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CONTENTS

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NOTAS SOBRE LA FLORA FANEROGAMICA DE NUEVA GALICIA, II

Servando Carvajal Hernández
Departamento de Pulpa y Papel
Centro Regional de Enseñanza Técnica Industrial
Apartado 6–725
Guadalajara, Jalisco
MEXICO

Desde la publicación de la primera parte de esta serie (PHYTOLOGIA 46(3): 145–153. 1980), un grupo de especímenes depositados en el Herbario del Centro Regional de Enseñanza Técnica Industrial de Guadalajara (CREG) y en el de la Universidad de Guadalajara (IBUG), ha llamado mi atención. Varios de ellos vienen a confirmar el hecho de que algunas zonas permanecen desconocidas y que requieren ser exploradas botanicamente. Otros más, sugieren la posibilidad de desaparecer de algunas áreas de Jalisco con el consecuente efecto en la comunidad vegetal en que se desarrollan.

Estas notas tienen por objeto, presentar algunos datos sobre especies que han sido escasamente recolectadas, por lo que su representación en los herbarios es pobre y que agregan al conocimiento de nuestra flora regional, información sobre su distribución en Nueva Galicia. Se proponen como elementos nuevos para la ciencia dos especies y una variedad.

Algunos de los duplicados de los taxa que se mencionan, han sido distribuídos a herbarios que se citan de acuerdo a las siglas registradas en el *Index Herbariorum* (Holmgren & Keuken, 1974).

El autor agradece el apoyo brindado por la Coordinación de Investigación y Desarrollo Tecnológico del CeRETI de Guadalajara; a la Profesora Luz María Villarreal de Puga, del Instituto de Botánica de la Universidad de Guadalajara por el préstamo de los ejemplares de herbario, sus ideas y críticas al mecanuscrito; a la Bióloga Luz María González Villarreal por su colaboración

en los trabajos de campo y en especial a Irma Rosalina Lomelí González por su ayuda y asistencia en el estudio de las **Euphorbiaceae** de Nueva Galicia.

CUPRESSACEAE

Juniperus monosperma var. *gracilis* Martínez, Anal. Inst. Biol. México, 17: 111–112. (1946).

Esta especie ha sido reportada como elemento común en pastizales y matorrales de *Acacia,* o matorrales de *Agave-Yucca-Opuntia* y *Juniperus* o bien, de bosques de pino; desarrollandose sobre suelos de piedra caliza, en las laderas de exposición Oeste de la Sierra Madre Oriental, en altitudes de 1050–2800 m. Zanoni y Adams (1979), citan a esta variedad para el Este de Coahuila, Sur de Nuevo León, Sureste de Tamaulipas, Noroeste de Queretaro y Norte de Hidalgo. Zanoni (1978), en su trabajo: "Los *Juniperus* de Jalisco", no incluyó ni a la especie ni a la variedad que se mencionan arriba. Aparentemente, este es el primer reporte para la región de Jalisco.

JALISCO: Parcela de Darillito, 10 km de Rancho Nuevo, municipio de Teocaltiche (102°33' W, 21°02' N); alt. 1700 m; 3 Jun 1979; *S. Carvajal H. 2033* (CREG, ENCB, IBUG). Matorral espinoso y bosque de *Juniperus con Acacia schaffneri, A. pennatula, A, farnesiana, Ipomoea stans, Dyssodia setifolia, Acalypha monostachya* y *Berlandiera.* Arbol de 6–7 m de alto y de 25–30 cm de D. A. P., común, corteza con estrías longitudinales, la mayoría de los árboles con conos femeninos maduros.

La madera de esta especie conocida como "cedro", es usada para la fabricación de artesanias y objetos decorativos. No se conoce otra forma de aprovechamiento.

FAGACEAE

Quercus emoryi Torrey, in Emory Notes Mil. Record 151. *pl. 9.* (1848).

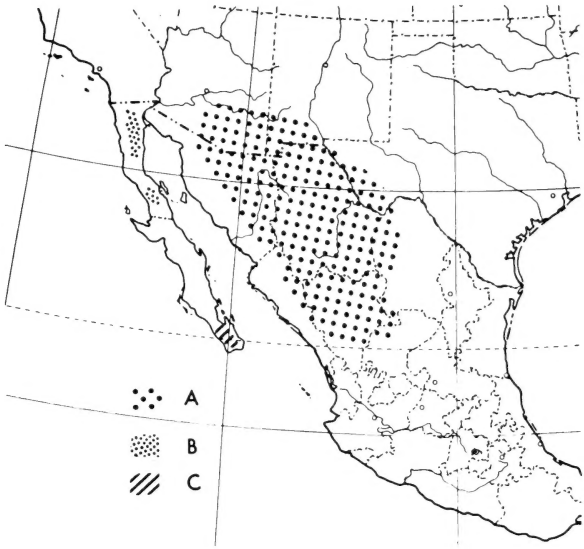

Fig. 1. La distribución de *Quercus emoryi* y especies derivadas: (A) *Q. emoryi;* (B) *Q. peninsularis* y (C) *Q. devia.*

Muller (1967), menciona que "hay un grupo natural de especies ampliamente distribuidas en el cuadrante Noroeste de la Región Austral de México (fig. 1). La principal especie es *Quercus emoryi* Torr., la cual se localiza del Sur de Arizona y del Big Bend de Texas, al Sur de Durango. En algunas porciones de esta área, *Q. emoryi* es simpátrico en el sentido más estricto con *Q. viminea* Trel. y *Q. eduardii* Trel., los que son miembros de la misma serie natural, pero rara vez se llegan a hibridizar con *Q. emoryi".* McVaugh (1974), citó para Nueva Galicia a *Q. viminea* y *Q. eduardii.* Este reporte parece ampliar el rango de distribución de *Quercus emoryi.**

JALISCO: Sierra de Cuale, entre Cuale y Talpa, municipio de Talpa

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* Agradezco al Dr. Cornelius H. Muller la identificación del ejemplar citado, así como los datos que aquí se proporcionan.

alt. 2450 m; 1 Feb 1976; *L. M. V. de Puga y J. de la Torre V. 8627* (IBUG); Bosque de *Pinus ayacahuite* var. *brachyptera* shaw y *Abies guatemalensis* var. *jaliscana* Martínez.

Este ejemplar había sido erroneamente identificado como *Quercus acutifolia* Née, que se encuentra en la misma localidad, pero las diferencias más notables entre ambos, son las mostradas en la siguiente tabla:

	Quercus emoryi	*Quercus acutifolia*
ramillas	2 mm de diámetro	1–2 (–3) mm de grueso
tamaño de la hoja	3–6 cm	8–12 cm
número de dientes	3–5 en cada lado	6–10 (–15) en cada lado
fruto	anual	bianual
pedúnculo	3 mm de largo	5–15 mm de largo
bellota	5 mm de diámetro	14–16 mm de diámetro

Quercus martinezii C. H. Muller, Anal. Inst. Biol. México. 24: 274 "1953" [24 Marz 1954].

Según McVaugh (1974), esta especie se distribuye en las montañas de la Vertiente del Pacífico y en la Sierra Volcánica Transversal, en Jalisco y Michoacán (Coalcomán, 25 km al Suroeste de Dos Aguas; *McVaugh 22855*). Ha sido una especie poco recolectada, por lo que los datos que a continuación se proporcionan, agregan información sobre su distribución en Nueva Galicia.

JALISCO: 9 km al Sur de El Rincón de Manantlán, municipio de Cuautitlán; alt. 2210 m; 19 Jun 1979; *L. M. González V. 1788, 1790* y *1792* (CREG, ENCB, IBUG, MEXU). Arbol de 25 m de altura, abundante. Al Sur de "Las Iglesias", Campamento de Investigación Forestal de la Universidad Autónoma de Chapingo, municipio de Ayutla; alt. 2080; 9 Feb 1980; *S. Carvajal H. & R. McVaugh 2696* (CREG, ENCB, IBUG, MEXU, MICH); Arbol de 20 m, frecuente, en algunas áreas formando masas puras. 8 km al Este de "Las Iglesias", municipio de Ayutla; alt. 2100 m; 9 Feb 1980; *S. Carvajal H. & R. McVaugh 2708* (CREG, ENCB, IBUG, MEXU, MICH); Arbol muy abundante.

MICHOACAN: 15 km al Sureste de Los Reyes (en el Rancho "La

Mesa''), municipio de Uruapan; alt. 2050 m; 3 abr 1980; *S. Carvajal H. 3036* (CREG, ENCB, IBUG); Arbol de 30 m de alto, hojas con lóbulos obtusos, azul-verdosas, en la ladera de un cerro, cercano a una huerta de *Persea*, no se observaron otros pinos o encinos.

EUPHORBIACEAE

El género *Euphorbia**, está considerado taxonómicamente, como uno de los más dificiles de las **Euphorbiaceae** y no es, sin algun temor el que nos aventuremos a describir una variedad y una especie nueva en este grupo. No obstante, tanto la especie como la variedad parecen ser morfológica y geográficamente diferentes a sus parientes más cercanos.

Euphorbia macvaughii Carvajal et Lomelí, sp. nov.

Frutex, 3.5–4 m altus; cortice exfoliante *Burserae* simile; foliis obovatis, integris, quorum obtuso, apice parva arista culminato, 2–3.5 longis et 8–10 mm latis, in verticillo dispositis; cyathia terminale per pares composita, raro in nodis solitaria; pedunculis glabris; involucro glabro, campanulato vel obconico, 3.5–4 mm per diametrum et 2–2.5 mm longo; lobulis triangularibus, fimbriatis; glandulis ellipticis, petaloideis, subcircularibus, rude dentatis, incisioneque plus minusve profunda in centro; floribus staminatis 15–24 per singulam cyathiam; androforis 0.7–0.9 mm longis; gynoforo incluso, rare exserto; ovario glabro; stylis bifidis usque ad dimidium 0.7–1.2 mm; capsula glabra, 5.6 mm longa, latiore in intermedia parte; seminis cinereis longe ovoideis, longitudinaliter lineatis dorsali parte, base truncata, 3.5–4.2 mm longa, cum foraminimus sparsis in totam superficiem.

Arbusto de 3.5–4 m de alto; tallos rojizos de 7–10 cm de diámetro; corteza exfoliante semejando *Bursera*; ramillas con estrías más o menos profundas, glabras, con nudos muy próximos; hojas en verticilos de (3–) 4, obovadas, enteras, con el ápice obtuso, rematando en una arista pequeña, base largamente atenuada, de 2–3.5 cm de longitud y de 0.8–1 cm de ancho; haz verde-

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* Agradecemos a la Dra. Graciela Calderón de Rzedowski, su amabilidad al proporcionarnos literatura relativa a este género.

oscuro en donde se aprecian de 4–5 nervaduras en cada lado, formando ángulos de 45° y que se anastomosan antes de llegar a los márgenes; envés verde-amarillento, ambas superficies glabras; peciolos de 1–1.5 cm de largo; ciatios terminales en grupos de 2, rara vez solitarios en los nudos; pedúnculo de 5 mm de largo, glabro; involucro glabro, campanulado u obcónico, de 3.5–4 mm de diámetro y de 2–2.5 mm de largo; lóbulos triangulares, fimbriados, excediendo un poco a las glándulas; glándulas estipitadas, elípticas, con apéndices petaloideos subcirculares, toscamente dentados y con una incisión más o menos profunda en la parte central, de 1–1.5 de largo; flores masculinas de 15–24 por ciatio; andróforos glabros, de 0.7–0.9 mm de largo; ginóforo glabro, redondeado en la parte inferior, en la superior con tres ángulos muy notorios; estilos bífidos hasta la mitad o menos, de 0.9–1.2 mm de largo; cápsula glabra, de 5–6 mm, más ancha en la parte central, ápice obtuso; semilla gris, largamente ovoidea, con una linea longitudinal en la parte dorsal, la base truncada, de 3.5–4.2 mm de largo, con hoyos dispersos en toda su superficie.

TIPO: en el Herbario del Centro Regional de Enseñanza Técnica Industrial de Guadalajara; 8 km de Juchitlán, por la carretera a Tecolotlán; alt. 1175 m; 22 Marz 1980; *S. Carvajal H. 2875.* ISOTIPOS (para ser distribuídos) en: B, BH, BM, CHAPA, ENCB, F, GH, IBUG, ILL, K, L, LIL, MEXU, MICH, MO, NA, P, TAES, TEX, UC, US, WIS, XAL.

Otros ejemplares examinados: 6 km de Tecolotlán, por la carretera a Juchitlán, municipio de Tecolotlán; alt. 1200 m; 24 Ene 1981; *S. Carvajal H. 3278, 3280, 3286* (CREG, ENCB, IBUG, MEXU, MICH).

Esta especie se incluye en la sección que Boissier (1862), denomina **Alectoroctonum** y que describe en los siguientes términos *"folia ternata vel verticillata; stipulae glanduliformes; cymae axillares vel terminales; glandulae appendiculatae; semen scrobiculatum, ecarunculatum; frutices Americani".* **Euphorbia macvaughii** Carvajal et Lomelí, parece estar estrechamente emparentada con **Euphorbia schlechtendalii** Boissier, pero difieren en las siguientes características:

	Euphorbia macvaughii	**Euphorbia schlechtandalii**
peciolos	1–1.5 cm de largo	2.5–3.7 cm de largo
hojas	obovadas	elípticas
ápice	obtuso	retuso

	Euphorbia macvaughii	**Euphorbia schlechtendalii**
nervaduras	4–5 en cada lado	8–12 en cada lado
glándulas	petaloideas, toscamente dentadas	petaloideas, enteras
andróforos	0.7–0.9 mm de largo	0.3–0.5 mm de largo
ginóforo	exerto, generalmente incluido	exerto, reflejado
ciatio	terminal en grupos de 2, a veces solitario en los nudos	terminal, en grupos de 4–12 (–15)
estilos	divididos en 1/2 de su longitud	divididos en 2/3 de su longitud
semillas	3.5–4.2 mm de largo	3–3.5 mm de largo
superficie	lisa, con hoyos	arrugada, con hoyos

Euphorbia macvaughii Carvajal et Lomelí, conocida sólo de la localidad tipo, se desarrolla en suelos más o menos arcillosos, en barrancas poco profundas y a las orillas de los arroyos de temporal; conviviendo con *Acacia pennatula, A. farnesiana, Bursera multijuga, B. bipinnata, Pithecellobium dulce, Zanthoxylon, Boerhaavia, Ruellia* y *Marina,* en lo que Rzedowski y McVaugh (1966), denominan: Bosque Tropical Deciduo; en altitudes de 1100–1400 m; florece de Febrero-Abril y es en Marzo cuando brotan las hojas. Por su corteza exfoliante en láminas delgadas, los campesinos de la región la han confundido con *Bursera* y la conocen vulgarmente con los nombres de: "papelillo", "sacuatle" y "tencuanete", pero la diferencían porque presenta látex.

La especie se denomina en honor a Rogers McVaugh (1909–), por sus destacadas contribuciones al conocimiento de la Flora de Nueva Galicia, en especial por su trabajo: **Euphorbiaceae Novae Novo-Galicianae.**

Euphorbia potosina var. ***lamasis*** Carvajal et Lomelí, var. nov.

Herba annualis, 40–50 cm alta, erecta, caulibus ramificatis a base eorum; foliis 20–28 mm longis, base obliqua, oribus integris parce serratis prope apicem; inflorescentiis densis coniunctis terminalibus, ad nodo caulis insertis; capsulis 1.8–2.2 longis, latioribus in intermedia parte; stylis 4 mm longis, seminibus 1–1.3 mm longis, cinereis vel cinereo-fuscis, rude ornatis tamquam apium favum.

Hierba anual de 30–40 cm de altura, erecta; tallos ramificados desde la base, glabros; hojas de 20–28 mm de largo, con la base oblícua, bordes enteros, escasamente aserrados cerca del ápice; inflorescencias densas, terminales y en los nudos de los tallos; cápsulas de 1.8–2 mm de largo, más anchas cerca de la mitad, estilos de 0.4 mm de longitud; semilla de 1–1.3 mm de largo, gris o gris-oscuro, toscamente ornamentada a manera de un "panal de abejas".

TIPO: en el Herbario del Centro Regional de Enseñanza Técnica Industrial de Guadalajara; 7 km al Norte de Los Reyes, Michoacán; alt. 1380 m; 19 Ago 1979; *S. Carvajal H. 2370.* HOLOTIPO: misma localidad; 2 Abr 1980; *S. Carvajal H. 2984*; para ser distribuidos en ENCB, F, GH, IBUG, ILL, K, MEXU, MICH, US, WIS, XAL.

Euphorbia potosina Fern. var. *potosina*, ha sido citada para el Noreste y Centro de la República Mexicana. Calderón (1980), considera al Valle de México, como el límite aparente de su distribución. *Euphorbia potosina* var. *lamasis* Carvajal et Lomelí, puede ser facilmente confundida con *E. glomerifera* (Millsp.) Wheeler, pero se diferencía de ésta última, en que las cápsulas son mayores, al igual que las semillas, en el color de éstas y en algunas características de su superficie.

La variedad se nomina en honor a Román Lamas Robles (1943–), por su decidido apoyo y gran interés en el conocimiento de la flora de Nueva Galicia.

SCROPHULARIACEAE

Sibthorpia pichinchensis H.B.K., Nov. Gen. et Sp. 2: 390. 1818.

Esta especie, a pesar de su relativa abundancia en los bosques de *Abies, Pinus* y *Quercus,* ha sido poco recolectada debido a que por tener flores muy pequeñas (2–3 mm de diámetro), en las axilas de las hojas, aparenta ser estéril; además su condición de rastrera, la hace inconspicua en relación con los otros elementos que se desarrollan en este tipo de vegetación. El ejemplar que se cita a continuación, parecer ser el primero depositado en los herbarios de Guadalajara.

JALISCO: Brecha entre el Campamento de la Universidad Autónoma

de Chapingo y el Rancho "El Platanito", municipio de Ayutla; alt. 2100–2020 m; 23 Mar 1980; *S. Carvajal H. 2959* (CREG, ENCB, IBUG, MEXU, MICH); hierba rastrera de flores rojizas, muy inconspicuas; frecuente.

COMPOSITAE

Senecio mexicanus McVaugh, Contr. Univ. Michigan Herb. 9(4): 473. 1972.

Recientemente descrita esta especie, McVaugh (1972), menciona haber examinado ejemplares procedentes de los estados de México, Michoacán y Guerrero. En Jalisco se ha localizado en los municipios de Tecalitlán (de donde procede el TIPO, *McVaugh & Koelz 1170*) y en el de Teocuitatlán de Corona. El espécimen que se cita a continuación, proviene de una área relativamente cercana a la ciudad de Guadalajara.

JALISCO: Puente Grande, en el Cerro de Santa Fe, municipio de Zapotlanejo; alt. 1600 m; 21 Oct 1972; *C. L. Díaz L. 3571* (CREG, MICH y en el Herbario de la Universidad Autónoma de Guadalajara); planta de 2 m de altura, frecuente.

Vernonia villaregalis Carvajal, sp. nov.

Frutex procerus arborescens 4–6 m altus; foliis lanceolatis 12–15 cm longis et 4–6 cm latis, apicem acuminato et base tenuata, facies pubescente et tergum dense cinereo-tomentoso; inflorescentiis densis glomerulis, terminalibus exeuntibus a foliorum axilliis, 32–47 capitulis per glomerulum; 6 floribus per capitulum, albis, involucrum cylindro-campalunatum 4–5 mm longum, multo longius quam latius; phyllariis externis oblongis et internis ovatis, dispositis in 3 vel 4 seriatibus, prope viginti numero, facile separata et sub anthesi etiam cadentia; corolla 6 mm longa, tubo cylindrico 3–4.5 mm longo, 0.1–0.17 mm crasso; antherae 1.5–2.5 mm longae, appendicibus acutis 0.1 mm longis; styli ramuli 1.5 mm longi, pappi setae principales lutescentes 37–48, barbellatae, 4–6 mm longae, exteriores setiformes 1.5–2 mm longae; achaenia clavato-columnaria 2 mm longa, costis 3 vel 4 parum prominentibus, qua de causa achaenium tamquam levigatum viditur, pilis serieceis pallidis appressis dense obsita; receptaculum glabrum, achaenii cicatrice elevata.

Arbusto arborescente de 4–6 m de alto, el tallo con un diámetro de 5–15 cm, corteza con grietas longitudinales; ramillas puberulentas o densamente tomentosas, sobre todo en las partes cercanas a las inflorescencias; hojas lanceoladas de 12–15 cm de longitud y de 4–6 cm de ancho, con el ápice acuminado, la base atenuada y los márgenes oscuramente dentados, ondulados y cartilaginosos, rígidas, de apariencia coriacea, el haz de color verde oscuro, puberulento, el envés densamente cubierto de pelos muy largos y deciduos que impiden observar la superficie, la nervadura principal y las primarias muy prominentes, las secundarias forman una red más o menos tosca, pero perfectamente visible a simple vista, la epidermis inferior de color verde-azuloso; peciolos cortos, de 2–9 mm de longitud, puberulentos, en la axila con una yema ovoidea densamente cubierta de pelos cortos, o con mechones de pelos largos cuando la yema ausente; inflorescencias en densos glomérulos terminales que salen de las axilas de las hojas, de 32 a 47 capítulos por glomérulo; pedicelos cortos de 1.5 mm o menos de tal manera que los capítulos parecen sésiles; capítulos de 6 flores, de 7–8 mm de longitud (incluyendo las flores), involucro cilíndrico-campanulado de 4–5 mm de largo, más largo que ancho, brácteas internas oblongas, de 4–5 mm de longitud, generalmente más anchas en la mitad; brácteas externas, ovadas, hasta parecer casi triangulares, dispuestas en 3–4 series, cerca de 20, de color glauco-verdoso, el ápice de la bráctea manchado de verde oscuro, puberulentas, no ciliadas, persistentes, aunque en muchos casos se observaron deciduas a la madurez del aquenio; flores de 6 mm de largo, blancas, el tubo de 3–4.5 mm de longitud y de 0.8–1 mm de ancho, piloso, las paredes de 0.1–0.17 mm de grueso, lóbulos de la corola agudos, de1.5–2 mm de longitud, estilo de 7 mm, ramificado, típico de la tribu, anteras de 1.5–2.5 mm de largo y de 0.1–0.3 mm de ancho, la base aguda de 0.1 mm; aquenio con la forma de una punta de clavo, de 2 mm de largo, costillas de 3–4, poco prominentes hasta parecer casi liso, castaño, cubierto de pelos sericeos, pálidos, muy juntos unos de otros; vilano setoso de 4–6 mm de largo, amarillentos, de 37–48, barbelados, los más exteriores de 1.5–2 mm de largo; receptáculo glabro, las cicatrices dejadas por los aquenios elevadas, conspicuas.

TIPO: en el Herbario del Centro Regional de Enseñanza Técnica Industrial de Guadalajara; 6 km de Tecolotlán por la carretera a Juchitlán, municipio de Tecolotlán; alt. 1175 m; 24 Ene 1981; *S. Carvajal H. 3296.* ISOTIPOS: para ser distribuidos en B, BH, BM, CHAPA, ENCB, F, GH, IBUG, ILL, K, L, LIL, MEXU, MICH, MO, NA, P, TAES, TEX, UC, US, WIS y XAL.

Otros ejemplares examinados: áreas cercanas a la localidad tipo; *S. Carvajal H. 2876* (22 Mar 1979), muestras con aquenios maduros. Misma localidad; 24 Ene 1981; *S. Carvajal H. 3279, 3289* y *3294.*

Esta especie se incluiría en el género que Gleason (1922), trató como *Eremosis*, por el reducido número de flores por capítulo, pero las brácteas se observaron sólo en unos casos deciduas a la madurez del aquenio. *Vernonia villaregalis* Carvajal, parece estar estrechamente emparentada con *Vernonia leiocarpa* DC. [*Eremosis leiocarpa* (DC.) Gleason], que se localiza al Sur de la República Mexicana y en Guatemala, sin embargo difieren en las siguientes características:

	Vernonia villaregalis	*Vernonia leiocarpa*
peciolos	2–9 mm de largo	15 mm de largo
flores	6 por capítulo	3 por capítulo
aquenio	cubierto de pelos	glabro
vilano	4–6 mm de largo	6–8 mm de largo

La especie se describe en honor a Luz María Villarreal de Puga (1913–), de la Escuela de Agricultura de la Universidad de Guadalajara, por el impulso que ha dado a la taxonomía vegetal y por su grandes conocimientos de la flora de Nueva Galicia.

Vernonia salicifolia var. *baadii* McVaugh, Contr. Univ. Michigan Herb. 9(4): 484. 1972.

Carvajal (1980), reportó para esta variedad, una nueva localidad situada en la parte central de Nueva Galicia, pero omitió referirse al hecho de que esta planta se encuentra el peligro de desaparecer de esa localidad. La primera vez que fue colectada (27 Feb 1977; *L.M.V. de Puga 10027),* se observaron aproximadamente 12 arbustos. En la segunda ocasión (28 Feb 1978; *S. Carvajal H. 915*), el número había disminuido a 5. En fecha reciente (1 Mar 1981; *S. Carvajal H. 3304a*), se localizaron sólo 2 ejemplares, no obstante haberse recorrido el área en una gran extensión. La vegetación natural en su mayor parte ha sido talada y sustituida por cultivos temporales de maíz (de los llamados coamiles). Según los comentarios de los habitantes de la región, esta planta es muy visitada por la abejas y de ella se obtiene una miel de alta calidad.

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INDICE DE EXSICCATA

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Carvajal H., S. & R. McVaugh. 2696, 2708.

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González V., L. M. 1788, 1790, 1792.

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MISCELLANEOUS NEW SPECIES AND COMBINATIONS IN THE PLEUROTHALLIDINAE (ORCHIDACEAE)

*Carlyle A. Luer**

Octomeria callosa Luer, sp. nov.

Planta mediocris caespitosa, foliis crassis anguste lineari-ellipticis caulibus secundariis plus minusve aequilongis, floribus parvis roseis fasciculatis successivis brevipedunculatis, sepalis petalisque similibus ellipticis obtusis, labello ovato obtuso incrassato callo bifurcato magno.

Plant medium-sized, epiphytic, caespitose; roots slender, flexuous. Secondary stems slender, horizontal to erect, 4-10 cm long, enclosed by 4-5 ribbed, imbricating, tubular sheaths, often shredded. Leaf erect, thickly coriaceous, linear-elliptical, 4.5-8.5 cm long including a 5-8 mm long petiole, 10-12 mm wide (much narrower dried), the acute apex apiculate, the base narrowly cuneate into the petiole. Inflorescence a succession of small, purple-appearing, solitary flowers produced from a dense fascicle of old peduncles near the apex of the secondary stem; peduncles ca. 1 mm long; floral bract 2 mm long; pedicel 1.5 mm long; ovary 1.5 mm long; sepals and petals glabrous, translucent rose, suffused with darker rose, free, elliptical, obtuse, nearly equal in size and shape, the lateral sepals lightly falcate, the dorsal sepal 3 mm long, 1.75 mm wide, the lateral sepals 3 mm long, 1.6 mm wide, the petals 2.5 mm long, 1.5 mm wide; lip dull yellow suffused with rose, thick, ovate, 2.25 mm long, 1.5 mm wide, the apex rounded, the disc with a large, erect, bilamellate callus united toward the base, the base of the lip truncate, firmly united to the obsolescent column-foot; column white, semiterete, 1.25 mm long.

Etymology: From the Latin *callosus*, "with callus," referring to the prominent callus of the lip.

Type: *ECUADOR*: Loja: epiphytic in cloud forest south of Yangana, alt. 2450 m, 12 May 1981, *C. Luer, J. Luer, J. Kuhn, L. Kuhn & D'Alessandro 6189* (Holotype: SEL).

Distribution: Southeastern Ecuador.

This species is most remarkable in the proportionately large, thick lip with a tall, prominent, forked callus occupying most of the disc, Similar to some species in other genera of the pleurothallids, the lip is firmly attached to the base of the column.

Platystele aculeata Luer, sp. nov.

Planta parva caespitosa, racemo successivifloro filiformi flexuoso folia longipetiolata superanti, sepalis petalisque glabris translucidis attenuatis aculeatis, labello brunneo oblongo apice attenuato hamato aculeato.

Plant small, epiphytic, caespitose; roots comparatively coarse, flexuous. Secondary stems unifoliate, 5-8 mm long, enclosed by 2-3 thin, white, loose, tubular, ribbed sheaths. Leaf coriaceous, elliptical, long-petiolate, 12-20 mm long including the 5-10 mm long petiole, 4-5 mm wide, the apex obtuse, tridenticulate, cuneate below into the slender petiole. Inflorescence a progressively lengthening, flexuous raceme up to 13 cm long including the filiform peduncle, bearing up to 25 successive flowers, 1-2 simultaneously, from a node on the secondary stem; floral bract 0.75 mm long; pedicel 3-3.5 mm long; ovary 0.5 mm long; sepals and petals glabrous, translucent light tan, the dorsal sepal narrowly ovate, attenuate, acute, 6 mm long, 1 mm wide, the lateral sepals similar, slightly oblique, 6 mm long, 1.1 mm wide; petals narrowly ovate, 5 mm long, 0.5 mm wide, filiform from 1 mm above the base;

* The Marie Selby Botanical Gardens, 800 South Palm Avenue, Sarasota, Florida, 33577, U.S.A.

lip brown, cellular, oblong, 4.5 mm long, 0.75 mm wide, the apex attenuate, incurved, the base truncate, reflexed to the rigid attachment to the column-foot, the glenion superficial; column nearly 1 mm long, broadly hooded, the foot short, thick.

ETYMOLOGY: From the Latin *aculeatus*, "sharp-pointed," referring to the apices of the flower parts.

TYPE: *ECUADOR*: NAPO: epiphytic in cloud forest southeast of El Carmelo, alt. 2050 m, 17 May 1981, *C. Luer, J. Luer, J. Kuhn, L. Kuhn & A. Hirtz 6303* (HOLOTYPE: SEL).

DISTRIBUTION: Northern Ecuador.

This little species, discovered by Alex Hirtz, may be distinguished from the other members of the genus by the long-attenuate, glabrous sepals and petals and an oblong, microscopically cellular, brown lip with an attentuate, hook-like apex.

Platystele culex Luer & Escobar, sp. nov.

Planta minuta caespitosa, racemo capillari paucifloro folia anguste obovata tripli-superanti, floribus successivis roseis, sepalis petalisque tenuibus angustissime ovatis acuminatis, petalis breviter ciliatis, labello ovato anguste attenuatis.

Plant very small, epiphytic, caespitose. roots comparatively large, fleshy, flexuous. Secondary stem unifoliate, abbreviated, 1-2 mm long, enclosed by 1-2 loose, tubular sheaths. Leaf erect, coriaceous, narrowly obovate, 5-12 mm long, 2-3 mm wide, the apex subacute, tridenticulate, gradually narrowed below to the slender base. Inflorescence a successively several-flowered raceme of up to 8 delicate flowers, up to 3 cm long including the capillary peduncle, from a node on the secondary stem; floral bract 0.5 mm long; pedicel 3.5 mm long; ovary 0.5 mm long; sepals and petals translucent pale rose, free, wide-spread, very narrowly ovate, acuminate, acute, the dorsal sepal 6 mm long, 0.5 mm wide, the lateral sepals 6 mm long, 1 mm wide, sparsely ciliate, the petals 4 mm long, 0.3 mm wide, minutely ciliate; lip rose in the basal third with glandular cells, the remainder translucent white, ovate, 3 mm long, 0.6 mm wide, the distal two-thirds attenuated, acute, angled upward in the distal third, the base subcordate with a minute glenion; column hooded, 0.5 mm long, 1 mm wide.

ETYMOLOGY: From the Latin *culex*, "a mosquito," in allusion to the appearance of the flower.

TYPE: *COLOMBIA*: without locality, cultivated at La Ceja, Columbia, by M. & O. Robledo, flowered in cult. 23 Jan. 1978, *C. Luer 2313* (HOLOTYPE: SEL).

DISTRIBUTION: Colombia.

This minute species is related to *P. lancilabris* (Rchb. f.) Schltr., but *P. culex* may be distinguished by the narrower flower parts and a very narrow, long-attenuate apex of the lip.

Platystele gemmula Luer, sp. nov.

Herba perpusilla caespitosa, foliis obovatis rotundatis pedunculo bifloro aequilongis, flore pro planta grandi, sepalis petalisque roseo suffusis, ovatis acuminatis ciliatis trichomatibus capitatis, labello parvo atropurpureo ovato acuto.

Plant very small, epiphytic, caespitose; roots comparatively coarse, flexuous. Secondary stems abbreviated, unifoliate, 1.5-2 mm long, enclosed by 1-2 loose, tubular sheaths. Leaf erect, coriaceous, obovate, shortly petiolate,

6-9 mm long including the 1-2 mm long petiole, 3-5 mm wide, the rounded apex notched with an apiculum in the sinus, cuneate below to the base. Inflorescence a successively 2-flowered raceme borne by a filiform peduncle 8-9 mm long, from a node on the secondary stem; floral bract 1 mm long; pedicel 2.5 mm long; ovary 0.5 mm long; sepals and petals free, wide-spread, translucent pale yellowish, suffused with purple centrally, ovate, acuminate, acute, subcarinate, minutely ciliate with capitate hairs, the dorsal sepal 5-6 mm long, 1.5-2 mm wide, the lateral sepals 5-6.5 mm long, 2 mm wide, oblique, more abruptly acuminate, shortly caudate, the petals 3.5-4 mm long, 1.5 mm wide; lip maroon, ovate, acute, 1.3 mm long, 0.75 mm wide, the base truncate with a small glenion; column hooded, 0.25 mm long, 0.9 mm wide.

Etymology : From the Latin *gemmula*, "a little gem," in allusion to qualities of the flower.

Type: *COLOMBIA*: Narino: epiphytic in cloud forest above Ricaurte, alt. ca. 1600 m, discovered by A. Hirtz, 3 Nov. 1979, *C. Luer, J. Luer, K. Walter & A. Hirtz 4581* (Holotype : SEL).

Distribution : Southern Colombia.

Compared to the small habit, the flower of this species is notable for its large size. It is borne by a two-flowered peduncle about as long as the little, obovate leaves. The rose-suffused sepals and petals are acuminate and ciliate with minute, capitate hairs. The dark purple lip is very small, ovate and acute.

Platystele jesupiorum Luer, sp. nov.

Planta parva caespitosa, racemo capillari debili multifloro foliis longipetiolatis multilongiore, floribus parvis successivis, sepalis petalisque roseo suffusis ovatis acuminatis ciliatis, labello atropurpureo ovato apice uncinato.

Plant small, epiphytic, caespitose. roots slender, flexuous. Secondary stems unifoliate, slender, 8-15 mm long, enclosed by 1-2 loose, tubular sheaths. Leaf erect, coriaceous, elliptical, long-petiolate, 15-45 mm long including the 8-20 mm long petiole, 7-8 mm wide, the subacute apex tridenticulate, cuneate below into the petiole. Inflorescence a continually lengthening, weak, flexible, capillary raceme to 15 cm long, bearing up to 40 small, successive flowers, 1-3 simultaneously, from a node on the secondary stem; floral bract 1 mm long; pedicel 2 mm long; ovary 0.5 mm long; sepals and petals free, widely spread, translucent pale green, suffused with rose, ovate, acuminate, acute, subcarinate, ciliate, the dorsal sepal 3.5 mm long, 1 mm wide, the lateral sepals 3 mm long, 1 mm wide, the petals more narrowly ovate, acuminate, 3 mm long, 0.6 mm wide; lip maroon, the surface glandular-cellular, ovate, 1.75 mm long, 0.75 mm wide, the apex acute, incurved, the base truncate with a small glenion; column hooded, 0.25 mm long, 0.5 mm wide.

Etymology : Named in honor of Ann and Phillips Jesup of Bristol, Connecticut, who have successfully cultivated this species.

Type: *ECUADOR*: without locality, imported from J. Strobel by P. Jesup, cultivated in Bristol, Ct., flowered in cult. 20 Nov. 1977, *C. Luer 2235* (Holotype : SEL).

Distribution : Ecuador, probably southern.

This species may be recognized by the long-petiolate leaves and continually lengthening, hair-like racemes of minute, successive, rosy flowers. The sepals and petals are acuminate and ciliate, and the acute apex of the maroon lip is turned upward like a hook.

Platystele reflexa Luer, sp. nov.

Species haec *P. stenostachyae* (Rchb. f.) Garay affinis sed statura et floribus majoribus, sepalis lateralibus petalisque reflexis et clinandrio denticulato dignoscenda.

Plant relatively large for the genus, epiphytic, caespitose; roots slender, flexuous. Secondary stems slender, erect, unifoliate, 1-4 cm long, enclosed by 2 thin, ribbed, tubular sheaths. Leaf erect, coriaceous, oblong-elliptical, petiolate, 2-5 cm long including the 0.5-1.5 cm long petiole, 7-13 mm wide, the apex obtuse, tridenticulate, the base cuneate into the petiole. Inflorescence a short, suberect, contracted raceme of successive, orange flowers, 1-2 borne simultaneously, up to 2 cm long including the peduncle ca. 1 cm long, from a 5 mm long, fugacious spathe near the apex of the secondary stem; floral bract thin, 1 mm long; pedicel 2 mm long; ovary triquetrous, 1 mm long; sepals free, ovate, acute, the dorsal sepal 2.25 mm long, 1.25 mm wide, the laterals reflexed, slightly oblique, 2 mm long, 0.9 mm wide; petals narrowly ovate, slightly oblique, reflexed, 1.75 mm long, 0.5 mm wide; lip elliptical-oblong, 1.75 mm long, 0.9 mm wide, covered by capitate cells, the apex round, the base round to truncate with a small but well-developed glenion; column stout, broadly hooded, the wings denticulate, 0.75 mm long, 0.75 mm wide, with a short, broad foot.

Etymology: From the Latin *reflexus*, "reflexed," referring to the reflexed sepals and petals.

Type: *ECUADOR*: MORONA-SANTIAGO: epiphytic in rain forest near the Río Calagras, alt. 1600 m, 19 Sept. 1980, cult. at SEL 80-1450, flowered in cult. 1 Dec. 1980, *C. Luer, J. Luer, A. Andreetta et al. 5601* (Holotype: SEL).

Distribution: Southeastern Ecuador.

Although vegetatively some plants of *P. stenostachya* equal some of those of *P. reflexa* in size, the leaves of the latter are broader. Florally the two species are basically very similar, but the flowers of *P. reflexa* are considerably larger, not as "microscopic" as those of *P. stenostachya*. The sepals and petals of *P. reflexa* are swept back parallel to the ovary. *Platystele stenostachya* occurs in coastal Ecuador.

Pleurothallis adeleae Luer, sp. nov.

Planta robusta grandis terrestris, caulibus secundariis altis quam foliis ellipticis rigidis longioribus, floribus magnis successivis solitariis pendulis longipedicellatis, sepalis atropurpureis extus nitentibus dorsali ovato synsepalo late cordato concavo, petalis triangularibus acutis, labello niveo transverse ovato apiculato.

Plant large, robust, terrestrial, caespitose; roots coarse, flexuous. Secondary stems erect, robust, unifoliate, 25-45 cm long, with a close tubular sheath below the middle and 1-2 others at the base. Leaf glossy green, erect, rigidly coriaceous, oblong-elliptical, 12-18 cm long, 3.5-7 cm wide, the apex shortly acuminate, acute, tridenticulate, the base sessile, cordate, the basal lobes extending ca. 1 cm behind the junction with the secondary stem. Inflorescence a dense fascicle of 1-flowered peduncles, 1-5 large, pendent flowers produced simultaneously, from a reclining spathe 2-2.5 cm long from the base of the leaf, the peduncles 5-10 mm long, enclosed within the spathe; floral bracts ca. 5 mm long; pedicels arcuate, flaccid, minutely verrucose, 3 cm long; ovary verrucose, 5 mm long; sepals shiny bright dark purple, fleshy, the margins microscopically cellular erose, the surface within cellular papillose, the dorsal sepal ovate, acute, 17-23 mm long, 12-15 mm wide, 13-veined, the lateral sepals connate into a broadly cordate, concave, obtusely acuminate

synsepal 12-16 mm long, 16-20 mm wide unspread, 16-veined; petals purple above the middle, white below the middle, triangular, acute, oblique at the base, 8 mm long, 3.25 mm wide; lip white, transversely ovate, 3 mm long, 4.75 mm wide, the transverse apex shortly apiculate, the disc with a gradual, rounded, central callus, microscopically cellular papillose, the margins cellular erose; column stout, 1 mm long, 3 mm wide, footless.

Etymology: Named in honor of Adele D'Alessandro who first discovered this species.

Type: *ECUADOR*: LOJA: terrestrial on wet grassy slopes south of Yangana, alt. 2250 m, 11 May 1981, *C. Luer, J. Kuhn, L. Kuhn, and D. D'Alessandro 6148* (Holotype: SEL).

Distribution: Southern Ecuador.

This magnificent species, allied to *P. ruberrima* Lindl., grows terrestrially in full exposure on wet, north-facing, grassy slopes. The large, showy flowers dangle in clusters below the lower margins of the glossy, lance-like blades.

Pleurothallis asperrima Luer, sp. nov.

Herba *P. tubatae* (Lodd.) Steud. affinis sed partibus libris sepalorum asperrimis et labello alte bicristato apice acuto integro laevique differt.

Plant medium in size, epiphytic, densely caespitose; roots slender, flexuous. Secondary stems erect, unifoliate, occasionally prolific, 3-9 cm long, with a close, brown, tubular sheath from below the middle and another sheath at the base. Leaf erect, smooth, coriaceous, oblong-elliptical, 3.5-7.5 cm long including a 0.5-1 cm long petiole, 1.6-2.8 cm wide, the apex obtuse to rounded, minutely apiculate in an apical sinus, the base cuneate into the petiole. Inflorescence a solitary, erect, several-flowered, secund raceme to 15 cm long including the slender peduncle, from near the apex of the secondary stem; floral bract and pedicel each 3-4 mm long; ovary 2 mm long; sepals connate to near the middle to form a white, cylindrical, sepaline tube below the middle, the free parts reflexed, bright orange, densely short-spiculate within, otherwise glabrous, the dorsal sepal linear, obtuse, 10 mm long, 2 mm wide, connate to the lateral sepals for 5 mm, the lateral sepals similar to the dorsal sepal, connate to each other for 3.5 mm; petals white, oblong, obtuse, 3.5 mm long, 1.5 mm wide; lip white, oblong, arcuate, 4 mm long, 1.25 mm wide unspread, with tall, erect, obtuse lateral lobes near the middle extending forward onto the middle lobe as erose, marginal carinae, the apex acute, entire, smooth, the base narrowly truncate, hinged to the column-foot; column white with purple spots, semiterete, 2.5 mm long with an equally long foot.

ETYMOLOGY: From the Latin *asperrimus*, "very densely covered with short, stiff hairs," in reference to the inner surfaces of the free part of the sepals.

TYPE: *BOLIVIA*: AZUAY: Santa Isabella, alt. 1500 m, A. Hirtz s.n., cultivated at SEL, flowered in cult. 19 March 1979, *C. Luer 4039* (HOLOTYPE: SEL). SEL).

DISTRIBUTION: Ecuador.

This species is closely related to the relatively frequent and variable Central American species commonly known as *Physosiphon tubatus* (Lodd.) Lindl., but the former may be readily distinguished by the densely spiculate internal surfaces of the sepals and the smooth anterior lobe of the lip.

Pleurothallis colothrix Luer, sp. nov.

Planta mediocris repens, caulibus secundariis ascendentibus foliis angustissime ovatis subaequilongis vaginis pubescentibus, floribus fasciculatis solitariis brevipedunculatis, sepalis extus ovario bracteisque breviter pubescentibus, sepalis translucidis alboflavescentibus anguste ovatis obtusis, petalis apice attenuatis sepalis subaequilongis, labello subpandurato apice rotundato disco cum callo basali rotundato.

Plant medium-sized, epiphytic, repent, the rhizome stout, 30 or more cm long, 0.5-1 cm between secondary stems, enclosed by densely pubescent sheaths. Secondary stems ascending, slender, unifoliate, 6-11 cm long, concealed by 4-5 close, tubular, imbricating sheaths with transversely arranged, digitated, scaly trichomes. Leaf erect, coriaceous, narrowly ovate, acute, 10-13 cm long, 1-1.5 cm wide, the base cuneate into a short, indistinct, conduplicate petiole. Inflorescence a fascicle of a few, single flowers borne from a congested aggregation of buds near the apex of the secondary stem, covered by 2-3 pubescent bracts 1 mm long; peduncles 2-3 mm long, pubescent; floral bract and pedicel each 2-4 mm long, pubescent; ovary 1.5 mm long, sparsely covered by short, red spicules; sepals translucent yellow-white, sparsely short-pubescent externally, free, the dorsal sepal linear-ovate, obtuse, 10 mm long, 2.25 mm wide, the lateral sepals similar to the dorsal sepal, slightly oblique, 9.5 mm long, 1.75 mm wide; petals translucent yellow-white, ovate near the base, entire, 9 mm long, 1.5 mm wide, the apex long-attenuate, acute, slightly thickened with revolute margins; lip yellow-white, oblong-subpandurate, 2.5 mm long, 1.25 mm wide, slightly narrowed above the middle, the apex rounded, recurved, with thin, erect, obtuse, marginal angles below the middle, the disc with a thick, rounded callus from the base to near the middle where the sides of the callus become a small pair of parallel carinae lightly colored with purple, the membraneous base hinged to the column-foot; column greenish white, stout, 2 mm long, broadly winged with a pair of short, obtuse, apical teeth, with a concave foot 1 mm long.

