580.5
FB
v.27:1
1950
cop.2

B
27'
.2

CONTRIBUTIONS TO THE

FLORA OF SOUTH AMERICA

STUDIES ON ANDEAN COMPOSITAE—I
STUDIES IN SOUTH AMERICAN PLANTS—II

JOSÉ CUATRECASAS

FIELDIANA: BOTANY
VOLUME 27, NUMBER 1
Published by
CHICAGO NATURAL HISTORY MUSEUM
JUNE 8, 1950

Return this book on or before the
Latest Date stamped below.

Theft, mutilation, and underlining of books are reasons for disciplinary action and may result in dismissal from the University.

University of Illinois Library

JAN -5 1957

L161—O-1096

CONTRIBUTIONS TO THE

FLORA OF SOUTH AMERICA

STUDIES ON ANDEAN COMPOSITAE—I
STUDIES IN SOUTH AMERICAN PLANTS—II

JOSÉ CUATRECASAS

Curator, Colombian Botany

FIELDIANA: BOTANY

VOLUME 27, NUMBER 1

Published by

CHICAGO NATURAL HISTORY MUSEUM

JUNE 8, 1950

THE LIBRARY OF THE

PRINTED IN THE UNITED STATES OF AMERICA
BY CHICAGO NATURAL HISTORY MUSEUM PRESS

F15
V. 27'
cop 2

STUDIES ON ANDEAN COMPOSITAE - I

The first installment of this series on Compositae includes descriptions of new species of *Senecioneae* from Colombia, Venezuela and Ecuador, chiefly collected by the author and Dr. J. A. Steyermark; included are also descriptions and critical observations concerning several species and genera of this tribe and a new combination in the genus *Gongylolepis* mostly based on material in the Herbarium of Chicago Natural History Museum and on my field data. Unless otherwise stated, the types are deposited in the Herbarium of Chicago Natural History Museum; isotypes of all my collections (and types when so stated) are either in the Herbarium of the Instituto de Ciencias Naturales (H.N.C.), Bogotá, or in that of the Facultad de Agronomía del Valle, Cali, Colombia.

I wish to express my thanks to Dr. Theodore Just, Chief Curator, Dr. Paul C. Standley, Curator of the Herbarium, and Dr. Julian A. Steyermark, Associate Curator, for their assistance.

Gynoxys perbracteosa Cuatr., sp. nov.

Arbor 8 metralis. Rami terminales subteretes nodosi internodiis brevibus foliosi adpresse cinereo-ochraceo-tomentosi vel fuliginoso-tomentosi.

Folia opposita coriacea petiolata. Petiolus angulosus circiter 1.5 cm. longus, basi vaginatus, dense tomentosus. Lamina lanceolato-elliptica, basi rotundato-subcordata apice attenuata subacuta, margine anguste revoluta integra sed subtus valde remote et minute tuberculato-dentata; supra in statu juvenili subtomentosa vel puberula, deinde glabra nervo medio tomentoso excepto, nitidula luteo-viridis tenuiter reticulato venosa; infra dense luteo vel cinereo-tomentosa costa valde prominenti nervis lateralibus 14-16 paribus furcatis eminentibus; 5.5-9 cm. long. x 18-28 mm. lat.

Paniculae cymosae rotundatae copiosae in ramorum terminationibus, in statu compresso 8-15 cm. latae, tantum basi foliorum pari munitae. Ramuli (inferiores oppositi) dense tomentosi bracteati. Bracteae lanceolato-lineares, inferiores plus minusve deciduae superiores persistentes, valde lanato tomentosae, plerumque 15 mm. long. (inferiores 20 mm. long.) Pedicelli 6-15 mm. longi tenues lanato-tomentosi 6-9 bracteati bracteis linearibus 8-10 mm. long., 2-3 superioribus ad modum calyculum.