ETYMOLOGY : From the Greek *kolos* (κολος), "shortened," and *-thrix* (*-θριξ*), "haired," referring to the short pubescence of the sheaths, bracts, ovary and sepals.

TYPE : *ECUADOR*: MORONA- SANTIAGO : epiphytic in cloud forest east of Paute, alt. 1700 m, 10 July 1977, cultivated at SEL, 77-2694, flowered in cult. 26 March 1981, *C. Luer, J. Luer, G. Luer & A. Andreetta 5991* (HOLOTYPE : SEL).

DISTRIBUTION : Southeastern Ecuador.

This medium-sized relative of *P. affinis* Lindl. is repent, reminiscent of *P. trachychlamys* Schltr., but considerably larger. The flowers are also very similar to those of *P. affinis*, but the lip has a basal callus similar to that of *P. trachychlamys*, but without the lateral lobes.

Pleurothallis cubitoria Luer, sp. nov.

Planta mediocris grandisve, foliis anguste ovatis acutis caulibus secundariis gracilibus brevioribus, flore pallide flavovirescenti grandi solitarii brevipedunculato super folium cubanti, sepalo dorsali longissime attenuato, synsepalo angustissime lineari-ovato, petalis filiformibus folium amplectentibus, labello anguste ligulato.

Plant medium-sized to large, epiphytic, caespitose; roots slender, flexuous. Secondary stems slender, suberect to horizontal, unifoliate, 16-20 cm long, with a close, tubular sheath below the middle and another 1-2 at the base. Leaf spreading, coriaceous, narrowly ovate, 11-15 cm long, 2.3-2.7 cm wide, gradually narrowed to the acute, tridenticulate apex, the base rounded to

shallowly cordate. Inflorescence a large, solitary flower adpressed to the surface of the leaf, produced successively from a 10-12 mm long, fugacious spathe at the base of the leaf; peduncle 3-4 mm long; floral bract 4-5 mm long; pedicel 7 mm long; ovary 4 mm long, yellow-white; sepals pale yellow-green, spreading 180°, the dorsal sepal ovate at the base, the apex long-acuminate, attenuate, 40 mm long, 3.5 mm wide, the lateral sepals united into a very narrowly ovate synsepal 38 mm long, 5 mm wide, the acute apex minutely bifid; petals filiform, 13 mm long, less than 1 mm wide, spreading, with the apices reflexed around the margins of the leaf, the base minutely biauriculate; lip yellow, narrowly oblong-ligulate, minutely verrucose, 8.5 mm long, 3 mm wide, the obtuse apex microscopically denticulate, the glenion well-developed, the truncate base concave on the end, hinged to the base of the column; column stout, 1.5 mm long, 1.5 mm wide, the foot obsolescent.

Etymology: From the Latin *cubitorius*, "of a lying posture" (*cubare*, "to lie"), referring to the unique posture of the flower suggesting a snooze in a chaise longue.

Type: *ECUADOR*: Zamora-Chinchipe: epiphytic in forest near Valladolid, alt. ca. 2600 m, July, 1975, Walter Teague s.n., cultivated in San Francisco, Calif., flowered in cult. Aug. 1979, *C. Luer 4110* (Holotype: SEL).

Distribution: Southern Ecuador.

The flower of this species lies flat upon the leaf and differs from that of *P. stenosepala* Rolfe in the filiform dorsal sepal, narrower synsepal, and filiform petals that clasp the leaf behind — as if trying to hold on.

Pleurothallis demissa Luer & Vásquez, sp. nov.

Inter species *P. antenniferae* Lindl. affines species haec caulibus secundariis gracillimis folio anguste elliptico acuminato longioribus, racemo longissimo flaccido demisso multifloro, floribus nonresupinatis, sepalo impari synsepaloque ovatis acutis concavis, petalis linearibus acutis et labello late triangulari angulis basalibus rotundatis distinguitur.

Plant medium in size, epiphytic to terrestrial, caespitose to shortly repent; roots fasciculate, slender, flexuous. Secondary stems erect to ascending or arching, very slender, unifoliate, 18-33 cm long, with a close, tubular sheath near the middle and another 1-2 sheaths at the base. Leaf suberect to spreading, more or less horizontal, thinly coriaceous, narrowly elliptical, 10-23 cm long, 1.5-3.8 cm wide, the apex acuminate, acute, tridenticulate, the base cuneate, sessile. Inflorescence racemose, 1-2 slender, flaccid, pendent, subdensely many-flowered, secund racemes of non-resupinate flowers, to 25 cm long including the filiform peduncle, from a spathe 1-1.5 cm long at the base of the leaf; floral bract 3-5 mm long, tubular; pedicel 3-4 mm long; ovary 3 mm long; sepals and petals transparent rose, glabrous, the middle sepal ovate, acute, concave, 5.5-6.5 mm long, 3 mm wide, the lateral sepals connate into an ovate, acute, concave synsepal 5-6.5 mm long, 3.5 mm wide; petals linear, acute, 5.5-6 mm long, 0.5 mm wide, thickened toward the apex; lip light green, transversely triangular, 1.75 mm long, 4 mm wide expanded, the basal angles rounded, the apex shortly acuminate, obtusely acute and incurved, the broad base hinged to the base of the column; column stout, 1.5 mm long, the foot obsolescent.

Etymology: From the Latin *demissus*, "drooping, weak," referring to the habit of the inflorescence.

Type: *BOLIVIA*: La Paz: Prov. of Nor Yungas, terrestrial on steep wet road embankment, alt. 2450 m, southwest of Coroico, 4 Feb. 1980, *C. Luer, J. Luer, R. Vasquez & R. Lara 5108* (Holotype: SEL).

Additional material examined: *BOLIVIA*: Cochabamba: Prov. of Chapare, epiphytic in cloud forest along the road to Tablas, alt. 2600 m, *C. Luer, J. Luer, & R. Vasquez 5183* (SEL).

Distribution: Bolivia.

This species is easily distinguished from *P. antennifera* and its allies by the long, slender secondary stems, the long, narrow leaf, and the long, drooping flaccid raceme. The flowers are "properly rotated," but due to the fact that the raceme is pendent, the lip again regains its uppermost position in the flower.

Pleurothallis diminuta Luer, sp. nov.

Planta *P. brenneri* Luer affinis sed habitu floribusque minore, pedunculo unifloro et sepalis glabris distinguitur.

Plant small, epiphytic, caespitose; roots slender, flexuous. Secondary stems slender, unifoliate, 1.5-2.5 cm long, enclosed by a ribbed, tubular sheath from the lower third and with another sheath at the base. Leaf dark green, purple beneath, suberect, coriaceous, elliptical, 12-25 mm long including the 4-6 mm long petiole, 6-9 mm wide, the obtuse apex minutely emarginate, the base cuneate into the petiole. Inflorescence a fascicle of 1-flowered, 5 mm long peduncles produced intermittently, from a spathe 3 mm long at the apex of the stem; floral bract 1-1.5 mm long; pedicel 1.5 mm long; ovary glabrous, 2 mm long; dorsal sepal dull tan, spotted with purple, oblong, obtuse, 6 mm long, 2.5 mm wide; lateral sepals dull tan, glabrous within, reflexed, connate to above the middle into an obovate, bifid lamina 6 mm long, 3.25 mm wide together, the apices subacute; petals translucent yellow with a purple midvein, oblong-obovate, 3.25 mm long, 1.5 mm wide, the apex rounded; lip purple, arcuate, the lamina oblong with subacute basal angles, 2.5 mm long, 1.2 mm wide, with a pair of intramarginal carinae, the apex rounded, the narrow claw 1 mm long; column green, semiterete, 2 mm long, with a foot equally long.

Etymology: From the Latin *diminutus*, "made small," referring to the small stature of the species.

Type: *ECUADOR*: LOJA: epiphytic in cloud forest south of Yangana, alt. 2450 m, 12 May 1981, *C. Luer, J. Luer, J. Kuhn, L. Kuhn & D. D'Alessandro 6195* (Holotype: SEL).

Distribution: Southern Ecuador.

When the first plant of the little species was found, it was believed to be a depauperate specimen of *P. brenneri*, but the discovery of other plants in the population indicated that that was not the case. *Pleurothallis diminuta* may be distinguished by the smaller habit and short, single-flowered peduncles bearing smaller, glabrous flowers. The ovaries and adjacent supporting structures of the specimens preserved are covered by a network of hyphae which gives the appearance of a dense, minute, black pubescence.

Pleurothallis dracontea Luer, sp. nov.

Species haec *P. pachyglossae* Lindl. affinis sed sepalis intus villosis, petalis extus longituberculatis intus bicarinatis et labello minore angustioreque distinguitur.

Plant medium-sized, epiphytic, caespitose; roots slender, flexuous. Secondary stems slender, erect, unifoliate, 5-13 cm long, with a tubular sheath from below the middle and 1-2 short sheaths at the base. Leaf erect, coriaceous, elliptical, 5-9.5 cm long, 1.5-2.5 cm wide, the acute apex tridenticu-

late, the base cuneate, sessile. Inflorescence an erect, several-flowered raceme, 2-3 flowers open simultaneously, 10-17 cm long including the slender, 6-8 cm long peduncle from a slender, appressed, 1 cm long spathe at the base of the leaf; floral bract 4 mm long; pedicel 5-8 mm long; ovary 5-6 mm long; sepals dark purple, villous within, the hairs white, the dorsal sepal ovate, concave, acuminate, acute, 21 mm long, 5 mm wide, the lateral sepals connate into an ovate, concave synsepal 22 mm long, 8 mm wide expanded, bicarinate, the toothed carinae protruding at the bifid apex; petals white, marked with purple, obovate-oblong, concave, the apex rounded, 5.5 mm long, 3 mm wide, long-tuberculate externally, smooth within except for 2 well-defined carinae along the outer nerves toward the apical margin, striped with purple along the 3 nerves; lip white, marked with purple, narrowly oblong-trilobed, thick, 6 mm long, 1.5 mm wide, the basal lobes erect, short, rounded, the distal half semiterete, verrucose, incurved to the narrowly obtuse apex, the deflexed base hinged to the column-foot; column dark purple, semiterete, stout, 2 mm long, the foot white, also 2 mm long.

Etymology: From the Latin *draconteus*, "dragon-like," in allusion to the hairy, gaping mouth with a warty, upturned tongue.

Type: *COSTA RICA*: HEREDIA: epiphytic in cloud forest east of the pass north of Castillo, alt. 2000 m, 21 June 1981, *C. Luer & A. Luer 6358* (Holotype: SEL; Isotype: CR).

Distribution: Costa Rica.

This species is related to *P. pachyglossa*, but may be distinguished by the sepals with a long-pubescent interior, by the petals with a long-tuberculate exterior and bicarinate interior, and by a small, verrucose lip with a narrow, upturned apex.

Pleurothallis flexibilis Luer & Vásquez, sp. nov.

Planta mediocris pendens, caulibus secundariis gracilibus flexibilibus flexuosis vaginis lepanthiformibus folio anguste elliptico longioribus, racemo brevi congesto paucifloro, floribus minutis purpureis, sepalis obtusis concavis ciliatis, petalis nanis oblongis ciliatis, labello ligulato ciliato basi bilobulato, columna bidentata.

Plant medium in size, epiphytic, caespitose, pendent; roots slender, flexuous. Secondary stems slender, descending, weak, flexible, flexuous, unifoliate, 5-14 cm long, enclosed by 8-14 close, imbricating, ribbed sheaths with dilated, oblique ostia with thickened, ciliated margins. Leaf pendent, coriaceous, elliptical, 3.5-9 cm long, 0.9-1.5 cm wide, the apex acute, tridenticulate, the base cuneate to a short, indistinct petiole. Inflorescence a short, congested raceme, up to 15 mm long including the 6-7 mm long peduncle, of 4-6 minute flowers, from the apex of the secondary stem; floral bract, pedicel and ovary each 1 mm long; sepals purple, whitish toward the base, concave, the margins sparsely ciliate, otherwise glabrous, the dorsal sepal ovate, 2.25 mm long, 1.5 mm wide, the apex rounded, the lateral sepals ovate, obtuse, 2.25 mm long, 2.1 mm wide together, connate to above the middle to form a shallow mentum below the column-foot; petals translucent watery purple, oblong, 1 mm long, 0.5 mm wide, the rounded apex sparsely ciliate; lip purple-black with white cilia, oblong, 1.5 mm long, 0.5 mm wide, the apex rounded, the base minutely bilobulate, hinged to the column-foot, the disc with a low, longitudinal callus extending from the base; column pale yellow, semiterete, 1.5 mm long, broadly winged above the middle and ending in a pair of apical teeth, the foot channeled, 1 mm long.

Etymology: From the Latin *flexibilis*, "flexible," referring to the weak, pendent, flexible secondary stems.

TYPE: *BOLIVIA*: COCHABAMBA: Prov. of Chapare, epiphytic in rain forest along Rio Evispas near the road to Villa Tunari, alt. 500 m, 16 Jan. 1981, *C. Luer, J. Luer, E. Besse & R. Vásquez 5639* (HOLOTYPE: SEL).

DISTRIBUTION: Bolivia.

This lepanthiform-stemmed species is characterized by the weak, pendent, flexuous, flexible stems, narrowly elliptical leaves, and a short, congested, few-flowered raceme of minute, purple flowers. The concave sepals are ciliated as well as the ligulate lip. The longitudinal callus of the lip is low, and the apex of the column is bidentate.

Pleurothallis galerita Luer, sp. nov.

Planta mediocris caespitosa, foliis ellipticis acuminatis sessilibus horizontalibus quam caulibus secundariis gracilibus brevioribus, floribus purpureis successivis fasciculatis, sepalo dorsali suborbiculari galeiformi, synsepalo angustiore ovato pubescenti, petalis falcatis serratis, labello late ovato acuto marginibus laceratis.

Plant medium in size, epiphytic, caespitose; roots slender, flexuous. Secondary stems slender, suberect to horizontal, unifoliate, 9-15 cm long, with a close, tubular sheath below the middle and another sheath at the base. Leaf spreading, horizontal, coriaceous, elliptical-oblong, 4.5-8 cm long, 1.8-2.8 cm wide, the apex shortly acuminate, tridenticulate, the sessile base rounded to cordate, the basal lobes extending ca. 5 mm behind the junction with the secondary stem. Inflorescence a fascicle of successive, solitary flowers, appearing 1-3 simultaneously on the dorsum of the leaf, from a spathe 8-12 mm long at the base of the leaf; peduncles 1-5 mm long; floral bract 5 mm long, pedicel 7 mm long; ovary 4 mm long; sepals translucent purple, veined in darker purple, the dorsal sepal suborbicular, deeply concave, minutely ciliate, 9 mm long, 6.5 mm wide unspread, 6-veined, the obtuse apex abruptly short-acuminate, the base thickened, the lateral sepals connate into an ovate, narrowly obtuse, pubescent synsepal 8 mm long, 4.5 mm wide; petals purple, oblong-falcate, acute, serrate, 4.5 mm long, 1 mm wide; lip erect, purple with the center white, broadly ovate, 3.5 mm long, 3.5 mm wide, narrowed above the middle to an acute apex, the margins lacerate, the truncate base broadly and shallowly concave on the end; column stout, 0.75 mm long, 1.25 mm wide, with a broad, thick foot.

Etymology: From the Latin *galeritus*, "wearing a helmet," in allusion to the appearance of the dorsal sepal.

Type: *ECUADOR*: IMBABURA: epiphytic in cloud forest west of Otavalo, Selva Alegre, alt. 2730 m, 1 May 1981, *C. Luer, J. Luer, J. Kuhn, L. Kuhn & A. Hirtz 6040* (Holotype: SEL).

Distribution: Northwestern Ecuador.

Among the species similar to *P. grandiflora* Lindl., the flowers of this species are small. The dorsal sepal is deeply concave, considerably wider than the pubescent synsepal. The shield-shaped, fringed lip is held erect, the falcate, serrated petals curving beneath on either side.

Pleurothallis gracilenta Luer & Vásquez, sp. nov.

Species haec *P. angustilabiae* Schltr. affinis, sed statura minore, caulibus secundariis gracillimis, foliis crassis anguste linearibus, racemo brevi pauciforoque et floribus minoribus differt.

Plant small, epiphytic, densely caespitose; roots fine, fasciculate. Secondary stems very slender, erect, unifoliate, 2.5-7.5 cm long, with a close, thin, tu-

bular sheath below the middle. Leaf erect, thickly coriaceous, narrowly linear-elliptical to semiterete, sulcate, 3-6.5 cm long, 3.5-4.5 mm wide, the apex acute, tridenticulate, gradually narrowed below into the sessile base. Inflorescence an erect, 1-1.5 cm long raceme of 2 to 4 flowers, borne from a 3 mm long spathe at the base of the leaf; floral bract thin, brown, 2 mm long; pedicel 1.5 mm long; ovary 0.5 mm long; sepals glabrous, carinate, translucent white with yellow apices, the dorsal sepal ovate, 4-5.5 mm long, 1.5 mm wide, acuminate from the middle to the acute apex, the lateral sepals similar, connate 0.5 mm at the base, occasionally lightly suffused with rose near the base, narrowly ovate, acuminate, acute, 4-5.5 mm long, 1.25 mm wide; petals translucent white, obovate, 2.75-3.75 mm long, 0.75 mm wide, acuminate from the middle to the slender, subulate apex, minutely erose above the middle; lip white, oblong-ligulate, 2 mm long, 0.66 mm wide, with recurved margins, the apex rounded, the disc with a low pair of longitudinal, parallel calli, the base truncate-retuse, delicately hinged to the column-foot; column white, 1.5 mm long, with prominent, subacute wings and toothed at the apex, the sulcate foot 1 mm long.

Etymology: From the Latin *gracilentis*, "becoming narrowed," referring to the slender secondary stems and leaves.

Type: *BOLIVIA* : La Paz: Prov. of Inquisivi, epiphytic in cloud forest between Inquisivi and Circuata, alt. 2550 m, 29 Jan. 1981, cult. at SEL, flowered in cult. 11 March 1981, *C. Luer, J. Luer, E. Besse & R. Vásquez 5975* (Holotype: SEL).

Distribution: Bolivia.

This species may be included in the *Pleurothallis angustilabia-obovata* complex. Although the flowers are very similar to those of the other related species, the little *P. gracilenta* may be readily distinguished by the densely caespitose, very slender secondary stems with narrowly semiterete leaves.

Pleurothallis gyas Luer & Vásquez, sp. nov.

Planta grandis scandens alta, caulibus secundariis crassis proliferatibus vaginis hispidis, floribus magnis solitariis successivis brevipedunculatis glomeratis, sepalis puberulis purpureo notatis anguste ovatis, petalis longissimis anguste teretibus et labello ligulato crasso bicarinato obtuso eroso.

Plant large, robust, up to over 1 meter tall, epiphytic to terrestrial, caespitose and scandent; roots coarse, flexuous. Secondary stems stout, cylindrical, unifoliate, proliferating, 7-30 cm long, clothed initially by 3-8 imbricating, hispidous, tubular sheaths, the lower ones more densely hispidous. Leaf erect. thickly coriaceous, narrowly ovate, 7-18 cm long, 2-3 cm wide, the apex acute, tridenticulate, the base cuneate, sessile. Inflorescence a dense fascicle of large, successive, solitary flowers produced from a node at the apex of the secondary stem; peduncles 2-4 mm long, enclosed by imbricating, pubescent bracts; pedicel 3 mm long; floral bract inflated, lobulated, spiculate, 5-8 mm long, 4-6 mm wide expanded. enclosing the base of the flower; ovary 2 mm long, minutely pubescent; sepals rose to tan, dotted or veined in darker rose, purple or brown, fleshy, finely pubescent externally, the margins more or less revolute, the dorsal sepal ovate, narrowly obtuse, 16-18 mm long, 5-6 mm wide, the lateral sepals free, ovate-falcate, subacute, pubescent over the convex inner part of the base, 15-16 mm long, 5-6 mm wide; petals ovate, 20-25 mm long, 2.5-4.5 mm wide, the margins minutely erose, the apex contracted into a thick, semiterete tail ca. 2 cm long; lip red to purple with yellowish calli, oblong, 5 mm long, 2 mm wide, arcuate, the apical half thick, obtuse with erose margins, bicarinate below the middle, the margins

acutely angled to the truncate base, hinged to the column-foot; column red, semiterete, 2.5 mm long, the clinandrium denticulate, the foot thick and equally long.

ETYMOLOGY : Named for Gyas, the classical mythological giant with a hundred arms, in allusion to the glomerate inflorescence with numerous protruding, arm-like petals.

TYPE: *BOLIVIA*: LA PAZ: Prov. of Sud Yungas, epiphytic in scrub vegetation near Unduavi, alt. 3200 m, 28 Jan. 1980, *C. Luer, J. Luer, R. Vásquez & R. Lara 4975* (HOLOTYPE : SEL).

ADDITIONAL MATERIAL EXAMINED : *BOLIVIA*: LA PAZ : Prov. of Nor Yungas, epiphytic in cloud forest between Unduavi and Coroico, alt. 2800 m, 4 Feb. 1980, *C. Luer, J. Luer, R. Vásquez & R. Lara 5160* (SEL); COCHABAMBA : Prov. of Chapare, epiphytic in cloud forest northeast of Cochabamba toward Villa Tunari, alt. 2600 m, 26-30 Nov. 1978, *C. Luer, J. Luer, J. Kuhn, L. Kuhn et al. 3494A, 3588* (SEL).

DISTRIBUTION : Bolivia.

When this robust species grows in shrubs, the series of proliferating secondary stems may reach over one meter in height. The short-pedunculated, long-petaled flowers are produced in dense, glomerate fascicles so that the flower parts, especially the petals, protrude in all directions. The flowers vary in color from pale dull rose to tan with dots or stripes of darker purple or brown. *Pleurothallis frutex* Schltr. var. *robusta* C. Schweinf. from Peru may prove to be synonymous.

Pleurothallis inquisiviensis Luer & Vásquez, sp. nov.

Planta mediocris caespitosa, caulibus secundariis lepanthformibus folio late elliptico purpureo suffuso longioribus, racemo paucifloro brevissimo, sepalo dorsali flavo ovato ciliato, synsepalo oblongo concavo ciliato, petalis acutis longiciliatis, labello spatulato longiciliato basi bilobulato.

Plant medium in size, epiphytic, caespitose; roots slender, flexuous. Secondary stems slender, ascending to erect, unifoliate, 4-10 cm tall, enclosed by a series of 5-9 brown, close, imbricating, ribbed sheaths markedly abruptly dilated into an ovate, acute, ciliated apex. Leaf more or less suffused and veined in purple, erect, coriaceous, broadly elliptical, 3.5-5 cm long including a 5-6 mm long petiole, 1.8-2.8 cm wide, the apex obtuse, tridenticulate, the base broadly cuneate into the petiole. Inflorescence a short raceme to 1 cm long of 1 to 3 successive flowers borne among a dense fascicle of old peduncles presenting behind the base of the leaf, from within the uppermost cauline sheath; floral bract membranous, tubular, 1.5-2 mm long; pedicel 3-4 mm long; ovary 1.5-2 mm long; dorsal sepal yellow, ovate, subacute, 4 mm long. 2.5 mm wide, connate 0.5 mm basally to the lateral sepals, ciliate; lateral sepals yellow, purple centrally, connate to above the middle into an oblong, concave, rounded, bifid lamina 4 mm long, 3.25 mm wide, ciliate; petals membranous with a purple vein, oblong, 1.75 mm long, 1 mm wide, the acute apex long-ciliate; lip yellow with purple margins, spatulate, 2.5 mm long, 1 mm wide, the apex obtuse, long-ciliate, the base bilobulate, delicately hinged to the column-foot, the disc with a low, basal callus; column white, semiterete, 2 mm long, the apex denticulate, the thick foot 1 mm long.

ETYMOLOGY : Named for the Province of Inquisivi, Bolivia, where the species was discovered.

TYPE: *BOLIVIA*: LA PAZ: Prov. of Inquisivi, epiphytic in cloud forest between Inquisivi and Circuata, alt. 2550 m, 28 Jan. 1981, *C. Luer, J. Luer,*

E. Besse & R. Vasquez 5808 (Holotype. SEL).

Distribution . Bolivia.

This species is similar in habit to *P. orbicularis* (Lindl.) Lindl. and *P. operculata* Luer, but *P. inquisiviensis* may be distinguished by the very short, 1- to 3-flowered racemes of small yellow flowers. The sepals, petals and lip are ciliate, and the lip is spatulate with a low, insignificant basal callus.

Pleurothallis kateora (Garay) Luer, comb. nov.

Physothallis kateora Garay, Orquideologia 9:133. 1973.

An examination of fresh flowers and the plant from which the type was described indicates that this species belongs to the conglomerate genus *Pleurothallis*.

Pleurothallis leopardina Luer, sp. nov.

Planta mediocris caespitosa, caulibus secundariis gracilibus quam foliis ellipticis breviter acuminatis longioribus, racemis paucis densifloris folio plus minusve aequilongis, floribus virescentibus purpureo punctulatis glabris, sepalo dorsali synsepaloque suborbicularibus concavis, petalis obovatis obtusis, labello subrhomboideo obtuso supra medium bicalloso.

Plant medium in size, epiphytic, caespitose; roots numerous, slender, flexuous. Secondary stems slender, erect, unifoliate, 14-21 cm long, with a close, tubular sheath below the middle and 1-2 shorter sheaths at the base. Leaf erect, thinly coriaceous, elliptical, 8-13.5 cm long, 2.5-4.5 cm wide, the apex shortly acuminate, acute, tridenticulate, the base cuneate to rounded, sessile. Inflorescence racemose, 1-6 arching, densely many-flowered racemes 8-11 cm long including the 3-4 cm long peduncle, from a reclining spathe 1.5-1.8 cm long at the base of the leaf; floral bract 3 mm long; pedicel 5 mm long; ovary 2 mm long; all floral parts light green, spotted with purple, glabrous; dorsal sepal suborbicular, concave, obtuse, 4 mm long, 3 mm wide unspread, 3-veined; lateral sepals connate into a synsepal similar to the dorsal sepal, 3.75 mm long, 3 mm wide, 4-veined; petals obovate, narrowed below the middle, obtuse, 2.3 mm long, 0.9 mm wide; lip subrhomboid, 2.25 mm long, 2.25 mm wide, the apex obtuse, the sides obtusely angled, suberect, the disc with a pair of low, smooth, rounded, adjacent calli above the middle, concave below the middle, separated from the minutely concave base by a low, transverse carina; column stout, 1.5 mm long, the thick foot with a short, bulbous apex.

Etymology: From the Latin *leopardina*, "like a leopard," in allusion to the diffusely spotted floral parts.

Type: *ECUADOR*: LOJA: epiphytic in cloud forest south of Yangana, alt. 2450 m, 12 May 1981, *C. Luer, J. Luer, J. Kuhn, L. Kuhn & D. D'Alessandro 6190* (Holotype: SEL).

Distribution: Southern Ecuador.

This species seems to be most closely allied to the Colombian *P. poculifera* Luer & Escobar, but the lip of the latter is distinguished by the pair of glandular calli above the base; the pair of calli of the lip of *P. leopardina* is smooth and near the apex.

Pleurothallis mastophora Luer & Vásquez, sp. nov.

Planta pro sectione grandis, caulibus secundariis prolificantibus vaginis lepanthiformibus, racemo delicatulo laxe plurifloro foliis oblongis retuculatis multilongiore, sepalis albescentibus libris carinatis longicaudatis lateralibus

dorsali angustioribus,petalis ovatis, labello trilobato infra medium cum callis duobus mammosis, lobo antico ligulato lobis lateralibus supra basim rotundatis erectis.

Plant medium in size to large for the lepanthiform-stemmed section, epiphytic, caespitose and scandent, to 30 cm tall; roots slender, flexuous. Secondary stems slender, prolific, unifoliate, 2-9 cm long, enclosed by 2-7 close, ribbed, imbricating sheaths with dilated, oblique, marginate ostia, the ribs and margins ciliate. Leaf erect, coriaceous, often reticulated in purple and suffused with purple beneath, oblong-elliptical, shortly petiolate, 1-5 cm long including the 1-7 mm long petiole, 4-18 mm wide, the apex rounded, retuse, the base cuneate into the petiole. Inflorescence a delicate, erect raceme 4-9 cm long including the filiform peduncle, of 5 to 13 long-pedicellate flowers; floral bract 1-1.5 mm long; pedicel 6-10 mm long; ovary 0.75 mm long; sepals and petals translucent yellow-white, glabrous; dorsal sepal ovate, the apex contracted into a filiform tail, 12-13 mm long, 2.5 mm wide; lateral sepals free, linear-ovate, acute, carinate, 11-12 mm long, 1 mm wide; petals elliptical, acute, 2.5 mm long, 1 mm wide; lip light yellow, ovate-trilobed, 3 mm long, 1 mm wide, the anterior lobe ligulate, rounded at the apex, with erect, rounded, lateral lobes in the lower third, the disc with a pair of mammate calli below the middle, the truncate base hinged to the column-foot; column white, semiterete, 1.75 mm long, with a foot 1 mm long.

ETYMOLOGY : From the Greek *mastos* (μαστος), "breast" and *-phoros* (φορος), "bearing," in allusion to the calli of the lip.

TYPE: *BOLIVIA*: COCHABAMBA : Prov. of Chapare, epiphytic in cloud forest northeast of Cochabamba, alt. 2840 m, 16 Jan. 1981, *C. Luer, J. Luer, E. Besse & R. Vásquez 5645* (HOLOTYPE: SEL).

ADDITIONAL MATERIAL EXAMINED : *BOLIVIA*: COCHABAMBA : Prov. of Chapare, same area, 25 Feb. 1978, *R. Vásquez 11* (SEL); LA PAZ : Prov. of Sud Yungas, epiphytic in cloud forest above Rio Unduavi, alt. 2450 m, 6 Feb. 1980, *C. Luer, J. Luer, R. Vásquez & M. Manon 5156* (SEL).

DISTRIBUTION : Bolivia.

Among the lepanthiform-stemmed species, *P. mastophora* may be recognized by the prolific stems; small to large, oblong, reticulated leaves; and long, loose racemes of comparatively large, delicate, widely spread, whitish flowers. The lip is 3-lobed with a pair of mammillate calli below the middle.

Pleurothallis melanostele Luer & Vásquez, sp. nov.

Herba mediocris caespitosa, foliis anguste oblongis petiolatis caulibus secundariis gracilibus aequilongis, racemis paucis erectis gracilibus longis dense multifloris, floribus parvis glabris flavovirescentibus, sepalis obtusis, petalis retusis, labello ovato trilobato concavo lobo antico crasso ligulato, columna antheraque nigris.

Plant medium in size, epiphytic, caespitose; roots slender, flexuous. Secondary stems slender, erect, fasciculate, unifoliate, 5-12 cm long, with a tubular bract below the middle and 2-3 imbricating sheaths at the base. Leaf erect, coriaceous, narrowly oblong, petiolate, 6-12 cm long including the 1-1.5 cm long petiole, 1-2.2 cm wide, the obtuse apex tridenticulate, the base cuneate into the petiole. Inflorescence racemose, 1-2 erect, slender, densely many-flowered racemes 10-15 cm long including the 1-3 cm long peduncle, produced among old peduncles from a 1-1.5 cm long spathe at the apex of the secondary stem; floral bract oblique, infundibular, 2.5 mm long, enclosing the pedicel 0.5 mm long and the ovary 1.5 mm long; sepals light yellow-green, carinate, 1-veined, glabrous, the dorsal sepal ovate, concave, obtuse,

2.5 mm long, 1.5 mm wide, the lateral sepals ovate, oblique, obtuse, 2.5 mm long, 1.5 mm wide, connate basally for 0.5 mm; petals translucent yellow, oblong, 1.25 mm long, 0.9 mm wide, the apex truncate, retuse; lip yellow-green, ovate, concave, indistinctly 3-lobed, 2 mm long, 1.25 mm wide unspread, the lateral lobes occupying the lower half, broadly rounded, erect, the anterior lobe thick, subverrucose, ligulate, obtuse, the truncate base broadly attached to the column-foot; column purplish black, semiterete, 1.5 mm long, with a pedestal-like base, the anther purplish black.

ETYMOLOGY : From the Greek *melano-* (μελανο-), "black," and *stele* (στηλη), "column," referring to the purplish black color of the column and anther.

TYPE : *BOLIVIA*: LA PAZ. Prov. of Inquisivi, epiphytic in cloud forest between Inquisivi and Circuata, alt. 2550 m, 28 Jan. 1981, *C. Luer, J. Luer, E. Besse & R. Vásquez 5798* (HOLOTYPE: SEL); cloud forest north of Inquisivi, alt. 2850 m, 27 Jan. 1981, *C. Luer, J. Luer, E. Besse & R. Vásquez 5751* (SEL).

DISTRIBUTION . Bolivia.

This *Stelis*-like species of the *P. floribunda*-complex is distinguished by the very small, yellow-green flowers with a conspicuous, relatively large, black column.

Pleurothallis micklowii Luer & Vásquez, sp. nov.

Planta mediocris caespitosa, caulibus secundariis gracilibus folio anguste elliptico tortipetiolato aequilongis, racemis paucis brevibus plurifloris ex spatha conspicua, sepalo dorsali synsepaloque translucidis acutis concavis, petalis ovatis acuminatis, labello integro crasso obovato obtuso basi ad pedem columnae brevis affixo.

Plant medium in size, epiphytic, caespitose; roots slender, fasciculate. Secondary stems slender, terete, erect, 5-10 cm long, unifoliate, with a close, tubular sheath below the middle and another sheath at the base. Leaf thinly coriaceous, erect, narrowly elliptical-oblong, petiolate, 6-11.5 cm long including the twisted 7-10 mm long petiole, 12-22 mm wide, the apex acute, tridenticulate, the base narrowly cuneate into the petiole. Inflorescence racemose, 1-3 short, distichous, several (7-13)-flowered racemes 3-4 cm long, from a conspicuous, oblique spathe 12-18 mm long, 3-4 mm wide, at the base of the petiole; floral bract infundibular, 1.5 mm long; pedicel 2 mm long; ovary 1 mm long; floral parts glabrous, pale translucent green with a few pale rose spots; dorsal sepal ovate, acute, 3.5 mm long, 1.75 mm wide; lateral sepals connate into a shortly bifid, ovate, subacute, concave synsepal 3.75 mm long, 2.75 mm wide spread; petals ovate, acuminate, acute, 2 mm long, 1 mm wide; lip thick, obovate, entire, 2 mm long, 1.25 mm wide, concave below the middle, the apex rounded, the truncate base broadly and solidly connate to the column-foot; column terete, 0.75 mm long, the anther and stigma apical, the foot short, thick, glandular-cellular.

ETYMOLOGY : Named in honor of Fred Micklow of Westfield, Indiana, who discovered this species.

TYPE: *BOLIVIA*: SANTA CRUZ : without exact locality, collected by F. Micklow, Aug. 1978, cultivated at SEL, flowered in cult. 23 Nov. 1980, *C. Luer 5599* (HOLOTYPE : SEL).

DISTRIBUTION : Bolivia.

This small-flowered species is related to the large-flowered *P. pedunculata* (Kl.) Rchb. f. and its allies. The lip is solidly united to the column-foot, a feature found in several genera of the Pleurothallidinae.

Pleurothallis nasiterna Luer, sp. nov.

Species haec *P. antenniferae* Lindl. proxima sed floribus immaculatis, synsepalo profundissime concavo, petalis latioribus et labello carnoso lobis basalibus erectis columnam amplectentibus, lobo antico integro aciculato differt.

Plant large, epiphytic, shortly repent, the rhizome stout, ca. 1 mm long between secondary stems; roots numerous, slender, flexuous. Secondary stems slender, erect, unifoliate, 13-36 cm long, with a tubular sheath below the middle and another at the base. Leaf suberect, coriaceous, elliptical, 9-12 cm long, 2.5-4 cm wide, the apex shortly acuminate, acute, tridenticulate, the base obtuse to rounded, sessile. Inflorescence racemose, 1-3 densely many-flowered, arching racemes 10-24 cm long including the peduncle ca. 5 cm long, from a reclining spathe 12-22 mm long at the base of the leaf; floral bract 3-4 mm long; pedicel 3-4 mm long; ovary 3 mm long; sepals green, suffused with purple, glabrous, the dorsal sepal ovate, acute, 5 mm long, 2.5 mm wide, the lateral sepals connate into a deeply concave, suborbicular synsepal 4.75 mm long, 4 mm wide unspread, 3 mm deep, the apex shortly acuminate, spout-like; petals purple, semiterete, narrowly triangular, acute, 4.5 mm long, 0.75 mm wide; lip green, 3-lobed, fleshy, the lateral lobes oblong, ca. 2 mm long, 1 mm wide, obtuse, erect, embracing the column, the middle lobe entire, ovate, ca. 2 mm long, 1.5 mm wide, the apex acuminate, acute, incurved, the base reflexed, attached to the base of the column; column stout, 1 mm long, with a thick, obsolescent foot.

Etymology: From the Latin *nasiterna*, "a watering-pot with a large spout," in allusion to the appearance of the synsepal.

Type: *ECUADOR*: NAPO: epiphytic in cloud forest southeast of El Carmelo, alt. 2700 m, 17 May 1981, *C. Luer, J. Luer, J. Kuhn, L. Kuhn & A. Hirtz 6287* (Holotype: SEL).

Distribution: Northern Ecuador.

This large species seems most closely allied to *P. antennifera*, but sufficient differences exist to separate it. The flowers of the few specimens seen are unspotted; the synsepal is very deeply concave; the petals are comparatively broad and thick; and the thick, basal lobes of the lip are erect and embrace the column.

Pleurothallis nymphalis Luer, sp. nov.

Planta parvula caespitosa, caulibus secundariis brevibus vaginis lepanthiformibus, pedunculo capillari uni- vel bifloro foliis hemisphaeroideis multilongiore, sepalis translucidis roseis caudis setiformibus, sepalo dorsali concavo, synsepalo oblongo bifido, petalis obovatis subrotundatis, labello flavo ovato anguste obtuso infra medium lobulato.

Plant very small, epiphytic, caespitose; roots slender, flexuous. Secondary stems unifoliate, abbreviated, 4-6 mm long, concealed by 2-3 imbricating, ribbed sheaths with dilated, acute, ciliated ostia. Leaf spreading, thickly coriaceous, subhemispherical, convex above, the midrib elevated below, 5-7 mm long including the 0.5 mm long petiole, 4-5.5 mm wide, the rounded apex shallowly notched with an apiculum, the rounded base contracted into the petiole. Inflorescence a 1- to 2-flowered raceme 10-17 mm long including the capillary peduncle, the flowers 5-6 mm apart, from a node below the leaf-stem abscission layer; floral bract close, thin, tubular, 0.75 mm long; pedicel 4 mm long; ovary 0.5 mm long; sepals translucent rose, glabrous, the dorsal sepal ovate, concave, carinate, 11 mm long including the tail, 4 mm wide expanded, the acute apex contracted into a filiform tail ca. 3.5 mm long, the

lateral sepals connate 4 mm into an oblong, bifid, bicarinate lamina 11 mm long, 3 mm wide, the acute apices produced into similar tails; petals translucent yellow, obovate, 3.5 mm long, 1.8 mm wide, the rounded apex oblique, subapiculate; lip yellow, ovate, 4.25 mm long, 1.75 mm wide, the apex narrowly obtuse, with a pair of erect, rounded marginal lobes below the middle, the disc thickened, shallowly sulcate centrally, the base hinged to the column-foot; column yellow, slender, semiterete, 2.5 mm long, the foot 1 mm long.

Etymology: From the Latin *nymphalis*, " like a nymph," referring to the mossy habit on the trunks of cloud forest trees.

Type: *ECUADOR*: LOJA: epiphytic in cloud forest south of Yangana, alt. 2450 m, 12 May 1981, *C. Luer, J. Luer, J. Kuhn, L. Kuhn & D. D'Alessandro 6197* (Holotype: SEL).

Distribution: Southern Ecuador.

This little species is distinguished by the thick, hemispherical leaves borne by short, lepanthiform stems. The flowers with rose sepals and yellow petals and lip are large for the size of the plant.

Pleurothallis operculata Luer, sp. nov.

Species haec *P. orbicularis* (Lindl.) Lindl. affinis sed statura majore, folio orbuculari convexo plusminusve horizontali, sepalis ciliatis et labello glabro distinguitur.

Plant medium in size, epiphytic, caespitose; roots fine, flexuous. Secondary stems ascending to erect, stout, 5-11 cm long, unifoliate, concealed by a series of 5-10 brown, ribbed, imbricating sheaths, inflated above, the ostia oblique with the margins and ribs ciliate. Leaf dark purplish green above, dark purple beneath, coriaceous, orbicular, convex, spreading to horizontal, shortly petiolate, 3.5-4.2 cm long, 2.6-3.3 cm wide, the rounded apex shallowly notched with a mucro in the sinus, the rounded base produced into a 1.5-2 mm long petiole. Inflorescence a fascicle of successive peduncles from a node within the uppermost sheath and appearing beneath the concave surface of the leaf, each peducle ca. 15 mm long including the short 2- to 3-flowered raceme; floral bract and pedicel white, each 1.5 mm long; ovary yellow-white, 1 mm long; sepals translucent yellow-white suffused with rose, ciliate, the dorsal sepal narrowly ovate, acute, 6 mm long, 1.6 mm wide, the lateral sepals connate to near the middle, ovate, the apices narrowly obtuse, thickened, recurved, 6 mm long, 2.5 mm wide expanded together; petals translucent white, obovate, acute, 3 mm long, 0.8 mm wide, finely fimbriate above the middle; lip yellow-white, suffused with rose centrally, glabrous, ovate, narrowly acute, the margins glandular-cellular at most, 3.25 mm long, 1 mm wide, the truncate base bilobulate, delicately hinged to the column-foot, the disc slightly thickened, especially toward the base; column white, winged and bidentate at the apex, 1.75 mm long, the foot short, thick.

Etymology : From the Latin *operculatus*, "with a lid," in allusion to the appearance of the leaf over the inflorescence.

Type: *PANAMA*. Cocle : epiphytic in cloud forest, El Cope, R. L. Dressler s.n., cultivated at SEL, 78-480, flowered 18 July 1979, *C. Luer 4075* (Holotype ; SEL).

Distribution : Panama.

This species is closely allied to the widespread *P. orbicularis*, but *P. operculata* may be recognized by the large, round, convex leaves held more or less horizontally covering the fascicle of peduncles. The flowers of the latter differ in possessing ciliated sepals and a glabrous lip.

Pleurothallis procera Luer & Vásquez, sp. nov.

Planta grandis caespitosa, caulibus secundariis gracilibus folio elliptico longioribus, racemis paucis gracilibus parvifloris folio longioribus, sepalis ovatis obtusis ciliatis lateralibus semiconnatis, petalis oblongis obtusis purpureolimbatis, labello ovato obtuso bicalloso basi subcordato.

Plant medium to large, epiphytic, caespitose; roots coarse, flexuous. Secondary stems slender, ascending to erect, fasciculate, unifoliate, 15-22 cm long, with a tubular sheath below the middle and another 2-3 sheaths at the base. Leaf erect, coriaceous, elliptical, 11-15 cm long including a 1 cm long petiole, 2-2.5 cm wide, the apex obtuse, tridenticulate, the base cuneate into the petiole. Inflorescence racemose, 2-4 erect to arching, slender, densely many-flowered racemes 15-20 cm long, from a 1 cm long spathe at the apex of the secondary stem; floral bract infundibular, oblique, acute, 2.5 mm long, enclosing the 2 mm long pedicel; ovary 1 mm long; sepals yellow, ciliate, unicarinate, the dorsal sepal elliptical, obtuse, apiculate, 4 mm long, 2 mm wide, the lateral sepals ovate, oblique, obtuse, apiculate, connate to the middle, 4 mm long, 2.75 mm wide together; petals yellow, edged in purple, oblong, obtuse, 3 mm long, 1 mm wide; lip yellow with blotches of purple on the calli and margins, ovate, 2.3 mm long, 1.5 mm wide unspread, the apex obtuse, the sides broadly rounded and erect below the middle, the disc with an erect pair of short, rounded calli near the middle; column yellow, edged in purple, semiterete, 1.5 mm long, with a thick, obsolescent foot.