Capitula radiata erecta. Involucrum campanulatum lutescenti-tomentosum, 8 bracteis ellipticis apice attenuatis subacutis margine plus minusve scariosis dorso dense tomentosis 9-8 mm. long. x 3-4 mm. latis. Flores feminei ligulati 8, lutei; tubo corollae 7-8 mm. long. lamina elliptico-oblonga, 12-14 mm. long., 3 mm. lata, 4 nerviis

tridentata; 3-5 staminodiis piliformibus, 2-3 mm. longis. Rami stigmatici truncati sub conico-appendiculati, brevi penicillati. Flores centrales hermaphroditi tubulosi, vulgo 20, lutei. Corolla 11 mm. longa glabra, tubulo 5 mm., limbo campanulato, 5 dentato, dentibus triangularibus. Antherae 3 mm. long. basi breviter auriculatae. Stylus exsertus, rami stigmatici apice truncati et conico-caudati, penicillati. Ovarium glabrum. Pappus 8-9 mm. long. sordido albidus, pilis scabriusculis.

Type: Colombia, Dep. Cauca. Cordillera Central; Cabeceras del río Páez, páramos alrededor de La Laguna del Páez, 3450 met. alt. colect. J. Cuatrecasas 19057, dic. 4, 1944. "Arbol 8 met. Hoja coriácea, flexible, verde amarillenta brillante haz, ceniciento amarillenta envés. Involucro amarillo tomentoso. Lígulas grandes (12 x 3 mm., tubo 7 mm.). Flósculos amarillos."

This species is very different from all other known Colombian species of *Gynoxys*, but is nearest to *G. Jelskii* Hier., *G. Poggeana* Mattf. and probably *G. baccharoides* (HBK) Cass., the last of which is poorly known. *G. perbracteosa* is distinguished by the form and pubescence of the leaves, the tomentum of the bracts, peduncles and involucres, and especially by the large number of bracteoles at the pedicels and branchlets.

Gynoxys arnicae Cuatr., sp. nov.

Arbor parva, 4-8 metralis. Rami terminales subteres nodosi cortice cicatricoso cinereo vel viridi-cinereo ochraceo-tomentoso.

Folia opposita coriacea vel subcoriacea petiolata. Petiolus anguloso-striatus, 1.5-2.5 cm. longus basi dilatato vaginatus tomentosus. Lamina oblongo-elliptica apicem versus attenuata vel truncata vel subcordata; margine anguste revoluta tenuissime sinuata vel integra sed remote et minute tuberculato-dentata; supra laevis obscure viridis subnitida conspicue venuloso-reticulata glabra nervo medio tomentuloso excepto; subtus dense cinereo (in sicco ochraceo) tomentoso, nervo medio eminenti striato, nervis lateralibus 16-18 in utroque latere, fere angulo recto 3-7 mm. distantibus, plus minusve prominulis sed interdum cum indumento occultis; 7-11 cm. long. x 22-42 mm. lata.

Paniculae cymosae terminales rotundatae, 12-22 cm. lat. (in statu compresso) basi foliosae. Rami dense viridi-ochracei tomentosi inferiores oppositi ultimi racemiformi dispositi satis bracteiferi. Bracteae lineares acutae tomentosae, 10-20 mm. longae x 1.5-3 mm. latae, inferiores deciduae reliquae persistentes erectae patulae vel reflexae rectae vel curvae. Pedicelli teneres, 1-2 cm. long., tomentosi 3-5 bracteis muniti. Capitula radiata erecta. Involucrum campanulatum ochraceo-viridis, 8 (vel 9) bracteis ellipticis obtusiusculis, dorso dense tomentosis, margine late scariosis, 8 mm. long. x 3-4 mm. lat. Apice pedicelli 5-6 bracteis ad instar calyculum conformatis. Receptaculum 2 mm. latum, margine alveolorum denticulato. Flores feminei ligulati 8, lutei; tubo corollae 6 mm. long. glabro lamina elliptico-oblonga 3-dentata, 13-15 mm. longa, 3-4 mm. lata, 4-nerviis; 4-5 stami-

nodia filiformia 2-3 mm. longa; rami stigmatici 1 mm. longi penicillati sub-appendiculati. Stylus 11-12 mm. longus. Flores centrales hermaphroditi tubulosi, 20-24; corolla 8-9.5 mm. longa lutea glabra tubulo 2-3 mm. longo limbo campanulato, 5 lobulis triangularibus; antherae 3 mm. longae basi breviter auriculatae; stylus 11-12 mm. longus, stigmatophora arcuata truncata sed conico-appendiculata penicillata. Ovarium glabrum. Pappus albidus pilis scabriusculis 8-9 mm. longus. Flores in vivo intense *Arnicae montanae* odorem emitentes.

Type: Colombia, Dep. Valle. Cordillera Occidental, Los Farallones, vertiente oriental bajo el cerro La Torre en La Laguna 3500-3550 m. alt., 1 ag. 1946 colect. J. Cuatrecasas 21864. "Arbol 8 met. Hoja coriácea, verde amarillento oscuro haz, ocráceo ceniciento envés. Involucro verde ocráceo. Corolas amarillas. Olor a árnica."

Gynoxys arnicae fma. **subtomentosa** Cuatr., nova

Folia infra laxe tomentosa nervis lateralibus valde prominentibus. Involucrum quam typus minus dense tomentosus.

Type: Colombia, Dep. Del Valle. Cordillera Occidental, Los Farallones, lomas parameras sobre la mina El Diamante, 3000-3120 m. alt., 31 jul. 1946 colect. J. Cuatrecasas 21834. "Arbolito 4 met. Hoja subcoriácea verde oscura haz, semimate cenicienta envés. Involucro verdoso ceniciento. Corolas amarillas."

When young the leaves are densely tomentose but later lose most of the tomentum, become more greenish and the nerves appear more conspicuous.

Gynoxys arnicae var. **scandens** Cuatr., nov. var.

Caulis valde elongatus scandens, ramis terminalibus foliatis et floriferus supra silvae arborum frondes emergentibus.

Type: Colombia, Dep. Del Valle. Cordillera Occidental, Los Farallones, extremo N. bajando a Las Cascadas, bosque alto 3100 met. alt., 2-VIII-1946 colect. J. Cuatrecasas 21923. "Gran bejuco. Hoja semicoriácea, verde amarillenta mate haz, ceniciento ocráceo envés. Involucro verdoso ocráceo. Corolas amarillas."

Additional specimen: Los Farallones, extremo N., entre Alto del Buey y Las Cascadas, bosque alto, 3300-3270 m. alt.. 2-VIII-46 colect. J. Cuatrecasas 21918. "Gran bejuco. Hoja subcoriácea verde amarillo haz, verde cenicienta envés o verde ocrácea. Involucro verde ocráceo. Corolas amarillas."

The abundant material of this species varies greatly in leaf form and tomentum. This variability can be seen even in the same individual. Var. *scandens* differs only by its lifeform. Thus great plasticity in response to special ecological conditions is as characteristic of *Gynoxys* as it is of *Senecio*, and accounts for the large number of species and conspicuous polymorphism in both genera. It is remarkable that plants of *G. arnicae* growing among paramo bushes are typical

trees. But numbers 21923 and 21918, representing individuals found on a lower vegetation level in the mountain forest with its large trees, are lianas; despite the excellent conditions for growth in the forest these plants can satisfy their light requirement only by climbing above *the* dark understory. *G. arnicae* is so closely related to *G. perbracteosa* that it might be regarded as a vicarious subspecies limited to the West Cordillera. Yet the distinguishing characters seem to be sufficient to justify its recognition as a different species. In *G. arnicae* the leaves are larger and less consistent than in *G. perbracteosa* and the base is commonly asymmetrical; the tomentum on the lower side of the leaves is more abundant but laxer, and less compressed. The bracts of the panicle are longer and narrower, and more numerous. The pedicels also are longer and the tomentum of the inflorescence is short and more compressed, whereas in *G. perbracteosa* it is more woolly, long and lax.