ETYMOLOGY: From the Latin *procerus*, "tall, slender," referring to the habit.

TYPE: *BOLIVIA*: COCHABAMBA: Prov. of Chapare, epiphytic in cloud forest along Rio Ronco, alt. 1780 m, northeast of Cochabamba, 13 Jan. 1981, *C. Luer, J. Luer, E. Besse, and R. Vásquez 5630* (HOLOTYPE: SEL).

DISTRIBUTION: Bolivia.

This tall, slender species, found by Roberto Vásquez, is another in the horde of relatives of *P. floribunda* Poepp. & Endl. It is notable in the long, slender, secondary stems; a few slender small-flowered racemes a little longer than the leaves; comparatively large, purple-bordered petals; and an ovate lip with a short pair of rounded calli near the middle.

Pleurothallis quinquecallosa Luer, sp. nov.

Planta grandis caulibus secundariis robustis fasciculatis laxe vaginatis folio ovato amplo multilongioribus, inflorescentia multiracemosa dense fasciculata folio breviore; sepalis roseoviridibus ciliatis dorsali suborbiculari lateralibus ovatis semiconnatis, petalis oblongis obtusis uninervatis, labello flavo obovato quinquecalloso base concavo.

Plant large, robust, caespitose, terrestrial (presumably also epiphytic); roots coarse, flexuous. Secondary stems stout, fascicled, erect, 82 cm long in the solitary specimen, with a loose, tubular sheath near the middle and several large, loose, imbricating sheaths (often fragmented) at the base, the outer sheaths enclosing more than 1 stem. Leaf erect, coriaceous, ovate, 23 cm

long, 12 cm wide, the apex acute, tridenticulate, the rounded base contracted into a short, thick, channeled petiole ca. 1 cm long. Inflorescence a dense fascicle of numerous (ca. 50) arching racemes 10-15 cm long, from a deciduous spathe (disintegrated in this specimen) at a node near the apex of the secondary stem; floral bract 2.5-3 mm long; pedicel 2 mm long; ovary 2-2.5 mm long; sepals light greenish rose veined in purple, ciliate, the dorsal sepal broadly ovate, subcarinate, shortly acuminate, acute, 4.5 mm long, 3.25 mm wide, 3-veined; the lateral sepals ovate, oblique, 4.75 mm long, 1.75 mm wide, subcarinate, connate to about the middle; petals similarly colored, glabrous, oblong, obtuse, 3 mm long, 1 mm wide, 1-veined; lip yellow, obovate, 2.1 mm long, 1.2 mm wide unexpanded, the apex obtuse, thickened but with thin margins, bearing near the tip a small pair of adjacent calli, the sides of the lip erect, thin, obtusely angled near the middle, each with a transverse, rounded callus, the center of the disc with a longitudinal callus, the base concave to accomodate the column-foot, the concavity limited by a transverse carina; column stout, 2 mm long, with a thick, bulbous foot.

Etymology: From the Latin *quinque*, "five," and *callosus*, "with calli," referring to the five calli on the lip.

Type: *ECUADOR*: CARCHI: terrestrial on the road embankment above El Carmelo, alt. 3200 m, 17 May 1981, *C. Luer, J. Luer, J. Kuhn, L. Kuhn & A. Hirtz 6269* (Holotype: SEL).

Distribution: Northern Ecuador.

Only one stem of this immense species could be obtained from the plant's high perch on a steep road embankment. The stem appeared to be about average in size; it was not the largest. The inflorescence consists of a shower of racemes shorter than the shortly petiolate leaf. The flowers are basically similar to many of the allied species (e.g. *P. fons-florum* Lindl.), but the lip with five calli distinguishes this species.

Pleurothallis reptans Luer, sp. nov.

Herba parva reptans, foliis ellipticis sessilibus caulibus secundariis subaequilongis, flore parvo aurantiaco bilabiato brevipedunculato solitario successivo, sepalo dorsali synsepaloque ovatis obtusis, petalis angustis serratis, labello ovato acuto microscopice eroso.

Plant small, epiphytic, long-repent, the rhizome 0.5-2 cm long between secondary stems; roots slender, from nodes on the rhizome. Secondary stems ascending-erect, slender, unifoliate, 1.5-3 cm long, the lower half enclosed by 2 imbricating, tubular sheaths. Leaf suberect, coriaceous, elliptical, 2-3 cm long, 0.8-1.1 cm wide, the subacute apex tridenticulate, the base cuneate, sessile. Inflorescence a succession of single, orange flowers from a congested raceme hidden within the 4 mm long spathe at the base of the leaf; peduncle 0.5-2 mm long; floral bract 2 mm long; pedicel 2.5 mm long; ovary 1 mm long; dorsal sepal elliptical, subacute, 3.5 mm long, 2 mm wide, 3-veined; lateral sepals connate into an ovate, obtuse, bi-apiculate lamina 3.25 mm long, 2.5 mm wide; petals narrowly ovate, acute, 2.75 mm long, 0.5 mm wide, the margins serrate; lip ovate, acute, 2 mm long, 1.3 mm wide, the margins cellular erose, the surface flat, cellular-papillose, the base subcordate with subacute basal angles, shortly reflexed and shallowly concave between on the top surface, with a well-developed glenion; column stout, 0.75 mm long, 1 mm wide, with a short foot.

Etymology: From the Latin *reptans*, "creeping," referring to the habit of the plant.

Type: *ECUADOR*: NAPO: epiphytic in cloud forest southeast of El Carmelo, alt. 2050 m, 17 May 1981, *C. Luer, J. Luer, J. Kuhn, L. Kuhn & A. Hirtz 6298* (Holotype: SEL).

Distribution: Northern Ecuador.

The creeping habit of this small, orange-flowered species is unusual among its numerous relatives in the "cordate-leaved" group.

Pleurothallis scansor Luer, sp. nov.

Planta mediocris scandens, rhizomate caulibus secundariisque laxe vaginatis plus minusve aequilongis, racemo multifloro folia oblonga breviter petiolata superanti, floribus flavescentibus glabris, sepalis ovatis lateralibus semiconnatis, petalis oblongis obtusis, labello ovato obtuso concavo transverse carinato lateribus erectis obtusis callosis.

Plant medium sized, epiphytic to semiterrestrial, scandent, the rhizomes stout, ascending, occasionally branching, enclosed by tubular sheaths often frayed or shed, 2-8 cm long between secondary stems; roots slender, fasciculate at nodes along the rhizome. Secondary stems stout, ascending, 3-8 cm long, more or less fasciculate with the rhizome, enclosed by 2-3 loose, imbricating, tubular sheaths. Leaf coriaceous, elliptical-oblong, 5-10 cm long including the 1-1.5 cm long petiole, 2-3 cm wide, the apex obtuse to rounded, tridenticulate, the base broadly cuneate into the petiole. Inflorescence an erect, densely many-flowered raceme 15-34 cm long including the 7-10 cm long peduncle, from a spathe 1.5-2.5 cm long, from near the apex of the secondary stem; floral bract 4-6 mm long; pedicel 3-4 mm long; ovary 2-3 mm long; sepals yellow-orange or yellow-green, glabrous, the dorsal sepal ovate, acute, 7.5 mm long, 3.5 mm wide, the lateral sepals ovate, subacute, 8 mm long, 2.5 mm wide, connate to near the middle; petals translucent brown, veined in darker brown, oblong, obtuse, 4 mm long, 1.5 mm wide; lip brown, ovate, 2.5 mm long, 1.5 mm wide, the apex thick, obtuse, the sides below the middle erect, obtusely angled, concave between, with an ill-defined callus along the margins near the middle, the base rounded, concave to accommodate the column-foot, with a transverse carina across the lower third between the two concavities; column stout, 2.5 mm long, with a bulbous foot.

Etymology: From the Latin *scansor*, "climber," referring to the habit of the species.

Type: *ECUADOR*: NAPO: epiphytic in cloud forest southeast of El Carmelo, alt. 2700 m, 17 May 1981, *C. Luer, J. Luer, J. Kuhn, L. Kuhn & A. Hirtz 6259* (Holotype: SEL).

Distribution: Northern Ecuador.

This species is notable in the long-scandent habit, the rhizomes and secondary stems clothed in loose, fragmented or deciduous sheaths. The long raceme far exceeds the oblong leaves. The flowers are basically similar to those of the "floribunda" alliance. *Pleurothallis scansor* is perhaps most closely related to *P. orectopus* Luer but from the latter it may be distinguished by the shorter secondary stems and much longer racemes.

Pleurothallis scintillata Luer, sp. nov.

A *P. antennifera* Lindl. et affinitatibus species haec caulibus secundariis gracillimis foliis longioribus, racemo arcuato multifloro, floribus parvis glabris, sepalo dorsali synsepaloque ovatis concavis roseis vel atropurpureis, petalis crassis anguste attenuatis, labello purpureo vel flavo transverse oblongo

apice late rotundato acute revoluto apiculato lateribus rotundatis et basi revoluto distinguitir.

Plant medium in size, epiphytic to terrestrial, caespitose; roots slender, flexuous. Secondary stems erect to suberect, very slender, unifoliate, 8-22 cm long, with a close, tubular sheath near the middle and another 1-2 sheaths near the base. Leaf suberect to spreading, coriaceous, narrowly elliptical, 6-9 cm long, 1-1.5 cm wide, the apex acuminate, acute, tridenticulate, the sessile base cuneate to rounded. Inflorescence racemose, 1-2 arching, many-flowered racemes 9-15 cm long including the slender peduncle ca. 3 cm long, from a spathe 11-14 mm long at the base of the leaf; floral bract 2-3 mm long; pedicel 3 mm long; ovary 2-3.5 mm long; sepals glabrous, rose to dark purple; dorsal sepal ovate, subacute, 5 mm long, 2.5 mm wide; lateral sepals connate into a deeply concave, ovate, more or less acuminate, acute to subacute synsepal, 4.5 mm long, 4 mm wide unspread; petals purple to yellow, thick, linear, attenuate, acute, more or less sigmoid, 4.5 mm long, 1 mm wide; lip purple to yellow, transversely oblong, 1 mm long, 2 mm wide unspread, the apex broadly rounded, acutely revolute, apiculate, the sides broadly rounded with arcuate thickenings near the middle, the base revolute and attached to the base of the column; column stout, 0.5 mm long, 0.75 mm wide, the foot obsolescent.

Etymology: From the Latin *scintillatus*, "sparkling, glittering," referring to the sparkling quality of the appearance of the inflorescence.

Type: *ECUADOR*: Morona-Santiago: terrestrial on road embankment, alt. 2900 m, east of the pass between Gualaceo and Limon, 17 Sept. 1980, *C. Luer, J. Luer, C. H. Dodson et al. 5470* (Holotype: SEL).

Additional material examined: *ECUADOR*: Zamora-Chinchipe: terrestrial near the pass, alt. 2700 m, between Loja and Zamora, 21 Sept. 1980, *C. Luer, J. Luer, C. H. Dodson et al. 5580* (SEL); Loja: terrestrial on embankment, alt. 2800 m, between Loja and Zamora, 20 Nov. 1961, *C. H. Dodson & L. B. Thien 1472* (SEL); Azuay: epiphytic in trees near Lago Zorrogucho west of Cuenca, alt. 3000 m, 5 June 1958, *C. H. Dodson 415* (SEL).

Distribution: Southeastern Ecuador.

This very pretty little species may be recognized by the narrow leaves borne by much longer, slender stems. The glistening, purple inflorescence of numerous small flowers arches over the leaf. The flowers are similar to those of *P. antennifera* and its allies, but the lip is transversely oblong or dumbbell-shaped with a rounded, revolute apex.

Pleurothallis sicariopsis Luer, sp. nov.

Species haec habitu *P. sicariae* Lindl. similis, sed sepalis carnosis obtusis, petalis serratis acuminatis, labello supra medium papilloso, lobis lateralibus minoribus distinguitur.

Plant medium in size, epiphytic, shortly repent, the rhizome 3-12 mm long between secondary stems; roots coarse, flexuous. Secondary stems ascending to erect, terete basally, sharply and broadly bialate above, up to 12 mm wide at the junction with the leaf, 10-22 cm long, unifoliate, with 2-3 close, tubular sheaths near the base. Leaf thinly coriaceous, elliptical-ovate, 6-10 cm long, 2-3.2 cm wide, the subacute apex tridenticulate, the base cuneate, more or less decurrent on the wings of the secondary stem. Inflorescence a 1.5 cm long, 4- to 6-flowered raceme from a spathe 8-10 mm long at the apex of the secondary stem, up to 2 cm above the lowest margins of the leaf; floral bract 2 mm long; pedicel 1.5-2 mm long; ovary 2.5 mm long;

sepals light green, yellow to brown, more or less spotted with red-brown, fleshy, the margins glandular-cellular, the dorsal sepal obovate-oblong, obtuse, 8.5-9 mm long, 2.5-3 mm wide, the lateral sepals connate into an obtuse, obovate synsepal 7 mm long, 4-5 mm wide, forming a prominent mentum below the column-foot; petals translucent yellow, marked with purple, obovate-oblong, 5 mm long, 1 mm wide, serrate above the middle, the apex acuminate to apiculate; lip purple, oblong-ligulate, 3-lobed, 5-6 mm long, 2 mm wide, the apical half oblong, rounded, coarsely papillose, with a pair of slender, acute, antrorse, marginal, lateral lobes near the middle, the basal half truncate; column white, suffused with rose, semiterete, 3.5 mm long, with a short, thick foot.

ETYMOLOGY : Named for the similarity of the species to *P. sicaria* Lindl.

TYPE: *ECUADOR*: COTOPAXI : epiphytic in cloud forest west of El Corazon, alt. 1200 m, 18 Feb. 1979, *C. Luer, J. Luer & A. Hirtz 4025* (HOLOTYPE: SEL).

ADDITIONAL MATERIAL EXAMINED : *ECUADOR*: MORONA -SANTIAGO : without exact locality, purchased from a local inhabitant, cult. at SEL, flowered 11 Feb. 1981, *C. Luer 5836* (SEL); ZAMORA-CHINCHIPE : between Loja and Zamora, alt. 1500 m, 12 Oct. 1959, *C. H. Dodson 21* (SEL).

DISTRIBUTION : Central and southern Ecuador.

Vegetatively this species is inseparable from *P. sicaria* which is widely distributed from Venezuela to central Ecuador. The flowers of *P. sicariopsis* are easily recognized by their fleshy texture, a prominent mentum, obtuse sepals, serrate and acuminate petals, and a papillose lip.

Pleurothallis stelidiopsis Luer, sp. nov.

Planta mediocris caespitosa, caulibus secundariis vaginatis fasciculatis quam foliis anguste linearibus brevioribus, racemo elongato dense multifloro secundo bifario folia superanti, floribus parvis glabris virescentibus, sepalo dorsali late ovato obtuso, sepalis lateralibus ovatis semiconnatis, petalis oblongis obtusis, labello ovato concavo apice obtuso cum callo submarginali, lateribus erectis basin versus obtusangulatis.

Plant medium-sized, epiphytic, densely caespitose; roots slender, flexuous. Secondary stems ascending to erect, fasciculate, unifoliate, 4-10 cm long, with a loose, tubular sheath below the middle and 1-2 loose, imbricating sheaths at the base, the outer sheath enclosing more than one stem. Leaf erect, coriaceous, narrowly elliptical to linear, 7-11.5 cm long including a petiole 1-1.5 cm long, 1-1.2 cm wide, the apex narrowly obtuse, tridenticulate, the base cuneate into the slender channeled petiole. Inflorescence an erect, densely many-flowered raceme 7-18 cm long including the 2-6 cm long peduncle, the small flowers secund in 2 rows, from a spathe 8-11 mm long near the apex of the secondary stem; floral bract 2 mm long; pedicel 1 mm long; ovary 1.5 mm long; sepals light green, more or less suffused with rose, glabrous, the dorsal sepal broadly elliptical, obtuse, apiculate, subcarinate, 2.75 mm long, 2 mm wide, the lateral sepals ovate, obtuse, apiculate, subcarinate, 2.75 mm long, 1.5 mm wide, connate to about the middle; petals purple, edged and veined in darker purple, obovate-oblong, obtuse-retuse, 1.75 mm long, 1 mm wide; lip light green, ovate, obtuse, 2 mm long, 1.5 mm wide unspread, the sides erect to the obtuse basal angles, the disc concave with a submarginal callus extending around the apex from near the middle of either side, the base transversely concave behind a low, transverse carina to accommodate the column-foot; column stout, 1 mm long, with a short, bulbous foot.

Etymology: Named for the similarity in appearance of the species to some species of *Stelis* Sw.

Type: *ECUADOR*: LOJA: epiphytic in cloud forest south of Yangana, alt. 2250 m, 11 May 1981, *C. Luer, J. Luer, J. Kuhn, L. Kuhn & D. D'Alessandro 6169* (Holotype: SEL).

Distribution: Southern Ecuador.

Superficially, a flowering plant of this species appears very much like many species of *Stelis*. The long, slender, many-flowered raceme surpasses the long, narrow leaf borne by shorter, fasciculated secondary stems. The small, greenish flowers are distinguished by the obtuse, ovate lip with a submarginal callus ringing the apex from near the middle of each side.

Pleurothallis systremmata Luer, sp. nov.

Species haec *P. pumilae* Luer affinis, sed petalis truncatis retusis et labello bicalloso lobis lateralibus minutis in medio sulcato non bilamellato differt.

Plant small, epiphytic, densely caespitose into rounded tufts; roots slender, flexuous. Secondary stems unifoliate, abbreviated, 2-4 mm long, concealed by 2-3 loose, imbricating, ribbed, glabrous sheaths. Leaf thickly coriaceous, suborbicular, margined, 5-7 mm long including a 1 mm petiole, 5-6 mm wide, the rounded apex shallowly notched with a continuation of the midrib as an apiculum, the rounded base abruptly contracted into the petiole. Inflorescence a delicate, several(5-7)-flowered raceme 3.5-5 cm long including the filiform peduncle, 2-3 flowers open simultaneously, from a node below the leaf-stem abscission layer; floral bract 1-1.25 mm long; pedicel 3-3.5 mm long; ovary 0.75 mm long; sepals translucent yellow, glabrous, the dorsal sepal ovate, concave, carinate, 6.5 mm long, 3 mm wide, acuminate to the acute apex, the lateral sepals narrowly ovate, acute, carinate, 5.5 mm long, 1 mm wide, connate 1.5 mm, forming a short mentum beneath the column-foot; petals yellow with a brown midvein, obovate, the apex truncate-retuse, 2 mm long, 1.25 mm wide; lip red-brown, thick, ovate, 3 mm long, 1.3 mm wide, the apex rounded, with erect, minute, obtuse marginal lobes in the lower third with low, irregular calli extending forward to the middle, sulcate between; the truncate base hinged to the column-foot; column yellow, slender, semiterete, 1.75 mm long, the foot 1 mm long.

Etymology: From the Greek *systremmatos* (συστρεμματος), "aggregated into a ball," in reference to the appearance of the densely caespitose habit.
to a ball," in reference to the appearance of the densely caespitose habit.

Type: *ECUADOR*: LOJA: epiphytic in cloud forest south of Yangana, alt. 2250 m, 11 May 1981, *C. Luer, J. Luer, J. Kuhn, L. Kuhn & D. D'Alessandro 6143* (Holotype: SEL).

Distribution: Southern Ecuador.

This little species grows with *P. pumila* to which it is closely allied. Both species form dense tufts of tiny, overlapping leaves with hair-like racemes projecting far beyond. *Pleurothallis systremmata* differs in the retuse petals and a red-brown lip with much reduced lateral lobes with an adjacent pair of calli, the space between them sulcate, not bilamellate.

Pleurothallis tropida Luer, sp. nov.

Habitu *P. foliatae* Griseb. similis sed floribus perparvis, labello obovato infra medium tricarinato et columna apice bi-alata differt.

Etymology: From the Latin *tropis*, "a keel," referring to the carina of the lip.

TYPE: *PANAMA*: COCLE: 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).

DISTRIBUTION: Panama.

In Selbyana 3:256, 1977, a new status and combination, *P. carinilabia*, were proposed for *P. broadwayi* Ames var.*tricarinata* C. Schweinf., but a previously undescribed species was mistakenly identified as this species. Therefore, a new epithet becomes necessary for the species illustrated on page 257, figure 229, and described on page. 256.

Pleurothallis tropida differs from *P. carinilabia* (*P. broadwayi* var. *tricarinata*) by possessing a prominent basal, central carina of the lip flanked by marginal thickenings toward the base. The disc of the lip of *P. carinilabia* has a pair of oblique carinae above the middle in addition to the central carina. The column of *P. tropida* is distinctly bi-alate at the apex, whereas the column of *P. carinilabia* is wingless.

Pleurothallis vasquezii Luer, sp. nov.

Planta mediocris caespitosa pendens, caulibus secundariis flaccidis folio crasso lineari-elliptico plusminusve aequilongis, racemis brevibus paucifloris, ovario nigropubescenti, sepalis viridibus anguste ovatis libris intus breviter pubescentibus, petalis obovatis trilineatis, labello spatulato arcuato tricarinato.

Plant medium in size, epiphytic, caespitose, pendent; roots slender, flexuous. Secondary stems descending, slender, flexible, unifoliate, 6-13 cm long, with a close, thin, tubular sheath below the middle and another sheath at the base. Leaf pendent, thickly coriaceous, linear-elliptical, more or less slightly curved upward, 8-13 cm long, 0.7-1.0 cm wide, the apex acute, tridenticulate, the base narrowly cuneate, more or less twisted above the junction with the secondary stem. Inflorescence pendent, racemose, 1-2 flowering racemes often produced among old peduncles, 3-5 cm long including the peduncle, 3- to 6-flowered, from a fugacious spathe ca. 5 mm long at the base of the leaf; floral bract 2-2.5 mm long; pedicel 4 mm long; ovary 4 mm long, dark green with black dots and a minute black pubescence; sepals free, light green with black dots, subcarinate and glabrous externally, with a fine, short, white pubescence within above the middle, the dorsal sepal narrowly ovate, obtuse, 13 mm long, 3 mm wide, the lateral sepals narrowly ovate, slightly oblique, 12 mm long, 2.75 mm wide, the apex narrowly obtuse; petals light green, obovate-spatulate, 4 mm long, 1.5 mm wide, the rounded apex cellular-ciliate, the 3 veins purple and subcarinate externally; lip light green with a thin purple line on the margins and lateral carinae, pyriform-spatulate, 4.5 mm long, 1.5 mm wide, arcuate, the rounded apex glandular-cellular, with a pair of low carinae above the middle and a low, uncolored, central carina, the base narrowed into a claw, hinged to the column-foot; column greenish-white margined with purple, semiterete, 3.5 mm long, the foot 2 mm long, dotted with purple.

ETYMOLOGY: Named in honor of Roberto Vásquez Ch. of Cochabamba, Bolivia, illustrator of the *Orchids of Bolivia*, who discovered this species.

TYPE: *BOLIVIA*: LA PAZ: Prov. of Inquisivi, epiphytic in cloud forest between Inquisivi and Circuata, alt. 2550 m, 29 Jan. 1981, cult. at SEL, 81-524, flowered 5 March 1981, *C. Luer, J. Luer, E. Besse and R. Vásquez 5971* (HOLOTYPE: SEL).

DISTRIBUTION: Bolivia.

The comparatively heavy, thick, narrow leaves hang from flexible sec-

ondary stems, and the short racemes of rather large, light green flowers are also pendent. Except for the color, the flowers are very similar to those of *P. brittonii* Rolfe, but the latter is an erect plant with erect racemes longer than the leaves.

Pleurothallis viduata Luer, sp. nov.

Planta mediocris caespitosa doctrina habitationis viduata, caulibus secundariis acute ancipituis foliis ovatis decurrentibus longioribus, floribus albis successivis fasciculatis longipedicellatis, sepalo dorsali synsepaloque ovatis acutis similibus, petalis obliquis cum macula purpurea pubescenti, labello atropurpureo suborbiculato columna semitereti apoda multiminore.

Plant medium-sized, epiphytic, caespitose; roots slender, flexuous. Secondary stems erect, sharply ancipitous, terete below, 7-18 cm long, 6 mm deep above, unifoliate, with 2-3 tubular sheaths above the base. Leaf erect, coriaceous, ovate, 7-9 cm long, 3-4.5 cm wide, the apex acute, tridenticulate, the rounded base decurrent on the secondary stem for 0.8-2 cm. Inflorescence a succession of solitary, long-pedicellate flowers borne in a fascicle from the apex of the secondary stem well above the lower margins of the leaf; spathe 5-6 mm long; peduncles 2.5-3.5 cm long; floral bracts 7-8 mm long, pedicels 4.5-5 cm long; ovary 3 mm long; sepals white, lightly marked with purple, lightly subverrucose externally, the doral sepal ovate, acute, 12 mm long, 5 mm wide, the lateral sepals connate into an ovate, acute synsepal 11 mm long, 5.5 mm wide; petals white, glandular-cellular, with an irregular patch of purple, microscopic pubescence on the lower, inner third, ovate, oblique, acute, 9 mm long, 2.5 mm wide; lip maroon, minute, suborbicular, 1 mm long, 1 mm wide, the rounded margins thick, the disc with a thick, rounded, bilobed callus, the truncate base hinged to the base of the column; column white, mottled with rose, semiterete, 2 mm long, the anther and stigma apical, without a foot.

Etymology : From the Latin *viduatus*, "lost, deprived," in allusion to the missing collection data.

Type : *ECUADOR*: without locality, cultivated at SEL, flowered in cult. 12 Nov. 1980 *C. Luer 5596* (Holotype : SEL).

Distribution : Ecuador.

This interesting relative of *P. crocodiliceps* Rchb. f. was collected in Ecuador two or three years ago and has been in cultivation at SEL. The plant now flowers repeatedly, but unfortunately, the label with the collection data has been lost. The most likely source of the plant is the eastern slopes of the Andes. Perhaps we shall find it again some day.

Pleurothallis yanganensis Luer, sp. nov.

Planta parva caespitosa, caulibus secundariis gracilibus vaginis lepanthiformibus, racemo paucifloro foliis ellipticis longiore, sepalis aurantiacis brunneo nervatis, sepalo dorsali ovato concavo breviter acuminato, lateralibus anguste ovatis acutis semiconnatis, petalis oblongis truncatis, labello ovato truncato unguiculato marginibus infra medium incrassatis.

Plant small, epiphytic, caespitose; roots slender, flexuous. Secondary stems unifoliate, slender, 2-4.5 cm long, enclosed by 2-4 close, ribbed sheaths dilated above, the ribs and margins minutely ciliate. Leaf erect, coriaceous, elliptical, 15-20 mm long including a 1 mm long petiole, 5 mm wide, the acute apex tridenticulate, cuneate below into the petiole. Inflorescence a 2- to 5-flowered raceme 1-3 cm long including the capillary peduncle, from a

node below the leaf-stem abscission layer; floral bract oblique, acute, 2.5 mm long; pedicel 1.5-2 mm long; ovary 0.75 mm long; sepals translucent yellow-orange with brown veins, glabrous, the dorsal sepal ovate, concave, carinate, shortly acuminate, acute, 8 mm long, 4.5 mm wide expanded, the lateral sepals narrowly ovate, acute, 7 mm long, connate to near the middle, 3 mm wide together; petals translucent pale orange with a brown midvein, oblong, truncate, 2.5 mm long, 1 mm wide; lip suffused with brown, ovate, the apex truncate, the base unguiculate, the sides below the middle elevated and thickened, 4 mm long, 1.75 mm wide; column slender, semiterete, 2.75 mm long, the foot 1 mm long.

Etymology: Named for the village of Yangana in the vicinity of the forest where the species was discovered.

Type: *ECUADOR*: LOJA: epiphytic in cloud forest south of Yangana, alt. 2550 m, 11 May 1981, *C. Luer, J. Luer, J. Kuhn, L. Kuhn & D. D'Alessandro 6150* (Holotype: SEL).

Distribution: Southern Ecuador.

This little species may be distinguished from its numerous, lepantiform-stemmed relatives by the few-flowered racemes of comparatively large, orange flowers with brown veins; the broad, shortly acuminate dorsal sepal much wider than the combined lateral sepals which are semiconnate; and the truncate petals and truncate lip with thickened margins below the middle.

Scaphosepalum ophidion Luer, sp. nov.

Planta mediocris grandisve caespitosa, pedunculo ascendenti descendentive gracili glabro foliis ellipticis longipetiolatis breviore vel subaequilongo, floribus parvis successivis guttatis racemo densifloro flexuoso, sepalo impari clavato, synsepalo concavo bifurcato pulvinis parvis caudis spiculatis brevibus, petalis ovatis obliquis apiculatis, labello subpandurato bicristato, lobo antico obovato, lobis lateralibus obtusis basi truncato.

Plant medium to large in size, epiphytic, caespitose; roots slender, flexuous. Secondary stems slender, erect, unifoliate, 2.5-5 cm long, enclosed by 2-3 tubular sheaths. Leaf erect, thinly coriaceous, elliptical, long-petiolate, 8-21 cm long including the 4-9 cm long petiole, 2-4 cm wide, the apex acute, tridenticulate, the base cuneate into the channeled petiole. Inflorescence an erect, ascending or descending, gradually lengthening, fractiflex, successively closely-flowered raceme of small flowers, 7-20 cm long including the slender, glabrous, distantly bracted peduncle, from a node low on the secondary stem; floral bract slender, acute, 4-5 mm long; pedicel 4-5 mm long; ovary green with purple spots, 3.5-5 mm long; sepals and petals light yellow or light green, spotted with purple, glabrous; middle sepal ovate, tricarinate, concave below the middle, clavate above the middle with the sides reflexed and suffused with purple, the obtuse apex apiculate, 6-8 mm long, 2-3 mm wide; lateral sepals connate into a more or less ovate, bifid, quadricarinate, concave synsepal 5-6 mm long, 5-7 mm wide expanded, the cushions subtriangular, 2-3 mm long, 1.5 mm wide, the acute apices contracted into shortly spiculate tails 3-4.5 mm long; petals ovate, oblique, 2.5 mm long, 1.5 mm wide, narrowly truncate at the apex, apiculate, the labellar margin dilated;lip orange, marked with red-purple, trilobed-pandurate, arcuate, 2.5 mm long, 1 mm wide, the apical lobe obovate, rounded at the apex and minutely serrulate, the lateral lobes obtuse, the disc bicristate near the middle, the truncate base hinged to the column-foot; column green, spotted with purple, arcuate, semiterete, 3 mm long, longitudinally winged above the middle, the apex denticulate, the thick foot 1.5 mm long.

ETYMOLOGY : From the Greek *ophidion*, (*οφιδιον*), "a little snake," in allusion to the appearance of the flower with bared fangs.

TYPE: *ECUADOR*: PICHINCHA : epiphytic in cloud forest above Mindo, western slopes of the Andes, alt. 2200 m, 15 Oct, 1979, A. Hirtz & A. Andretta s.n., *C. Luer 4318* (HOLOTYPE: SEL); same area, 11 Nov. 1979, *C. Luer, J. Luer & A. Hirtz 4747* (SEL).

ADDITIONAL MATERIAL SEEN : *ECUADOR*: CARCHI : epiphytic in cloud forest above Maldonado, alt. 2500 m, W. Teague, s.n., cultivated in San Francisco, Calif., flowered in cult. 19 Aug. 1979, *C. Luer 4108* (SEL); *COLOMBIA*: NARINO : epiphytic in cloud forest above Ricuarte, alt. 1600 m, 3 Nov. 1979, *C. Luer, J. Luer, K. Walter & A. Hirtz 4607* (SEL); without locality, cultivated by Amalia Lehmann de Sarria in Popayan, flowered in cult. 25 July 1978, *C. Luer 3011* (SEL).

DISTRIBUTION: Southwestern Colombia and northwestern Ecuador.

Although vegetatively this species resembles *S. swertiaefolium* (Rchb. f.) Rolfe, the small flowers are more similar to those of Central American species: short sepaline tails, a clavate middle sepal, and a pandurate lip.

Scaphosepalum tiaratum Luer, sp. nov.

Planta grandis caespitosa, pedunculo crasso verrucosissimo foliis anguste ellipticis longipetiolatis multilongiore, floribus successivis purpureo guttatis verrucossis, ovario verrucoso, sepalo impari clavato, synsepalo supero suborbiculato superne saccato cum caudis aequilongis et pulvinis parvis, petalis dolabriformibus, labello panduriformi bicristato et columna prope medium acute alata.

Plant medium to large in size, presumably epiphytic, caespitose; roots slender, flexuous. Secondary stems stout, erect, unifoliate, 2-3 cm long, enclosed by 2-3 tubular sheaths. Leaf erect, coriaceous, narrowly elliptical, long-petiolate, 12-20 cm long including the 4-7 cm long petiole, 1.7-2.3 cm wide, the acute apex tridenticulate, the base narrowly cuneate into the petiole. Inflorescence an erect, gradually lengthening raceme of successive flowers, up to 30 cm or more tall including the stout, markedly verrucose, sparsely bracted peduncle, from a node low on the secondary stem; floral bract oblong, elongated, acute, verrucose, 7-9 mm long; pedicel verrucose, 7-10 mm long; ovary markedly verrucose, 8 mm long; sepals fleshy-rigid, verrucose externally, light green, suffused and spotted with purple; middle sepal ovate, concave below the middle, tricarinate, contracted near the middle, clavate above the middle with the sides revolute, the obtuse apex uncinate-apiculate; lateral sepals connate into a concave, suborbicular synsepal 10 mm long, 10 mm wide unspread, the margins minutely ciliate, connate to form a well-demarcated, saccate "turban" above the column-foot, the rounded apices abruptly contracted into diverging, verrucose tails 12 mm long, the cushions comparatively small, narrowly triangular, amber-colored, each 5 mm long, 2.5 mm wide; petals yellow, spotted with purple, irregularly ovate, 5 mm long, 3 mm wide, the apex obliquely apiculate, the labellar margin dilated; lip greenish white, heavily suffused with purple below the middle, panduratetrilobed, arcuate, 4 mm long, 2 mm wide, the apical lobe suborbicular, dotted with purple, denticulate, the lateral lobes subacute, denticulate, the disc with a tall, parallel pair of serrated crests near the middle, the truncate base bilobulate, hinged to the column-foot; column purple, arcuate, semiterete, 5 mm long, longitudinally winged above acutely angled wings near the middle, the apex lacerate, the thick foot 3 mm long.

ETYMOLOGY : From the Latin *tiaratus*, "turbaned," in allusion to the appearance of the uppermost synsepal.

TYPE: *COLOMBIA*: without locality, imported from Colombia by Broersma in the Netherlands, cultivated by B. Wuerstle in Fuerstenfeldbruck, Germany, flowered in cult. 20 May 1980, *C. Luer 5255* (HOLOTYPE : SEL).

DISTRIBUTION : Colombia.

This large species, similar to *S. pulvinare* (Rchb. f.) Rolfe and its relatives, may be distinguished by the markedly verrucose ovary, the clavate middle sepal, the posteriorly saccate synsepal, the tall crests of the lip, and the acutely angled wings of the column.

Stelis acicularis Luer, sp. nov.

Planta mediocris caespitosa, caulibus secundariis foliis ellipticis brevioribus, racemo gracili elongato laxe plurifloro, floribus parvis, sepalis similibus patentibus alboviriscentibus roseo suffusis ovatis obtusis breviter pubescentibus, petalis transverse oblongis apice incrassitis, labello crasso transverse oblongo apice rotundato apiculo aciculari, columna crassa lobis stigmatis confluentibus.

Plant medium in size, epiphytic, shortly scandent to caespitose. roots slender, flexuous. Secondary stems erect, unifoliate, 2-4 cm long, enclosed by a brown, tubular sheath and a shorter sheath below. Leaf erect, coriaceous, elliptical, 5-7 cm long including the 0.5-1 cm long petiole, 1.5-2 cm wide, the apex subacute, tridenticulate, cuneate below into the petiole. Inflorescence a slender, erect, distichous, loosely-flowered, subflexuous raceme 15-20 cm long including the peduncle ca. 8 cm long, from a short spathe near the apex of the secondary stem; floral bract thin, 1.5 mm long; pedicel 1.5 mm long; ovary 2 mm long; sepals similar, widespread, greenish white, suffused with rose centrally, shortly pubescent, broadly ovate, obtuse, the dorsal sepal 2 mm long, 2.2 mm wide, the lateral sepals 2 mm long, 2 mm wide, all sepals 3-veined, connate basally; petals greenish white, suffused with rose at the apex, transversely oblong, the apical margin broadly rounded, thickened, 0.6 mm long, 0.9 mm wide; lip rose, thick, transversely oblong, 0.5 mm long, 0.6 mm wide, shallowly concave anteriorly, the apex broadly rounded, with a very slender apiculum directed forward beneath the rostellum, the disc callous-thickened, with a shallow, longitudinal groove curving forward over the callus as the glenion, the base truncate; column stout, 0.5 mm long, 0.5 mm wide, the anther cap proportionately large, the stigmatic lobes confluent.

ETYMOLOGY . From the Latin *acicularis*, "with a needle-like point," referring to the apiculum of the lip.

TYPE: *ECUADOR*: MANABI: epiphytic in forest on Cerro Monticristi, alt. ca. 500 m, 27 Feb. 1977, cult. at SEL, 77-2663, flowered in cult. 9 Sept. 1977, *C. Luer, J. Luer & K. Cordoba 1828* (HOLOTYPE : SEL).

DISTRIBUTION . Western Ecuador.

This species is remarkable in the needle-like apiculum which projects from the rounded apex of the lip under the rostellar flap above. The stigmatic lobes are confluent centrally.

Stelis butcheri Luer, sp. nov.

Planta grandis caespitosa, caulibus secundariis robustis folio elliptico acuto longioribus, racemo longissimo dense multifloro subflexuoso usque 70 cm longo, floribus plus minusve decem simul apertis pallide flavovires-

centibus pilis niveis, sepalis late ovatis obtusis similibus patentibus dense ciliatis, petalis transverse ovatis apice crassissimis rotundatis, labello crasso subquadrato apice rotundato breviter obtuse apiculato.

Plant large, epiphytic, caespitose; roots coarse, flexuous. Secondary stems erect, stout, unifoliate, 25-33 cm long, with a loose, tubular sheath near the middle and 2 other sheaths at the base. Leaf erect, coriaceous, longitudinally veined, elliptical, 12-15 cm long including a 1.5 cm long petiole, 4-6 cm wide, the apex acute, tridenticulate, the base cuneate into the channeled petiole. Inflorescence racemose, 1-2 erect, progressively lengthening, densely many-flowered, subflexuous racemes 30-70 cm long, with 8-12 relatively large, all yellow-green open simultaneously, from a spathe 1.5-2 cm long at the base of the leaf; floral bract oblique, acute, 4-6 mm long; pedicel 3-5 mm long; ovary 2-3 mm long; sepals similar, widespread, glabrous except for the densely white-ciliate margins, broadly ovate, obtuse, the dorsal sepal 4 mm long, 4.5 mm wide, the lateral sepals 3 mm long, 3.5 mm wide, connate basally; petals transversely ovate, markedly thickened and widened at the broadly rounded apex, cellular-glandular, 1.5 mm long, 2 mm wide; lip thick, subquadrate, 1 mm long, 1 mm wide, shallowly concave anteriorly, the apex broadly rounded with a short, obtuse apiculum, the disc callous-thickened with a glenion anteriorly, the truncate base hinged to the base of the column; column stout, 1 mm long, 1 mm wide, the stigmatic lobes diverging to either side of the rostellar flap.

Etymology : Named in honor of Henry Butcher of Volcán, Chiriqui, Panamá, avid orchid enthusiast, who discovered this species.

Type: *PANAMA*. Chiriqui: epiphytic in cloud forest above Guadalupe, alt. ca. 2000 m, 1 Sept. 1976, H. Butcher, s.n., *C. Luer 1101*(Holotype: SEL); same area, 13 Sept. 1976, *C. Luer & H. Butcher 1204* (SEL).

Distribution : Western Panama.

This huge, showy species is remarkable in the gradually lengthening raceme of relatively large, yellow-green flowers with densely ciliated margins, the hairs being white. About ten closely packed flowers are open simultaneously as the lower ones fade and the upper ones mature. Some plants reach a height of one meter.

Stelis cauda-equina Luer & Vásquez, sp. nov.

Planta magna pendens breviter repens, foliis anguste linearibus canovirescentibus caulibus secundariis flexibilibus aequilongis, vaginis pubescentibus, racemis multifloris foliis brevioribus, sepalis parvis similibus roseis pubescentibus ovatis obtusis convexis, petalis tenuibus transverse oblongis, labello apice transverse concavo apiculato disco crasso callo bilobato, stigmate bilobato.

Plant large, epiphytic, shortly repent to caespitose, pendent; roots slender, flexuous. Secondary stems descending, slender, flexible, 10-20 cm long, enclosed by a glabrous, tubular sheath above the middle and 2-3 imbricating, densely pubescent sheaths at the base. Leaf pendent, dull gray-green, coriaceous, narrowly linear-elliptical, 15-22 cm long, 1.2-1.6 cm wide, the acute apex tridenticulate, gradually narrowed to the base. Inflorescence racemose, 1-3 pendent, densely many-flowered racemes produced among numerous old rachises, flowering nearly to the base, 6-15 cm long, from a spathe 15-18 mm long at the base of the leaf; floral bract oblique, infundibular, 2-3 mm long; pedicel 2 mm long; ovary 1.5 mm long; sepals similar, rose, shortly pubescent within, ovate, obtuse, convex, 2.5 mm long, 2.5 mm wide, 3-veined, widespread, free except at the base; petals transversely oblong, thin, concave, 1 mm

long, 1.4 mm wide, the transversely obtuse apex minutely apiculate; lip rose, obovate, 1.25 mm long, 1.1 mm wide, the apical portion transversely oblong, thin, concave, the incurved margin with a minute apiculum, callous-thickened and bilobed from above the middle to the truncate base; column stout, 1 mm long, 1.25 mm wide, the stigma bilobed.

ETYMOLOGY : From the Latin *cauda equina*, "a horsetail," in allusion to the appearance of the plant.

TYPE. *BOLIVIA*: LA PAZ : Sud Yungas, epiphytic in scrubby cloud forest above Unduavi, alt. 3200 m, 28 Jan. 1980, *C. Luer, J. Luer, R. Vásquez & R. Lara 4992* (HOLOTYPE : SEL).

DISTRIBUTION : Bolivia.

The rhizome of this species is shortly creeping, but the great masses of pendent, long, narrow, gray-green leaves and stems produce a spectacular plant. The basal cauline sheaths are densely pubescent. Numerous many-flowered racemes, shorter than the leaves, hang among the leaves. The small flowers are sparkling rose with similar, obtuse sepals, and concave, apiculate petals and lip.

Stelis cubicularia Luer & Vásquez, sp, nov.

Planta parva dense caespitosa, foliis anguste ellipticis caulibus secundariis subaequilongis, racemis binis duplo longioribus bifariis, floribus parvis flavis glabris, sepalo dorsali ovato, synsepalo ovato obtuso profunde concavo, petalis oblongis apice rotundatis concavis, labello ovato concavo apice acuto incurvo.

Plant small, epiphytic, densely caespitose, roots slender, fasciculate. Secondary stems slender, appoximate, erect, unifoliate, 5-7 cm long, with a tubular sheath from below the middle and 2 other tubular sheaths near the base. Leaf erect, coriaceous, narrowly elliptical, 4-5.5 cm long, 6-8 mm wide, the apex acute, tridenticulate, the base narrowly cuneate into a petiole 0.5-1 cm long. Inflorescence racemose, 2 (occasionally 1) slender, erect, densely many-flowered racemes 6-10 cm long including a peduncle 2-3 cm long, from a fugacious spathe 8-9 mm long near the apex of the secondary stem; floral bract oblique, acute, 2 mm long; pedicel and ovary each 1 mm long; flowers small, yellow, glabrous, held perpendicular to the rachis in 2 rows; dorsal sepal ovate, narrowly obtuse, apiculate, 2.3 mm long, 1.5 mm wide, 3-veined; lateral sepals connate to near the apex into a deeply concave, ovate synsepal, the apex rounded, minutely cleft, 2 mm long, 1.5 mm wide unspread; petals oblong, 0.75 mm long, 0.5 mm wide, the apex rounded, smooth, thickened, concave; lip ovate, 0.9 mm long, 0.75 mm wide, the rounded basal angles more or less lobulate, broadly concave from the transverse callus above the base to the acute, incurved apex, the dorsum flat to the truncate base; column stout, 0.5 mm long, with a protruding rostellar flap, the stigma bilobed.

Etymology: From the Latin *cubicularius*, "like a bedchamber," in allusion to the concave synsepal nearly filled with the central apparatus.