GYNOXYS LINDENII Schultz Bip.

This name was given by Weddell (Chl. And. I;76) as a synonym of *G. baccharoides*. But the species described by Weddell does not belong to *S. baccharoides* HBK as it agrees more with the first specimen mentioned by Weddell (Linden 903). Fortunately I had the opportunity to examine a fragmentary specimen of this collection in the Herbarium of Chicago Natural History Museum; I was able to identify it with my number 23273 from the Nevado Santa Isabel, a locality very close to that where Linden's specimen was collected (Nevado del Tolima). All of these plants are related to the two previously described species. The plants of my collection, referable to *Gynoxys Lindenii*, differ from the others in that their leaves are stronger and the tomentum is more compressed. The inflorescences are shorter and are covered with a shorter and more appressed indumentum; the pedicels and bracteoles are much shorter. The heads are smaller than in *G. perbracteosa* and the involucres are shorter; the flowers are also smaller; only 5 ligules seem to be present in each head, whereas in the two former species there are always 8. These ligules have a shorter lamina (8-9 mm.), while in the other species they are more than 12 mm. long. I have measured the only two ligules of Linden's specimen and found that the tube was 6 mm. and the lamina was 9 mm. long.

I think the Santa Isabel plant is very close to the Linden plant (from Tolima) in spite of having more tomentum on its leaves; the leaves of sterile branches are also larger. A plant from Barragán (No. 20060) is a form with smaller coriaceous leaves, and appears to be more closely related to *S. baccharoides*, although its leaves are too acute to belong to the latter.

Gynoxys florulenta Cuatr., sp. nov.

Arbuscula 3 met. alta, ramorum series compactili rotundati multitudine floribus luteis ornati. Rami grisei adpresse tomentosi.

Folia opposita coriacea petiolata. Petiolus rigidus, adpresse cinereo-ochraceo-tomentosus, 1-2 cm. long., supra sulcatus basi vaginatus. Lamina ovato oblonga, basi subattenuata vel rotundata apice angustata obtusiuscula, margine plana integra, 5-11 cm. long. x 2-6 cm. lat., supra atroviridis nitida (in sicco lutescens subnitida) excepto costa glaberrima, nervis secundariis plus minusve impressus et inter se manifeste reticulato-venulosa; subtus dense et adpresse tomentosa ochraceo-cinerea nervo medio valde crasso, lateralibus 9-10 paribus prominentibus saepe furcatus reliqua venuloso-reticulata.

Extremi ramorum valde floribundi, inflorescentia paniculato-composita foliata principialibus ramulis oppositis, singulae paniculae 10 cm. lat. (statu compresso); bracteis medianis foliis similibus sed minoribus, bracteis superioribus lineari-lanceolatis vel linearibus acutis pubescentibus, plus minusve erectis 10-3 mm. long. Pedicelli rigidi erecti adpresse tomentosi 3-10 mm. longi bracteati; apice 3-4 bracteis (3-4 mm. long.) ad instar calyculum formantibus. Capitula radiata erecta. Receptaculum marginibus alveolorum dentatis. Involucrum campanulatum, 8 bracteis ellipticis apice attenuatis 6 mm. long. 2-2.5 mm. lat. margine scarioso dorso pallido-viridibus pubescentibus. Flores feminei ligulati 5 lutei, tubo corollae 5 mm. long., ligula lineari-elliptica 7 mm. long., 4 nerviis, tridentata; rami stigmatici longe conici appendiculati. Flores disci hermaphroditi 8 lutei tubulosi. Corolla 8 mm. long., tubulo 3.5 mm. long. limbo campanulato profunde 5-fido. Antherae 2 mm. longae basi brevissime auriculatae. Rami stigmatophori longi caudato-penicillati. Ovarium glabrum. Pappus albidus 8 mm. long. pilis scabriusculis.

Type: Colombia, Dep. Valle. Cordillera Central; Hoya del río Bugalagrande, Barragán: Páramo de Bavaya, Corrales, 3450-3520 m. alt., mayo 1946, colect. J. Cuatrecasas 20148. "Arbolito 3 met. Copa densa redondeada completamente cubierta de flores. Hoja coriácea, rígida verde oscura brillante haz, ceniciento ocrácea envés. Lígulas amarillas. Flósculos amarillos. Involucro verde claro con una fila regular de brácteas y otra externa de piezas desiguales."

I think this species corresponds to *G. laurifolia* HBK from Ecuador, which has not been found in Colombia. It is distinguished by the form of its leaves, the pubescent (not woolly) involucre and by the linear, long and acute bracteoles of its pedicels and calycle.

Gynoxys laurata Cuatr., sp. nov.

Arbor 10 metralis. Rami terminali subteretes vel subtetragoni adpresse tomentosi grisei vel fuliginosi.

Folia opposita coriacea petiolata. Petiolus longus, erectus vel curvatus, supra valde sulcatus, subtus angulosus basi vaginatus, dense adpresseque griseo tomentosi, 15-35 mm. longus. Lamina ovato-elliptica basi rotundanta vel subcordata apicem versus attenuata acuta margine integra, 7-14 cm. long. x 3-7 cm. lat., supra in vivo viridis nitida in sicco viridi-brunnea glaberrima, nervo medio et lateralibus notatis, reliqua tenuiter venuloso-reticulata; subtus adpresse cinereo-

tomentosa vel interdum fuliginosa, costa eminenti nervis secundariis utroque latere 14-15 prominentibus furcatis, reliquis leviter reticulatis.

Inflorescentiae terminales cymoso-paniculatae basi foliosae ramis cinereis vel fuliginosis adpresse tomentulosis, erectis vel plus minusve flexuosis, 10-20 cm. latae in statu compresso. Bracteae ramusculorum lanceolatae 6-2 mm. long., tomentulosae. Pedicelli 3-15 mm. longi erecti vel inclinati vel flexuosi aliquis bracteolis triangulari lanceolatis acutis, 1-2 mm. long., superioribus ad instar brevem calyculum formantibus.

Capitula radiata erecta vel nutantia. Receptaculum 2.5 mm. diam. laeve. Involucrum campanulatum bracteis membranaceis 8, elliptico-oblongis obtusiusculis 6-7 mm. long., 2-3 mm. lat., glaberrimis, apice ciliolatis, dorso basi callosis. Flores feminei ligulati 3-4 lutei, tubo corollae 4 mm. long. lamina 5-6 mm. long. breviter 3-dentata. Rami stigmatici glabri lineares. Flores disci hermaphroditi 8 lutei tubulosi. Corolla 8 mm. longa, tubulo 3.5-4 mm. limbo dilatato profunde 5-fido. Antherae 2 mm. long. basi breve auriculatae. Stigmata recurvata truncata breviter penicillata. Ovarium glabrum. Achaenia 3.5 mm. long. lineari-elliptica laevia. Pappus albo-ochraceus 8 mm. longus.

Type: Colombia, Dep. Valle. Cordillera Central, cabeceras del río Tuluá: Quebrada de las Vegas, páramo 3400-3500 m. alt., marzo 1946 colect. J. Cuatrecasas 20399. "Arbol 10 m. Hoja coriácea, verde brillante haz, cenicienta enves. Invólucro verde. Lígulas y flósculos amarillos."