Type: *BOLIVIA*: LA PAZ: Prov. of La Paz, epiphytic in cloud forest along the Río Zongo, alt. 2600 m, 27 Jan. 1980, *C. Luer, J. Luer, R. Vásquez & R. Lara 4968* (Holotype: SEL).

Distribution: Bolivia.

This little species with its small flowers held transversely closely together in two rows is most remarkable in the deeply concave synsepal nearly filled with the petals, lip and column.

Stelis debilis Luer, sp. nov.

Planta parva scandens debilis, foliis ellipticis caulibus secundariis brevibus longioribus, racemo laxe paucifloro folium duplo superanti, floribus flavis perparvis, sepalis ovatis subacutis, petalis hastatis apice inscrassatis, labello crasso hastato apice rotundato.

Plant small, epiphytic, scandent, weak, the primary stem slender, flexuous, 5-13 mm long between secondary stems, with 2-3 loose, tubular sheaths; roots slender, flexuous. Secondary stems ascending, suberect, 8-15 mm long, enclosed by 2 loose, imbricating, tubular sheaths. Leaf suberect, elliptical, coriaceous, 15-25 mm long including the 5-7 mm long petiole, 5-6 mm wide, the subacute apex tridenticulate, the base cuneate into the slender petiole. Inflorescence a weak, suberect, loosely few-flowered raceme 4 cm long including the capillary peduncle ca. 2 cm long, from a node near the apex of the secondary stem; floral bract 1 mm long; pedicel 1 mm long; ovary 0.5 mm long; sepals similar, yellow, glandular-cellular within, ovate, subacute, connate basally, the dorsal sepal 1.75 mm long, 1.75 mm wide, 3-veined, the laterals oblique, 1.5 mm long, 1.5 mm wide; petals triangular-hastate, 0.6 mm long, 0.75 mm wide, the subacute apex thickened, the margin flattened, with silver particles; lip thick, triangular-subhastate, 0.6 mm long, 0.6 mm wide, 0.3 mm deep, narrowed to the rounded apex, the anterior surface slightly concave, the dorsum with a low, rounded callus continuing forward across the central callus as the glenion; column stout, 0.5 mm long, 0.75 mm wide across the bilobed stigma.

Etymology: From the Latin *debilis*, "weak," referring to the habit of the plant.

Type: *ECUADOR*: MORONA-SANTIAGO: epiphytic in rain forest near Río Calagras, alt. 1600 m, 19 Sept. 1980, *C. Luer, J. Luer, C. Dodson, A. Andreetta et al. 5486* (Holotype: SEL).

Distribution: Southeastern Ecuador.

This weak, little species is characterized by the thin, flexible rhizome bearing at intervals short, slender stems. The little, elliptical leaves are surpassed by the few-flowered raceme borne by a hair-like peduncle. The yellow sepals are cellular-pubescent within and the petals and lip are more or less hastate in shape.

Stelis dressleri Luer, sp. nov.

Species haec *S. morganii* Dodson & Garay persimilis sed sepalis glabris, petalis labelloque breviter pubescentibus et labello minute apiculato differt.

Plant small to medium in size, epiphytic, shortly scandent, the rhizome erect, concealed by loose, tubular sheaths, 1-2 cm long between secondary stems. Secondary stems erect, unifoliate, 2-2.5 cm long, enclosed by 2 brown, loose, tubular sheaths. Leaf erect, coriaceous, ovate-oblong, 3-5.4 cm long including a 0.5-1 cm long, twisted petiole, 1.5-2 cm wide, the apex subacute to rounded, tridenticulate, the base more or less abruptly rounded above the petiole. Inflorescence racemose, 1-2 short, distichous, densely many-flowered racemes borne along the back surface of the leaf; floral bract thin, inflated, 1.5 mm long, enclosing the pedicel 1 mm long and the ovary 0.5 mm long; sepals glabrous, greenish white, transversely ovate, widely spread into a flat, suborbicular flower, each ca. 1.1 mm long, 2.1 mm wide, the apices obtuse, the bases connate below the middle; petals greenish white, transversely obovate, obtuse, 0.6 mm long, 0.8 mm wide, the thickened margin well demarcated, shortly pubescent; lip cream, suffused with rose centrally, thick, transversely ovate, 0.5 mm long, 0.5 mm wide, with a transverse thickening across

the middle, shallowly concave above the middle, glandular-cellular to minutely ciliate, the apex rounded with a short, obtuse apiculum, the disc with a low callus above the base continuous with a well-developed glenion over the transverse thickening; column stout, 0.5 mm long, 0.5 mm wide, the stigma with 2 small, red lobes.

ETYMOLOGY : Named in honor of Robert L. Dressler of the Smithsonian Tropical Research Institute, co-discoverer of the species.

TYPE : *PANAMA*: VERAGUAS : epiphytic in cloud forest above Santa Fe, alt. ca. 700 m, 5 Sept. 1976, *C. Luer & R. L. Dressler 1146* (H OLOTYPE : SEL).

DISTRIBUTION : Panama.

This plant was cited in Icones Plantarum as *S. morganii* occurring in Panama, but, although the two species are inseparable vegetatively, the glabrous sepals, pubescent petals, and minutely apiculate lip immediately distinguish *S. dressleri.*

Stelis elegans Luer & Vásquez, sp. nov.

Planta grandis, rhizomate crasso breviter repenti, caulibus secundariis foliis subaequilongis, racemo longissimo dense multifloro bifario, floribus flavis mediocris rotundatis, sepalis similibus ovatis obtusis pubescentibus, marginibus recurvatis, petalis transverse oblongis, labello transverse oblongo apice rotundato apiculato disco bicalloso basin versus pubescenti.

Plant large, epiphytic, the rhizome stout, branching, ascending, shortly repent, 0.5-2 cm long between secondary stems; roots slender, flexuous. Secondary stems ascending to erect, 6-9 cm long, enclosed by 3 imbricating, tubular sheaths. Leaf erect, coriaceous, narrowly elliptical, 7-12 cm long, 1.5-2.3 cm wide, the subacute apex tridenticulate, the base narrowly cuneate into a petiole 1-1.5 cm long. Inflorescence a slender, erect, densely many-flowered, distichous raceme 15-25 cm long including the peduncle 8-10 cm long, from a spathe 12-22 mm long near the apex of the secondary stem; floral bract oblique, acute, 4 mm long; pedicel 1 mm long, ovary 1.5 mm long; flowers yellow, rounded in outline; sepals similar, ovate, obtuse, shortly pubescent, the margins recurved, 3-veined, the dorsal sepal 3.25 mm long, 2.75 mm wide, the laterals 2.75 mm long and wide, connate basally; petals transversely oblong, 1 mm long, 1.6 mm wide, thickened above the middle, the apex broadly obtuse to truncate, the 3 veins prominent externally; lip thick, transversely oblong, 1 mm long, 1.2 mm wide, 0.5 mm thick, the apex broadly rounded with a small, obtuse apiculum, the disc mostly filled by a bilobed callous thickening, rounded and pubescent on top toward the truncate base; column stout, the stigma bilobed.

Etymology: From the Latin *elegans*, "elegant," referring to the handsome quality of the plant.

Type: *BOLIVIA*: LA PAZ: Prov. of La Paz, epiphytic in cloud forest along the Río Zongo, alt. 2600 m, 27 Jan. 1980, *C. Luer, J. Luer, R. Vásquez & R. Lara 4966* (Holotype: SEL).

Distribution: Bolivia.

This large, handsome species may be recognized by the long raceme of rounded, yellow, pubescent flowers in two close rows. The sepals are reflexed, the petals and lip are transversely oblong, and the disc of the lip is filled with a pair of rounded, pubescent calli.

Stelis fasciculata Luer, sp. nov.

Species haec *S. mononeurae* Lindl. similis sed habitu dense fasciculato, sepalis trinervatis et petalis oblongis apice rotundatis concavis non scabris differt.

Plant medium-sized, epiphytic to terrestrial, densely caespitose; roots slender, densely fasciculate.Secondary stems slender, erect, approximate, unifoliate, 9-17 cm long, with a close, tubular sheath from near the middle plus 2 others below. Leaf erect, coriaceous, narrowly elliptical, 5-7 cm long including the petiole ca. 1 cm long, 1.2-1.5 cm wide, the acute apex tridenticulate, the base narrowly cuneate into the petiole. Inflorescence racemose, 3-6 erect, densely many-flowered, simultaneous racemes 6-10 cm long from a 5-6 mm long spathe near the apex of the secondary stem; floral bract oblique, 3 mm long; pedicel 2 mm long; ovary 1 mm long; sepals light green, pubescent within, ovate, 3-nerved, the apices obtuse to rounded, the dorsal sepal 2.25 mm long, 1.25 mm wide, the lateral sepals 2 mm long, 1.3 mm wide, connate only at the base, the laterals held forward in the natural position; petals oblong-obovate, 0.8 mm long, 0.5 mm wide, the thickened apex rounded, smooth, concave; lip thick, subpentagonal, 0.6 mm long, 0.5 mm wide, 0.4 mm thick, the apex obtuse, the anterior surface concave below a cleft, transverse bridge, with a rounded callus on top at the base; column stout, the stigma bilobed.

Etymology. From the Latin *fasciculatus*, "growing in bundles," referring to the fasciculated secondary stems and racemes.

Type: *ECUADOR*: NAPO: terrestrial on the road embankment below Papallacta, alt. 2770 m, 15 May 1981, *C. Luer, J. Luer, J. Kuhn & L. Kuhn 6230* (Holotype: SEL).

Distribution: Eastern Ecuador.

This species is similar to *S. mononeura*, but *S. fasciculata* differs in the fasciculate habit, the three-nerved sepals, and the oblong petals (longer than wide) with a smooth, rounded, concave apex. The lips of the two species are basically similar.

Stelis hirtella (Garay) Luer, comb. nov.
Stelis hirta Lindl., Folia Orchid. Stelis 3. 1858, not J. E. Smith 1816.
Apatostelis hirtella Garay, Bot. Mus. Leafl. 27: 189. June 1980.

Stelis loculifera Luer, sp. nov.

Planta mediocris grandisve caespitosa, caulibus secundariis foliis ellipticis acutis longipetiolatis longioribus, racemo longissimo disticho dense multifloro, floribus purpureis, sepalis similibus ovatis obtusis nonpatentibus basibus in loculum brevem connatis intus breviter pubescentibus, petalis flabellatis, labello subquadrato apice subacuto disco transverse incrassato supra basin callo bilobato, columna brevi lobis stigmatis confluentibus.

Plant medium to large in size, epiphytic, caespitose; roots numerous, fine, flexuous. Secondary stems slender, erect, unifoliate, 8-14 cm long, with a loose, tubular sheath near the middle and 1-2 other sheaths at the base. Leaf erect, coriaceous, elliptical, long-petiolate, the petioles slender, 2.5-3.5 cm long, the blade 6-8 cm long, 1.8-2.5 cm wide, the apex acute, tridenticulate, cuneate below into the petiole. Inflorescence an erect, densely many-flowered, distichous raceme 20-28 cm long including the peduncle ca. 5 cm long, from a spathe 12-15 mm long near the apex of the secondary stem; flo-

ral bract 2-3 mm long; pedicel sharply angled, 1.5 mm long; ovary 1 mm long; sepals purple, similar, not widely spread, minutely glandular-pubescent within, ovate, obtuse, the dorsal sepal 4 mm long, 3 mm wide, the lateral sepals 3 mm long, 2.5 mm wide, connate basally to form a short, rounded, sepaline tube; petals flabellate, 0.6 mm long, 0.8 mm wide, the apex broadly truncate with a thickened margin; lip thickly subquadrate, triangular in the lateral view, 0.6 mm long, 0.5 mm wide, the apex subacute, more or less incurved, the disc transversely fleshy-thickened, protruding slightly from the non-concave anterior surface, with a low, bilobed callus on top near the base, shallowly cleft between, continuing anteriorly as the glenion; column stout, 0.5 mm long, 0.5 mm wide, the stigmatic lobes confluent centrally.

ETYMOLOGY . From the Latin *loculus*, "a small cavity," and *-fer*, "-bearing," referring to the small sepaline tube.

TYPE: *PANAMA*: CHIRIQUI: 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).

DISTRIBUTION: Western Panama.

This species may be recognized by the slender secondary stems longer than the long-petiolate leaves; a very long, many-flowered raceme of purple flowers; similar, non-spreading sepals connate basally into a short sepaline tube filled with the remaining floral parts; flabellate petals; a thick, subquadrate lip with a bilobed callus on top; and a column with centrally confluent stigmatic lobes.

Stelis maloi Luer, sp. nov.

Planta parvula caespitosa, racemo paucifloro foliis ellipticis longiore, sepalis similibus atropurpureis late ovatis obtusis basin versus in cupulam connatis, petalis flavis orbicularibus membranaceis, labello flavo oblongo concavo cum callo basali transversali crassissimo verruculoso.

Plant small, epiphytic, caespitose; roots slender, flexuous. Secondary stems slender, unifoliate, 5-10 mm long, enclosed by 2 loose, imbricating, tubular sheaths. Leaf erect, coriaceous, elliptical-obovate, 15-22 mm long including the petiole ca. 5 mm long, 5-7 mm wide, the apex subacute, tridenticulate, the base cuneate into the slender petiole. Inflorescence a loose, few-flowered raceme 2.5-3.5 cm long including the filiform peduncle, from a node on the secondary stem; floral bract 1.5 mm long; pedicel 1 mm long; ovary purple, 1 mm long; sepals similar, dark purple externally, dull purple within, glabrous, broadly ovate, obtuse, 2 mm long, the dorsal 1.75 mm wide, the laterals 1.5 mm wide, all connate basally to form a cup; petals translucent light yellow, orbicular, shallowly concave, membranous, 1.1 mm long, 1.1 mm wide; lip light yellow, thick, oblong, concave, the apex rounded, 1.1 mm long, 1.1 mm wide, with a thick, minutely verrucose, transverse, basal callus across the lower third, fringed on the basal margins; column stout, 0.5 mm long and broad.

Etymology: Named in honor of Benigno Malo of Cuenca, Ecuador, who discovered and cultivated this species.

Type: *ECUADOR*. ZAMORA-CHINCHIPE: epiphyte in cloud forest between Loja and Zamora, alt. ca. 1500 m, collected and cultivated by B. Malo at Tarqui, flowered in cult. 5 May 1981, *C. Luer 6095* (Holotype: (SEL).

Distribution: Southern Ecuador

This little species may be recognized by the small, dark purple sepals connate basally into a sepaline cup from which the light yellow, rounded, membranous petals protrude. The lip is concave in front of a thick, transverse, basal callus.

Stelis megalocephala Luer, sp. nov.

Planta pusilla caespitosa, vaginis caulium secundariorum duobus imbricatis costatis minute scaberulis, racemo paucifloro folio elliptico breviore, floribus purpureis pro planta grandibus, sepalo dorsali orbuculari sepalis lateralibus ovatis obtusis majore, petalis transverse ovatis apice incrassatis, labello transverse oblongo apice rotundato disco transverse incrassato callo parvo pubescenti supra basin.

Plant small, epiphytic, caespitose; roots slender, flexuous. Secondary stems unifoliate, abbreviated, 3-8 mm long, enclosed by 2 loose, imbricating, tubular, ribbed sheaths. slightly more inflated toward the apex, microscopically scabrous on the ribs and margins of the ostium. Leaf erect, coriaceous, elliptical, 10-20 mm long including the 3-4 mm long petiole, 5-8 mm wide, the apex obtuse, tridenticulate, the base cuneate into the petiole. Inflorescence a lax raceme, up to 12 mm long, of 2-4 successive, comparatively large, purple, glabrous flowers, from a node near the apex of the secondary stem; floral bract oblique, acute, 2 mm long; pedicel 2 mm long; ovary 1.5 mm long; dorsal sepal orbicular, convex, the apex rounded, 5 mm long, 5 mm wide, 5-(7-)veined; lateral sepals ovate, obtuse, low-carinate externally, 4 mm long, 2.5 mm wide, connate 1 mm; petals transversely oblong-ovate, 1.25 mm long, 1.5 mm wide, fleshy, the apex broadly rounded and thickened; lip thick, transversely oblong-ovate, 0.5 mm long, 1.25 mm wide, 0.8 mm thick, shallowly concave anteriorly, the apex rounded with a thickened margin, the disc fleshy-thickened transversely, with a small, rounded, pubescent callus on top toward the base and continuous with the glenion anteriorly; column stout, 1 mm long, 1.25 mm wide, the stigma bilobed.

Etymology: From the Greek *megalokephalos* (μεγαλοκεφαλος), "with a large head," referring to the proportionately large dorsal sepal.

Type: *ECUADOR*: Morona-Santiago: epiphytic in rain forest near Rio Calagras, alt. 1600 m, 19 Sept. 1980, *C. Luer et al. 5500* (Holotype: SEL).

Distribution . Southeastern Ecuador.

The successively borne flowers of this small species are very large in proportion to the size of the plant. The orbicular dorsal sepal dominates the flower. Although the smaller lateral sepals are only connate basally, they protrude forward in the manner of the bilabiate-flowered species.

Stelis megaloglossa Luer, sp. nov.

Planta parva caespitosa, caulibus secundariis foliis angustissime oblongis subaequilongis, racemo arcuato dense multifloro foliis plus minusve aequilongo, floribus non-resupinatis purpureis bifariis, sepalo mediano obovato obtuso quam synsepalo transverse cordato multimajore, petalis transverse oblongis, labello ovato acuto bicalloso.

Plant small, epiphytic, caespitose; roots slender, flexuous. Secondary stems slender, erect, 5-6.5 cm long, with a tubular sheath from below the middle plus two others near the base. Leaf suberect, coriaceous, narrowly oblong-elliptical, 7-9 cm long, 5-7 mm wide, the obtuse apex notched with an apiculum, narrowly cuneate below to the subpetiolate base. Inflorescence

an arching, densely many-flowered raceme 7-9 cm long including the 2.5-4 cm long peduncle, from a 10-12 mm long spathe near the apex of the secondary stem; floral bract close, 2 mm long, pedicel and ovary each 1 mm long; flowers purple, non-resupinate, perpendicular to the rachis, arranged in 2 rows facing in opposite directions; middle sepal obovate, the apex obtuse to rounded, 5 mm long, 3.75 mm wide, 3-veined with 2 accesory lateral veins, connate 0.5 mm to the lateral sepals; lateral sepals ovate, markedly oblique, connate 0.5 mm to form a transversely cordate synsepal, 2.5 mm long, 3.75 mm wide expanded, the subacute apices free for 0.5 mm and incurved; petals transversely obovate-oblong, 0.6 mm long, 1 mm wide, the apex rounded with a flattened margin, minutely apiculate; lip ovate, 0.75 mm long, 0.4 mm wide, the disc with a central, thick, bilobed callus, concave to the acute, triangular apical portion, pubescent toward the truncate base; column stout, the stigma bilobed.

Etymology: From the Greek *megaloglossa* (μεγαλογλωσσα), "with a large tongue," referring to the proportionately large middle sepal.

Type: *COLOMBIA*: NARINO: epiphytic in cloud forest east of Ricuarte, 1800 m, 1 Nov. 1979, *C. Luer, J. Luer, K. Walter & A. Hirtz 4528* (Holotype: SEL).

Distribution: Southern Colombia.

This species, most remarkable in the "over-sized" middle sepal, seems to demonstrate a connection between *S. nexipous* Garay and the species of the bilabiate section.

Stelis odobenella Luer, sp. nov.

Planta parva caespitosa, racemo laxe plurifloro gracili foliis ellipticis petiolatis duplolongiore, sepalo dorsali purpureo ovato obtuso, synsepalo flavo ovato concavo obtuso, petalis transverse ovatis retusis margine incrassato, labello purpureo subpyramidali cum carina transverse elata antice bicallosa, lobis stigmaticis elongatissimis acutis.

Plant small, epiphytic, caespitose. roots slender, flexuous. Secondary stems slender, unifoliate, 7-17 mm long, enclosed by 2 loose, ribbed sheaths. Leaf erect, coriaceous, elliptical, petiolate, 18-35 mm long including the slender petiole 5-13 mm long, 5-8 mm wide, the apex subacute, tridenticulate, the base cuneate into the petiole. Inflorescence a slender, suberect to arching, lax raceme of 5-10 flowers, 1-3 produced simultaneously, 5-6 cm long including the filiform peduncle, from a node on the secondary stem; floral bract 1.5 mm long; pedicel 1 mm long; ovary 1 mm long; dorsal sepal purple, glabrous, broadly ovate, obtuse, 5 mm long, 4 mm wide, 3-veined; lateral sepals yellow, glabrous, connate to above the middle into a broadly ovate, concave, obtuse synsepal, 4 mm long, 4 mm wide; petals purple with 3 darker purple veins, transversely ovate with acute lateral angles, 0.5 mm long, 1.25 mm wide, the rounded apex shallowly and broadly retuse with a thickened margin; lip purple, subpyramidal, 0.5 mm long, 0.6 mm wide, 0.6 mm tall, the truncate apex with an erect, bilobed margin, the disc with a tall, transverse, erect callus with a prominent glenion at the summit and a pair of tuberosities on the anterior surface to either side, the glenion extending toward the base as a rounded callus; column stout, 0.5 mm long with a foot equally long, the stigma with a pair of protruding, slender, curved, acute processes ca. 1 mm long.

Etymology: Named for the genus of walrus, *Odobenus*, in allusion to the tusk-like stigmatic processes.

Type: *ECUADOR:* MORONA-SANTIAGO: epiphytic in wet forest, alt. 2200 m, above Limón, 17 Sept. 1980, *C. Luer & J. Luer 5456* (Holotype: SEL).

Distribution: Southeastern Ecuador.

This little species is most remarkable in the long, tusk-like processes of the stigmatic lobes. Like a pair of tiny prongs, they are held within the concave synsepal, the dorsal sepal acting like a lid above.

Stelis opercularis Luer, sp. nov.

Herba parva caespitosa, racemo laxe plurifloro gracili foliis ellipticis duplo vel triplo longiore, sepalo dorsali purpureo ovato obtuso sensibili, synsepalo flavo suborbiculari profunde concavo, petalis crassissimis transverse oblongis, labello purpureo notato transverse obovato cum carina alta transversa et callo purpureo supra basin erecto.

Plant small, epiphytic, caespitose; roots slender, flexuous. Secondary stems unifoliate, 3-4 mm long, enclosed by 1-2 thin, tubular sheaths. Leaf erect, coriaceous, elliptical-obovate, 15-25 mm long including a 5-10 mm long petiole, 6-7 mm wide, the subacute apex tridenticulate, cuneate below into the petiolate base. Inflorescence a suberect to arching, slender, laxly 5- to 11-flowered raceme 3-5 cm long including the filiform peduncle, from a node on the secondary stem, 1-3 flowers produced simultaneously, closing quickly when disturbed; floral bract red, infundibular, acute, 1 mm long; pedicel 1 mm long; ovary 1 mm long; dorsal sepal purple, glabrous, broadly ovate, obtuse, 3.5-4 mm long, 3.5-4 mm wide, 3-veined, connate basally to the synsepal for nearly 1 mm; lateral sepals pale yellow, glabrous, connate into a deeply concave, suborbicular synsepal 3 mm long, 3.5-4 mm wide unspread, the rounded apex minutely cleft; petals purple, transversely oblong, very thick, 0.3 mm long, 1.2 mm wide, the apex broadly obtuse, the surface cellular-glandular; lip light green, marked with purple, transversely obovate, 0.5 mm long, 0.75 mm wide, 0.6 mm tall, the truncate apex with an erect margin, the disc with a tall, erect, transverse carina with a glenion at the summit and an erect, purple callus on top near the base; column stout, 0.5 mm long with an equally long foot, the stigmatic lobes shortly stalked.

Etymology: From the Latin *opercularis*, "provided with a lid," referring to the sensitively hinged dorsal sepal over the concave synsepal.

Type: *ECUADOR:* MORONA-SANTIAGO: epiphytic in rain forest between Limón and Gualaquiza, alt. 1600 m, 19 Sept. 1980, *C. Luer, J. Luer, C. Dodson et al. 5500* (Holotype: SEL).

Distribution: Southeastern Ecuador.

This little species may be recognized by the purple lid-like dorsal sepal which closes over a deeply concave, bowl-like synsepal in the afternoon or when disturbed, especially when moved into drier air.

Stelis pachyrrhiza Luer & Vásquez, sp. nov.

Planta terrestris caespitosa, radicibus crassissimis, foliis anguste ellipticis caulibus secundariis subaequilongis, racemis paucis elongatis erectis dense multifloris, sepalis similibus, flavis, ovatis, obtusis, ciliatis, petalis atropurpureis flabellatis apice rotundatis incrassatis, labello atropurpureo subquadrato callo crasso leviter canaliculato base truncato pubescenti apice concavo late obtuso.

Plant medium in size, terrestrial, densely caespitose; roots thick, coarse,

fasciculate. Secondary stems erect, unifoliate, 4-8.5 cm long, with a tubular sheath from below the middle and 2 others near the base. Leaf erect, coriaceous, narrowly elliptical, 4.5-7 cm long, 1-1.5 cm wide, the apex acute, tridenticulate, cuneate below into the subpetiolate base. Inflorescence racemose, 2-5 erect, densely many-flowered racemes 7-16 cm long including the peduncle 4-6 cm long, from a spathe 10-12 mm long near the apex of the secondary stem; floral bract 2.5 mm long; pedicel and ovary each 1.5 mm long; sepals similar, widespread, yellow-green, ciliate and pubescent near the margins, ovate, obtuse, connate basally, 3-veined, the dorsal sepal 2.5 mm long, 2.25 mm wide, the laterals 2.25 mm long, 2 mm wide; petals dark purple, transeversely obovate-flabellate, the rounded apex thickened, 1 mm long, 1.1 mm wide; lip dark purple, subquadrate, 1 mm long, 1 mm wide, callous-thickened and lightly channeled to above the middle, concave above the broadly obtuse apex, the truncate base microscopically pubescent; column stout, the stigma bilobed.

Etymology: From the Greek *pachys* (παχυς), "thick" and *rhiza* (ριζα), "root," referring to the very thick roots of the species.

Type: *BOLIVIA*: LA PAZ: Prov. of Inquisivi, terrestrial among shrub vegetation between Quime and Inquisivi, alt. 3000 m, 27 Jan. 1981, *C. Luer, J. Luer, E. Besse & R. Vásquez 5737* (Holotype: SEL).

Distribution: Bolivia.

This species is most remarkable in the exceptionally thick roots for the genus. Plants were found growing terrestrially in high, cold, foggy, scrubby terrain. Whether or not plants also grow epiphytically is unknown.

Stelis pendens Luer & Vásquez, sp. nov.

Herba mediocris pendens, caulibus secundariis gracilibus vaginibus basalibus pubescentibus foliis plus minusve aequilongis, spatha conspicua, racemo pendulo subdense multifloro, floribus purpureis parvis non-resupinatis, sepalis similibus ovatis acutis ciliatis, petalis tenuibus proportione grandibus reniformibus, labello oblongo leviter concavo apice late rotundato.

Plant medium in size, epiphytic, shortly repent to caespitose, pendent; roots slender, flexuous. Secondary stems descending, slender, unifoliate, 3-9 cm long, with a close, tubular sheath near the middle and 2 shorter, red-pubescent sheaths at the base. Leaf pendent, coriaceous, elliptical, subsessile, 4-7 cm long, 1.2-1.9 cm wide, the acute apex tridenticulate, cuneate at the base. Inflorescence a dependent, flaccid, subdensely many-flowered raceme 10-14 cm long including the slender peduncle, from a 1.3-1.5 cm long oblique spathe near the apex of the secondary stem; floral bract 2 mm long; pedicel 2.5 mm long; ovary 2 mm long; flowers small, non-resupinate in the pendent position; sepals similar, red-purple, widespread, ciliate, ovate, acute, 2.5 mm long, 2 mm wide; petals rosy white edged in purple, thin, transversely oblong, broadly rounded, 1.3 long, 2 mm wide; lip greenish white, lightly suffused with purple at the apex, ovate-oblong, 1.3 mm long, 0.9 mm wide, 0.5 mm deep, the apex broadly rounded, shallowly concave and more or less filled with a droplet of clear fluid, the base truncate, microscopically pubescent; column stout, 0.6 mm long, 1.2 mm wide, the stigma bilobed, the foot obsolescent.

ETYMOLOGY: From the Latin *pendens*, "pendulous," referring to the habit of the plant.

TYPE: *BOLIVIA*: COCHABAMBA: Prov. of Charasco, epiphytic in rain forest along Rio Mendoza below Monte Puncu, alt. 2500 m, 1 Feb. 1981, cult.

at SEL, flowered in cult. 17 April 1981, *C. Luer, J. Luer, E. Besse & R. Vasquez 6012* (HOLOTYPE : SEL).

DISTRIBUTION: Bolivia

This species may be distinguished by the pendent habit; pubescent basal sheaths; a conspicuous spathe; small, purple flowers with similar, ciliated sepals; proportionately large, thin, reniform petals; and a shallowly concave, ligulate lip.

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Stelis pristis Luer, sp. nov.

Planta mediocris caespitosa, foliis ellipticis obtusis petiolatis quam caulibus secundariis plus minusve aequilongis, racemo multilongiore dense multifloro floribus glabris purpurascentibus horizontalibus alternantibus, bracteis floralibus inflatis, sepalo dorsali elliptico obtuso basin versus synsepalo brevi bifurcato concavo connato, petalis lunatis marginibus incrassatis, labello crasso triangulari apice rotundato disco concavo.

Plant medium-sized, epiphytic, caespitose; roots numerous, fine, flexuous. Secondary stems slender, erect, 4-7 cm long, mostly concealed by a loose, tubular sheath with 1-2 shorter, basal sheaths. Leaf erect, coriaceous, elliptical, 4-8 cm long including a petiole 1.2-1.5 cm long, 1.5-2 cm wide, the apex obtuse to rounded, minutely notched, the base cuneate into the slender petiole. Inflorescence an erect, densely many-flowered raceme 12-15 cm long including the peduncle 2-3 cm long, from an erect, narrow spathe 1-1.2 cm long at the node below the leaf-stem abscission layer; floral bracts inflated, approximate, 5 mm long, 5 mm wide expanded, enclosing the 2 mm long pedicel and the 1 mm long ovary; flowers glabrous, purple externally, greenish purple within, arranged perpendicularly to the rachis, alternating in opposite directions but facing the same side; dorsal sepal elliptical, erect, obtuse, 5.5 mm long, 3.5 mm wide, connate 1.5 mm to the lateral sepals, the free portion 4.5 mm long, 5-veined; lateral sepals ovate, oblique, semiconnate to form a shallowly concave synsepal, each 2 mm long, 3 mm wide, 4 mm across together, the 1 mm long, free apices acute; petals purple, lunate, 0.75 mm long, 1.1 mm wide, the rounded, thickened margin flat-edged with silver, crystalline-like deposits; lip purple, thick, triangular, 0.5 mm long, 0.8 mm wide, 0.8 mm deep, the apex rounded, the transverse thickening prominent, the disc concave, the dorsum filled with a low, broad callus; column stout, 0.75 mm long, the stigma bilobed.

Etymology: From the Latin *pristis*, "a sawfish," in allusion to the appearance of the raceme.

Type: *ECUADOR*: COTOPAXI: epiphytic in cloud forest between Angamarca and El Corazón, alt. 1500 m, 17 Feb. 1979, *C. Luer, J. Luer & A. Hirtz 4004* (Holotype: SEL).

Distribution: Western Ecuador.

The most remarkable, elongated flowers of this species all face to one side, perpendicular to the rachis, and in alternating opposite directions, creating an illusion of the double-edged "sawfish" beak. The base of the dorsal sepal is well incorporated into the formation of a shallow sepaline cup, i.e., connate for at least 1 mm below the marginal union with the lateral sepals. The lateral sepals are very short, broader than long, and semiconnate.

Stelis pudens Luer, sp. nov.

Planta mediocris breviter repens, caulibus secundariis foliis anguste ellipticis subaequilongis, racemo dense multifloro folia duplo superanti, bracteis obliquis conspicuis, floribus parvulis sensitivis, sepalis similibus late ovatis obtusis leviter pubescentibus infra medium in cupulam connatis, petalis flabellatis apice incrassatis, labello subquadrato truncato concavo supra basim callo curvato.

Plant medium in size, epiphytic, caespitose, the rhizome coarse, shortly repent, ascending, branching, the secondary stems approximate or separated up to 1 cm; roots slender, flexuous. Secondary stems erect, slender, 2-5 cm long, enclosed by 3 loose, imbricating, tubular sheaths. Leaf erect, coriaceous, narrowly elliptical, 3-6 cm long, 0.6-1 cm wide, the apex acute, tridenticulate, gradually narrowed below to the subpetiolate base. Inflorescence a slender, erect, densely many-flowered, distichous raceme 5-15 cm long including the 4-8 cm long peduncle, from a node near the apex of the secondary stem; floral bract oblique, acute, 4 mm long below to 2.5 mm long above; pedicel and ovary each 1 mm long; sepals similar, sensitive, yellow-orange externally, light green and sparsely pubescent within, not wide-spreading, deeply connate to form a cup filled by the central apparatus, broadly ovate, obtuse, 3-veined, the dorsal sepal 1.75 mm long, 1.75 mm wide, the laterals 1.25 mm long, 1.75 mm wide; petals light yellow, transversely obovate-flabellate, 1 mm long, 1.25 mm wide, the thickened apex broadly obtuse, subverrucose; lip light yellow, subquadrate, 1 mm long, 1.2 mm wide, 0.6 mm deep, concave, the apex truncate, with a U-shaped callus from both sides around and above the truncate base; column stout, 1.2 mm long, with a short, incurved foot, the stigmatic lobes protuberant with incurved, dentate margins.

Etymology: From the Latin *pudens*, "bashful," in allusion to the sensitive flowers.

Type: *ECUADOR*: LOJA: epiphytic in cloud forest south of Yangana, alt. 2250 m, 11 May 1981, *C. Luer, J. Luer, J. Kuhn, L. Kuhn & D. D'Alessandro 6179* (Holotype: SEL).

Distribution: Southern Ecuador.

Vegetatively *S. pudens* is similar to many other species of the genus. The minute flowers are sensitive, the sepals closing over a comparatively large central apparatus. The petals and lip are nearly as large as the sepals themselves. The nearly square, concave lip bears a U-shaped callus.

Stelis rosulenta Luer & Vásquez, sp.nov.

Planta mediocris caespitosa, folio elliptico caulibus secundariis longiore, racemo erecto gracili dense multifloro folio multilongiore, floribus parvis subsphaericis roseo suffusis, sepalis late ovatis obtusis usque medium connatis, petalis membranaceis transverse obovatis, labello profunde concavo minute apiculato base truncato transverse calloso, columna tereti, stigmate transverso, pede brevi.

Plant medium-sized, epiphytic, caespitose; roots slender, flexuous. Secondary stems erect, stout, unifoliate, 2-5 cm long, enclosed by 2-3 tubular, ribbed sheaths. Leaf erect, oblong-elliptic, coriaceous, 5-8 cm long, 1.5-2.3 cm wide, the apex obtuse to round, tridenticulate, cuneate below to an ill-defined petiole ca. 0.5 cm long. Inflorescence an erect, distichous, densely many-flowered raceme of small, subspherical flowers, 12-17 cm long, the peduncle ca. 5 cm long, from a 6-12 mm long spathe near the apex of the secondary stem; floral bract oblique, infundibular, 2 mm long; pedicel 1.5 mm

long, ovary 1.5 mm long; sepals translucent pale rose, mottled and speckled with rose, glabrous except for the partially short-ciliate inner margins of the lateral sepals, broadly ovate, obtuse, the dorsal sepal 2.6 mm long, 2.3 mm wide, the lateral sepals 2.3 mm long, 2 mm wide, connate 1 mm to form a globose, sepaline tube filled with the inner floral parts, the free parts of the sepals only slightly recurved; petals membranous, white, suffused with rose near the outer margin, transversely obovate, the apex broadly obtuse to truncate, 1.3 mm long, 1.5 mm wide, the margin only minimally, irregularly thickened; lip purple, suborbicular, deeply concave, 1.3 mm long, 1.3 mm wide, the apex rounded, minutely apiculate, the truncate base with a narrow, transverse callus; column white, suffused with purple, stout, terete, 1 mm long, the stigma transversely oblong, the foot 0.5 mm long.

ETYMOLOGY: From the Latin *rosulentus*, "full of roses," in allusion to the multitude of tiny flowers that look like little rose buds.

TYPE: *BOLIVIA*: LA PAZ: Prov. of Inquisivi, epiphytic in cloud forest between Inquisivi and Circuata, alt. 2500 m, 28 Jan. 1981, *C. Luer, J. Luer, E. Besse & R. Vasquez 5980* (HOLOTYPE: SEL).

DISTRIBUTION: Bolivia.

This species may be recognized by the long spike of small, subspherical, rose bud-like flowers, membranous petals, and a concave, rounded lip with a transverse callus at the base where it is broadly affixed to a broad, short column-foot.

Stelis rutrum Luer & Vásquez, sp. nov.

Planta parva caespitosa, caulibus secundariis foliis anguste ellipticis subaequilongis, racemo plurifloro foliis longiore, sepalis similibus flavescentibus glabris ovatis obtusis, petalis purpureis transverse ovatis apice rotundatis incrassatis, labello purpureo late ovato infra callum transversum basalem tenuiter concavo apice rotundato, base pubescenti cum callo parvo rotundato.

Plant small, epiphytic, caespitose; roots slender, flexuous. Secondary stems slender, erect, unifoliate, 2-3.5 cm long, mostly enclosed by 3 loose, tubular sheaths. Leaf erect, coriaceous, narrowly elliptical, petiolate, 3-4.5 cm long including the 1-1.5 cm long petiole, 0.8-1 cm wide, the apex acute, tridenticulate, the base narrowly cuneate into the slender petiole. Inflorescence an erect, densely, several-flowered raceme 6-9 cm long including the peduncle 3-4 cm long, from a node near the apex of the secondary stem; floral bracts 2.5-3 mm long; pedicel 1.5 mm long; ovary 1.5 mm long; sepals similar, yellow-green to yellow-orange, glabrous, ovate, obtuse, connate basally, 3-veined, the dorsal sepal 3 mm long, 2.75 mm wide, the laterals 2.5 mm long, 2.5 mm wide; petals purple, transversely ovate, 1.1 mm long, 1.5 mm wide; the apex broadly rounded, thickened, with minute flecks of silver; lip purple, oblong-ovate, 1.25 mm long, 1.25 mm wide, 0.6 mm deep, with a narrow, transverse carina near the base, broadly concave to the rounded apex, the basal surface pubescent with a central, rounded callus; column short, stout, the stigma bilobed.

Etymology: From the Latin *rutrum*, "a shovel," in allusion to the shape of the lip.

Type: *BOLIVIA*: CHAPARE: epiphytic in cloud forest along the road to Villa Tunari, alt. 2400 m, 13 Jan. 1981, *C. Luer, J. Luer, E. Besse & R. Vásquez 5648* (Holotype: SEL).

Distribution: Bolivia.

This little species may be identified by the broadly concave disc below

a narrow, minutely cleft, transverse callus (the bridge) bordering the shallow, narrow, pubescent basal portion on top.

Stelis sarcophylla Luer, sp. nov.

Planta mediocris caespitosa, foliis strictis carnossimis anguste linearibus apice obtusis retusis caulibus secundariis longioribus, racemo multifloro disticho folios leviter superanti, floribus purpureis perparvis, sepalis similibus patentibus late ovatis obtusis, petalis transverse rhomboideis, labello oblongo apice rotundato basi crasso calloso, columna brevi lobis stigmatis confluentibus.

Plant medium-sized, epiphytic, caespitose; roots coarse, flexuous. Secondary stems erect, unifoliate, 5-10 cm long, mostly enclosed by a tubular sheath from below the middle and 1-2 other sheaths near the base. Leaf erect, thickly coriaceous, rigid, narrowly linear-oblong, wedge-shaped in cross-section, 11-16 cm long, 1.2-1.4 cm wide, the obtuse apex retuse, the base cuneate to the subsessile base. Inflorescence an erect, distichous, many-flowered raceme, crowded above, distantly-flowered below, 12-18 cm long including the 5-7 cm long peduncle, from a spathe 5-9 mm long near the apex of the secondary stem, the flowers purple, small, short-pedicellate; floral bracts oblique, 0.5-1.5 mm long; pedicel 1 mm long, ovary 0.75 mm long; sepals similar, widespread, glabrous, broadly ovate, obtuse, 1.5 mm long, 1.5 mm wide, connate basally; petals transversely rhomboid, 0.75 mm long, 1.1 mm wide, the apical margin thickened, broadly obtuse; lip oblong-ligulate, 0.75 mm long, 0.75 mm wide, the anterior surface more or less flat, non-concave, the apex rounded, the disc callous-thickened below the middle with a low, glandular callus on top toward the base and continued forward on the anterior surface as the glenion; column stout, 0.5 mm long, 0.5 mm wide, the stigmatic lobes confluent.

ETYMOLOGY : From the Greek *sarx*, *sarkos* (σαρξ), "flesh," and *phyllon* (φυλλον), "leaf," referring to the thick, fleshy leaves.

TYPE: *PANAMA*: CHIRIQUI: 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).

DISTRIBUTION : Western Panama.

This species is most remarkable in the long, narrow, thick, fleshy leaves, longer than the secondary stems. The small, purple flowers are short-pedicellate; the sepals are similar, ovate, obtuse, widespread; the ligulate lip is rounded; and the stigmatic lobes are confluent.

Stelis semperflorens Luer, sp. nov.

Planta parva caespitosa, caulibus secundariis foliis obovatis multibrevioribus, racemo perlongo flexuoso floribus successivis, sepalis similibus ovatis obtusis recurvatis supra medium breviter pubescentibus, petalis transverse obovatis apice rotundatis incrassatis, labello crasso subquadrato apice rotundato.

Plant small, epiphytic, densely caespitose; roots filiform, flexuous. Secondary stems unifolate, abbreviated, 5-8 mm long, enclosed by 2-3 ribbed, tubular sheaths. Leaf erect, coriaceous, elliptical-obovate, 2-3 cm long, 6-9 mm wide, the apex obtuse, minutely notched, with an apiculum, cuneate below into a subpetiolate base. Inflorescence a progressively lengthening, loosely flowered, flexuous, flexible raceme up to 32 cm long, 7-10 mm be-

tween flowers, 2-6 flowers produced simultaneously, from a node on the secondary stem; floral bracts thin, close, 1.5 mm long; pedicel 1.5 mm long; ovary 1-1.5 mm long; sepals similar, purple below the middle, dull white and shortly pubescent above the middle, ovate, obtuse, recurved, connate basally, 1.75 mm long, 1.75 mm wide; petals green, suffused with purple, transversely obovate, 0.8 mm long, 1.25 mm wide, the apex broadly rounded and thickened with the surface glandular-cellular; lip purple, subquadrate from above, triangular from the side, 0.4 mm long, 0.75 mm wide, with a transverse callus, shallowly concave to the rounded apex, the dorsum more or less flat and soft-cellular, with a low, rounded, central callus; column stout, the stigma bilobed.

Etymology: From the Latin *semperflorens*, "always in flower," referring to a quality of the species.

Type: *PANAMA*: PANAMA: epiphytic in cloud forest on Cerro Jefe, alt. 1000 m, 2 March 1976, *C. Luer, J. Luer, P. Taylor & R. L. Dressler 966* (Holotype: SEL).

Distribution: Eastern Panama.

During the more than five years that this little species has been in cultivation at SEL, it has been constantly in flower. It has produced numerous, progressively lengthening racemes each of which flowers continuously for about a year. The much smaller habit separates it from *S. vestita* Ames.

Stelis tonsoria Luer, sp. nov.

Planta mediocris breviter repens, caulibus secundariis vaginis purpureo punctatis folio elliptico petiolato subaequilongis, racemo dense plurifloro foliis subaequilongo, floribus grandibus albis rubrostriatis, sepalis lateralibus obliquis triangularibus conniventibus mentum profundum formantibus, petalis flavis crassis lunatis apiculatis, labello transverse subquadrato longiapiculato.