Additional specimens: Dep. Valle, Cordillera Central, vertiente occidental; Hoya del rio Bugalagrande, Barragán: Páramo de Bavaya, Corrales, 3450-3520 met. alt., colect. III-1946 J. Cuatrecasas 20166. "Arbolito. Hoja coríacea, crasa, flexible, verde grisacea, semibrillante haz, tomentoso cenicienta envés. Invólucro verde. Lígulas y flósculos amarillos." Dep. Valle, Cordillera Central, vertiente occidental; cabeceras del río Tuluá: Quebrada de Las Vegas, páramo 3400-3500 met. alt., colect. III-1946 J. Cuatrecasas 20377. "Arbol grande, 20 cm. diam., 10 met. àlt. Invólucro verde. Flósculos y lígulas amarillas.

Number 20166 is a form with longer ligules (lamina up to 9 mm. long), whereas number 20377 is a form with narrower leaves.

Gynoxys laurata is also related to *G. laurifolia* HBK, but distinguished from it and from *G. florulenta* by the shape, texture and hairiness of its leaves, by the glabrous involucre and short bracteoles.

Gynoxys subcinerea Cuatr., sp. nov.

Arbor parva. Rami plus minusve tortuosi vel penduli, adpresse tomentoso-cinerei plus minus striati.

Folia opposita subcoriacea petiolata. Petiolus erectus vel curvatus supra sulcatus subtus angulosus dense adpresse cinereo-tomentosus basi vaginatus, 2-3 cm. longus. Lamina elliptico-oblonga vel ovato-

elliptica, basi rotundata vel truncata vel subcordata, apice attenuata acutiuscula, margine plana integra vel leviter subsinuata repando minute tuberculato-dentata (infra visibilis), supra viridis in junioribus pilis sparsis munita, adultior glabra costa et nervis secundariis saepe albo-cinereo-tomentosis exceptis; subtus dense tomentosa albo-cinerea costa crassiuscula nervis secundariis 10-11 paribus prominentibus reliqua leviter reticulato-venosa; 3.5-9 cm. longa x 2-4 cm. lata.

Paniculae cymosae terminales inferne foliosae, ramis ramulisque oppositis erectis vel flexuosis, valde albo-cinereo tomentosae. Bracteae lanceolato-lineares vel anguste lineares, 2-4 mm. longae. Pedicelli tenues 4-12 mm. longi aliquibus bracteolis linearibus munitis, superioribus vix ad instar calyculum.

Capitula radiata erecta vel cernua. Involucrum campanulatum 8-phyllum, bracteis ellipticis 6 mm. long., 3 mm. latis margine scariosis, dorso albo cinereo tomentosis apice ciliatis. Flores feminei ligulati 4-5, lutei, tubo corolla 3 mm. longo, lamina linearis 4-4.5 mm. longa, tridentata breviter staminodiis piliformibus munita. Flores disci hermaphroditi 12-16 tubulosi corolla 7-8 mm. longa tubulo 3 mm., limbo campanulato 5-dentato, stigmata gynoxyformia. Ovarium glabrum. Pappus 7.5 mm. long. albo-luteolus scabridus.

Type: Colombia, Dep. Norte de Santander. Cordillera Oriental; Hoya del río Chitagá en Vega Colombia, 2880 m. alt. 28-IX-1941 colect. J. Cuatrecasas 13473.

Additional specimen: Dep. Norte de Santander, Cordillera Oriental: Hoya del río Chitagá, cerca de Presidente, bosques 3300 m. alt., colect. 21-VII-1940 J. Cuatrecasas & H. G. Barriga 10060.

This species is well characterized by its thin, flexible, nearly coriaceous leaves which are grayish-white underneath, by the same (grayish-white) color of the inflorescence, branchlets and involucre, by the small number of short ligules, and long pedicels, and by the linear and acute bracteoles.

Gynoxys paramuna Cuatr., sp. nov.

Arbor parva. Rami terminali nodosi subteretes, plus minus striati minute et adpresse cinereo-ochraceo tomentosi.