Plant medium in size, epiphytic, shortly repent but forming dense clumps; roots numerous, fine, flexuous. Secondary stems erect, slender, 1.5-6 cm long, enclosed by 2-3 loose, imbricating, purple-spotted, tubular sheaths. Leaf erect, coriaceous, elliptical, petiolate, 5-8 cm long including the 1-3 cm long petiole, 1.5-2 cm wide, the acute apex minutely tridenticulate, cuneate below into the slender petiole. Inflorescence a solitary, congested, several-flowered raceme 4-6 cm long including the peduncle ca. 2 cm long, from a node near the apex of the secondary stem; floral bract inflated, obtuse, 3 mm long; pedicel 1 mm long; ovary 1.5 mm long; dorsal sepal white, suffused with red-purple externally, ovate-oblong, the obtuse apex thickened, 8-9.5 mm long, 3-3.75 mm wide, 5-veined, connate basally to the lateral sepals for 2 mm; lateral sepals white, conspicuously striped with red-purple, obliquely triangular, acute, each 6.5 mm long, 4.5 mm wide across the base, 4-veined, connate 1.5 mm basally, connivent to form a deep mentum containing the central apparatus deep within; petals yellow, thick, semilunate, with a broad, flat anterior surface, the rounded apex apiculate, 1.6 mm long, 1.2 mm wide; lip yellow, transversely subquadrate, 1.2 mm long including the 0.5 mm long apiculum, 1 mm wide, the anterior surface shallowly concave, the apex obtusely acuminate into the apiculum, the dorsum with a low, 3-lobed callus behind a well-developed bridge; column stout, 0.5 mm long, the stigma bilobed.

Etymology: From the Latin *tonsorius*, "pertaining to barbering," in fanciful allusion to the red-striped barber pole.

Type: *COLOMBIA*: NARINO: epiphytic in cloud forest above Ricaurte, alt. ca. 1600 m, 3 Nov. 1979, *C. Luer, J. Luer, K. Walter & A. Hirtz 4579* (Holotype: SEL).

Distribution: Southern Colombia.

The flowers of this handsome species are white, marked with red-purple, the connivent lateral sepals conspicuously striped. The long dorsal sepal is connate to the lateral sepals to form a deep mentum in which the central apparatus is located low on the posterior wall.

Stelis viridula Luer, sp. nov.

Planta perparva dense caespitosa, caulibus secundariis brevissimis, racemo laxe plurifloro folia anguste obovata duplo superanti, floribus minutis viridibus, sepalis similibus breviter pubescentibus ovatis obtusis uninervatis, petalis membranaceis transverse oblongis, labello carnoso transverse ovato.

Plant very small, epiphytic, densely caespitose; roots fine, flexuous. Secondary stems abbreviated, unifoliate, 3-5 mm long, enclosed by 2-3 thin, ribbed, tubular sheaths. Leaf suberect, coriaceous, narrowly obovate, 15-27 mm long, 2.5-4 mm wide, the apex acute, tridenticulate, gradually narrowed below to the indistinctly petiolate base. Inflorescence a loosely few-flowered, subflexuous raceme 3-6.5 cm long including the 2 cm long capillary peduncle, from a node on the secondary stem; floral bract oblique, thin, 1 mm long; pedicel 1 mm long, ovary 0.75 mm long; sepals similar, pale green, shortly pubescent within with capitate hairs, ovate, obtuse, 1-nerved, connate basally, the dorsal sepal 1.3 mm long, 1.3 mm wide, the laterals 1.3 mm long, 1 mm wide; petals transversely oblong, 0.5 mm long, 0.66 mm wide, membranous, slightly thickened along the truncate apical margin; lip thick, transversely ovate, 0.4 mm long, 0.6 mm wide, the apex broadly obtuse, the base with a flat, rounded, pubescent callus extending forward over the central thickening onto the front surface as the glenion; column stout, 0.4 mm long, the foot 0.2 mm long, the stigma bilobed.

Etymology: From the Latin *viridulus*, "greenish," referring to the little, green flowers.

Type: *ECUADOR*: MORONA-SANTIAGO: epiphytic in rain forest near Río Calagras, alt. 1600 m, 19 Sept. 1980, *C. Luer, J. Luer, A. Andreetta, C. Dodson et al. 5488* (Holotype: SEL); cult. at SEL 80-1477, flowered in cult. 20 March 1981, *C. Luer 5982* (SEL).

Distribution: Southeastern Ecuador.

This very small species is characterized by the narrowly obovate leaves topped by the loosely few-flowered carpillary raceme of minute, green flowers. The similar sepals are covered by capitate hairs within, the petals are membranous, and the thick lip is transversely ovate.

STUDIES IN NEOTROPICAL SENECIONEAE
II. TRANSFERS TO GENUS PENTACALIA OF NORTH ANDEAN SPECIES

Jose Cuatrecasas
Department of Botany, Smithsonian Institution
Washington, D.C. 20560

In a previous paper of this series (1978), the author expressed his concern about the large number of North Andean species traditionally included in Senecio which obviously depart from the natural concept of the genus. Special mention was made of the species falling into the concepts Microchaete Benth. 1845, Streptothamni Greenm., Triana Cuatr., Culcitium auct. var. and Lasiocephalus Schlecht 1818. In the same paper, the generic status of Lasiocephalus was reassessed, its identity with Aethiolena Cass 1827 (recently reinstated by Nordenstam, 1978) established and the corresponding transfers of 21 species to Lasiocephalus were published. At that time 28 Senecio, 10 Culcitium, 4 Cacalia and 3 Gynoxys binomials were synonymized.

The largest bulk of North Andean woody "Senecios" belong to the groups which can be classified, 1st under the Microchaete Bentham concept, initially characterized as erect woody plants with discoid capitula, sagittate anthers and apically truncate style branches, and 2nd the group with woody climbing stems or branches, with the same floral features as the former, which falls into the Senecio sect Streptothamnus Greenm, as well as into the Pentacalia concept of Cassini who emphasized the pentagonal shape of the achene, and its nomenclatural synonym Senecio sect. Triana Cuatr. On the occasion of a study of the Central American species of the section Streptothamnus, Robinson and Cuatrecasas (1978) raised the group to a generic level and adopting the Cassini's concept reestablished the genus Pentacalia Cass. A formal enlarged diagnosis was given besides the introductory taxonomic comments. Thirteen species were listed in Pentacalia for Central America, ten of them transferred from Senecio, and three newly described. The species with erect stems represented in the first group Microchaete, mentioned above, were not included pending from further indagation.

Repeated examination of extensive Andean collections has reaffirmed in this author the belief in the generic identity of both groups: Microchaete Benth. and Streptothamni Greenm. The present contribution deals with the necessary transfer of most of the North Andean species belonging to these groups to the genus Pentacalia. The Bentham's name, Microchaete, that I had preferred could not be used because it was rejected by ICBN, being conserved instead Microchaete Thuret ex Burnet for the Cyanophyceae-Microchaetaceae (Algae). Pentacalia is the earlier existing available name for this senecioid new genus concept. The following listing includes all known Venezuelan and Colombian and most part of Ecuadorian concerned species; also a few Peruvian and Bolivian and one Costa Rican species are considered. The author has examined, rep-

resentative specimens and almost all available type collections of the species treated below, besides many others not accepted within this concept. Typical and other material was consulted on visits to European Herbaria (BM, K, P, G, FI, MA) in addition to the use of the US National Herbarium, Chicago Field Museum, N.Y. Botanical Garden, Missouri Botanical Garden and Herb. Nac. Colombiano, Bogota. The facilities given and the long term loans that have been allowed by these institutions are greatly appreciated.

There still remain many species, without any authentic material available to me at this time, which might be transferred to Pentacalia in the future. Because more detailed research is needed for a good number of species in order to be able to redefine sectional and subsectional groups a classification and a comprehensive key of the genus is left for a later opportunity. First step in this process is a system for the Colombian species fully illustrated for Prima Flora Colombiana, in preparation. In the subgenus Pentacalia the key provided by Cabrera (1954) for the Peruvian and Bolivian climbing species is still very useful. For the time being, it seems advisable to communicate in advance the present series of transfers in order to make the names available to people who might use them. Nonsystematic botanists, ecologists, geographers, economic botanists, and biochemists are constantly asking for the proper names of the plants they are dealing with. The present reassessment of generic criteria and names is of special interest to ecologists working on the vegetation of the North Andean region.

PENTACALIA Cassini, Dict. Sc. Nat. 48: 461. 1827. Robinson & Cuatrecasas, Phytologia 40(1): 37-46. 1978.

Arbores, frutices vel fruticuli, erecti vel scandentes. Folia alterna plerumque petiolata; lamina elliptica, ovata vel oblonga usque linearis, coriacea vel subcoriacea plerumque carnosula, margine plus minusve dentata denticulata vel integerrima, nervatione pinnata valde prominenti vel immersa inconspicuaque. Inflorescentiae terminales vel laterales corymboide paniculatae vel thyrsoides, multicapitatae vel paucicapitatae. Capitula discoidea vel radiata, plerumque erecta plus minusve pedicellata bene distincta vel glomerata, plerumque parva vel mediana raro lata; involucrum cylindraceum vel campanulatum, plerumque (5-)8-13, phyllariis subuniseriatis elliptico-oblongis, dorsale plus minusve crassiusculis; receptaculum marginibus alveolorum plus minusve minuteque scariosofimbriatis. Corollae radii bene ligulatae et valde exsertae, luteae, glabrae, vel brevemtubum dentatum reductae. Corollae disci tubulosae glabrae plerumque lutea vel alba, limbo tubuloso vel leviter infundibulari lobato-dentato, lobis triangulari-oblongis, brevibus interdum longiusculis venis marginalibus tantum conspicuis. Collum antherae basim versus dilatatum cellulis majoribus; thecae basi sagittatae plerumque longiuscule caudatae; endotheciocellulae oblongae copiosis nodulis verticale seriatis, apicale ap-

pendice oblonga obtusiuscula. Pollen grana 30-40 μ diam. Rami styli truncati vel convexiusculi annulare plus minusve papilloso-piloso coronati. Achaenia plerumque 5-angulata, plus minusve conspicue 5-10-nervata. Pappus setis scabris plerumque tenuibus 1-3 seriatis.

Type species: Pentacalia arborea (HBK) Robinson & Cuatrecasas, Phytologia 40(1): 39. 1978. Cauca, Colombia.

Subgenus PENTACALIA Cuatr. subgen. nov.

Frutices caule vel ramis scandentibus, interdum epiphytici.
Typus: Pentacalia arborea (HBK) Rob. & Cuatr.
Senecio sect. Triana Cuatr., Fieldiana Bot. 27(2):71. 1951. Type: Pentacalia arborea (HBK) Rob. & Cuatr. Colombia.
Senecio sect. Streptothamni Greenm. Bot. Jahrb. 32:19. 1902; Ann. Mo. Bot. Gard. 2:578; lectotype: Pentacalia streptothamna (Greenm. & Stand.) Robinson & Cuatr. Costa Rica.

PENTACALIA ANDREI (Greenm) Cuatr. comb. nov.
Senecio andrei Greenm. Ann. Mo. Bot. Gard. 25:797. 1938. Type: André 4520. (GH, holotype). Loja, Ecuador.

PENTACALIA ANTIOQUENSIS (Cuatr) Cuatr. comb. nov.
Senecio antioquensis Cuatr. Fieldiana Bot. 27(2):27. 1951. Type: Tomás-Alberto 252 (US, holotype). Antioquia, Colombia.

PENTACALIA ARBOREA (HBK) Robinson & Cuatr. Phytologia 40(1):39. 1978.
Cacalia arborea HBK., Nov. Gen. Sp. Pl. 4:128, ed folio 1818; p. 163, ed 1820. Type: Humboldt & Bonpland (P, holotype). Cauca, Colombia.
Senecio arboreus (HBK) Greenman, Ann. Mo. Bot. Gard. 10:77. 1923.

PENTACALIA ARCHERI (Cuatr.) Cuatr. comb. nov.
Senecio archeri Cuatr. Fieldiana Bot. 27(2):28. 1951. Type: Archer 1581 (US, holotype) Antioquia, Colombia.

PENTACALIA ASCHERSONIANA (Hieron.) Cuatr. comb. nov.
Senecio aschersonianus Hieron., Engl. Bot. Jahrb. 28:642. 1901. Type: Triana 1485 (P. holotype) Antioquia, Colombia.

PENTACALIA ASPLUNDII (Cabrera) Cuatr. comb. nov.
Senecio asplundii Cabrera, Darwiniana 10(4):598-599, fig. 17A. 1954. Type: Asplund 13127 (S, holotype). Huánuco, Peru.

PENTACALIA BADILLOI (Cuatr.) Cuatr. comb. nov.
Senecio badilloi Cuatr. Fieldiana Bot. 1:39. 1950. Type: Steyermark 61607 (VEN, holotype) Anzoátegui, Venezuela.
Senecio laetivirens Badillo, Bol. Soc. Venez. Cienc. Nat. 10 (68):317. 1946, non S. laetevirens Phillipi, 1894.

PENTACALIA BARKLEYANA (Cuatr.) Cuatr. comb. nov.
Senecio barkleyanus Cuatr. Fedd. Rep. 55(2/3):133. 1953. Type: Gutierrez, Correa &Barkley 18C221 (US, holotype) Antioquia, Colombia.

PENTACALIA BREVILIGULATA (Hieron) Cuatr. comb. nov.
Senecio breviligulatus Hieron. Engl. Bot. Jahrb. 28:639-640. 1901. Type: Lehmann 7969. (US, lectotype) Cauca, Colombia.
Senecio bejucosus Cuatr. Fieldiana Bot. 27(1):22. 1950. Type: Cuatrecasas 2197 (F, holotype). Valle del Cauca, Colombia.

PENTACALIA BRITTONIANA (Hieron.) Cuatr. comb. nov.
Senecio brittonianus Hieron. Bot. Jahrb. 29:72. 1900. Type: Rusby 1695 (NY, lectotype by Cabrera). Yungas, Bolivia.
Cabrera, Darwiniana 10(4):588. 1954.
Senecio sprucei Britton (not Klatt 1888), Bull. Torrey Botanical Club 19:265. 1892. Type: Rusby 1695 (NY, lectotype). Bolivia.

PENTACALIA BUCHTIENI (Greenm) Cuatr. comb. nov.
Senecio buchtienii Greenm., Ann. Mo. Bot. Gard. 10:78-79. 1923. Type: Buchtien 3087 (US, lectotype). Unduavi, Bolivia.

PENTACALIA CADIRIENSIS (Cuatr.) Cuatr. comb. nov.
Senecio cadiriensis Cuatr. Brittonia 8(3):190-191. 1956. Type: Karsten (P, holotype). Santander, Colombia.

PENTACALIA CALIANA (Cuatr.) Cuatr., comb. nov.
Senecio calianus Cuatr. Fieldiana Bot. 27(1):24. 1950. Type: Cuatrecasas 19616 (F, holotype). Valle, Colombia.

PENTACALIA CAMPII (Cuatr.) Cuatr. comb. nov.
Senecio campii Cuatr. Brittonia 8:41. 1954. Type: Camp E-4070 (F, holotype). Chimborazo-Cañar. Ecuador.

PENTACALIA CARACASANA (Klatt) Cuatr., comb. nov.
Senecio caracasanus Klatt, Abh. Naturf. Ges. Halle 15:331. 1882. Type: Moritz 1658 (P, holotype). Aragua, Venezuela.
Senecio cucullatus Klatt, Abh. Naturf. Ges. Halle 15:331. 1882. Type: Fendler 702 (P, holotypus). Aragua, Venezuela.

PENTACALIA CARCHIENSIS (Cuatr.) Cuatr. comb. nov.
Senecio carchiensis Cuatr. Fedd. Rep. 55(2/3):135. 1953. Type: Hitchcock 20946 (GH, holotype) Carchi, Ecuador.

PENTACALIA CARPISHENSIS (Cuatr.) Cuatr. comb. nov.
Senecio carpishensis Cuatr. Collectanea Botanica 3:287-288. 1953. Type: Ferreyra 2354 (US, holotype). Huánuco, Peru. Photo FM-40685.

PENTACALIA CHACHAPOYENSIS (Greenm.) Cuatr. comb. nov.
Senecio chachapoyensis Greenm. Ann. Mo. Bot. Gard. 25:801. 1938. Type: Mattheus 1356 (K, holotype). Chachapoyas, Peru.

PENTACALIA CHAQUIROENSIS (Greenm.) Cuatr. comb. nov.
Senecio chaquiroensis Grenm. Ann. Mo. Bot. Gard. 10:79-80. 1923. Type: Pennell 4290 (NY, holotype) Bolívar, Colombia.

PENTACALIA COBRENSIS (Cuatr.) Cuatr. comb. nov.
Senecio cobrensis Cuatr. Fieldiana Bot. 1:27-28. 1950. Type: Steyermark 57128 (F, holotype) Táchira, Venezuela.

PENTACALIA COMARAPENSIS (Cabrera) Cuatr. comb. nov.
Senecio comarapensis Cabrera, Darwiniana 10(4):599-600, fig. 15A. 1954. Type: Steinbach 8519 (LIL, holotype) Santa Cruz, Bolivia.

PENTACALIA CORAZONENSIS (Hieron.) Cuatr. comb. nov.
Senecio corazonensis Hieron. Engl. Bot. Jahrb. 29:73. 1900. Type: Sodiro 59/3 (P, lectotype). Ecuador.

PENTACALIA DANIELIS (Cuatr.) Cuatr. comb. nov.
Senecio danielis Cuatr. Fieldiana Bot. 27(2):31. 1951. Type: H. Daniel 3418 (US, holotype) Antioquia, Colombia.

PENTACALIA DECOMPOSITA (Sch. Bip. ex Hieron.) Cuatr. comb. nov.
Senecio decompositus Sch. Bip. ex Hieron. Engl. Bot. Jahrb. 28:634. 1901. Type: Moritz 1423 (P, holotype) Mérida, Venezuela.

PENTACALIA DIAMANTENSIS (Cuatr.) Cuatr. comb. nov.
Senecio diamantensis Cuatr. Fieldiana Bot. 27(2):26-27. 1951. Type: Cuatrecasas 21821 (F, holotype). Valle, Colombia.

PENTACALIA DICTYOPHLEBIA (Greenm.) Cuatr. comb. nov.
Senecio dictyophlebius Greenm., Ann. Mo. Bot. Gard. 25:801-802. 1938. Type: Mandon 146 (K, holotype). Sorata, Bolivia.

PENTACALIA DISCIFORMIS (Hieron.) Cuatr. comb. nov.
Senecio disciformis Hieron., Engl. Bot. Jahrb. 29:72. 1900. Type: Sodiro s.n. Ecuador.

PENTACALIA DIVISORIA (Cabrera) Cuatr. comb. nov.
Senecio divisorius Cabrera, Darwiniana 10(4):611-603, fig 15B. 1954. Type: Asplund 12604 (S, holotype). Huánuco, Peru.

PENTACALIA ELLIPTICIFOLIA (Hieron.) Cuatr. comb. nov.
Senecio ellipticifolius Hieron. Engl. Bot. Jahrb. 28:637. 1901. Type: Lehmann 8508 (K, holotypus). Cauca, Popayán.

PENTACALIA EPIPHYTICA (O. Kuntze) Cuatr. nov. comb.
Senecio epiphyticus O. Kuntze, Rev. Gen. 3(2):173. 1898. Type: Kuntze s.n. (NY, lectotype). Tunari, Bolivia.
Senecio steinbachianus Cuatr. Fieldiana Bot. 27(2):55. 1951. Type: Steinbach 9876 (F, holotype). Cochabamba, Bolivia.

PENTACALIA FAVILLOSA (Cuatr.) Cuatr. comb. nov.
Senecio favillosus Cuatr. Proceed. Biol. Soc. Washington 74: 20-21. 1961. Type: Romero Castañeda 7449 (US, holotype). Magdalena, Colombia.

PENTACALIA FLOCCOSA (Britton) Cuatr. comb. nov.
Senecio floccosus Britton, Bull. Torr. Bot. Club 19:264. 1892. Type: Rusby 1680 (NY, holotype) La Paz, Bolivia.

PENTACALIA GENUFLEXA (Greenm.) Cuatr. comb. nov.
Senecio genuflexus Greenm., Ann. Mo. Bot. Gard. 10:82-83. 1923. Type: H.H. Smith 1987 (MO, holotype) Magdalena, Colombia.

PENTACALIA GIBBIFLORA (Cuatr.) Cuatr. comb. nov.
Senecio gibbiflorus Cuatr. Brittonia 8:42-43. 1954. Type: Camp E-4580 (F, holotype). Azuay, Ecuador.

PENTACALIA GRAN-SABANENSIS (Aristeg.) Cuatr. comb. nov.
Senecio gran-sabanensis Aristeg. Bol. Soc. Venez. Cienc. Nat. 23(101):96-97. 1962. Type: Steyermark & Aristeguieta 32 (VEN, holotype). Bolívar, Venezuela.

PENTACALIA HACHANA (Cuatr.) Cuatr.) comb. nov.
Senecio hachanus Cuatr. Notas Fl. Colombia VI: 25,26 fig 20. Trab. Comis. Bot. Secret. Agric. Valle, Cali. 1944. Type: Cuatrecasas 8510 (COL, holotype). Caquetá, Colombia.

PENTACALIA HATICOENSIS (Cuatr.) Cuatr. comb. nov.
Senecio haticoensis Cuatr. Fieldiana Bot. 27(2):29-30. 1951. Type: Killip & Smith 20735 (US, holotype). N. de Santander, Colombia.

PENTACALIA HAUGHTII (Cuatr.) Cuatr. comb. nov.
Senecio haughtii Cuatr. Fieldiana Bot. 1:25-26. 1950. Type: Haught 6173. (F, holotype). Cundinamarca, Colombia.

PENTACALIA HERZOGII (Cabrera) Cuatr., comb. nov.
Senecio herzogii Cabrera, Blumea 7(1):202. 1952. Type: Herzog 2145 (L, holotype). Choquetanga, Bolivia.

PENTACALIA HILLII (Greenm.) Cuatr. comb. nov.
Senecio hillii Greenm. Ann. Mo. Bot. Gard. 25:804. 1938. Type: Spruce 5587 (K, holotype). Ecuador.

PENTACALIA HITCHCOCKII (Cuatr.) Cuatr. comb. nov.
Senecio hitchcokii Cuatr. Fedd. Rep. 55(2/3):139. 1953. Type: Hitchcock 21525 (GH, holotype). Loja, Ecuador.

PENTACALIA HUALLAGANA (Cuatr.) Cuatr., comb. nov.
Senecio huallaganus Cuatr. Fieldiana Bot. 27(2):54-55. 1951. Type: Weberbauer 6811 (F, holotype). Huallaga, Peru.

PENTACALIA HUAMALIENSIS (Cabrera) Cuatr. comb. nov.
Senecio huamaliensis Cabrera, Darwiniana 10(4):596-598, fig. 15D. 1954. Type: Weberbauer 3409 (La Molina, holotype). Huanuco, Peru.

PENTACALIA HUILENSIS (Cuatr.) Cuatr. comb. nov.
Senecio huilensis Cuatr. Notas Fl. Colombia VI:26,27, fig 21. Trab. Comis. Bot. Secret. Agric. Valle, Cali. 1944. Type: Cuatrecasas 8485 (COL, holotypus).

PENTACALIA JAHNII (Cuatr) Cuatr. comb. nov.
Senecio jahnii Cuatr. Fieldiana Bot. 27(2):32. 1951. Type: Jahn 1226 (US, holotype). Miranda, Venezuela.

PENTACALIA JALCANA (Cuatr.) Cuatr. comb. nov.
Senecio jalcanus Cuatr. Proceed. Biol. Soc. Washington 77:152-153. 1964. Type: Wurdack 1375 (US, holotype). Amazonas, Peru.

PENTACALIA JELSKII (Hieron) Cuatr. comb. nov.
Senecio jelskii Hieron. Bot. Jahrb. 36:509-510. 1905. Type: Jelski 769 (US, isotype). Tambillo, Peru.
Senecio prunioides Rusby, Bull. N.Y. Bot. Gard. 4:396. 1907. Type: Bang 2437 (NY, holotype). Coroico, Bolivia.

PENTACALIA KLEINIOIDES (HBK) Cuatr. comb. nov.
Cacalia kleinioides HBK., Nov. Gen. Sp. Pl. 4:128-129 ed. folio, 1818; p. 164 ed. 1818. Type: Humboldt & Bonpland (P, holotype); Guaduas, Colombia.
Psacalium kleinioides (HBK.) DC. Prodr. 6:335. 1837.
Senecio karstenii Hieron. Engl. Bot. Jahrb. 28:641-642. 1901. Type: Karsten 26, loc. nonindicato. (P; B. photo F.M. 15627).
Senecio pennellii Greenm., Ann. Mo. Bot. Gard. 10:88-89. 1923. Type: Rusby & Pennell 572 (NY, holotype). Huíla, Colombia.

PENTACALIA LANCEOLIFOLIA (Cuatr.) Cuatr. comb. nov.
Senecio lanceolifolius Cuatr. Brittonia 8:43. 1954. Type: Camp E-1389 (F, holotype). Santiago-Zamora, Ecuador.

PENTACALIA LOPHOPHILUS (Greenm.) Cuatr. comb. nov.
Senecio lophophilus Greenm, Ann. Mo. Bot. Gard. 10:84. Pl. 5. 1923. Type: H.H. Smith 1988 (NY, holotype) Magdalena, Colombia.

PENTACALIA LORETENSIS (Cuatr.) Cuatr., comb. nov.
Senecio loretensis Cuatr. Fieldiana Bot. 27(2):56-57. 1951. Type: Klug 3191 (F, holotype). Loreto, Peru.

PENTACALIA LUCIDISSIMA (Cuatr.) Cuatr. comb. nov.
Senecio lucidissimus Cuatr. Fieldiana Bot. 27(2):56. 1951. Type: Tuesta & Woytkowski 34500 (F, holotype). Huánuco, Peru.

PENTACALIA MAGNUSII (Hieron.) Cuatr. comb. nov.
Senecio magnusii Hieron. Engl. Bot. Jahrb. 28:642. 1901. Type: Triana 1486 (P, holotype). Colombia.

PENTACALIA MARINII (Cabrera) Cuatr. comb. nov.
Senecio marinii Cabrera, Darwiniana 10(4):590-593, fig. 16. 1954. Type: Marin 1789 (LP, holotype) Cuzco, Peru.

PENTACALIA MEGAPHLEBIA (Greenm. & Cuatr.) Cuatr. comb. nov.
Senecio megaphlebius Greenm & Cuatr., Collect. Botanica 3:288-289. 1953. Type: Macbride 5157 (F, holotype). Villacamba, Peru.

PENTACALIA MIGUELII (Cuatr.) Cuatr.
Senecio miguelii Cuatr. Fieldiana Bot. 27(2):54. 1951. Type: Miguel Bang 2039 (F, holotype) Bolivia.

PENTACALIA MILLEI (Greenm.) Cuatr. comb. nov.
Senecio millei Greenm. Ann. Mo. Bot. Gard. 25:809-810. 1938. Type: Seemann s.n. (K, holotype). Loja, Ecuador.

PENTACALIA NIGELLA (Badillo) Cuatr. comb. nov.
Senecio nigellus Badillo, Bol. Soc. Venez. Cienc. Nat. 10(68): 316-317. 1947. Type: Steyermark 61305 (VEN, holotype). Anzoategui, Venezuela.

PENTACALIA OCANENSIS (Cuatr.) Cuatr. comb. nov.
Senecio ocanensis Cuatr. Brittonia 8(3):191. 1956. Type: Schlim 680 (P, holotype). N. de Santander.

PENTACALIA ORONOCENSIS (DC.) Cuatr. comb. nov.
Senecio oronocensis DC. Prodr. 6:423. 1837. Type: Haenke s.n. (P, holotype) Monte Orinoca, Bolivia. Photo FM. 37952.
Senecio baccharidiflorus Rusby, Bull. N.y. Bot. Gard. 4:397. 1907. Type: Bang 2494 (NY, holotype). Unduavi, Bolivia.
Senecio cuzcoensis Cabrera, Not. Mus. La Plata 9(45):197-198, fig. 3. 1944. Type: Vargas 1908 (LP, holotype). Cuzco, Peru.
Senecio ramonii Cuatr. Fieldiana 27(2):53. 1951. Type: Ferreyra 2310 (US, holotype) Carpish, Peru.
The above synonymy was established by Cabrera, 1954 pag. 594.

PENTACALIA PHELPSIAE (Cuatr.) Cuatr. comb. nov.
Senecio phelpsiae Cuatr. Mem. N.Y. Botanical Garden 9(3):374. 1957. Type: Maguire, Phelps & al 31737 (NY, holotype). Terr.

Fed. Amazonas, Venezuela.

PENTACALIA POMACOCHANA (Cuatr.) Cuatr. comb. nov.
Senecio pomacochanus Cuatr. Ciencia (Mexico) 23(4):150-151. 1964. Type: Wurdack 989 (US, holotype). Amazonas, Peru.

PENTACALIA POPAYANENSIS (Hieron.) Cuatr. comb. nov.
Senecio popayanensis Hieron., Engl. Bot. Jahrb. 28:638. 1901. Type: Lehmann 8502 (K, lectotype). Cauca, Colombia.

PENTACALIA POYASENSIS (Cuatr.) Cuatr. comb. nov.
Senecio poyasensis Cuatr. Brittonia 8(3):188-189. 1956. Type: Matthews 1838 (K, holotype).

PENTACALIA PSIDIIFOLIA (Rusby) Cuatr. comb. nov.
Senecio psidiifolius Rusby, Mem. Torr. Bot. Cl. 6(1):66. 1896. Type: Bang 1532 (NY, holotype). Mapiri, Bolivia.

PENTACALIA PTARIANA (Cuatr.) Cuatr. comb. nov.
Senecio ptarianus Cuatr. Fieldiana Bot. 1:26-27. 1950. Type: Steyermark 59567 (F, holotype). Bolívar, Venezuela.

PENTACALIA PURPURIVENOSA (Cuatr.) Cuatr. comb. nov.
Senecio purpurivenosus Cuatr., Collectanea Botanica 3:286-287. 1953. Type: Macbride 4969 (F, holotype). Villacabamba, Peru.

PENTACALIA RICOENSIS (Cuatr.) Cuatr. comb. nov.
Senecio ricoensis Cuatr. Fedd. Rep. 55(2/3):144. 1953. Type: Killip & Smith 17728 (GH, holotype). Santander, Colombia.

PENTACALIA RIOTINTIS (Cuatr.) Cuatr. comb. nov.
Senecio riotintis Cuatr. Fieldiana Bot. 1:28-29. 1950. Type: Steyermark 53625 (F, holotype). Santiago-Zamora, Ecuador.

PENTACALIA RUFICAULIS (Greenm. & Cuatr.) Cuatr. comb. nov.
Senecio ruficaulis Greenman & Cuatr. Brittonia 8:44-45. 1954. Type: Camp E-4703 (F, holotype). Azuay, Ecuador.

PENTACALIA RUFOHIRSUTA (Cabrera) Cuatr. comb. nov.
Senecio rufohirsutus Cabrera, Darwiniana 10(4):585-586, fig 15C. 1954. Type: Macbride 4876 (MO, holotype). Playapampa, Peru.

PENTACALIA RUGOSA (Cuatr.) Cuatr. comb. nov.
Senecio rugosus Cuatr. Proceed. Biol. Soc. Washington 74:23. 1961. Type: Cuatrecasas & Romero-Cast. 25180 (US, holotype).

PENTACALIA SAILAPATENSIS (Cuatr.) Cuatr. comb. nov.
Senecio sailapatensis Cuatr. Fieldiana Bot. 27(2):52-53. 1951. Type: Cardenas 3273 (US, holotypus). Cochabamba, Bolivia.

PENTACALIA SCORTIFOLIA (Greenm.) Cuatr. comb. nov.
Senecio scortifolius Greenm. Ann. Mo. Bot. Gard. 10:91. 1923. Type: H.H. Smith 2000 (MO, holotype). Magdalena, Colombia.

PENTACALIA SEVILLANA (Cuatr.) Cuatr. comb. nov.
Senecio sevillanus Cuatr. Brittonia 8:45. 1954. Type: Camp E-4323 (F, holotype) Azuay, Ecuador.

PENTACALIA SILVASCANDENS (Cuatr.) Cuatr. comb. nov.
Senecio silvascandens Cuatr. Fieldiana Bot. 27(1):21. 1950. Type: Cuatrecasas 23768 (F, holotype). Valle, Colombia.

PENTACALIA SONSONENSIS (Cuatr.) Cuatr. comb. nov.
Senecio sonsonensis Cuatr. Fedd. Rep. 55(2/3):147. 1953. Type: Barkley & al 19 An 222 (F, holotype). Antioquia, Colombia.

PENTACALIA SUBGLOMEROSA (Greenm.) Cuatr. comb. nov.
Senecio subglomerosus Greenm. Ann. Mo. Bot. Gard. 10:93 pl. 7. 1923. Type: Bang 2459 (NY, holotype). Yungas, Bolivia.

PENTACALIA SUBOPPOSITIFOLIA (Cuatr.) Cuatr. comb. nov.
Senecio subopositifolius Cuatr. Brittonia 8(3):192. 1956. Type: Triana 1480 (P, holotype). Antioquia, Colombia.

PENTACALIA SUPERNITENS (Cuatr.) Cuatr. comb. nov.
Senecio supernitens Cuatr. Filediana Bot. 27(2):28-29. 1951. Type: Archer 1652 (US, holotype). Antioquia, Colombia.

PENTACALIA SYLVICOLA (Greenm.) Cuatr. comb. nov.
Senecio sylvicolus Greenm. Ann. Mo. Bot. Gard. 10:95, pl. 8. 1923. Type: Pennell 2985 (NY, holotype). Tolima, Colombia.

PENTACALIA TABLENSIS (Cabrera) Cuatr., comb. nov.
Senecio tablensis Cabrera, Blumea 7(1):203. 1952. Type: Herzog 2204 (L, holotype). Tablas, Bolivia.

PENTACALIA TARAPOTENSIS (Cabrera) Cuatr. comb. nov.
Senecio tarapotensis Cabrera, Darwiniana 10(4):589-590. Fig. 17 D, Larn 3. 1954. Type: Spruce 4811 (C, holotype) Loreto, Peru. Photo F.M. 28409.

PENTACALIA THEAEFOLIA (Benth.) Cuatr. comb. nov.
Senecio theaefolius Benth. Pl. Hartw. 210. 1845. Type: Hartweg 1166 (K, holotype). Bogotá, Colombia.

PENTACALIA TOMASIANA (Cuatr.) Cuatr.
Senecio tomasianus Cuatr. Fieldiana Bot. 27(2):30-31. 1951. Type: H. Tomás 595 (US, holotype). Antioquia, Colombia.

PENTACALIA TRIANAE (Klatt) Cuatr. comb. nov.
Senecio trianae Klatt (corrected from "trianii") Klatt, Abhandl. Naturf. Ges. Halle (1882):332. Type: Triana 24 "Nolle. Grenade" (P, holotypus), identical to Linden 24 (US, isotype).
Senecio tamaensis Cuatr. Notas Fl. Colombia VI:26 fig 22. Trab. Com. Bot. Secret. Agr. Valle, Cali 1944. Type: Cuatrecasas, Schultes & Smith 12737 (COL, holotype). Paramo de Tamá, Colombia.

PENTACALIA URBANII (Hieron.) Cuatr., comb. nov.
Senecio urbanii Hieron., Engl. Bot. Jahrb. 28:640. 1901. Type: Triana 1489 (F, US). Cauca, Popayán.

PENTACALIA URUBAMBENSIS (Cabrera) Cuatr. nov. comb.
Senecio urubambensis Cabrera Not. Mus. La Plata 9:204. 1944. Type: Vargas 2185 (LP, holotype). Cuzco, Peru.

PENTACALIA VALLECAUCANA (Cuatr.) Cuatr. comb. nov.
Senecio vallecaucanus Cuatr. Fieldiana Bot. 1:23-24. 1950. Type: Cuatrecasas 20153 (F, holotype). Valle, Colombia.

PENTACALIA VICELLIPTICA (Cuatr.) Cuatr. comb. nov.
Senecio vicellipticus Cuatr. Fedd. Rep. 55(2/3):151-152. 1953. Type: Steyermark 55361 (F, holotype). Lara, Venezuela.

PENTACALIA VULPINARIS (Cuatr.) Cuatr. comb. nov.
Senecio vulpinaris Cuatr. Fieldiana Bot. 1:26. 1950. Type: Steyermark 55432 (F, holotype). Lara, Venezuela.

PENTACALIA WEINMANNIFOLIA (Cuatr.) Cuatr. comb. nov.
Senecio weinmannifolius Cuatr. Notas Fl. Colombia VI:25, fig 20. Trab. Comis. Bot. Secret. Agric. Valle, Cali. 1944. Type: Cuatrecasas 11696 (COL, holotype). Putumayo-Nariño, Colombia.

PENTACALIA WURDACKII (Cuatr.) Cuatr. comb. nov.
Senecio wurdackii Cuatr. Proceed. Biol. Soc. Washington 77:153-154. 1964. Type: Wurdack 1599 (US, holotype). Amazonas, Peru.

PENTACALIA YAPACANA (Aristeg.) Cuatr. comb. nov.
Senecio yapacanus Aristeg. Mem. N.Y. Bot. Gard. 9(3):374. 1957. Type: Maguire, Cowan & Wurdack 30719 (NY, holotype). Terr. Fed. Amazonas, Venezuela.

Subgen. MICROCHAETE (Benth.) Cuatr. nov. stat.
Arbores, frutices et fruticuli erecti vel interdum prostrati.
Typus: Pentacalia pulchella (HBK) Cuatr.
Microchaete sect. Microchaete Benth. Pl. Hartw. 210. 1845.
Lectotype: Cacalia pulchella HBK.
Microchaete sect. Cryptochaete Benth. Pl. Hartw. 209. 1845.
Type: Cacalia teretifolia HBK.
Senecio sect. Microchaete (Benth.) Benth. in Benth & Hook. Gen Pl. 2:450. 1873.

Also belong here the Senecio sections Vaccinoides, Ledifolium, Abietoides, Arbutoides, Ericoides, Granata and Macbrideus Cuatr. Fieldiana 27(2):70-72. 1951.

PENTACALIA ABIETINA (Willdenow ex Wedd.) Cuatr. comb. nov.
Senecio abietinus Willd. ex Wedd., Chl. And 1:101. 1856. Type: Humboldt & Bompland in Willdenow Herbarium (B; holotype). Bogotá, Colombia.

PENTACALIA ABIETINA var. ACICULATA (Cuatr.) Cuatr. stat. nov.
Senecio aciculatus Cuatr. Notas Fl. Colombia VI: 24 fig 19. Trab. Comis. Bot. Secret. Agric. Valle, Cali. 1944. Type: Cuatrecasas, Schultes & Smith 12612 (COL, holotype). Norte de Santander, Colombia.

PENTACALIA ACLYDIPHYLLA (Cuatr.) Cuatr. comb. nov.
Senecio aclydiphyllus Cuatr. Proceed. Biol. Soc. Washington 77:149-151, fig 8. 1964. Type: Wurdack 1196 (US, holotype). Amazonas, Peru.

PENTACALIA ALBIRAMEA (Cuatr.) Cuatr. comb. nov.
Senecio albirameus Cuatr. Bol. Soc. Venez. Cienc. Nat. 21 (97): 302-303. 1960. Type: Pannier & Schwabe 1685 (F, holotype). Táchira, Venezuela.

PENTACALIA ALBOTECTA (Cuatr.) Cuatr. comb. nov.
Senecio albotectus Cuatr. Fedd. Rep. 55 (2/3): 130. 1953. Type: Grant 10848 (F, holotype). Cesar, Colombia.

PENTACALIA AMERICANA (L. f.) Cuatr. comb. nov.
Cineraria americana L. f. Sp. Pl. Supl.: 373. 1781. Type: Mutis, No. 1000, 28 and 1000, 29, Herb. Linnaean Society, London. Colombia.
Senecio americanus (L. f.) D.C. Prodr. 6:310. 1837. See Cuatrecasas, Fedde Rep. 55:131. 1953.
Senecio xanthopappus Klatt. Engl. Bot. Jahrb. 21:360. 1895. Type: Humboldt (B). Photo F.M.-15794.

PENTACALIA AMPLEXICAULIS (HBK.) Cuatr. comb. nov.
Senecio amplexicaulis HBK., Gen. Sp. Pl. 4:142 ed. folio 1818; p 181 ed. 1820. Type: Humboldt & Bonpland (P, holotype). Ecuador.

PENTACALIA ANDICOLA (Turcz.) Cuatr. comb. nov.
Senecio andicola Turcz. Bull. Soc. Nat. Mosc. 24(2):91. 1851. Type: Jameson 847 (BM, holotype). Ecuador.

PENTACALIA APICULATA (Sch. Bip ex Wedd.) Cuatr., comb. nov.
Senecio apiculatus Sch. Bip. ex Wedd. Chl. And. 1:128. 1856. Type: Linden 478 (P, holotypus). Mérida. Venezuela.

PENTACALIA ARBUTIFOLIA (HBK) Cuatr. comb. nov.
Senecio arbutifolius HBK, Nov. Gen. Sp. Pl. 4:143, ed. folio 1818; 182 ed. 1820. Type: Humboldt & Bonpland (P. holotype). Ecuador.
Senecio pichinchensis Greenm. Ann. Mo. Bot. Gard. 25: 814-815. 1938. Type: Jameson 24 (BM, holotype). Pinchincha, Ecuador.

PENTACALIA BACOPOIDES (Greenm. & Cuatr.) Cuatr., comb. nov.
Senecio bacopoides Greenm. & Cuatr., Collectanea Botanica 3:268-269. 1953. Type: Macbride 4868 (F, holotype). Playa-pampa, Peru.

PENTACALIA BATALLONENSIS (Cuatr.) Cuatr. comb. nov.
Senecio batallonensis Cuatr. Phytologia 29(5): 382-383. 1975. Type: Cuatrecasas, Ruiz & López 28415 (US, holotype). Táchira, Venezuela.

PENTACALIA BEFARIOIDES (Cuatr.) Cuatr. comb. nov.
Senecio befarioides Cuatr. Fedd. Rep. 55(2/3): 134. 1953. Type: Hitchkock 21940 (US, holotype). Chimborazo, Ecuador.

PENTACALIA CACAOSENSIS (Cuatr.) Cuatr. comb. nov.
Senecio cacaosensis Cuatr. Phytologia 31(4): 324-325. 1975. Type: Cleef 4776 (US, holotype). Boyacá, Colombia.

PENTACALIA CACHACOENSIS (Cuatr.) Cuatr. comb. nov.
Senecio cachacoensis Cuatr. Fieldiana 27(2): 34. 1951. Type: Christ 85 (US, holotype). Trujillo, Colombia.

PENTACALIA CARDENASII (Cuatr.) Cuatr., comb. nov.
Senecio cardenasii Cuatr. Fieldiana Bot. 27(2): 48-49. 1951. Type: Cárdenas 3988 (F, holotype). Cochabamba, Bolivia.

PENTACALIA CARRIKERI (Cuatr.) Cuatr. comb. nov.
Senecio carrikeri Cuatr. Fieldiana Bot. 27(2): 33. 1951. Type: Carriker 56 (US, holotype) Magdalena, Colombia.

PENTACALIA CLEEFII (Cuatr.) Cuatr. comb. nov.
Senecio cleefii Cuatr. Phytologia 31(4): 322-324. 1975. Type: Cleef 8826 (US, holotype) Boyacá, Colombia.

PENTACALIA COLOMBIANA (Cuatr.) Cuatr. comb. nov.
Senecio colombianus Cuatr., Caldasia 1:9. 1940. Type: Cuatrecasas 422 (COL, holotype). Cundinamarca, Colombia.
Senecio pavonicus Badillo, Bol Soc. Venez. Cienc. Nat. 10:318. 1946. Type: Steyermark 57379 (VEN: holotype). Táchira, Venezuela.

PENTACALIA CORYMBOSA (Benth.) Cuatr. comb. nov.
Microchaete corymbosa Benth. Pl. Hartw. 196-197. 1845. Typus: Hartweg 1086 (K, holotype). Cundinamarca, Colombia.
Senecio microchaete Wedd. Chl. And. 1: 100. 1856.

PENTACALIA DIPLOSTEPHIOIDES (Cuatr.) Cuatr. comb. nov.
Senecio diplostephioides Cuatr. Brittonia 12: 189. 1960. Type: Rauk-Hirsch. P-1252 (NY, holotype). Cuzco, Peru.

PENTACALIA ELATOIDES (Wedd.) Cuatr., comb. nov.
Senecio elatoides Wedd. Chloris And. 1:101. 1856. Type: Schlim 2. Santander, Colombia.

PENTACALIA EMPETROIDES (Cuatr.) Cuatr. comb. nov.
Senecio empetroides Cuatr. Brittonia 8: 41-42. 1954. Type: Camp E-2254 (F, holotype). Azuay, Ecuador.

PENTACALIA FIRMIPES (Greenm.) Cuatr. comb. nov.
Senecio firmipes Greenm. Proceed. Am. Acad. 39: 119. 1903. Type: Pittier 10472 (US, isotype). Costa Rica.

PENTACALIA FLOCCULIDENS (Sch. Bip ex Wedd) Cuatr. comb. nov.
Senecio flocculidens Sch. Bip ex Wedd. chl. And. 1: 127. 1856. Type: Funck & Schlim 1267 (P, holotype). Mérida, Venezuela.

PENTACALIA FLORIBUNDA Cuatr. sp. nov.
Based on Sodiro 59/19, and its description by Hieronymus under "S. floribundus (Kunth) Schultz-Bip mscr." Engler Bot. Jahrb. 29: 69-70. 1900. S. floribundus was illegitimate under Senecio because it was published as a transfer from the Kunth (HBK) species which is positively a Vernonia. See Cuatrecasas, Fieldiana 27(2): 34. Type: Sodiro 59/19 in silvis subandinis montis Corazón, Ecuador. Other collections are: Sodiro 720 (NY); Mille 720 (K, GH); Benoist 2541 (P); H & B in Herb. Willdenow no. 15073, Photo FM: 15588.

PENTACALIA FLOSFRAGRANS (Cuatr.) Cuatr, comb. nov.
Senecio flosfragrans Cuatr. Notas Fl. Colombia VI: 21-22, fig. 17. Trab. Comis. Bot. Secret. Agric. Valle, Cali. 1944. Type: Cuatrecasas 10461 (COL, holotype). Cundinamarca. Colombia.

PENTACALIA FLOSFRAGRANS var. FRIGIDOPHILA (Cuatr.) Cuatr. stat. nov.
Senecio frigidophilus Cuatr. Fieldiana, Bot. 27(2): 23-24. 1951. Type: Cuatrecasas 1498 (F, holotype). Boyacá, Colombia.

PENTACALIA GELIDA (Wedd.) Cuatr., comb. nov.
Senecio gelidus Wedd. Chl. And. 1: 95. 1856. Type: Goudot s.n. (P, holotype). Tolima, Colombia.
Senecio crymophilus Wedd. Chl. And. 1: 95-96. 1856. Type: Goudot (P). Tolima, Colombia.
Culcitium panizzae Duse, Nuovo Giornale Bot. Ital., Nuov. ser. 12:285. 1905. Type: Goudot 3 (FI, holotype). Tolima, Colombia.
Culcitium paramense Cuatr. Trab. Mus. Nac. Cienc. Nat. ser. Bot. 29: 36-37, fig 14. 1935. Type: Cuatrecasas 2883 (MA, holotype). Tolima, Colombia.

PENTACALIA GREENMANIANA (Hieron.) Cuatr. comb. nov.
Senecio greenmanianus Hieron. Engl. Bot. Jahrb. 28: 643. 1901. Type: Moritz 1384 (F, P). Mérida, Venezuela.

PENTACALIA GUADALUPE (Cuatr.) Cuatr., comb. nov.
Senecio guadalupe Cuatr. Fieldiana Bot. 27(2): 23. 1951. Type: Pennell 2254 (NY, holotype), Cundinamarca, Colombia.

PENTACALIA GUICANENSIS (Cuatr.) Cuatr.
Senecio guicanensis Cuatr. Caldasia 1: 8-9. 1940. Type: Cuatrecasas & García-Barriga 1464 (COL, holotype). Boyacá, Colombia.

PENTACALIA HARRIETAE (Cuatr.) Cuatr. comb. nov.
Senecio harrietae Cuatr. Proceed. Biol. Soc. Washington 74: 19-20. 1961. Type: H. Barclay 6690 (US, holotype) Magdalena, Colombia.

PENTACALIA IMBRICATIFOLIA (Sch. Bip. ex Wedd.) Cuatr., comb. nov.
Senecio imbricatifolius Sch. Bip. ex Wedd. chl. And. 1: 96. 1856. Type: Moritz 1394 (P, holotype) Mérida, Venezuela.

PENTACALIA INVOLUTA (Klatt) Cuatr. comb. nov.
Senecio involutus Klatt, Annal. Naturh. Hofsmus. Wien 9: 365. 1894. Type: Funck & Schlim 1514; Mérida, Venezuela.

PENTACALIA KRUKOFFII (Cuatr.) Cuatr. comb. nov.
Senecio krukoffii Cuatr. Fieldiana Bot. 27(2): 60. 1951. Type: Krukoff 10715 (NY; holotype). La Paz, Bolivia.

PENTACALIA LEDIFOLIA (HBK) Cuatr. comb. nov.
Cacalia ledifolia HBK. Nov. Gen. Sp. Pl. 4: 162 ed. folio 1810; p. 162 ed. 1820.
Cacalia lanata HBK. l.e. 127 ed. folio, 162 ed. 1820.
Senecio lanatus (HBK) DC. Prodr. 6:422. 1837. Type: Humboldt & Bonpland. Bogotá region, Colombia.

PENTACALIA LEDIFOLIA ssp. SCHLIMII (Wedd.) Cuatr. stat. nov.
Senecio ledifolius var. schlimii Wedd. Chl. And. 1:94. 1856. Type: Funck & Schlim 1291 (P). Santander, Colombia.
Senecio chitaganus Cuatr. Nat. Fl. Colombia VI: 23-24, fig. 18. 1944. Type: Cuatrecasas 13471 (COL, holotype).

PENTACALIA LEDIFOLIA ssp. LEHMANNII (Hieron.) Cuatr. stat. nov.
Senecio lehmannii Hieron. Engl. Bot. Gahrb. 19: 66. 1894. Type: Lehmann 7434 (F). Antioquia, Colombia.
Senecio ledifolius var. lehmannii (Hieron.) Cuatr. Phytologia 27(1): 38. 1950.

PENTACALIA LEIOCLADA (Cuatr.) Cuatr. comb. nov.
Senecio leiocladus Cuatr. Notas Fl. Colombia VI: 20, fig. 15, Trab. Comis. Bot. Secret. Agric. Valle, Cali. 1944. Type: Cuatrecasas 13536 (COL, holotype), Cundinamarca, Colombia.

PENTACALIA LIBERTATIS (Cuatr.) Cuatr. comb. nov.
Senecio libertatis Cuatr. Phytologia 29(5): 383-385. 1975. Type: Cuatrecasas, Ruiz & López 28512 (US, holotype). Mérida, Venezuela.

PENTACALIA LINDENII (Sch. Bip ex Wedd) Cuatr. comb. nov.
Senecio lindenii Sch. Bip. ex Weddell, Chl. And. 1:101. 1856. Type: Linden 721 (P, holotype) Santander, Colombia.

PENTACALIA MAGNICALICULATA (Badillo) Cuatr. comb. nov.
Senecio magnicaliculatus Badillo, Bol. Soc. Venez. Cienc. Nat. 10(68): 315-316. 1947. Type: Jahn 971 (VEN, holotype). Mérida, Venezuela.

PENTACALIA MAMANCANACANA (Cuatr.) Cuatr. comb. nov.
Senecio mamancanacanus Cuatr., Fieldiana Bot. 27(2): 32-33. 1951. Type: Cabot Expedition 6 (GH, holotype) Cesar-Magdalena, Colombia.

PENTACALIA MASON-HALEI (Ruiz & López) Cuatr. comb. nov.
Senecio mason-halei Ruiz-Terán & López-Figueiras, Revista Fac. Farm. Univ. Andes, Mérida no. 17: 20-24, figs 11, 12. 1976. Type: López-Figueiras 11905 (MERF, holotype). Mérida, Venezuela.

PENTACALIA MEDULLOSA (Sch. Bip. ex Greenm.) Cuatr. comb. nov.
Senecio medullosus Sch. Bip. ex Greenm., Ann. Mo. Bot. Gard. 10: 85-86. 1923. Type: Mandon 147 (GH, holotype). Unduavi, Bolivia.

PENTACALIA MICRODON (Wedd.) Cuatr. comb. nov.
Senecio microdon Wedd. Chl. And. 1: 102-103. 1856. Type: Jameson 118 or 115 (P) Cotopaxí, Ecuador.

PENTACALIA MICROPACHYPHYLLA (Cuatr.) Cuatr. comb. nov.
Senecio microphachyphyllus Cuatr. Fedd. Rep. 55 (2/3): 140-141. 1953. Type: Jahn 65 (US, holotype). Mérida, Venezuela.

PENTACALIA MUTISII (Cuatr.) Cuatr., comb. nov.
Senecio mutisii Cuatr. Trab. Mus. Nac. Cienc. Nat. Madrid, ser. Bot. 29: 40-42 fig. 16. 1935. Type: Cuatrecasas 2880 (MA, holotype). Tolima, Colombia.

PENTACALIA MYRSINITES (Turcz.) Cuatr. comb. nov.
Senecio myrsinites Turcz. Bull. Soc. Nat. Mosc. 24(1): 211. 1851. Type: Jameson 229 (K) Quito, Ecuador.
Senecio ecuadoriensis Hieron. Engler Bot. Bot. Jahrb. 19: 68. 1894. Type: Lehmann 4576 (K, lectotype). Azuay, Ecuador.
Senecio ecuadoriensis Klatt, Ann. Naturhist. Hofmus. Wien 9: 364. 1894. Type: Spruce 5996 in Andibus Ecuadoriensibus. (Not seen).

PENTACALIA NIGROSTAGNOSA (Cuatr.) Cuatr., comb. nov.
Senecio nigrostagnosus Cuatr. Notulae Systematicae, Mus. d'Hist. Nat. 15(2): 236-238, fig. 2. 1956. Type: Humbert 26507 (P, holotype). Mérida, Venezuela.

PENTACALIA NITIDA (HBK) Cuatr. comb. nov.
Cacalia nitida HBK. Nov. Gen. Sp. Pl. 4:127 ed. folio 1818; p. 162 ed. 1820.
Senecio nitidus (HBK) DC. Prodr. 421. 1837. Type: Humboldt & Bonpland (P, holotype). Probably Bogotá, Colombia. Cuatrecasas Fieldiana 27(1): 37. 1950; Brittonia 12: 194, 1960.

PENTACALIA NOVOLANATA (Cuatr.) Cuatr., comb. nov.
Senecio novolantus Cuatr. Fieldiana Bot. 27(2): 24-25. 1951. Type: Killip & Smith 17505 (US, holotype). Santander, Colombia.

PENTACALIA OCANENSIS (Greenm. & Cuatr.) Cuatr. comb. nov.
Senecio ocanensis Greenm. & Cuatr., Brittonia, 8: 191. 1956. Type: Schlim 680 (P, holotype). N. de Santander, Colombia.

PENTACALIA ONAE (Cuatr.) Cuatr. comb. nov.
Senecio onae Cuatr. Fieldiana Bot. 1: 30-31. 1950. Type: Steyermark 53688 (F, holotype). Azuay, Ecuador.

PENTACALIA PACHYPUS (Greenm.) Cuatr. comb. nov.
Senecio pachypus Greenm. Ann. Mo. Bot. Gard. 25: 811-812. 1938. Type: Pittier 13243 (MO, holotype). Mérida, Venezuela.

PENTACALIA PERIJAENSIS (Cuatr.) Cuatr. comb. nov.
Senecio perijaensis Cuatr. Fedd. Rep. 55 (2/3): 143. 1953. Type: Grant 10854 (US, holotype). Cesar, Colombia.

PENTACALIA PERUVIANA (Pers.) Cuatr. comb. nov.
Senecio peruvianus Pers. Syn. Plant. 2: 436. 1807. Type: Herb. J. De Jussieu No. 8968 (P, holotype).
Senecio ericaefolius Benth. Pl. Hartw. 208. 1845. Type: Hartweg 1155 (K). Antisana, Ecuador.
Senecio diosmoides Turcz. Bull. Soc. Natur. Mosc. 24: 210. 1851. Type: Jameson 71. Quito. The synonymy was established by Cabrera, Boletin Soc. Arg. Bot. 7(3-4): 244. 1959.

PENTACALIA POLYMERA (Klatt) Cuatr. comb. nov.
Senecio polymerus Klatt, Abhandl. Natur. Gesell. Halle 15: 332. 1882. Type: Funk 505 (W, holotype). Magdalena-Cesar, Colombia.
Senecio sancti-sebastiani Sandwith, Kew Bull. 1941: 227. 1942. Type: Hanbury-Tracy 355 (K, holotype). Colombia.

PENTACALIA PRUNIFOLIA (Weddell) Cuatr. comb. nov.
Senecio prunifolius Weddell, Chl. And. 1: 102. 1856. Type: Schlim 447 (G). N. de Santander, Colombia.

PENTACALIA PULCHELLA (HBK) Cuatr. comb. nov.
Cacalia pulchella HBK. Nov. Gen. Sp. Pl. 4: 126 ed. folio. 1818; p. 160 ed. 1820. Type: Humboldt & Bonpland (P, holotype) Cundinamarca, Colombia.
Senecio pulchellus (HBK) DC. Prodr. 6: 421. 1837. non Senecio pulchellus HBK, Nov. Gen. Sp. Pl. 4: 146-147 ed. folio 1818; p. 187 ed. 1820.
Microchaete pulchella (HBK) Benth. Pl. Hartw. 210. 1845.

PENTACALIA PULCHELLA ssp. GUANTIVANA (Cuatr.) Cuatr. stat. nov.
Senecio guantivanus Cuatr. Not. Fl. Colombia VI: 23, fig. 18-2. Trab. Com. Bot. Secret. Agr. Valle, Cali 1944. Type: Cuatrecasas 10344 (COL, holotype). Cundinamarca, Colombia.

PENTACALIA PULCHELLA var. PUNGENS (HBK) Cuatr. stat. nov.
Cacalia pungens HBK. Nov. Gen. Sp. Pl. 4: 125 ed. folio; p. 160 ed. 1820. Type: Humboldt & Bonpland (P, holotype). Colombia.
Senecio pungens (HBK) DC. Prodr. 6: 421. 1837.

PENTACALIA QUIRORANA (Cuatr.) Cuatr. comb. nov.
Senecio quiroranus Cuatr. Fedd. Rep. 55 (2/3): 143-144. 1953. Type: Jahn 709 (US, holotype). Mérida, Venezuela.

PENTACALIA RAMENTOSA (Cuatr.) Cuatr. comb. nov.
Senecio ramentosus Cuatr. Notas Fl. Colombia VI: 21, 22, fig. 16. Trab. Comis. Bot. Secret. Agric. Valle, Cali. 1944. Type: Cuatrecasas, Schultes & Smith 12671. (COL, holotype). Páramo de Tamá, Colombia.

PENTACALIA REFLEXA (HBK) Cuatr. comb. nov.
Senecio reflexus HBK. Nov. Gen. Sp. Pl. 4: 142-143 ed. folio, 1818; pag. 182 ed. 1820. Type: Humboldt & Bonpland (P, holotype). "Provincia Quitensi". Photo FM 37894.
Senecio semidentatus Klatt, Abhandl. Naturf. Ges. Halle 15: 331. 1882. Type: Triana 88 (P, lectotype) Colombia.
Senecio aberrans Greenm. Ann. Mo. Bot. Gard. 10: 73, pl. 3. 1923. Type: Pennell 3636 (NY, holotype). Tolima, Colombia.
Senecio macbridei Greenm. Ann. Mo. Bot. Gard. 25: 808-809. 1938. Type: Macbride 5254 (F. holotype). La Merced, Peru.
Senecio klugii Greenm. Ann. Mo. Bot. Gard. 25: 806-807. 1938. Type: Klug 3466 (MO, holotype). San Martín, Peru.

PENTACALIA REISSIANA (Hieron.) Cuatr. comb. nov.
Senecio reissianus Hieron., Engl. Bot. Jahrb. 21: 356. 1895. Type: Stuebel 141. Cundinamarca, Colombia.

PENTACALIA REX (Sandwith) Cuatr. comb. nov.
Culcitium rex Sandwith, Bull. Misc. Inform. Kew, 1941 (3): 224-225. 1942. Type: Hanbury-Tracy 151 (K, holotype) Mérida, Venezuela.
Senecio rex (Sandw.) Cuatr. Fieldiana Bot. 27(1): 45. 1950.

PENTACALIA RIGIDIFOLIA (Badillo) Cuatr. comb. nov.
Senecio rigidifolius Badillo, Bol. Soc. Venez. Cienc. Nat. 10 (68): 318. 1947. Type: Steyermark 55496 (VEN, holotype) Lara, Venezuela.

PENTACALIA RUITERANII (Cuatr.) Cuatr. comb. nov.
Senecio ruiteranii Cuatr. Phytologia 20 (8): 477-478. 1971. Type: Cuatrecasas, Ruiz-Terán & López-Figueiras 28204 (US, holotype). Trujillo, Venezuela.

PENTACALIA SCITOPHYLLA (HBK) Cuatr. comb. nov.
Senecio scitophyllus HBK. Nov. Gen. Sp. Pl. 4:142 ed folio, 181 ed. 1820. Type: Humboldt & Bonpland (P, holotype). Ecuador.

PENTACALIA SCLEROSA (Cuatr.) Cuatr., comb. nov.
Senecio sclerosus Cuatr. Notas Fl. Colombia VI: 24, fig. 20. Trab. Comis. Bot. Secret. Agric. Valle, Cali. 1944. Type: Gehriger 95 (NY, holotype). Mérida, Venezuela.

PENTACALIA SOTARENSIS (Hieron.) Cuatr. comb. nov.
Senecio sotarensis Hieron. Engl. Bot. Jahrb. 21: 360. 1895. Type: Stuebel 339a Cauca, Colombia. Photo F.M. 15751

PENTACALIA STUEBELII (Hieron.) Cuatr. comb. nov.
Senecio stuebelii Hieron., Engl. Bot. Jahrb. 21: 357. 1895. Type: Stuebel 440a (B, holotype) Nariño, Colombia. Photo F.M. -15757.

PENTACALIA SUBARACHNOIDEA (Wedd.) Cuatr. comb. nov.
Senecio subarachnoideus Wedd. Chl. And. 1: 122. 1856. Type: Schlim 810 (P, holotype). Magdalena, Colombia.

PENTACALIA SUMMAPACIS (Cuatr.) Cuatr. comb. nov.
Senecio summapacis Cuatr. Fedd. Rep. 55 (2/3): 150.1953. Type: Fosberg 20791 (F, holotype). Cundinamarca, Colombia.

PENTACALIA TERETIFOLIA (HBK) Cuatr. comb. nov.
Cacalia teretifolia HBK. Nov. Gen. Sp. Pl. 4:124-125 ed.folio 1818. Type: Humboldt & Bonpland (P, holotype). Ecuador.
Senecio teretifolius (HBK) DC. Prodr. 6: 420. 1837.
Microchaete teretifolia (HBK) Benth. Pl. Hartw. 209. 1845.

PENTACALIA TOLIMENSIS (Sch. Bip. ex Wedd.) Cuatr. comb. nov.
Senecio tolimensis Sch. Bip. ex Wedd. Chl. And. 1: 98-99. 1856. Type: Linden 939 (P, holotype). Tolima, Colombia.
Senecio caroli-tertii Cuatr. Trab. Mus. Nac. Cienc. Nat. Madrid, ser. Bot. 29: 38-40, fig. 15. 1935. Type: Cuatrecasas 2881 (MA, holotype). Tolima, Colombia.

PENTACALIA TRICHOPUS (Benth.) Cuatr. comb. nov.
Microchaete trichopus Benth Pl. Hartw. 210. 1845. Type: Hartweg 1163 (K, holotype) Cauca, Colombia.
Senecio trichopus (Benth.) Greenman, An. Mo Bot. Gard. 25: 820. 1938.
Senecio pulchellus var. squamiferus Cuatr. Trab. Mus. Nac. Cienc. Nat. Madrid Ser. Bot. 29: 42, fig. 17. 1935. Type: Cuatrecasas 2800 (MA, holotype). Tolima, Colombia.

PENTACALIA TUNAMENSIS (Cuatr.) Cuatr. comb. nov.
Senecio tunamensis Cuatr. Fedd. Rep. 55 (2/3): 150-151. 1953. Type: Jahn 60 (US, holotype). Trujillo, Venezuela.

PENTACALIA VACCINIOIDES (HBK) Cuatr. comb. nov.
Cacalia vaccinioides HBK., Nov. Gen. Sp. Pl. 4: 126 ed. folio 1918, p 161 ed. 1820. Tab. 358. Type: Humboldt & Bonpland (P, holotype). Cauca, Colombia.
Cacalia glabrata HBK., Nov. Gen. Sp. Pl. 4: 126-127 ed. folio, p. 161 ed. 1820. Type: Humboldt & Bonpland (P, holotype). Cauca, Colombia.
Psacalium vaccinioides (HBK.) DC. Prodr. 6: 335. 1837.
Psacalium glabratum (HBK.) DC. Prodr. 6: 335. 1837.
Microchaete vaccinoides (HBK.) Benth. Pl. Hartw. 210. 1845.
Senecio vaccinioides Sch. Bip. ex Wedd Chl. And. 1: 99, pl. 20A. 1856.

PENTACALIA VENEZUELENSIS (Sandw.) Cuatr. comb. nov.
Sneecio venezuelensis Sandw. Kew Bul. 1941: 226. 1942. Type: Hambury-Tracy 264 (K, holotype). Merida, Venezuela.
Senecio mucuyanus Cuatr. Nat. Fl. Colombia VI: 27, fig. 22. 1944. Type: Gehriger 90. Merida, Venezuela.

PENTACALIA VERNICIFOLIA (Cuatr.) Cuatr. comb. nov.
Senecio vernicifolius Cuatr. Brittonia 8(3): 190. 1956. Type: Sandeman 4298 (K, holotype). Huancabamba, Peru.

PENTACALIA VERNICOSA (Weddell) Cuatr. comb. nov.
Senecio vernicosus Schultz Bip ex Wedd. Chl. And. 1:94-95. 1856. Type: Linden 899 (F, isotype). Tolima, Colombia.
Senecio vernicosus v. microphyllus Wedd. l.c.

PENTACALIA VERTICILLATA (Klatt) Cuatr. comb. nov.
Senecio verticillatus Klatt, Abh. Naturf. Ges. Halle 15: 331. 1882. Type: Mathews 105 (K, lectotype). Chachapoyas, Peru.

PENTACALIA VIRIDI-ALBA (Cuatr.) Cuatr. comb. nov.
Senecio viridi-albus Cuatr. Rev. Acad. Colomb. Cienc. 5: 30. 1942. Type: Cuatrecasas 13525 (COL, holotype). Santander, Colombia.

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SIX NEW SPECIES OF *VERNONIA* FROM SOUTH AMERICA.

Harold Robinson
Department of Botany
Smithsonian Institution, Washington, D.C., 20560.

Continuing work in South American Asteraceae was resulted in the recognition of the following one new variety and six new species.

VERNONIA CANESCENS H.B.K. var. OPPOSITA H. Robinson, var. nov.

Folia opposita; inflorescentiae densae; bracteae involucri acutae non pungentiter acuminatae.

TYPE: COLOMBIA: Magdalena: Santa Marta, Cerro Quemado. 17 Dec. 1922. *H.L.Viereck 6* (Holotype, US). PARATYPES: COLOMBIA: Magdalena: Santa Marta. 1898-1901. *H.H.Smith 1981* (US); Summit of Cerro San Lorenzo, 3000 m. Shrub. 1941. *Bro. Apolinar A. 607* (US); Mount San Lorenzo, near Santa Marta, 1900-2400 m. July 1932. *W.Seifriz 121* (US).

The opposite-leaved plants from the Santa Marta region of Colombia seem to form a distinct population, but the phyllotaxy, denser inflorescence, and less pointed involucral bracts seem to represent only a varietal level of distinction. Nevertheless, opposite leaves would appear to be very unusual in the *Lepidoploa* element of *Vernonia*. The present variety has no close relation to other opposite-leaved Vernonieae known from the northern Andes (Cuatrecasas, 1956; Robinson, 1980).

VERNONIA BISHOPII H. Robinson, sp. nov.

Plantae suffrutescentes vel frutescentes 1 m altae. Caules lati subteretes vel subtiliter 5-angulati dense sordido-velutini. Folia alterna, petiolis plerumque 0.5-1.5 cm longis; laminae oblongae plerumque 4-11 cm longae et 3.0-5.5 cm latae base late obtusae margine multo subdenticulatae apice breviter obtusae supra dense praeter in nervis primariis evanescentiter subtomentoso-puberulae, pilis T-formibus sessilibus, in nervulis leniter prominulae subtus dense sordide tomentosae, nervis secundariis utrinque ca. 7-11 late divaricatae distincte arcuatae. Inflorescentiae in seriebus cymosae, bracteis foliiformibus plerumque 2.5-3.5 cm longis et 2-3 cm latis. Capitula sessilia 2.0-2.5 cm alta et 1.7-2.0 cm lata; squamae involucri ca. 90 appressae oblongo-lanceolatae 5-10 mm longae et 1.5-3.0 mm latae apice breviter acutae vel obtusae minute apiculatae ca. 50 exteriores extus subapicaliter dense aureo-tomentellae interiores superne purpurascentes. Flores ca. 75 in capitulo; corollae albae ca. 10 mm longae extus glabrae, tubis ca. 4.5 mm longis infundibularibus, faucibus ca. 2 mm longis, lobis lanceolatis ca. 4 mm longis et inferne 0.7 mm latis apice extus vix spiculiferis;

Thecae antherarum ca. 4 mm longae; appendices antherarum ca. 1 mm longae et 0.23 mm latae glabrae; basi stylorum non noduliferi, scapi stylorum in partibus superioribus hispidulis ca. 1 mm longi; rami stylorum ca. 4.5 mm longi non glanduliferi. Achaenia ca. 3 mm longa dense lanata non glandulifera; carpopodia cylindrico-obturaculiformia 0.25 mm longae et ca. 0.5 mm latae; setae pappi albae ca. 55 plerumque ca. 8 mm longae superne sensim distincte latiores margine scabridulae extus laeves; squamae exteriores anguste lanceolatae ca. 2 mm longae margine scabridulae extus laeves. Grana pollinis oblata ca. 50 μm alta et 60 μm lata valde lophorata, cristis altis minute multo spinuliferis, spinis majoribus nullis (reticulation *V. argyrophylla*-type).

TYPE: BRASIL: Goiás: Serra dos Pirineus, ca. 15 km (straight line) N of Corumbá de Goiás; elev. ca. 1300 m; rocky hillside with blocky outcrops of metamorphic rock. Shrub 1 m tall; flowers white. 14 May 1973. *W.R.Anderson l0287* (Holotype, UB; isotype, US). PARATYPE: BRASIL: Goias: 5-12 km S of Alto Paraiso de Goias, mostly E of road to São João da Aliança, elev. 3300-3800 ft. Subligneous herb branched from base, 1 meter tall, flowers all past anthesis. Feb. 8, 1981. *R.M.King & L.E.Bishop 8899* (UB, US).

The type specimen of the new species was distributed under the name *Vernonia flavescens* Glaziou, and the material appears to match a photograph of a supposed type of that species. Unfortunated, the Glaziou species was never validly described, and the name is a latter homonym of *V. flavescens* Less. The species is one of those with thick tomentum and large haeds. Yellow tomentum extends onto the basal half of the involucre, leaving the purplish tips exposed.

VERNONIA CARDENASII H. Robinson, sp. nov.

Plantae suffrutescentes vel infirme frutescentes 2-3 m altae pauce ramosae. Caules teretes leniter striati dense puberuli, pilis T-formibus breviter vel non stipitatis, pilis paucis erectis multiseptatis uniseriatis. Folia alterna, petiolis 2-3 cm longis; laminae herbaceae late ellipticae 4-11 cm longae 1.5-6.0 cm latae base obtusae vel late acutae margine integrae vel subintegrae apice obtusae et breviter apiculatae supra dense puberuli subtus in nervis dense pilosulae aliter dense minute glandulo-punctatae et sparse pilosae, pilis T-formibus longe stipitatis, nervis secundariis utrinque 5-6 late divaricatis. Inflorescentiae thrysoideae in ramis corymboso-cymosae, pedunculis 1-3 cm longis dense puberulis vel subtomentosis; bracteis inflorescentiis minutis. Capitula late campanulata ca. 2 cm alta et 1.0-1.5 cm latae; squamae involucri ca. 60-70 ca. 6-seriatae in apicibus plerumque reflexae vel extrorse circinatae anguste oblongae vel lineares 3-15 mm longae et 1.5-2.0 mm latae apice plerumque anguste obtusae extus rufo-tomentosae. Flores 30-35 in capitulo; corollae purpureae ca. 19 mm longae in tubis et faucibus glabrae, tubis 10-11 mm longis inferne perangustis, faucibus ca. 2 mm

longis, lobis linearibus ca. 7 mm longis et 0.7 mm latis extus plerumque glabris apice spiculiferae et perpauce glandulo-punctatae; thecae antherarum ca. 3.5 mm longae; appendices antherarum anguste oblongo-ovatae ca. 1 mm longae et 0.3 mm latae; basi stylorum in nodis disciformes; scapi stylorum in partibus superioribus hispidulis ca. 0.6 mm longi; rami stylorum ca. 4 mm longi non glanduliferi. Achaenia submatura ca. 2.8 mm longa base dense glandulo-punctata aliter non glandulifera dense longe setifera; carpopodia obturaculiformia ca. 0.25 mm longa et 0.5 mm lata; setae pappi albidae persistentes interiores ca. 50 plerumque 11-12 mm longae apice non latiores margin dense erecte scabridulae; squamae exteriores anguste lanceolatae ca. 1.5 mm longae margine et extus scabridulae. Grana pollinis in diametro ca. 55 um subregulariter areolata et spinulosa (*Lychnophora*-type).

TYPE: BOLIVIA: Cochabamba: Cordillera of Chimore, 2700 m. Shrub, slender 2-3 m high. At forest edge. Nov. 1, 1937. *M. Cardenas 2079* (Holotype, US).

The new species keys to *Vernonia fulta* Griseb. in Gleason (1923), and has the broadly oblong or elliptical petiolate leaves and large heads in subcorymbose cymes similar to the latter species. Still, *V. fulta* differs by having heads only half to two-thirds as high with the bracts erect and sparsely puberulous.

VERNONIA COULONIOIDES H. Robinson, sp. nov.

Plantae suffrutescentes ca. 0.8 m altae superne pauce ramosae. Caules brunnescentes teretes striati evanescentiter puberuli. Folia alterna subsessilia, petiolis ca. 1 mm longis; laminae oblongae plerumque 2-4 cm longae et 0.5-1.5 cm latae base anguste rotundatae margine intergrae anguste revolutae apice pungentiter acutae utrinque lucido-virides supra sparse appresse pilosulae subtus sparse puberulae et dense glandulo-punctatae, nervis secundariis utrinque ca. 3-5 ca. 45° ascendentibus vix arcuatis. Inflorescentiae dense serialiter cymosae, bracteis minutis. Capitula seesilia ca. 7 mm alta et 5-6 mm lata; squamae involucri ca. 50 ca. 5-seriatae ca. 40 exteriores in apicibus leniter recurvae anguste ovatae vel lanceolatae 1.5-4.0 longae et 0.8-1.0 mm latae pungentes ad medio leniter costatae interiores anguste oblongae ad 5 mm longae et 1.2 mm latae apice obtusae vel breviter obtusae minute apiculatae interdum purpureo-tinctae, squamae omnino extus minute puberulae et sparse glandulo-punctatae. Flores ca. 22-25 in capitulo; corollae albidae vel superne lavandulo-tinctae 5-7 mm longae in tubis superioribus faucibus et apices lobarum dense glandulo-punctatae, tubus 2-4 mm longis inferne perangustis superne infundibularibus, faucibus ca. 0.5 longis, lobis linearibus ca. 2.5 mm longis et 0.4 mm latis subapice perminute pauce spiculiferis; thecae antherarum ca. 1.8 mm longae; appendices antherarum ca. 0.4 mm longae et 0.2 mm latae extus dense glanduliferae; basi stylorum in nodis minute disciformes; scapi stylorum in partibus superioribus hispidulis ca. 0.4 mm longi; rami stylorum ca. 1.5 mm longi abaxialiter gland-

uliferi. Achaenia ca. 1 mm longa late obpyramidalia breviter setifera glandulifera et multo prominentiter punctata, punctis superficialibus 1-3-cellulatis subglanduliformibus; setae pappi albidae interiores subpersistentes ca. 40 plerumque ca. 4 mm longae superne vix vel non latiores margine et extus scabridulae; squamae exteriores lineares ca. 0.5 mm longae extus perminute scabridulae sublaeves. Grana pollinis oblata ca. 37 µm alta et 45 µm lata valde lophorata, cristis altis minute multo spinuliferis, spinis majoribus nullis (reticulation *V. geminata*-type).

TYPE: BRASIL: Rio de Janeiro: Mun. Cabo Frio, Praia do Pontal, Cabo Frio 22°56'48" S., 42°01'54" W., near sea level. April 17, 1952. *L.B.Smith with A.Magnanini, S.L.Oliviera e Silva, L.Dau, W.T.Ormond & Z.Lopes da Silva 6587* (Holotype, UB; isotype, US). PARATYPE: BRASIL: Rio de Janeiro: Cabo Frio, Arraial do Cabo, Praia do Pontal. Restinga. I-214?-1953. *F.Segadas-Vianna, L.Dau, W.T.Ormond, G.C.Machline & J.Lorêdo Jr. Museo Nacional Cat. no. 117984* (R, US).

The new species is another of the numerous members of the *Vernonia geminata* group, in the subgroup having minute bracts in the inflorescence. Of the related species, *V. geminata* Less. differs by the longer and denser hairiness of the leaves, the more strongly ascending secondary veins, and the reflexed outer involucral bracts. The new species has greater similarity to *V. coulonii*, but differs by the narrower more shiny leaves with dense glandular-punctation and short hairs on the under surface. The leaves of *V. coulonii* Sch.Bip. ex Baker have long rather sericeous pubescence on the under surface, and the floral parts seem to be generally larger. Corollas seen in two specimens of the latter species seem to lack the dense glandular pubescence on the throat and distal part of the tube.

VERNONIA LIESNERI H. Robinson, sp. nov.

Plantae frutescentes ca. 1.5 m alta mediocriter ramosae. Caules teretes vix striati dense minute appresse puberuli, pilis uniseriatis base dense 1-5-septatis in cellulis apicalibus elongatis. Folia alterne, petiolis 2-5 mm longis; laminae anguste ellipticae plerumque 4-6 cm longae et 1.0-1.5 cm latae base et apice acutae margine subintegrae vel remote subserrulatae supra et subtus immerse glandulo-punctatae et minute appresse puberulae, nervis secundariis obscuris utrinque ca. 4-6 ca. 45° ascendentibus vix arcuatis. Inflorescentiae serialiter cymosae, bracteis foliiformibus 2-4 cm longis et 0.5-1.0 cm latis. Capitula sessilia vel subsessilia 9-10 mm alta et ca. 4-5 mm lata; squamae involucri ca. 35-40 ca. 5-seriatae erectae appressae 1.0-6.5 mm longae et 0.8-1.5 mm latae plerumque lanceolatae et acutae interiores oblongae et apice breviter obtusae apiculatae omnino extus tenuiter appresse puberulae superne sordido-vittatae minute immerse glandulo-punctatae. Flores ca. 8-9 in capitulo; corollae lavandulae ca. 7 mm longae extus in tubis et faucibus sparse pilosulae base densiores in lobis subapice dense pilosulae et

glandulo-punctatae, tubis late leniter infundibulares ca. 3 mm longis; faucibus ca. 1 mm longis; lobis linearibus 2.7-3.0 mm longis inferne ca. 0.6 mm latis; thecae antherarum ca. 2 mm longae; appendices antherarum anguste ovatae ca. 0.6 mm longae et 0.25 mm latae glabrae; nodi stylorum breviter obturaculiformes; scapi stylorum in partibus superioribus hispidulis ca. 0.5 mm longi; rami stylorum ca. 2.5 mm longi. Achaenia submatura 1.8 mm longa dense setifera et inter costas glandulifera; carpopodia anguste turbinata ca. 0.2 mm longa et 0.27 mm lata; setae pappi albidae ca. 40 plerumque 4.5-5.5 mm longae superne vix latiores margine et extus scabridae; squamae exteriores lineares ca. 1 mm longae extus sparse scabridae. Grana pollinis oblata ca. 45 um alta et 55 um lata valde lophorata, cristis altis minute multo spinuliferis, spinis majoribus nullis (reticulation *V. cognata*-type).

TYPE: VENEZUELA: Tachira: Vicinity of Las Minas, north of La Laguna, 16 km SE of Santa Ana, Lat. 7°36'N, Long. 72°13'W. Primary wet forest. Alt. 1150-1250 m. 28 July 1979. *J.A. Steyermark & R.Liesner 118879* (Holotype, US; isotype, MO). PARATYPE: VENEZUELA: Tachira: Cerro Las Minas, bordering Quebrada Las Minas, 18-20 km SE of Santa Ana, Lat. 7°36'N, Long. 72°13'W. Alt. 1150-1250 m. Primary forest over sandstone substrate. Open sandstone slopes bordering virgin forest in zone of more dwarfed trees. Flowers lavender; stem 1.5 m tall. 29 July 1979. *J.A.Steyermark & R.Liesner 119046* (MO).

The new species differs from related species by the fewer flowers in the head and by the glandular-punctate leaves with obscure secondary veins.

VERNONIA MEXIAE H. Robinson, sp. nov.

Plantae subscandentes vel scandentes ad 9-10 m mediocriter ramosae. Caules brunnescentes striati vel costati puberuli inferne glabrescentes. Folia alterna, petiolis ca. 1 cm longis; laminae subcoriacea oblongo-ovatae vel oblongae base rotundatae vel obtusae margine integrae apice acuminatae supra glabrae subtus appresse puberulae, pilis brevibus. Inflorescentiae late pyramidaliter thrysoideo-paniculatae in ramis subracemosae. Capitula solitaria vel in glomerulis pauci-capitatis pedicellata; bracteis inflorescentiis minutis; involucra late campanulata 4-5 mm alta et 3-4 mm lata; squamae involucri ca. 25 erecto-appressae oblongae vel suborbiculares 1-4 mm longae et 0.7-1.0 mm latae apice rotundatae vel apiculatae extus glabrae superne purpurascentes. Flores 8-10 in capitulo; corollae purpureo-roseae ca. 5 mm longae anguste infundibulares ca. 5 mm longae extus praeter apicem loborum glabrae; tubis ca. 2 mm longis, faucibus ca. 1.8 mm longis, lobis lanceolatis ca. 1.3-1.5 mm longis et base ca. 0.4 mm latis fere ad apicem pauce glandulo-punctatis; thecae antherarum ca. 1.5 mm longae; appendices antherarum lanceolatae ca. 0.6 mm longae et 0.17 mm latae glabrae; base stylorum annuliformes; scapi stylorum in partibus superioribus hispidulis ca.

0.8 mm longi; rami stylorum ca. 2 mm longi non glanduliferi. Achaenia ad 2 mm longa breviter setulifera; carpopodia leniter turbinata ca. 0.15 mm longa et 0.3 mm lata; setae pappi albidae vel flavescentes subpersistentes ca. 35 plerumque 3.5-4.0 mm longae apice vix vel non latiores margine et extus dense scabridulae; squamae exteriores anguste oblongae 0.5-0.7 mm longae extus scabridulae. Grana pollinis in diametro ca. 35 µm subregulariter areolata et spinulosa (*Lychnophora*-type).

TYPE: PERU: Huanuco: Distrito Churubamba, Hacienda Mercedes, La Purisima; within border of forest. Alt. 1750 m. Suffrutescent; long, scandent branches, brownish flower. Common locally. Sept. 24, 1936. *Y.Mexia 8229* (Holotype, US). PARATYPE: PERU: San Martin: Prov. Mariscal Caceres - Tocache Nuevo. Quebrada de Pólvora, 10 km abajo de Puerto Pizana (Márgen derecha del río Huallaga). A orilla del río en bosque alto terreno rocoso. Trepadora de 9-10 metros. Flores purpura rojizo fuerte, 2.5RP5/10, brácteas pardas. Las láminas de las hojas son onduladas brillosas de color verde obscuro. Jun. 10, 1971. *J.Schunke V. 4974* (US).

The pyramidal form of the inflorescence is reminiscent of the genus *Critoniopsis* of the subtribe Piptocarphinae (Robinson, 1980), but the new species lacks the glabrous achenes and blunt hairs on the style branches of that group. The subracemose branches of the inflorescence are rather unusual in the tribe.

VERNONIA RIMACHII H. Robinson, sp. nov.

Plantae suffrutescentes erectae ad 7.5 dm altae mediocriter ramosae. Caules sericeo-pilosi. Folia alterna, petiolis 3-5 mm longis; laminae oblongo-ellipticae 4-7 cm longae et plerumque 1.5-2.0 cm latae base anguste rotundatae margine anguste reflexae superne pauce subserrulatae apice acutae vel subacuminatae supra sericeo-pilosae subtus glandulo-punctatae et plerumque in nervis et nervulis sericeo-pilosae. Inflorescentiae pauce ramosae, ramis serialiter cymosis in nodis vix vel non deflectis dense sericeis, bracteis foliiformibus 2-4 cm longis et 0.5-1.5 cm latis. Capitula in seriebus solitaria vel raro geminata sessilia axillaria; involucra brunnescentes campanulata 6-7 mm alta et lata; squamae involucri exteriores ca. 35 anguste lanceolatae subappressae vel laxe patentes 3-5 mm longae et base ca. 0.5 mm latae apice perangustae subaristatae extus sparse sericeae, squamae interiores ca. 12 erectae oblongo-lanceolatae ca. 6 mm longae et 1 mm latae apice argute acutae extus superne sparse puberulae. Flores ca. 25 in capitulo; corollae azureae? ca. 6 mm longae, tubis ca. 3 mm longis infundibularibus inferne perangustis glabris, faucibus ca. 0.8 mm longis glabris, lobis oblongo-lanceolatis ca. 1.5 mm longis et 0.4 mm latis extus plerumque glabris in apicibus multo glandulo-punctatis; thecae antherarum ca. 1.2 mm longae; appendices antherarum ovatae ca. 0.25 mm longae et 0.2 mm latae apice obtusae extus glanduliferae; basi stylorum annuliformes; scapi stylorum in partibus superior-

ibus hispidulis ca. 0.5 mm longi; rami stylorum ca. 1 mm longi extus glanduliferi. Achaenia submatura ca. 1.2 mm longa glandulifera non setulifera; carpopodia turbinata ca. 0.35 mm longa et lata; setae pappi subpersistentes ca. 30-35 ca. 4 mm longae apice latiores margine et extus dense scabridulae; squamae exteriores oblongo-ellipticae ca. 1 mm longae extus sublaeves. Grana pollinis in diametro ca. 50 um valde lophorata, cristis altis minute multo spinuliferis, spinis majoribus nullis (reticulation *V. geminata*-type).

TYPE: PERU: San Martin: Dpt. Tarapoto. Carretera de Tarapoto-Yurimaguas, km 12 to 16, elev. ca. 2250 ft., wet montane forest, sandy rocky soil, herb, corolla blue. Aug. 23, 1978. *M.Rimachi Y 3856* (Holotype, US).

The only *Vernonia* with glands on the achenes included in the treatment of peruvian Vernonieae by Jones (1980) is *V. yurimaguasensis* Hieron., a very different species more like *V. patens* H.B.K. in aspect. The new species is a member of the *Vernonia geminata* group, but it differs from most of the brasilian members by the large folliform bracts of the inflorescence. The closest relative might be *V. retrosetosa* H.Robins. of Peru, but the new species lacks the distinctive pubescence of the stems, the marked serration of the leaves, and the setiferous achenes of that species.

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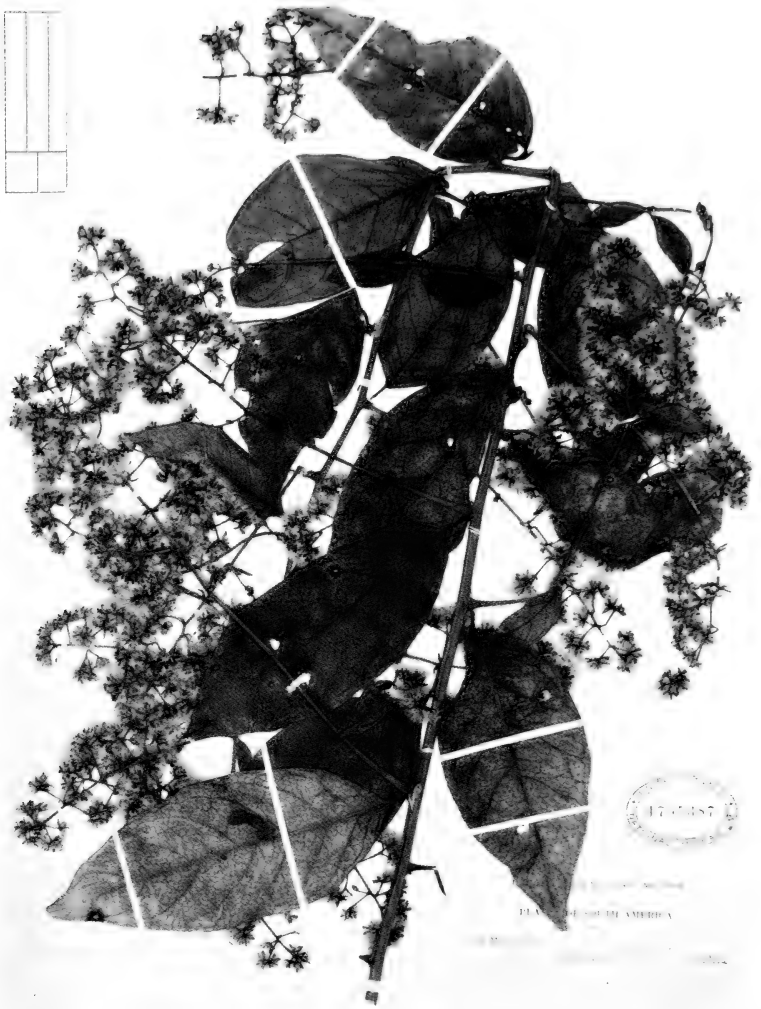
Vernonia bishopii H. Robinson, Isotype, United States National Herbarium. Photos by Victor E. Krantz, Staff Photographer, National Museum of Natural History.

Vernonia cardenasii H. Robinson, Holotype, United States National Herbarium.

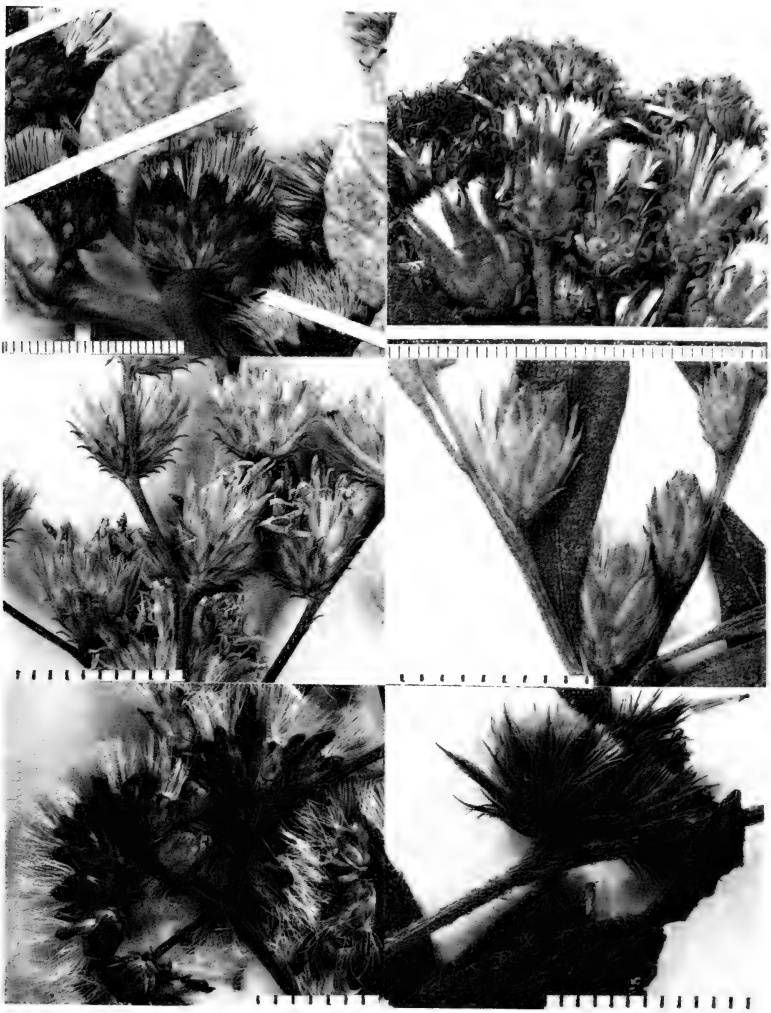
Vernonia coulonioides H. Robinson, Holotype, Herbário Universidade de Brasília.

Vernonia liesneri H. Robinson, Holotype, United States National Herbarium



Vernonia mexiae H. Robinson, Holotype, United States National Herbarium.

Vernonia rimachii H. Robinson, Holotype, United States National Herbarium.



Enlargements of heads of *Vernonia*. Top. *V. bishopii*, *V. cardenasii*. Middle. *V. coulonioides*, *V. liesneri*. Bottom. *V. mexiae*, *V. rimachii*.

STUDIES IN THE HELIANTHEAE (ASTERACEAE). XXIX.

NEW SPECIES OF *DIMEROSTEMMA* AND *OYEDAEA* FROM BRASIL

Harold Robinson
Department of Botany
Smithsonian Institution, Washington, D.C., 20560.

The two genera, *Dimerostemma* Cass. and *Oyedaea* DC., are the two members of the Heliantheae subtribe Ecliptinae in Brasil that have achenes not constricted above and rays that are sterile. All of the Brasilian species had been placed in the genus *Oyedaea*, at least in the form of a synonym, until 1917 when Blake placed under *Dimerostemma* those species which had more quadrangular achenes and lacked squamellae between the awns of the pappus. The latter species also seemed to characteristically have large foliaceous bracts at the base of the involucre. After the study by Blake, the remnant of *Oyedaea* contained mostly a group of Andean species related to the type *O. verbesinoides* DC., but a few brasilian species remained in the latter genus.

The present paper deals with two new species from Brasil, one in *Dimerostemma*, and the other falling technically in the brasilian remnant of *Oyedaea*. It is notable that, in spite of the supposed generic placements, both species have many floral details in common, and they seem to be related. The achenes are glabrous, the corolla lobes lack spicules on the outer surface, the filaments are fleshy and yellow, and the style branches have numerous short-stalked capitate glands abaxially in both species. In contrast, typical *Oyedaea* has achenes with distinct setulae on at least the margin, has an awned pappus, and has spicules on the corolla lobes. It would seem that a future natural concept would place the new species of *Oyedaea* in or near the genus *Dimerostemma* with which it shares so many characters. Still, for the present, the more flattened achenes, the squamellae in the pappus, and the scarcely enlarged subinvolucral bracts seem to place the new species near *Oyedaea humboldtii* (Gardn.) Benth. ex Baker of Brasil.

DIMEROSTEMMA BISHOPII H. Robinson, sp. nov.

Plantae suffruticosae ca. 1 m altae pauce ramosae. Caules brunnescentes leniter hexagonales vix striati dense retrorse hirtsuti; internodis 3.5-9.0 cm longis. Folia opposita, petiolis 3-10 mm longis; laminae ovatae 3.0-6.5 cm longae et 1.8-4.7 cm latae base late rotundatae vel plerumque leniter cordatae margine multo interdum irregulariter serrulatae apice breviter acuminatae supra dense pilosae subtus pallidiores dense pilosae vel subvillosae et dense glandulo-punctatae e base trinervatae. In-

florescentiae pauce ramosae, pedunculis plerumque 7-12 cm longis retrorse hirsutis. Capitula ad 5.5 cm latis (with rays); bracteae involucri exteriores foliaceae ca. 7 ellipticae 6-12 mm longis et 5-8 mm latis integrae acutae dense pilosae subtus glandulo-punctatae fere ad apicem trinervatae; bracteae 12-14 mediales in apicis reflexae foliaceae in bracteis interioribus sensim minores; bracteae 12-14 interiores oblongae ca. 5 mm longae plerumque in apicis erectae breviter acutae non foliaceae margine inferne scariosae glabrae extus superne puberulae et glandulo-punctatae; paleae bracteis interioribus similes. Flores radii ca. 22 steriles; corollae flavae, tubis ca. 1 mm longae, limbis ellipticis ad 20 mm longis et 8 mm latis subtus dense glandulo-punctatae et sparse pilosulis; achaenia radii triangularia ca. 3 mm longa glabra apice tridenticulata. Flores disci 150-250 in capitulo; corollae sordido-flavae 4.5-5.0 mm longae, tubis breviter cylindraceis ca. 1 mm longis glabris, faucibus anguste campanulatis 2.8-3.2 mm longis glabris, lobis ca. 0.7 mm longis et latis intus praeter basem papillosis extus sparse glandulo-punctatis; filamenta in partibus superioribus 0.6-0.7 mm longa; thecae antherarum nigrescentes ca. 2.5 mm longae; appendices antherarum flavae ovatae ca. 0.4 mm longae et 0.37 mm latae extus multo glanduliferae; rami stylorum abaxialiter multo glanduliferi in acuminis breviter appendiculatae; achaenia disci bilateralia subquadrangularia ca. 4 mm longa et ca. 1.3 mm latae non alata apice bidenticulata et vix minute crenulata. Grana pollinis in diametro ca. 30 µm.

TYPE: BRASIL: Goias: 68 kn NW along road from Iaciara to Nova Roma. Elev. 1400 ft. Subshrub 1 m tall, flowers yellow. Feb. 5, 1981. *R.M.King & L.E.Bishop 8803* (Holotype, UB; isotype, US).

The new species is clearly a *Dimerostemma* as shown by the foliaceous bracts at the base of the involucre and the essential details of the corollas and achenes. Nevertheless, the plant does not give the initial impression of a *Dimerostemma* because of the more herbaceous and more pointed leaves. Also, the achenes seem to have no wings and no awns, features at least partially present in typical members of the genus. The hairless parts of the flowers that so resemble those of the following species, are a further distinction from typical *Dimerostemma* which commonly has some setulae on the achene and distinct helianthean hairs near the sinuses of the disk corollas.

OYEDAEA EPISCOPALIS H. Robinson, sp. nov.

Plantae fruticosae ad 1.5 m altae mediocriter ramosae. Caules rufo-brunnescentes teretes leniter striati dense antrorse puberuli vel scabridi, internodis plerumque 1-2 cm longis. Folia opposita, petiolis indistincte demarcatis 2-3 mm longis; laminae ellipticae plerumque 2.5-4.0 cm longae et 0.7-1.3 cm latae base acuminatae margine multo serrulatae anguste recurvatae apice breviter acutae supra atro-virides subbullatae dense

antrorse scabridae subtus pallidae dense hispidulo-subtomentosae et glandulo-punctatae in nervis et nervulis dense exsculpto-reticulatae, nervis pinnatis, nervis secundariis in partibus inferioribus leniter ascendentioribus. Inflorescentiae terminales plerumque trifidae, pedunculis plerumque 3-7 cm longis dense antrorse scabridulae et glandulo-punctatae. Capitula ad 3.5 cm lata (with rays); bracteae involucri 8-10 exteriores anguste foliiformes 6-9 mm longae et ca. 2 mm latae obscure trinervatae ca. 12 interiores plerumque subscarioisae margine puberulo-fimbriatae apice obtusae extus lateraliter glabrae ad medio puberulae vel scabridulae et glandulo-punctatae; paleae bracteis interioribus similes in apicis plerumque rotundatae. Flores radii 10-12 steriles; corollae flavae extus dense glandulo-punctatae, tubis ca. 1.5 mm longae sparse puberulis, limbus oblongae ad 9 mm longae et 4.5 mm latae; achaenia radii triangularia ad 2.3 mm longa superne minute puberula apice tridenticulata interdum in aristis 1-3 ad 0.8 mm longis producta. Flores disci ca. 70 in capitulo; corollae sordido-flavae ca. 4.5 mm longae extus sparse puberulae, tubis cylindraceis ca. 1 mm longis, faucibus anguste campanulatis ca. 2.5 mm longis, lobis ca. 0.7 mm longis et latis intus praeter basem papillosis extus sparse glandulo-punctatae; filamenta in partibus superioribus ca. 0.5 mm longa; thecae antherarum nigrescentes ca. 2 mm longae; appendices antherarum nigrescentes late ovatae ca. 0.25 mm longae et 0.37 mm latae extus multo glanduliferae; rami stylorum abaxialiter multo glanduliferi in acuminis breviter appendiculati; achaenia disci complanata ca. 5 mm longa et 2 mm lata margine distincte integriter pallide alata plerumque glabra superne sparse minute scabridula apice breviter bidentata et minute squamulifera. Grana pollinis in diametro ca. 27 μm.

TYPE: BRASIL: Bahia: 14 km NW from the town of Rio das Contas along road to Pico das Almas. Elev. 3300 ft. Slender shrub to 1 1/2 meters tall, flowers yellow. Jan. 24, 1981. *R.M.King & L.E.Bishop 8633* (Holotype, UB; isotype, US).

As indicated above, the new species belongs to a small group of brasilian species that do not seem to be true members of the genus *Oyedaea*. The new species seems closest to *O. humboldtii* (Gardn.) Benth. ex Baker in Mart., but the latter has less firm and more herbaceous leaves without the dense reticulum of exsculpate veins beneath. Also, the new species has only short lobes at the top of the disk achene rather than awns.

LITERATURE CITED

Blake, S. F. 1917. II. A revision of the genus *Dimerostemma* Cass. Contrib. from the Gray Herb., new series 52: 8-16.

Dimerostemma bishopii H. Robinson, Isotype, United States National Herbarium. Photos by Victor E. Krantz, Staff Photographer, National Museum of Natural History.

Oyedaea episcopalis H. Robinson, Isotype, United States National Herbarium.

Enlargements of heads. Top. *Dimerostemma bishopii*. Bottom. *Oyedaea episcopalis*.

STUDIES IN THE EUPATORIEAE (ASTERACEAE). CCX.

A SECOND SPECIES OF *VITTETIA* FROM BRASIL.

R. M. King and H. Robinson
Department of Botany
Smithsonian Institution, Washington, D.C., 20560.

The genus *Vittetia* was originally described to include the single species *V. orbiculata* (DC.) K.& R. A recent collection from Brasil seems to represent a second species of the genus.

VITTETIA BISHOPII R. M. King & H. Robinson, sp. nov.

Plantae parve frutescentes ca. 25 cm altae supra basem pauce ramosae. Caules striati dense scabridi et glandulo-punctati. Folia alterna subsessilia, petiolis ca. 1 mm longis; laminae subcarnosae oblongae vel late ellipticae plerumque 1.5-2.0 cm longae et 0.7-1.3 cm latae base rotundatae margine integrae apice obtusae vel breviter acutae supra dense scabridae subtus pilosulae et immerse glandulo-punctatae trinervatae. Inflorescentiae cymosae aliquantum virgatae, pedunculis plerumque 2-4 cm longis dense hispidulis. Capitula ca. 10 mm alta et 7-8 mm lata; bracteae involucri 10-12 eximbricatae elliptico-lanceolatae ca. 7 mm longae et 1.5 mm latae apice acutae extus dense canescentiter hispidulae; receptacula glabra. Flores 10-12 in capitulo; corollae albidae 4.5 mm longae extus sparse stipitate glanduliferae, tubis breviter cylindrica ca. 1.5 mm longis et 1 mm latis, faucibus leniter infundibularibus ca. 2.3 mm longis, lobis ovato-triangularibus ca. 1 mm longis et latis extus dense glandulo-punctatis; filamenta in partibus superioribus ca. 0.4 mm longis; thecae antherarum ca. 1.5 mm longae; appendices antherarum oblongo-ovatae ca. 0.35 mm longae et latae; appendices stylorum late lineares dense breviter argute papillosae. Achaenia ca. 4 mm longa 7-8-costata minute stipitato-glandulifera sed nequaquam glandulo-hispidula, pilis majoribus non glanduliferis uniseriatis; carpopodia annuliformia vel breviter cylindrica, cellulis 2-3-seriatis; setae pappi sordidae ca. 60-65 plerumque 3.5-4.5 mm longae plerumque aliquantum contortae irregulariter barbellatae. Grana pollinis in diametro ca. 27 µm.

TYPE: BRASIL: Minas Gerais: Serro do Cipó, 16 km E of Chapeu de Sol. Elev. ca. 3500-4000 ft. Small shrub 1/4 meter tall, flowers white, growing in wet stream bank. Jan. 16, 1981. *R.M.King & L.E.Bishop 8493* (Holotype, UB; isotype, US).

The new species is obviously a member of the Gyptidinae, but does not show much initial resemblance to the distinctive species that has previously been the only member of the genus *Vittetia*. The generic type, *V. orbiculata*, is a more flexuous

plant, with mostly opposite leaves, with more herbaceous blades, crenate leaf margins, with longer corolla tubes becoming narrowed near the base, and with puberulous receptacles. Still, the new species has the eximbricate involucre and plane receptacle, ovate and thick-margined corolla lobes which are smooth on both surfaces, glabrous unenlarged style bases, and pointed tips of the pappus setae that would place it near *V. orbiculata*. The two species further share broad subsessile leaves, 7-8 ribs on the achene, small carpopodia, glanduliferous corollas, 10-12 flowers in the heads, and crowded sharp papillae on the style branches. In the new species the style branches are broader and the papillae shorter. Both species have glands on the achene, but those of the type species are conventional short-stalked capitate glands, while those of the new species are less numerous and smaller-tipped. The numerous non-glandular hairs on the achenes of the new species are not zwillingshaare as in most Asteraceae, but are uniseriate. It is notable that some small uniseriate hairs are also present among the glands in *V. orbiculata*.

REFERENCE

R. M. King & H. Robinson 1974. Studies in the Eupatorieae (Asteraceae). CXXIX. A new genus, *Vittetia*. Phytologia 29 (2): 121-122.

Vittetia bishopii R. M. Robinson & H. Robinson, Isotype, United States National Herbarium. Photographs by Victor E. Krantz, Staff Photographer, National Museum of Natural History.

STUDIES IN THE EUPATORIEAE (ASTERACEAE). CCIX.

TWO NEW SPECIES OF *GRAZIELIA* FROM BRASIL.

R. M. King and H. Robinson
Department of Botany
Smithsonian Institution, Washington, D.C., 20560.

The concept of *Grazielia* was established by King and Robinson in 1971 under the name *Dimorpholepis* (a later homonym of *Dimorpholepis* A. Gray), and the new name was furnished by the same authors in 1972. Species were placed in the concept on the basis of species concepts as represented by prevailing determinations in herbaria, and types of few species had been seen. One of the species thus transferred has already proven to be misassigned, *Eupatorium anethifolium* DC. being a *Mikania* (Matzenbacher, 1978). Material that had been placed under the name in *Grazielia* is now considered to belong to *G. multifida* (DC.) K.& R. Now, study of collections from Brasil, recognized initially as one new species, have led to the revelation of a can of worms involving the true identity of *Grazielia coriacea* (Scheele) K.& R.

For a number of years, the authors have had problems determining some of the *Grazielia* specimens from the new Federal District in Brasil. Some of the material has been identified as *G. dimorpholepis* (B.L.Robins.) K.& R., but that species has larger heads with longer more numerous linear subinvolucral bracts, and has larger more remote longer-petiolate leaves. The specimens also resembled material in the herbarium under the name *G. coriacea*, but that material itself proved to consist of two species. Of the material seen under the name *G. coriacea*, some is properly placed in *G. gaudichaudeana* (DC.) K.& R., especially those from Paraná and Santa Catarina. The other material matches a type photograph of the unvalidated *Eupatorium involucratum* of Schultz-Bipontinus. An attempt to determine which species should take the name *G. coriacea* has led to a final problem.

The original publication of *Eupatorium coriaceum* Scheele, citing as type a collection by Hartleben, describes a totally different plant from any that have been seen under the name. The description mentions glabrous glutinous stems and pedicels, lucid obovate punctate reticulately veined leaves, mostly stramineous involucral bracts with glabrous outer surfaces, and puberulous achenes longer than the pappus. The described species with its elongate outer involucral bracts and purplish coloration can be closely matched by some specimens of *Symphyopappus reticulatus* Baker, and it is regarded here as being that species. It seems that none of the three species of *Grazielia* that have been encountered in the present study are the Scheele species, and that

two of the species are apparently undescribed. It is notable that the name *coriaceum* does not now take precedence over the later Baker name in *Symphyopappus*, and should not have been transferred to *Grazielia* because as described it was a later homonym of *Eupatorium coriaceum* Vahl and *E. coriaceum* Spreng.

The three similar species of *Grazielia* in this study all bear crowded small ovate leaves on erect moderately branching stems. They can be distinguished from each other by the following key.

1. Stems and undersurfaces of leaves long-pilose; leaf blade trinervate from base, without glandular punctations.
G. schultzii

1. Stems and undersurfaces of leaves puberulous; leaf blades trinervate or pinnate, with glandular punctations.

2. Achenes glabrous below callus; leaves trinervate from base of blade; involucral bracts prominently costate
G. bishopii

2. Achenes sparsely pilosulous; leaves weakly trinervate to pinnately veined; involucral bracts obscurely or not costate above middle
G. gaudichaudeana

The two new species are as follows.

GRAZIELIA BISHOPII R. M. King and H. Robinson, sp. nov.

Plantae suffruticosae ca. 1 m altae pauce vel mediocriter ramosae. Caules brunnescentes vel sordido-rubescentes teretes dense puberuli. Folia in medio caulorum dense opposita et in axillis fasciculatae inferne deciduae superne minora et remotiora, petiolis 1-3 mm longis; laminae herbaceae latae ovatae plerumque 1.5-2.0 cm longae et 1.0-1.5 cm latae base rotundatae margine multo crenulatae apice breviter acutae vel obtusae supra et subtus dense glandulo-punctatae supra dense vel vix puberulae subtus dense vel plerumque in nervis puberulae fere ad basem trinervatae. Inflorescentiae laxe thyrsoideo- vel corymboso-paniculatae in ramis dense corymbosae, ramis ultimis dense puberulis et glandulíferis. Capitula campanulata 5-6 mm alta; bracteae involucri biformes 2-4 exteriores sordidi- vel atro-rubescentes lanceolatae vel lineares 2.5-3.0 mm longae sparse puberulae ca. 5 interiores pallide brunnescentes oblongae 4-5 mm longae et 1.5-1.8 mm latae apice rotundatae vel truncatae interdum denticulatae extus distincte ca. 4-costatae subapice dense puberulae. Flores 5 in capitulo; corollae albae leniter infundibulares 3.7-4.0 mm longae, tubis ca. 1 mm longis, faucibus ca. 2 mm longis, tubis et faucibus extus glabris, lobis ca. 1 mm longis et 0.5 mm latis extus perpauce puberulis et 1-2-glandulo-punctatis; thecae antherarum ca. 1.5 mm longae; appendices antherarum ovatae ca. 0.3 mm long-

ae et 0.21 mm latae. Achaenia ca. 2 mm longa triangularia glabra in callosis superioribus minute glandulifera; setae pappi ca. 40 plerumque 3,0-3.5 mm longae apice attenuatae flexuosae margine barbellatae. Grana pollinis in diametro ca. 23 µm.

TYPE: BRASIL: Goiás: West of road to Monte Alegre de Goias, 12-20 km N of Alto Paraiso de Goias. Elev. 4000-4400 ft. Common subshrub along stream, flowers white. Feb. 7, 1981. *R.M.King & L.E.Bishop 8836* (Holotype, UB; isotypes MO, US). PARATYPES: BRASIL: Distrito Federal: Brasilia, Fundação Zoobotanica. 9.1. 1968. *A.P.Duarte 10268* (RB, US); Corrego Paranoazinho, near Sobradinho, steep rocky slopes. Elev. 1050 m. Shrub ca. 1 m tall, heads white. 9 Jan. 1966 *H.S.Irwin, R.Souza & R.R. dos Santos 11494* (US); Goiás: Corumbá de Goiás, Pirineus. 17-II-56. *A.Macedo 4320* (US).

As shown in the key, the species can be distinguished from those of similar habit by the trinervate glandular punctate leaves. The heads are generally larger and the involucral bracts are more prominently costate. In addition, the lobes of the corolla are more narrowly triangular.

GRAZIELIA SCHULTZII R. M. King and H. Robinson

Plantae suffruticosae ca. 90 cm altae pauce ramosae. Caules brunnescentes in partibus rubescentes teretes distincte pilosi. Folia in medio caulorum dense opposita inferne decidua superne minora et remotiora, petiolis 1-3 mm longis; laminae firme herbaceae late ovatae plerumque 1.7-2.5 cm longae et 1.2-1.7 cm latae base late rotundatae margine multo crenato-serratae apice breviter acutae supra et subtus non glandulo-punctatae supra glabrae subtus plerumque in nervis pilosae e base distincte trinervatae. Inflorescentiae laxe thyrsoideo-paniculatae in ramis densius corymbosae, ramis ultimis 1-2 mm longis dense puberulis. Capitula campanulata ca. 4 mm alta; bracteae involucri biformes 2-3 exteriores atro-rubescentes lanceolatae vel lineares 2.0-2.5 mm longae pilosulo-fimbriatae ca. 5 interiores rubescentes oblongae ca. 3.5 mm longae et 1 mm latae apice subtruncatae inferne obscure costatae superne sensim perdense puberulae. Flores 5 in capitulo; corollae albae vix infundibulares ca. 3 mm longae, tubis ca. 0.5 mm longis; faucibus ca. 2 mm longis, tubis et faucibus glabris, lobis ca. 0.5 mm longis et 0.4 mm latis extus plerumque multo puberulis; thecae antherarum ca. 1 mm longae; appendices antherarum subquadratae ca. 0.2 mm longae et latae. Achaenia ca. 1.5 mm longae triangularia glabra; setae pappi ca. 35 plerumque 2.5-3.0 mm longae margine dense scabridulae. Grana pollinis in diametro ca. 22 µm.

TYPE: BRASIL: Minas Gerais: 19/3 1865. *A.F.Regnell 230* (Holotype, US). PARATYPE: BRASIL: Minas Gerais: *Claussen 26* (US).

The species is distinguished by the trinervate non punctate leaves and by the pilose stems and undersurfaces of the leaves. The species also has a number of more subtle differences from

the preceding. The ultimate corymbose branches of the inflorescence are less dense, the heads are smaller with more obscurely costate bracts as in *G. gaudichaudeana*, the corolla lobes are shorter with more hairs, and there are no minute glands on the upper callus of the achene.

A photograph of a supposed type, *Claussen 89*, of *Eupatorium involucratum* Sch.Bip. nom. nud. seems to represent this species.

Literature Cited

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_____ and _____. 1972. Studies in the Eupatorieae (Asteraceae). LXVII. *Grazielia* nom. nov. for *Dimorpholepis*. Phytologia 23 (3): 305-306.

Matzenbacher, N. I. 1978. Uma nova combinaçao no genera *Mikania* Willd. (Compositae). Bradea 2 (37): 258-259.

Grazielia bishopii R. M. King & H. Robinson, Isotype, United States National Herbarium. Photos by Victor E. Krantz, Staff Photographer, National Museum of Natural History.

Grazielia schultzii R. M. King & H. Robinson, Holotype, United States National Herbarium.

Enlargements of heads of *Grazielia*. Top. *G. bishopii*. Bottom. *G. schultzii*.

NEW COMBINATIONS IN RAILLIARDIA (COMPOSITAE)
Hawaiian Plant Studies 111

Harold St. John
Bishop Museum, Box 19000A, Honolulu, Hawaii 96819, USA.

Railliardia Herbstobatae (Carr) comb. nov.
Dubautia herbsobatae Carr, Pacif. Sci. 33: 233, fig. 1, (1979) = 1980.

Railliardia waianapanapaensis (Carr) comb. nov.
Dubautia waianapanapaensis Carr, Pacif. Sci. 33: 234-237, fig. 2, (1979) = 1980.

These two species have the phyllaries of the heads laterally coalesced into a cup. This is the distinctive character of *Railliarda*. The two combinations made above, are proposed for the botanists who, like the writer, accept the genus *Railliardia*.

A VARIETY OF ZANTHOXYLUM HAWAIIENSE HBD. (RUTACEAE)
Hawaiian Plant Studies 110

Harold St. John
Bishop Museum, Honolulu, Box 19000A, Hawaii, 96819, USA

Zanthoxylum hawaiiense Hbd., var. citriodorum Rock, Indig. Trees Haw. Is. 197, 1913.
Z. hawaiiense Hbd., var. β Hbd., Fl. Haw. Is. 75, 1888.
Lectotype: Hawaiian Is., Lanai, W. Hillebrand (B).

Discussion: This variety is in need of typification. In his original publication, Rock cited Z. hawaiiense Hbd., var. β Hbd., based on Hillebrand's collection from Lanai; Rock's sterile collection, no. 8,076, from Lanai, on July 24, 1910; and Rock 5,207 from Kauai, Kaholuamano, on Sept. 18, 1909, but this differing in shorter petiolules. In Rock's herbarium, now in the Bishop Museum, there is a sheet from Hawaii, Puuanahulu, March 1912, Rock 10,204. Also in Rock's hand, but in red ink, this flowering specimen is marked type, but it cannot be a type, since it was a later collection, and it is not mentioned in the original publication.

Of the three original bases of this variety, the Hawaiian one, Rock 10,204 was called atypical; so that leaves only the two Lanai collections. Rock 8,076 is sterile, and from its broadly ovate leaflets, it is evidently Z. maviense Mann, var. lanaiense (Sherff) St. John. Hence, the third specimen, Lanai, W. Hillebrand (B), a fruiting collection, is here chosen as the lectotype. There is an isotype in (BISH).

NOTES ON NEW AND NOTEWORTHY PLANTS. CL

Harold N. Moldenke

PAEPALANTHUS ARGENTEUS var. *VIRIDIS* Mold., var. nov.

Haec varietas a forma typica speciei pilis ubique brevioribus non albis nec villosis recedit.

This variety differs from the typical form of the species in having the pubescence throughout uniformly much shorter, not at all shaggy-villous nor silvery-white.

The type of the variety was collected by Bassett Maguire, Celia K. Maguire, and J. Murça Pires (*no. 44744*) 49 miles from Diamantina, Minas Gerais, Brazil, at an altitude of 3800 feet, on December 22, 1959, and is deposited in my personal herbarium.

PAEPALANTHUS SAVANNARUM (Mold.) Mold., comb. nov.

Syngonanthus savannarum Mold., Phytologia 2: 352 & 381. 1947; in Maguire & al., Bull. Torrey Bot. Club 75: 202. 1948.

PAEPALANTHUS SAVANNARUM var. *GLABRESCENS* (Mold.) Mold., comb. nov.

Syngonanthus savannarum var. *glabrescens* Mold., Mem. N. Y. Bot. Gard. 9: 412. 1957.

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NOTES ON THE GENUS *SPARTOTHAMNELLA (CHLOANTHACEAE)*

Harold N. Moldenke

In view of the excellent taxonomic review of this genus by Munir (1976) it would be presumptious on my part to continue with my long-planned and previously announced monograph of the genus. However, it may be worthwhile to place on record the bibliographic and herbarium notes pertaining to it and gathered by my wife, Alma L. Moldenke, and myself over the past 52 years of work on this and related families of plants. This is the 73rd genus so written up by me and the acronyms employed herein are the same as were used in all of the long series of papers in this journal (and some other journals) and most recently fully explained in Phytologia Memoirs 2: 463--469 (1980).

SPARTOTHAMNELLA Briq. in Engl. & Prantl, Nat. Pflanzenfam., ed. 1, 4 (3a): 161. 1895.

Synonymy: *Spartothamnus* A. Cunn. in Loud., Hort. Brit., ed. 1, Suppl.: 600. 1830; Walp., Repert. Bot. Syst. 6: 694. 1847 [not *Spartothamnus* Presl, 1904, nor Walp., 1904, nor Webb. & Benth., 1956, nor *Spartotamnus* Webb & Berth., 1844, nor "Webb & Berth. ex Presl", 1973]. *Sparthotamnus* Buek ex Post & Kuntze, Lexicon

526, in syn. 1904. *Sparthothamnus* A. Cunn. ex Durand & Jacks., Ind. Kew. Suppl. 1, imp. 1, 404, in syn. 1906. *Sparattothamnella* Briq. ex Van Steenis, Ann. Mo. Bot. Gard. 52: [469] & 471, sphalm. 1965. *Sparattothamnella* Van Steenis ex Airy Shaw in J. C. Willis, Dict. Flow. Pl., ed. 7, 1053. 1966. *Spartothammella* Maiden & Betche ex Mold., Résumé Suppl. 14: 9, in syn. 1966. *Spartothannella* Brig. ex Mold., Résumé Suppl. 14: 10, in syn. 1966.

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Glabrous or pubescent shrubs or subshrubs; stems much-branched, acutely or obtusely tetragonal, woody, solid, green; branches rigid, tetragonal, divaricate, *Spartium*-like; leaves borne on stems and branches, simple, very small, decussate-opposite, exstipulate, sparse and usually borne in distant pairs, deciduous, not decurrent, marginally entire or few-toothed; flowers small, complete, perfect, solitary or borne in clusters of 2 or 3 in short axillary cymules, zygomorphic, short-pedicellate or sessile, bracteate and 2-bracteolate, the bracteoles lateral at about the middle of the pedicel; calyx inferior, gamosepalous, patently campanulate, small, longer or shorter than the corolla, basally tubular, the tube short, broad, basally villous, apically deeply 5-lobed, ampliate, the lobes subequal; corolla gamopetalous, subactinomorphic or more or less zygomorphic, basally tubular, the limb bilabiate or apically unequally 5-lobed, the lobes patent, the anterior (middle) one somewhat larger than the others; stamens 4, subequal, epipetalous in the corolla-tube, exserted, all fertile; anthers dorsifixed, 2-lobed, subreniform, 1-celled by a confluence of the divergent basally muticous and minutely apiculate thecae, dorsally glandulose; pistil bicarpellary, terminal, single; style solitary, filiform, glabrous or basally pilose, exserted, usually equaling the stamens, apically bilobed, the lobes stigmatiferous; ovary superior, compound, completely 4-celled, 4-ovulate; ovules 1 per cell, axile, semi-anatropous; fruit small, drupaceous, globose, fleshy, oramge or red, the endocarp separating into 4 1-seeded nutlets; seeds without endosperm; embryo straight; cotyledons 2, thick; radicle inferior.

Type species: *Spartothamnus junceus* A. Cunn. ex Walp., Repert. Bot. Syst. 6: 694. 1847 [=*Spartothamnella juncea* (A. Cunn.) Briq.].

This is a small genus of 3 recognized species endemic to Australia. Its checkered taxonomic history and close relationships with the *Myoporaceae* and *Verbenaceae* are fully discussed by Munir (1976) who concludes that "although it is retained here in the *Chloanthaceae,* the present author agrees with F. Mueller (1868) in regarding the genus transitional between *Chloanthaceae* and *Myoporaceae*". Some authors have also placed it in the *Stilbaceae* and the *Dicrastylidaceae.* Barkley (1965) lists it as a valid genus in both the *Verbenaceae* and the *Chloanthaceae* on the same page of his work. Briquet's original publication of the name, *Spartothamnella,* is dated "1894" by Durand & Jackson (1906), but Stafleu (1967) maintains that the cover titlepage dates on the parts of Engler & Prantl's vol. 4 (3a) are not correct, and that pages 97--225 of that volume, including the *Spartothamnella* proposal, were not issued until 1895. Similarly, Baillon's (1891) reference to the genus is often misdated as "1892". Post & Kuntze (1904) erroneously place *Spartothamnus* Webb & Berth. in the synonymy of *Spartothamnus* A. Cunn. (and therefore of *Spartothamnella* Briq.), but actually it belongs to the synonymy of Sect. *Spartothamnus* in the genus *Cytisus* L. in the *Fabaceae,* as are also the *Spartothamnus* homonyms accredited to Presl (1844), to Walpers (1848), and [by Angely (1956)] to "Webb & Benth." Post & Kuntze also date the Walpers, Repertorium, vol. 6, reference as "1846", and Thiselton-

Dyer (1904), as well as Domin (1928), date it "1846-47", but again, according to Stafleu, pages 385--834 actually were published in 1847. In my 1975 and 1980 works *Spartotamnus* Webb & Berth. and *Spartotamnus* "Webb & Berth. ex Presl." were inadvertently and erroneously listed as synonyms of *Spartothamnella* Briq. instead of *Cytisus* L. Airy Shaw (1966) refers "*Spartothamnus* Walp." to Walp., Ann. Bot. Syst. 1: 221 (1848), but the name is there plainly accredited to "Webb & Berth."

The generic name, *Spartothamnella,* is derived from the Greek, σπάρτος (spartos, cordage broom), θάμνος (thamnos, a shrub), and the dimunutive ελλα (ella, small).

Junell (1934) gives a lengthy and important discussion of the gynoecium morphology of the genus based on unnumbered Bechler and Ince collections in the Kew herbarium and a F. Mueller collection in the British Museum herbarium. He says: "Die Beschreibung des Fruchtknotenbaus bezieht sich hauptsächlich auf *S. teucriiflorus*. Den Fruchtbau habe ich nur bei *S. junceus* untersucht. Wie bei gewissen *Teucrium*- und *Ajuga*-Arten sind die Fruchtknotenfächer im oberen Teil des Fruchtknotens dadurch voneinander getrennt, dass die Fruchtblattmitten noch ein ziemliches Stück unter der Insertionsfläche der Samenanlagen mit den Plazenten verwachsen sind.....Die Verwachsung der Plazenten beginnt....schon in dieser Höhe, und in den tieferen Schnitten ist sie seitlich weiter fortgeschnitten. Wie bei *Ajuga chia* und *A. chamaepithys* bleibt jedoch an der Fruchtknotenwandung ein kleiner Hohlraum bestehen. Durch diese Öffnungen in der Medianlinie gelangen die Pollenschläuche zu den Samenanlagen hinab. Diese Kanale sind bei dieser Art verhältnismässig kurz, da die Fruchtblattränder höher oben als bei den genannten *Ajuga*-Arten frei werden.....Auf den Fruchtblatträndern kommen vereinzelte Drüsenhaare vor.

"Die kugelige Frucht, welche nach Angabe in Engler & Prantl ein fleischiges Exocarp besitzen soll, zerfällt in vier Teilfrüchte. Walpers....gibt an, dass die Frucht trocken ist. An Herbarmaterial lässt sich kaum entscheiden, welche Angabe richtig ist. Immerhin steht fest, dass die Fruchtwandung nur ganz wenig fleischig sein kann. Die Oberfläche is glänzend und ziemlich hart. Die Seitenwände der Epidermiszellen sind nach aussen zu stark verdickt. Auf der Innenseite der Fruchtwandung sind die Zellenwände verdickt (etwa wie bei *Amethystea*), jedoch nicht stärker, als dass man ohne Schwierigkeit Mikrotomschnitte der Frucht herstellen kann. Es ist kein steinfruchtartiges Endokarp vorhanden. Die Samen besitzen kein Endosperm. In der Litteratur wird angegeben, dass die Samen Nährgewebe enthalten, welche Angabe wohl einen der Hauptgründe für die Einreihung der Gattung in *Chloanthoideae* bildete. Die Gattung weicht jedoch in diesem wichtigen Merkmal von der genannten Tribus ab, und auch ihr Fruchtknotenbau beweist, dass ihre Stellung früher ganz falsch aufgefasst worden ist. Das leitende Gewebe, das bei *Chloanthoideae* immer so schön ausgebildet und im Gynäceum charakteristisch verbreitet ist, tritt bei dieser Gattung nur wenig hervor und besitzt eine andere Anordnung. Bei *Chloanthoideae* sind die

mittleren Partien der Fruchtblätter nicht nach innen ausgebaucht.

"*Spartothamnus* und *Teucridium* sind in ihrem Habitus einander sehr ähnlich, und nach Bentham....hat v. Müller sie in einer Gattung zusammengefasst. Hinsuchtlich der Fruchtknoten- und Fruchtbaus liegen aber gewisse Verschiedemheiten vor, welche jedoch kein Hindernis dafür bilden, dass die beiden Gattungen einander sehr nahe stehen können....Die Stellung von *Teucridium, Oncinocalyx* und *Spartothamnus* ist verhältnismässig unsicher. Bei *Teucridium* und *Spartothamnus* ist die Fruchtwandung möglicherweise etwas säftig. Sie sind vielleicht Übergangstypen zu *Clerodendreae*.In Engler & Prantl sind *Teucridium* und *Oncinocalyx* in die letztere Subtribus eingereiht, *Spartothamnus* hingegen in *Chloanthoideae*. Für die letztere Plazierung liegt jedoch kein Anlass vor....Es würde mich nicht überraschen, wenn festgestellt werden könnte, dass der Ursprung der beiden amerikanischen Gattungen *Isanthus* und *Trichostema* in *Clerodendreae* zu suchen ist."

It may also be of interest to note that Post & Kuntze (1904) list a "*Spartothamnus* Presl", while Thiselton-Dyer (1904) refer to it as "*Spartothamnus* Walp." -- Walpers, as stated before, accredits the name to Webb and Berthelot.

Bailey's "Comprehensive Flora" (1913) is dated "1909" in the New York Botanical Garden library, apparently on the basis of the preface date. The Kew library dates it "1909-1913". Stafleu (1967) says of it: "Publ.: Jan-Mar 1913; a few copies (or only one single copy?) were available late December 1912; delivery for distribution took place in Mar 1913."

Gibbs (1974) found saponins "absent or probably so" in the genus.

It is worth noting that Bentham (1876) describes the ovary as "imperfecte 2-loculare, loculis 2-ovulatis: ovula medio v. paullo altius affixa.....Semina albuminosa." DeCandolle (1847) describes the ovary as "Loculi complete divisi" and the ovules as "pendentia, anatropa".

Bentham & Mueller (1870) comment that "The genus is limited to a single species, endemic to Australia, very nearly allied to *Pityrodia,* but with a different habit, and differs from all the preceding genera [of *Verbenaceae*] by its succulent drupe, and from the following ones by the albuminous seeds and solitary flowers." Endlicher (1838) notes: "characterem e speciminibus defloratis, a generis auctore mecum humanissime communicatis eruere nequeo, ceterum genus *Eremophilae* et *Pholidiae* propinquum videtur."

Munir (1976) dates the Beadle, Evans, & Carolin work (1962) as "1963" and appears to regard Cunningham as partial author of the First Supplement to Loudon's Hort. Brit., dating is "1830".

Excluded taxa, including variations in spelling and/or accreditation:

Sparthothamnus Webb & Berth. ex Presl, Abh. König. Böhm. Gesel. Wiss., ser. 5, 3: 567--568. 1845 = *Cytisus* L., *Fabaceae*.

Spartotamnus Webb & Berth. ex Presl, Bot. Bemerk. 138. 1844 = *Cytisus* L., *Fabaceae*

Spartotamnus "Webb & Berth. ex Presl" apud Airy Shaw in J. C.

Willis, Dict. Flow. Pl., ed. 8, 1082, in syn. 1973 = *Cytisus* L., *Fabaceae*

Spartotamnus albus (Link) Presl, Bot. Bemerk. 138. 1844 = *Cytisus multiflorus* (Ait.) Sweet, *Fabaceae*

Spartotamnus sessilifolius (L.) Presl, Bot. Bemerk. 138. 1844 = *Cytisus sessilifolius* L., *Fabaceae*

Spartothamnus Presl ex Post & Kuntze, Lexicon 526. 1904 = *Cytisus* L., *Fabaceae*

Spartothamnus Walp. ex Thiselt.-Dyer, Ind. Kew. Suppl. 2: 953, in syn. 1904 = *Cytisus* L., *Fabaceae*

Spartothamnus Webb & Benth. ex Angely, Cat. Estat. Gen. Bot. Fan. 17: 6, sphalm. 1956 = *Cytisus* L., *Fabaceae*

An artificial key to the accepted taxa, based on Munir (1976):

1. Plant pubescent, the hairs branched; flowers sessile; calyx longer than the corolla.....*S. puberula.*

1a. Plant glabrous or gray-puberulent only on the youngest parts, the hairs simple; flowers pedicellate; calyx shorter than the corolla.

2. Plant glabrous throughout; stems acutely tetragonal, longitudinally striate; pedicels and calyx glabrous.*S. juncea.*

2a. Plant gray-puberulent when young, later glabrescent; stems obtusely tetragonal, not striate; pedicels and calyx gray-puberulent.....*S. teucriiflora.*

SPARTOTHAMNELLA JUNCEA (A. Cunn.) Briq. in Engl. & Prantl, Nat. Pflanzenfam., ed. 1, 4 (3a): 161. 1895.

Synonymy: *Spartothamnus junceus* A. Cunn. ex Loud., Hort. Brit., ed. 1, Suppl. 600. 1830; Walp., Repert. Bot. Syst. 6: 694. 1847. *Sparthothamnus junceus* A. Cunn. ex Durand & Jacks., Ind. Kew. Suppl. 1, imp. 1, 404. 1906. *Spartothamnus juncea* Junell, Symb. Bot. Upsal. 1 (4): 128, fig. 205. 1934. *Spartothamnella juncea* (Alum.) Briq. ex Beadle, Evans, & Carolin, Handb. Vasc. Pl. Sydney Dist. 414. 1962. *Sparattothamnella juncea* "(A. Cunn. ex G. Don)" Briq. ex Van Steenis, Ann. Mo. Bot. Gard. 52: [469]. 1965. *Spartothannella juncea* (A. Cunn.) Brig. ex Mold., Résumé Suppl. 9: 10, sphalm. 1966. *Spartothamnella juncea* "(A. Cunn. ex G. Don) Briq." ex Beadle, Evand, Carolin, & Tindale, Fl. Sydney Reg., ed. 2, 506. 1972. *Spartothamnella juncea* "(A. Cunn. ex Walp.) Briq." apud Munir, Journ. Adelaide Bot. Gard. 1: 12. 1976. *Spartothamnella juncea* Briq. ex Mold., Phytol. Mem. 2: 438, in syn. 1980. *Spartothamnus ephedroides* A. Cunn., in herb. *Spartothamnus ephedraeoides* A. Cunn., in herb.

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Fragm. 6: 153. 1868; Benth., Fl. Austr. 5: 55. 1870; F. Muell., Fragm. 9: 5. 1875; Bailey & Tenison-Wood, Cens. Fl. Brisbane 174. 1880; F. Muell. in Wing, South. Sci. Record 2: 55. 1882; F. M. Bailey, Syn. Queensl. Fl. 375. 1883; F. M. Bailey, Proc. Roy. Soc. Queensl. 1: 70. 1884; F. M. Bailey, Cat. Indig. Natur. Pl. Queensl. 35. 1890; Moore, Handb. Fl. N. S. Wales 355. 1893; Briq. in Engl. & Prantl, Nat. Pflanzenfam., ed. 1, 4 (3a): 161. 1895; Solered., Syst. Anat. Dicot. 715. 1899; F. M. Bailey, Queensl. Fl. 4: 1169--1170. 1901; Diels & Pritz., Engl. Bot. Jahrb. 35: 513. 1904; F. M. Bailey, Weeds Poison. Pl. Queensl. 140, fig. 240. 1906; Dixon, Pl. N. S. Wales 236. 1906; Durand & Jacks., Ind. Kew. Suppl. 1, imp. 1, 404. 1906; D. H. Scott. in Solered. [transl. Boodle & Fritsch], Syst. Anat. Dicot. 1: 634. 1908; F. M. Bailey, Queensl. Agric. Journ. 28: 199. 1912; F. M. Bailey, Compreh. Cat. Queensl. Pl. 381. 1913; Maiden & Betche, Cens. N. S. Wales Pl. 177. 1916; White, Queensl. Agric. Journ. 13: 29. 1920; Domin, Bibl. Bot. 89 (6): 1107. 1928; Junell, Symb. Bot. Upsal. 1 (4): 128 & 130, fig. 205. 1934; Mold., Geogr. Distrib. Avicenn. 34. 1939; Mold., Prelim. Alph. List Inv. Names 40. 1940; Blake & al., Proc. Roy. Soc. Queensl. 52: 73. 1941; Durand & Jacks., Ind. Kew. Suppl. 1, imp. 2, 404. 1941; Mold., Alph. List Inv. Names 41. 1942; Mold., Known Geogr. Distrib. Verbenac., ed. 1, 70 & 99. 1942; Mold., Alph. List Inv. Names Suppl. 1: 20. 1947; Mold., Known Geogr. Distrib. Verbenac., ed. 2, 154, 155, & 195. 1949; Metcalfe & Chalk, Anat. Dicot. 2: 1033. 1950; Durand & Jacks., Ind. Kew. Suppl. 1, imp. 3, 404. 1959; Mold., Résumé 210, 211, 345, & 434. 1959; Willaman & Schubert, Agr. Res. Serv. U. D. Dept. Agr. Tech. Bull. 1234: 237. 1961; Beadle, Evans, & Carolin, Handb. Vasc. Pl. Sydney Dist. 414. 1962; Van Steenis, Ann. Mo. Bot. Gard. 62: [469]. 1965; Mold., Résumé Suppl. 14: 10. 1966; Mold., Fifth Summ. 1: 348 & 350 (1971) and 2: 623 & 842. 1971; Beadle, Evans, Carolin, & Tindale, Fl. Sydney Reg., ed. 2, 506. 1972; Mold., Phytologia 23: 435. 1972; Gibbs, Chemotax. Flow. Pl. 3: 1752. 1974; Kooiman, Act. Bot. Neerl. 24: 463. 1975; Mold., Phytologia 31: 407. 1975; Munir, Journ. Adelaide Bot. Gard. 1: 3--5, 8, 9, 12--16, 20, & 24--25. 1976; Farr, Leussink, & Stafleu, Ind. Nom. Gen. 3: 1635. 1979; Mold., Phytol. Mem. 2: 339, 340, 360, 437, 438, & 517. 1980.

Illustrations: F. M. Bailey, Weeds Poison. Pl. Queensl. fig. 240. 1906; Junell, Symb. Bot. Upsal. 1 (4): 128, fig. 205 a & b. 1934; Munir, Journ. Adelaide Bot. Gard. 1: 15, fig. 2. 1976.

The following description is based, in major part, on that given by Munir (1976). A rigid or scrambling, intricately branched, wiry shrub, 0.6--3 m. tall; stems dark-green, acutely tetragonal, horizontally striate, glabrous, somewhat glutinous: branches and branchlets slender, green, very sharply tetragonal, conspicuously flattened or sulcate on the sides, longitudinally costate parallel to the margins, glabrous and shiny throughout, very twiggy; twigs rather sharp-pointed; nodes annulate; principal internodes 5--15 mm. (or less) long on the twigs, but elongate to 4 cm. on the larger branches; leaves very small, decussate-opposite, caducous, sessile or very short-petiolate; petioles absent or to 2 mm.

long, glabrous, glandulose; leaf-blades chartaceous, narrowly elliptic or elliptic-oblong to linear, often reduced to small scales, 2--18 mm. long, 1--5 mm. (or less) wide, apically obtuse to subacute or acute, marginally entire, glabrous, very minutely and obscurely puberulent and somewhat glandulose when young but soon glabrescent; flowers axillary, mostly solitary (or seldom to 3 per axil), pedicellate; pedicels filiform, 1--4 mm. long, glabrous; bracts subsessile, ovate-oblong, 0.5--1.5 mm. long, about 0.5 mm. wide, subglabrous above, glandulose and puberulent on the lower surface; bracteoles minute, sessile, linear, located as a pair halfway up the pedicel, to 1 mm. long but usually much less, marginally puberulent-ciliolate; fruiting pedicels eventually reflexed;flowers about 3 mm. wide; calyx campanulate, very shallow, 1--2.5 mm. long, externally glabrous or subglabrate but glandulose, its tube 0.5 mm. long or less, the 5 lobes extending almost to the calyx base, lanceolate or narrow-lanceolate, patent, 1--2 mm. long, apically attenuate to the sharply acute apex, basally 0.5--1 mm. wide, strongly ribbed; corolla white, 3--4 mm. long, the tube externally very slightly puberulent, the throat more or less villous, the tube subcylindric, 0.5--2 mm. long, the limb 5-lobed, the anterior lobe oblong, 1.5--2.5 mm. long, 1--1.5 mm. wide, the other 4 lobes smaller, subequal, ovate, 1--1.5 mm. long, basally about 1 mm. wide; stamens slightly exserted; filaments filiform, the 2 anterior ones 1.5--3 mm. long, the 2 posterior (lateral) ones 1--2 mm. long; anthers more or less reniform, 0.5--1 mm. long, 0.3--0.5 mm. wide, dorsally glandulose, the thecae subrotundate; style filiform, exserted, 3--4 mm. long, glabrous; ovary subglobose, 1--1.5 mm. long and wide, apically faintly 4-lobed, glandulose and puberulent on the upper half, basally glabrous; fruiting-calyx persistent, flattened and star-shaped, about 3 mm. wide, glabrous, its lobes reflexed; fruit drupaceous, globose, red or orange-red to orange, tomato-red, or scarlet when mature, 2--4 mm. long and wide, glabrous, smooth, often surpassing the fruiting-calyx before its lobes reflex.

This species is based on *Cunningham 78* from the Brisbane River area of Queensland, Australia, collected in October, 1824, and deposited in the Kew herbarium. Munir (1976) considers *Cunningham 247* & *491* from New South Wales as "syntypes".

Bentham & Mueller (1870) comment that "This plant had been placed in *Myoporineae* and retained there by A. DeCandolle (who had no specimens in an examinable state) owing to Walpers having erroneously described the radicle as superior. F. Mueller, in referring it correctly to *Verbenaceae*,.....adduces *Teucridium*, Hook. f., from New Zealand, as a second species, which however can scarcely be admitted -- the anthers and lobed ovary and fruit of the latter plant showing a nearer relation to *Oxera* and a few other genera which connect *Verbenaceae* with the tribe *Ajugoideae* of *Labiatae*. The albuminous seeds branching hairs and other characters of *Spartothamnus* are quite those of *Chloantheae*." They cite only unnumbered collections of Barton, Bowman, Cunningham, Leichhardt, Mitchell, and Mueller from Queensland and of Beckler, Cunningham, and Stuart from New South Wales.

DeCandolle (1847) cites only an unnumbered Cunningham collection, but asserts that the species was cultivated in the Berlin Botanical Garden in 1844 (of which plant he saw herbarium material in that herbarium and in his own herbarium, but, unfortunately, lacking flowers and fruit). Don (1839) and Sweet (1839) claim that it was introduced into cultivation in England from the interior of "New Holland" [Australia] as early as 1819.

Beadle and his associates (1972) assert that this species inhabits swamps near the coast in the Sydney region. Domin (1928) reports it abundant on sandstone hills in Queensland, where Clemens also found it "frequent in dry bush and in shaded gullies near rivulets", Wilson "in dry rainforests", and White "very common as undergrowth in soft-wood scrub (light rainforest)". Johnson found it "common on rather dry basalt mountainsides" in New South Wales.

Munir (1976), in his excellent and thorough revision, cites for this species no less than 66 collections from Queensland and 41 from New South Wales.

Recent collectors have encountered this plant at 1400 feet altitude, in fruit in February, April, June, and August. Gibbs (1974) reports cyanogenesis absent in the plant.

The cheironyms, *Spartothamnus ephedroides* and *S. ephedraeoides,* listed in the synonymy (above), are apparently based on *Cunningham 1836/XVI & 491,* respectively, in the Vienna herbarium.

The *Everist 3091,* misidentified and distributed in some herbaria as *Spartothamnella juncea,* actually is *S. puberula* (F. Muell.) Maiden & Betche, while *R. A. Perry 551* is *S. teucriiflora* (F. Muell.) Mold.

Citations: AUSTRALIA: New South Wales: *Boorman s.n.* [Sandiland Ranges, 11.1904] (Po--63510), *s.n.* [Narrabri, 6.1907] (N, N--photo, Po--121597), *s.n.* [Darwick, 3.1911] (Bi); *M. A. Clemens s.n.* (Oa); *Cunningham 491* (V), *1836/XVI* (V); *Herb. Endlicher s.n.* (V); *Herb. Mus. Caes. Palat. Vindob. s.n.* (V); *Herb. Prager 18664* (Gg--31240); *L. A. S. Johnson s.n.* [Nat. Herb. N. S. Wales 23444] (W--2187538); *Maiden s.n.* [Palesthan, Feb. 1892] (Mi); *Maiden & Boorman s,n,* [Tabulan to Drake, 12.03] (Ca--67209, It, Vt). Queensland: *Boorman s.n.*[Feb. 1905] (S), *s.n.* [3.1911] (F--294428); *M. S. Clemens 43762* (Mi), *s.n.* [Yarraman, Aug. 5-15, 1944] (Ca--990268, N, W--2875532); *Shelton s.n.* [St. George] (Ka); *C. T. White 884* (Bz--23026, Ca--226273), *10785* (I), *s.n.* [Wyaga, 9/19] (Ca--206103); *C. L. Wilson 729* (Dt, W--2277645).

SPARTOTHAMNELLA PUBERULA (F. Muell.) Maiden & Betche, Cens. N. S. Wales Pl. 177. 1916.

Synonymy: *Spartothamnus junceus* var. *puberula* F. Muell. in Wing, South. Sci. Record 2: 55, in obs. 1882. *Spartothamnus puberulus* (F. Muell.) F. Muell., Second Cens. Austr. Pl. 1: 171. 1889. *Spartothamnus junceus* var. *puberulus* F. M. Bailey, Queensl. Pl. 4: 1170. 1901. *Spartothamnus puberulus* F. Muell. apud Thiselt.-Dyer, Ind. Kew. Suppl. 2: 953. 1904. *Spartothamnus puberulus* F. M. Bailey, Compreh. Cat. Queensl. Pl. 381, nom. nud. 1913. *Spartothamnella puberula* Maiden ex Fedde & Schust., Justs Bot. Jahresber. 59

(2): 417. 1939. *Spartothamnella puberula* Maiden & Betche apud Fedde & Schust., Justs Bot. Jahresber. 59 (2): 417. 1939. *Spartothammella puberula* (F. Muell.) Maiden & Betche ex Mold., Résumé Suppl. 14: 9, in syn. 1966. *Spartothamnella puberulus* (F. Muell.) Maiden & Betche ex Chippendale, Proc. Linn. Soc. N. S. Wales 96: 256. 1971.

Bibliography: Benth. & F. Muell., Fl. Austr. 5: 55. 1870; F. Muell in Wing, South. Sci. Record 2: 55. 1882; F. Muell., Second Cens. Austr. Pl. 1: 176. 1889; Tate, Trans. Proc. Roy. Soc. S. Austr. 12: 103. 1889; F. M. Bailey, Cat. Indig. Natur. Pl. Queensl. 35. 1890; Tate, Fl. Extratrop. S. Austr. 254 & 302. 1890; Tate in Spencer, Horn Sci. Exped. 3 Bot.: 174. 1891; F. M. Bailey, Queensl. Fl. 4: 1169 & 1170. 1901; Diels & Pritz., Engl. Bot. Jahrb. 35: 513. 1904; Thiselt.-Dyer, Ind. Kew. Suppl. 2: 953. 1904; Dixon, Pl. N. S. Wales 236. 1906; F. M. Bailey, Compreh. Cat. Queensl. Pl. 381. 1913; Maiden & Betche, Cens. N. S. Wales Pl. 177. 1916; Domin, Mem. Soc. Sci. Bohem. 1921/22: 106.1923; A.W. Hill, Ind. Kew. Suppl. 8: 226. 1933; Fedde & Schust., Justs. Bot. Jahresber. 59 (2): 417. 1939; Mold., Geogr. Distrib. Avicenn. 34. 1939; Mold., Prelim. Alph. List Inv. Names 40. 1940; Mold., Alph. List Inv. Names 41. 1942; Mold., Known Geogr. Distrib. Verbenac., ed. 1, 70 & 99 (1942) and ed. 2, 154 & 195. 1949; Mold., Résumé 210, 345, & 439. 1959; Mold., Résumé Suppl. 14: 9. 1966; Chippendale, Proc. Linn. Soc. N. S. Wales 96: 256. 1971; Mold., Fifth Summ. 1: 348 (1971) and 2: 622, 623, & 842. 1971; Mold., Phytologia 25: 243 (1973) and 31: 391. 1975; Munir, Journ. Adelaide Bot. Gard. 1: 3, 5, 8--11, 13, & 23--25, fig. 1. 1976; Mold., Phytol. Mem. 2: 339, 438, & 517. 1980

Illustrations: Munir, Journ. Adelaide Bot. Gard. 1: 11, fig. 1. 1976.

The following description is taken, with only a very few modifications, from Munir (1976). An erect branched shrub, 0.5--1.5 m. tall, puberulent-pubescent throughout with branched and more or less stellate hairs; stems arising from a woody rootstock, divaricately branched from the base; branched dull-green, acutely tetragonal, longitudinally striate; leaves sessile, the leaf-blades linear-lanceolate to narrow-elliptic or sometimes ovate-lanceolate, 0.5--3 cm. long, 2--6 mm. wide, dull-green, marginally entire and recurved, puberulent-pubescent on both surfaces; flowers axillary, solitary, borne towards the upper ends of the branches, sessile, the subtending bract foliaceous, sessile, linear-lanceolate, 0.5--1.5 cm. long, 1--4 mm. wide, pubescent; bracteoles sessile, linear or linear-lanceolate, 1--3 mm. long, 0.3--1 mm. wide, pubescent, persistent; calyx longer than the corolla, 2--4 mm. long, pubescent on both surfaces, externally glandulose, the tube 0.5--1 mm. long, broad, internally glabrous, the lobes narrow-lanceolate, spreading, 1.5--3 mm. long, basally 0.2--1 mm. wide, longer than the tube, dorsally strongly ribbed, internally ventrally sparsely pubescent; corolla white or greenish-white, 2.5--3 mm. long, externally puberulent and glandulose, internally glabrous except for the villous throat, the tube cylindric, broad, about 1 mm. long, the anterior lobe subelliptic-oblong, 1.5--2 mm. long, about 1 mm. wide, the other 4 lobes subequal, broadly elliptic-ovate, 1--

1.5 mm. long, basally 0.5--1 mm. wide; stamens shortly exserted; filaments filiform, the 2 anterior ones 1.5--2 mm. long, the 2 posterior ones 1--1.5 mm. long; anthers subreniform, 0.3--0.5 mm. long, 0.2--0.3 mm. wide, dorsally glandulose, the thecae rounded; style shortly exserted, filiform, 1--3 mm. long, glabrous or sometimes basally puberulent; ovary subglobose, 0.5--1.5 mm. long, apically 0.5--1 mm. wide, apically faintly 4-lobulate when immature, basally sometimes cuneate, apically glandular-puberulent, the remainder glabrous; fruit globular, orange-red, 2.5--4 mm. wide, often scarcely surpassing the persistent fruiting-calyx, glabrous, smooth.

This species is based on an unnumbered F. Mueller collection from the Suttor River area, Queensland, Australia, the lectotype designated by Munir (1976) as sheet no. 68872 in the Melbourne herbarium, collected, he says, in "1956" -- apparently a typographic error for "1856". Mueller (1882) says "The starry downy variety (*puberula*) of *S. junceus* I am inclined to separate specifically on account of its more copiously developed and larger leaves, its more abbreviated flower-stalks, less pointed calyx-segments and also outside star-hairy corolla. It is known to me only from near the Cape River, Suttor River, Maranoa and Warrego. In habit it is also strikingly different from the genuine *S. junceus*." Thiselton-Dyer (1904) regarded this as valid publication of the name, "*Spartothamnus puberulus*", but this view is not now accepted under the present provisions of the International Code of Botanical Nomenclature.

Collectors describe the species as a shrub or subshrub, 0.5--1.5 m. tall, growing from a woody rootstock, the stems several, stiffly erect or "of weak straggling growth", dull-green, the leaves dull-green, the fruit globular, red or orange-red to orange-yellow. They have encountered it in arid *Acacia* country, as well as "in paddocks near rivers", flowering in November, and in fruit in March, July, October, and November.

Latz erroneously describes the fruit as "berries" -- they actually are drupes. He avers that the species is "very rare", growing "in skeletal soil of rocky sandstone hills" in the Northern Territory of Australia,but White found it "moderately common as undergrowth in mixed softwood scrub in Queensland. The corollas are said to have been "white" on *White 12400*.

Munir (1976) cites 19 collections from Queensland, 9 from New South Wales, and 3 from Northern Territory. Material has been misidentified and distributed in some herbaria as *Spartothamnella juncea* (A. Cunn.) Briq.

Citations: AUSTRALIA: New South Wales: *Betche s.n.* [Girilambone, 10.1886; Herb. Prager 18665] (Gg--31241), *s.n.* [Girilambone, 11.1890; Herb. Prager 14782] (Gg--31239, W--370286); *Boorman s.n.* [Byrock, 11.1903] (N, N--photo, Vt, Z--photo). Northern Territory: *Latz 1930* [Herb. North. Terr. 33933] (Z). Queensland: *M. S. Clemens s.n.* [Oct. 10, 1945] (Or--53422, Or--53423, Or--53424), *s.n.* [1 May 1946] (Mi); *Everist 3091* (N); *F. Mueller s.n.* [Lice River] (Bz--23207--syntype, N--photo of syntype, Z--photo of syntype); *C. T. White 9461* (Ca--8200), *12400* (Ca--937617, W--

1991835).

SPARTOTHEMNELLA TEUCRIIFLORA (F. Muell.) Mold., Geogr. Avicenn. 34, nom. nud. 1939; Phytologia 1: 430. 1940.

Synonymy: *Spartothamnus teucriiflorus* F. Muell. in Wing, South. Sci. Record 2: 55. 1882. *Spartothamnus teucriiflorus* (F. Muell.) Mold. apud Beard, Descrip. Cat. W. Austr. Pl., ed. 1, 93. 1965. *Spartothamnella teucriifolia* (F. Muell.) Mold., Résumé Suppl. 14: 940, sphalm. 1966.

Bibliography: Kempe, Trans. Roy. Soc. S. Austr. 5: 22. 1882; F. Muell. in Wing, South. Sci. Record 2: 55. 1882; F. Muell., Syst. Cens. Austr. Pl. 1: 102. 1882; F. Muell., Second Cens. Austr. Pl. 1: 171. 1889; Tate, Trans. Proc. Roy. Soc. S. Austr. 12: 113. 1889; F. Muell. & Tate, Trans. Roy. Soc. S. Austr. 13: 105. 1890; Tate, Fl. Extratrop. S. Austr. 156 & 254. 1890; Tate, Trans. Roy. Soc. S. Austr. 15: 262. 1892; F. Muell. & Tate, Trans. Roy. Soc. S. Austr. 16: 375. 1896; Tate in Spencer, Horn Sci. Exped. 3 Bot.: 174. 1896; S. Moore, Journ. Linn. Soc. Lond. Bot. 34: 215--216 & 256. 1899; Diels & Pritz., Engl. Bot. Jahrb. 35: 513. 1904; Thiselt.-Dyer, Ind. Kew. Suppl. 2: 953. 1904; Ewart & Davies, Fl. North. Terr. 239. 1917; Domin, Mem. Soc. Roy. Sci. Boheme 1921/1922: 106--107. 1923; Black, Fl. South. Austr., ed. 1, 3: 483. 1926; Gardn., Enum. Pl. Austr. Occ. 3: 111. 1931; Junell, Symb. Bot. Upsal. 1 (4): 130. 1934; Black, Trans. Roy. Soc. S. Austr. 60: 172. 1936; Mold., Geogr. Distrib. Avicenn. 34. 1939; Mold., Phytologia 1: 430. 1940; Mold., Prelim. Alph. List Inv. Names 40. 1940; Mold., Known Geogr. Distrib. Verbenac., ed. 1, 70 & 99. 1942; Mold., Alph. List Inv. Names 41. 1942; E. J. Salisb., Ind. Kew. Suppl. 10: 218. 1947; Mold., Known Geogr. Distrib. Verbenac., ed. 2, 154 & 195. 1949; Black, Fl. S. Austr., ed. 2, 4: 725. 1957; Mold., Résumé 210, 345, & 439. 1959; Beard, Descrip. Cat. West Austr. Pl., ed. 1, 93. 1965; Blackall & Grieve, How Know W. Austr. Wildfls., imp. 1, 3: 567 & cx. 1965; Mold., Résumé Suppl. 14: 9--10 (1966) and 15: 22. 1967; Beard, Descrip. Cat. West Austr. Pl., ed. 2, 114. 1970; Chippendale, Proc. Linn. Soc. N. S. Wales 96: 256. 1971; Mold., Fifth Summ. 1: 348 (1971) and 2: 622, 623, & 842. 1971; Blackall & Grieve, How Know W. Austr. Wildfls., imp. 2, 3: 567 & cx. 1974; Kooiman, Act. Bot. Neerl. 24: 263. 1975; Munir, Journ. Adelaide Bot. Gard. 1: 3, 5, 8, 12, 16--18, & 21--25, fig. 3. 1976; Mold., Phytol. Mem. 2: 339 & 517. 1980.

Illustrations: Munir, Journ. Adelaide Bot. Gard. 1: 19, fig. 3. 1976.

The following description is taken, in major part, from Munir (1976): A much-branched semi-scandent shrub or subshrub, to 1.5 m. tall; branches green. slender, rigid, obtusely tetragonal, gray-puberulent when young, later glabrescent and leafless; leaves sessile, linear-lanceolate to narrowly ovate-lanceolate, 5--25 mm. long, 1--4 mm. wide, marginally entire, glabrous and glutinous above, pubescent beneath, caducous; flowers axillary, 1--3 on a short axillary peduncle, pedicellate; pedicels slender, 3--5 mm. long, gray-pubescent; bracts subfoliose, sessile, linear or linear-lanceolate, 3--7 mm. long, 1--2 mm. wide, glabrous above, gray-

pubescent beneath; bracteoles persistent, sessile, linear, 1--2 mm. long, 0.3--0.5 mm. wide; flowers sweet-scented; calyx 4--7 mm. long, externally gray-pubescent, internally glabrous, deeply 5-lobed, the tube 1--2 mm. long, the lobes lanceolate, patent, 2--5 mm. long, basally 1--1.5 mm. wide, longer than the tube; corolla creamy-white, 8--11 mm. long, externally puberulent, villous in the throat, the tube 2--4 mm. long, the anterior lobe subelliptic, 5--7 mm. long, 3--4.5 mm. wide, the other 4 lobes subequal, oblong-ovate, 3--5 mm. long, 2--3 mm. wide; stamens 4, much exserted, the 2 anterior filaments 8--10 mm. long, the posterior (lateral) two 7--8 mm. long; anthers reniform, about 1 mm. long and 0.5 mm. wide, dorsally somewhat glandulose; style filiform, much exserted, 9--13 mm. long, glabrous; ovary subglobose, about 1 mm. long and wide, glabrous, apically sparsely glandulose and faintly 4-lobulate; fruit globose, at first green, later orange-red to blackish, 3--5 mm. long and wide, glabrous, smooth, shiny, often surpassing the open fruiting-calyx.

The species is based on *Rev. H. Kempe 438* from near the Finke River, Northern Territory, Australia, collected in 1882 and preserved as sheet no. 68887 in the Melbourne herbarium as lectotype. Mueller (1882) also cites an unnumbered E. Giles collection from "between the Murchison and Gascoyne Rivers" and says of the species: "More robust than *S. junceus,* neither glabrous nor crisp-downy; leaves always exceedingly small, flower-stalk never longer than the calyx, flowers twice as large.....calyx lobes less acutely pointed, corolla slightly silky outside, style longer, stigmas proportionately shorter, fruit not seen in a matured state, not lobed."

Recent collectors describe the plant as a weak, leafless, semi-scandent shrub, 18 inches to 5 feet tall, with numerous stems, the flowers sweet-scented, and the fruit (inaccurately referred to as "berries" by Moore and by Perry) black. They have found it growing in red loam soil. The corollas are described as "white" on *Lazarides 5768* and as "cream" on *Perry 5517*. Black (1926) asserts that it grows in central and western Australia. Moore (1899) describes it as "a fairly common subshrub" in the interior of western Australia, its aphylly obviously a xeric adaptation". Lazarides found it to be "rare in medium sandy red earth with *Acacia aneura* and *Eragrostis xerophila*. It has been collected in anthesis from May to September, and in fruit in September.

Munir (1976) cites 31 collections from Northern Territory, 7 from South Australia, and 36 from Western Australia. Domin (1923) cites an Ince collection from Western Australia.

Citations: AUSTRALIA: Northern Territory: *Lazarides 5788* (W--2318273). South Australia: *R. A. Perry 5517* (W--2374706). Western Australia: *S. Moore s.n.* [June '95] (N).

ADDITIONAL NOTES ON THE GENUS *PETITIA*. VI

Harold N. Moldenke

PETITIA Jacq., Enum. Syst. Pl. Carib. 1. 1760 [not *Petitia* Neck., 1790, nor J. Gay, 1832].

Additional synonymy: *Petilia* Mukherjee & Chanda, Trans. Bose Res. Inst. 41: 44, sphalm. 1978. *Petetia* Jacq., in herb.

Additional & emended bibliography: Jacq., Select. Stirp. Amer. Hist. Picta pl. 259, fig. 5. 1780; J. F. Gmel. in L., Syst. Nat., ed. 13, 2: 245 & 943. 1791; Endl., Gen. Pl. 1: 636. 1838; D. Dietr., Syn. Pl. 3: 613. 1843; Lindl., Veget. Kingd. 664. 1846; A. L. Juss. in Orbigny, Dict. Univ. Hist. Nat. 13: 185. 1849; Pfeiffer, Nom. Bot. 2 (1): 25 (1874) and 2 (2): 1569, 1570, & 1593. 1874; Baill., Hist. Pl. 11: 88, 112, & 117--118. 1891; Briq. in Engl. & Prantl, Nat. Pflanzenfam., ed. 1, 4 (3a): 137, 144, & 167 (1895) and ed. 1, 4 (3a): 383. 1897; Post & Kuntze, Lexicon 427 & 688. 1904; Urb., Symb. Antil. 4: 537. 1911; J. C. Willis, Dict. Flow. Pl., ed. 5, 501. 1925; J. Hutchins., Fam. Flow. Pl., ed. 1, 309 & 323. 1926; Stapf, Ind. Lond. 5: 39. 1931; A. W. Hill, Ind. Kew. Suppl. 8: 178. 1933; Lemée, Dict. Descrip. Syn. Gen. Pl. Phan. 8B: 655. 1943; H. N. & A. L. Mold., Pl. Life 2: 18, 20, 22--24, 32, 43, 57, 76, & 87. 1948; Spackman, Ann. Mo. Bot. Gard. 35: 110 & 111. 1948; Metcalfe & Chalk, Anat. Dicot. 2: 1035, 1037, & 1041. 1950; J. C. Willis, Dict. Flow. Pl., ed. 6, 501. 1951; Alain in León & Alain, Fl. Cuba, imp. 1, 4: 279, 280, & 311--312, fig. 133. 1957; Dalla Torre & Harms, Gen. Siphonog., imp. 2, 432 (1958) and imp. 3, 432. 1963; Mukhopadhyay, Pollen Morph. Verb. [thesis]. 1971; D. Powell, Bull. Inst. Ham. Sci. 15 (2): 417. 1973; Thanikaimoni, Inst. Franç. Pond. Trav. Sect. Scient. Tech. 12 (2): 95 (1973) and 13: 179 & 328. 1976; Heathcote in Heywood, Flow. Pl. World 237. 1978; Mukherjee & Chanda, Trans. Bose Res. Inst. 41: 40, 41, 44, 45, & 47. 1978; López-Palacios, Revist. Fac. Farm. Univ. Andes 20: 34. 1979; Mold., Phytologia 43: 273--278, 295--296, 503, & 508 (1979), 44: 219 & 510 (1979), and 45: 40 & 509. 1980; Byrne, Atoll Res. Bull. 240: 196 & 199. 1980; Mold., Phytol. Mem. 2: 5, 23, 86, 90, 92, 94, 96--99, 102, 357, 381, 429, & 565. 1980; Rogerson, Becker, Long, Prince, & Zanoni, Bull. Torrey Bot. Club 107: 99. 1980.

Spackman (1948) reports that the fossil, *Paraphyllanthoxylon idahoense,* has wood structure and vessels resembling those seen in *Petitia*.

PETITIA DOMINGENSIS Jacq.

Additional synonymy: *Petilia domingensis* Mukherjee & Chanda, Trans. Bose Res. Inst. 41: 44, sphalm. 1978. *Petetia domingensis* Jacq., in herb.

Additional & emended bibliography: Jacq., Select. Stirp. Amer. Hist. Picta pl. 259, fig. 5. 1780; J. F. Gmel. in L., Syst. Nat., ed. 13, 2: 245. 1791; D. Dietr., Syn. Pl. 3: 613. 1843; C. Muell. in Walp., Ann. Bot. Syst. 5: 709. 1860; Bocq., Adansonia, ser. 1,

3: [Rév. Verbenac.] 193--194, pl. 9, fig. 15--25. 1863; Urb., Symb. Antil. 4: 537. 1911; J. Hutchins., Fam. Flow. Pl., ed. 1, 309 & 323. 1926; Stapf, Ind. Lond. 5: 39. 1931; H. N. & A. L. Mold., Pl. Life 2: 57. 1948; Spackman, Ann. Mo. Bot. Gard. 35: 110 & 111. 1948; Alain in Leon & Alain, Fl. Cuba, imp. 1, 4: 311 & 312. 1957; D. Powell, Bull. Inst. Jam. Sci. 15 (2): 417. 1973; Mukherjee & Chanda, Trans. Bose Res. Inst. 41: 44. 1978; López-Palacios, Revist. Fac. Farm. Univ. Andes 20: 34. 1979; Mold., Phytologia 43: 275--278 & 295--296. 1979; Byrne, Atoll Res. Bull. 240: 196 & 199. 1980; Mold., Phytol. Mem. 2: 23, 86, 90, 92, 94, 96--99, 102, 357, 381, 382, 429, & 565. 1980.

Additional illustrations: Jacq., Select. Stirp. Amer. Hist. Picta pl. 259, fig. 5 (in color). 1780.

Recent collectors report the fruit of this plant as "red when ripe". The corollas are said to have been "white" on *Correll 41156*.

Spackman (1948) asserts that the fossil, *Paraphyllanthoxylon idahoense* Spackm., exhibits wood rays similar to those of *Petitia domingensis*, but that the structure and arrangement of the vessels are different.

Additional citations: BAHAMA ISLANDS: North Eleuthera: *D. S. Correll 41156* (Au). PUERTO RICO: *Howard & Nevling 15761* (N).

PETITIA DOMINGENSIS var. *EKMANI* Mold.

Additional bibliography: Mold., Phytologia 43: 276 & 277. 1979; Mold., Phytol. Mem. 2: 96 & 565. 1980.

PETITIA DOMINGENSIS var. *POEPPIGII* (Schau.) Mold.

Additional bibliography: H. N. & A. L. Mold., Pl. Life 2: 76. 1948; Mold., Phytologia 43: 295--296. 1979; Mold., Phytol. Mem. 2: 86, 90, 92, 96, 429, & 565. 1980.

Recent collectors describe this plant as a small tree, 5 m. tall, and have found it growing in dense rocky coppices, flowering in November.

Additional citations: CAYMAN ISLANDS: Grand Cayman: *Correll & Correll 51012* (N).

PETITIA URBANII Ekm.

Additional bibliography: Mold., Phytologia 43: 296. 1979; Mold., Phytol. Mem. 2: 90, 97, & 565. 1980.

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ADDITIONAL NOTES ON THE GENUS *DIOSTEA*. III

Harold N. Moldenke

DIOSTEA Miers

Additional synonymy: *Diostae* Mold., Phytologia 44 (2): front cover, sphalm. 1979.

Additional & emended bibliography: Gay, Hist. Fis. Chile Bot. 5: 20--22 & 30--31. 1849; Baill., Hist. Pl. 11: 111 (1891) and 11: 409. 1892; Dalla Torre & Harms, Gen. Siphonog., imp. 1, 430. 1904; Post & Kuntze, Lexicon 688. 1904; Reiche & Phil. in Reiche, Estud. Crit. Fl. Chile 5: 272, 280, 282--283, 298--299, & 303. 1910; C. K. Schneid., Illustr. Handb. Laubholzk. 2: 590. 1912; Sanzin, Anal. Soc. Cient. Argent. 88: 97, 98, 100, 103, 104, 116--118, 122, 125, & 133, fig. 6. 1919; Lemee, Dict. Descrip. Syn. Gen. Pl. Phan. 8B: 653. 1943; Metcalfe & Chalk, Anat. Dicot. 2: 1032 & [1034], fig. 247 F & H. 1950; Dalla Torre & Harms, Gen. Siphonog., imp. 2, 430 (1958) and imp. 3, 430. 1963; Thanikaimoni, Inst. Franc. Pond. Trav. Sect. Scient. Tech. 13: 80 & 328. 1976; Mukherjee & Chanda, Trans. Bose Res. Inst. 41: 40, 47, & 51. 1978; Mold., Phytologia 44: 123--126, 134--140, & 507 (1979) and 45: 40, 388, & 505. 1980; Mold., Phytol. Mem. 2: 5, 182, 185, 352, 375, 380, 397, 448, & 546. 1980; Rogerson & al., Bull. Torrey Bot. Club 107: 265. 1980.

DIOSTEA CINERASCENS (Schau.) Mold.

Additional synonymy: *Verbena cinerascens* Gay ex F. Phil., Cat. Pl. Vasc. Chil. 219. 1881. *Citharexylum alpinum* Poepp. ex Reiche & Phil. in Reiche, Estud. Crit. Fl. Chile 5: 282, in syn. 1910.

Additional & emended bibliography: Reiche & Phil. in Reiche, Estud. Crit. Fl. Chile 5: 282--283. 1910; Mold., Phytologia 44: 124--125, 136, & 138. 1979; Mold., Phytol. Mem. 2: 182, 380, 448, & 546. 1980.

DIOSTEA JUNCEA (Gill. & Hook.) Miers

Additional & emended bibliography: Reiche & Phil. in Reiche, Estud. Crit. Fl. Chile 5: 272, 280, 297--299, & 303. 1910; Sanzin, Anal. Soc. Cient. Argent. 88: 97, 98, 100, 103, 104, 133, & 134, fig. 6. 1919; Metcalfe & Chalk, Anat. Dicot. 2: 1032 & [1034], fig. 247 F & H. 1950; Mukherjee & Chanda, Trans. Bose Res. Inst. 41: 51. 1978; Mold., Phytologia 44: 134--136, 138, & 139 (1979) and 45: 388. 1980; Mold., Phytol. Mem. 2: 182, 185, 352, & 546. 1980.

Additional illustrations: Metcalf & Chalk, Anat. Dicot. 2: [1034], fig. 247 F & H. 1950.

Sanzin (1919) affirms that the true *D. juncea* is characteristic of the middle andean zone, 1500--2500 m. altitude, while what he calls *D. scirpea* is found in the upper andean zone, 2500 m. and upwards.

Additional citations: ARGENTINA: Chubut: *A. Castellanos s.n.* [Herb. Inst. M. Lillo 118404] (Ac, Ws).

DIOSTEA SCOPARIA (Gill. & Hook.) Miers

Emended synonymy: *Diostea scoparia* Miers ex Reiche, Estud. Crit. Fl. Chile 282, in syn. 1907.

Additional & emended bibliography: Griseb., Abhandl. K. Gesell. Wiss. Gött. 24: [Symb. Fl. Argent.] 276. 1879; Reiche & Phil in Reiche, Estud. Crit. Fl. Chile 4: 282 & 299. 1910; Sanzin, Anal. Soc. Cient. Argent. 88: 97, 98, 116, 118, 122, 123, & 133, fig. 26. 1919; Mukherjee & Chanda, Trans. Bose Res. Inst. 41: 51. 1978.

[to be continued]

BOOK REVIEWS

Alma L. Moldenke

"Xth INTERNATIONAL SEAWEED SYMPOSIUM PROCEEDINGS - Göteborg, Sweden, August 11-15, 1980" edited by Tore Levring, xiv & 780 pp., 245 b/w fig., 24 tab., 10 maps & 66 photo. Walter de Gruyter & Co. Verlag, New York & 1000 Berlin 30, West Germany. 1981. $97.50 or DM.195.

Hardly half a year passed from this conference to the publication of this thick book by photo-offset printing of the authors' typewritten papers. The assorted typings are remarkably "clean" and the many useful figures, tables and other illustrations are well presented. Such publication is certainly a very sensible, time-saving, efficient way to share what the 304 participants from 38 countries around the globe had to offer and/or to receive at this conference. To deal competitively with regularly printed reports calls for schoolmaster-firm editors who will not accept slovenly and/or tardy contributions no matter how brilliant their ideas may be.

There are 9 plenary sessions papers from Biosynthesis of Alginate to Marine Phycoculture in China by that many leading scientists. Then there are 99 concise papers grouped as follows: (1) Distribution, Morphology, Taxonomy, (2) Ecology, (3) Biochemistry, Physiology, (4) Cultures for food, agar, carrageenans, etc., (5) Application, Biomass, Technology, Utilization and 6 Special Sessions on (a) Methods and Terminology, (b) Marine Algae and Fouling and (c) Marine Algae in Pharmaceutical Science.

This is an expensive, valuable and important addition to the literature on marine algae. I hate to think of how much more it would have cost if not printed by photo-offset.

"MARINE MYCOLOGY. The Higher Fungi" by Jan & Erika Kohlmeyer. 690 & xiv pp., 482 b/w original micrographs, 129 fig. & 22 tab. Academic Press, New York, N. Y. 10003. 1979. $62.50.

This excellently prepared study of the 149 *Asco-*, 4 *Basidio-* and 56 *Deuteromycotina* "includes sections on ecological groups of fungi,.....phylogeny, ontogeny, physiology, and vertical and geographical distribution, providing information on known facts and open questions. The taxonomic-descriptive part contains complete descriptions of each genus and species, together with substrates, range, etymology of generic and specific names, and literature. There are keys for all species....The majority 191 (91%) of the filamentous fungi, are obligately marine species, whereas the remainder are facultatively marine." This monographic text is very well illustrated, provided with a comprehensive bibliography and will assuredly be the leading information source

in this field for at least a few years to come.

"ONE DAY ON BEETLE ROCK" by Sally Carrighar, iv & 196 pp., 20 b/w draw. University of Nebraska Press, Lincoln, Nebraska 68588. 1978. $3.25 paperbound.

This charmingly written account of what a naturalist-oriented person might be privileged to witness on a June day from this spot in Sequoia National Park in the daily doings of a weasel, Sierra grouse, chickaree, black bear, lizard, coyote, deer mouse, Steller jay and mule deer. Native vegetation is not ignored. The illustrations by Henry B. Kane are well done. Old timers may recognize this book as a paperback reprinting of the 1944 edition of Knopf.

"ONE DAY AT TETON MARSH" by Sally Carrighar, vi & 239 pp., 23 b/w draw. & 1 map. University of Nebraska Press, Lincoln, Nebraska 68588. 1979. $4.25 paperbound.

Eat or be eaten -- this is the beautifully told set of stories, mainly of predation, from the end of summer to the onset of winter in the Teton Marsh in Jackson Hole, Wyoming. The naturalist-author follows the otter, cutthroat trout, the osprey, the mosquito and scud in Willow Cove, the mink, the varying hare, the merganser, the moose, the clepsine leech, leopard frog and physa snail on water-lily pads, the trumpeter swan and the beaver. Old timers may recall their pleasure in reading the 1946 and 1947 editions. It is good to have a reasonably priced copy available again.

"INTRODUCTION TO FUNGI" Second Edition by John Webster, xii & 669 pp., 331 b/w fig., 128 photo. & 9 tab. Cambridge University Press, Cambridge, and New York, New York 10022. 1980. $69.50 clothbound or $18.95 paperbound.

The first edition of a decade ago I admired because for all of its erudition the text demonstrated that "the best way to teach mycology, and indeed all biology, is to make use, wherever possible, of living material". This excellent new edition gives "a more complete account of the *Myxomycota* and a more general introduction to the *Eumycota*,... aquatic *Fungi Imperfecti*, nematophagous fungi and seed-borne fungi". There are almost a hundred new illustrations usually drawn or photographed by the author and an enlarged bibliography. This valuable new text will have much use in British-influenced collegiate and university mycology courses. In the United States, if it does not serve as a text or "co-text", it surely should be on the reading shelf for such courses. The paperbound copy is priced reasonably enough for students. The sturdier clothbound one should be made available in scientific and botanical research libraries and in the personal libraries of researchers, technicians and academicians with

mycological concerns.

"DEFENCE MECHANISMS OF PLANTS" by Brian J. Deverall, vii & 110 pp., 7 b/w fig. & 8 tab. Cambridge University Press, Cambridge and New York, N. Y. 10022. 1977. &17.95.

This cautious, careful study is published as No. 19 in the Cambridge Monographs in Experimental Biology series. It is "concerned with the dynamic mechanisms involved in the defence of plant cells against attack by parasitic bacteria and fungi...[and] the processes by which plant cells perceive the approach of an intruder and occasionally permit, but commonly discourage, its further progress.....The gene-for-gene hypothesis is considered to apply to many host-parasite interactions.....[and] genetically determined incompatibility can occur at any stage in the ontogeny of the interaction between host and parasite.....The evidence that phytoalexin accumulation in numerous members of the *Leguminosae* and *Solanaceae* is responsible for the inhibition of fungal or bacterial growth in hypersensitive tissues, and in limited lesions, has been cautiously but favourably reviewed." The evidences for and limitations to host-specific toxin, common antigens, message-containing cross-protection factors are presented. Scientists and students with many varied interests will find this text and its full references very useful.

"REGULATION OF DEVELOPMENTAL PROCESSES IN PLANTS" edited by Horst Robert Schutte & Dieter Gross, 408 & 20 pp., 20 b/w photo., 146 fig. & 26 tab. Gustav Fischer Verlag, Postfach 176, 69 Jena, D.D.R. 1978. 38 M.

Herein are 26 invited papers photo-offset printed directly from typewritten copies. They comprise the proceedings of an international conference held at Halle during 1977 for about 450 scientists. The papers are all rendered in English, thus making them available to the largest reading audience possible and they are grouped under the following four topics: (I) Protein Pattern and Regulation of Differentiation, (II) Regulation of Organelle Biogenesis, (III) Regulation of Differentiation in Cell and Tissue Cultures and (IV) Regulation of Development by Interactions of Plant Hormones or Other Growth Substances. At the end of the book there are listed the titles of 157 poster presentations also given during the conference.

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