Folia subcoriacea opposita petiolata. Petiolus 12-18 mm. long., dense tomentosus angulatus. Lamina elliptico-oblonga, vel elliptico-lanceolata, basi rotundata, apice attenuata acutiuscula, margine revoluta integra; supra viridis in juvenilis tomentulo deciduo, deinde nervo medio excepto glabra; subtus dense adpresseque tomento cinereo-lutescenti tecta, costa eminenti nervis lateralibus 12-16 utroque latere prominentibus; 5-7 cm. longa x 15-23 mm. lata.

Paniculae terminales 10-15 cm. longae, ramis oppositis valde adpresse cinereo-ochracei tomentosis flexuosis plus minusve pendulae. Pedicelli 1-2.5 cm. longi flexuosi, 6-8 bracteis brevissimis crassis subtuberculatis muniti 2-4 superioribus vix calyculiformibus dispositis.

Capitula vix radiata pendula. Involucrum campanulatum, 8 bracteis crassiusculis 8 mm. longis 3 mm. latis margine scariosis dorso adpresse tomentosis apice acutiusculis basi crassioribus. Flores feminei exteriores ligulati, corolla tubulo 4.5 mm. longo lamina 4 mm. longa tridentata, stigmata acuta brevissime penicillata. Flores centrales hermaphroditi, corollae tubuloso-campanulatae 7 mm. longi, rami stigmatici caudiculati penicillati. Pappus 8-9 mm. long. sordide albus. Achaenia 4 mm. longa glabra.

Type: Colombia, Dep. Boyacá. Sierra Nevada del Cocuy, valle de Las Lagunillas, páramo 4110 met. alt. collect. 11-IX-1938 J. Cuatrecasas 1434.

Additional specimen examined: Dep. Boyacá: Sierra Nevada del Cocuy: Chorreón de San Paulino, bosque, vert. sur, 3750 met. alt., 10-IX-1938 colect. J. Cuatrecasas 1368.

G. paramuna is characterized by the shape and texture of its rather thin and flexible leaves, by the dense and appressed, grayish-white or yellowish tomentum, by its thick and tomentose phyllaries and by the shape of its inflorescences.

Gynoxys venulosa Cuatr., sp. nov.

Arbor parva ramis extremo pendulis. Rami teretes ravi hirsuto-tomentulosus pilis erectis et crispis intermixis, terminales dense hirsuto-tomentosi virido-fulvi et plus minusve fuliginosi.

Folia petiolata opposita coriacea. Petiolus brevis, 4-8 mm. longus hirsuto tomentosus supra canaliculatus basi vaginatus. Lamina ovata basi cordata apice obtusa margine integra plana vel subrevoluta, 2-4.8 cm. longa x 13-30 mm. lata, supra in juvenilis crispo-pilosula mox glabra, obscure viridis, nervo medio profunde impresso, prominule et minute venuloso-reticulata; infra dense hirsuto-tomentosa ochracea costa valde prominenti nervis lateralibus distantibus, 6-8 utroque latere, et laxo reticulo minus signato.

Inflorescentiae cymosae paniculatae ramusculorum terminalium productae, ramulis tenuibus flexuosis dense hirsutulo tomentosis ochraceis et plus minusve fuliginosis; bracteae lanceolatae vel lineares, 4-10 mm. longae inferiores deciduae. Pedicelli tenues erecti vel flexuosi 5-20 mm. longi bracteati, 2-3 bracteis superioribus linearibus acutis 4 mm. long. vix calyculum formantibus.

Capitula heterogama plus minusve pendula. Involucrum campanulatum, 8 bracteis 6-7 mm. longis x 2.5-3 mm. latis ellipticis obtusiusculis margine squamosis dorso dense tomentoso-hirsutis. Flores feminei ligulatae 4, valde breves lutei tubo corollae 3 mm. longo lamina tridentata 4-5 mm. longa 2-5 staminodiis piliformibus. Rami stigmatici conico-elongati pilosi. Flores centrales hermaphroditi vulgo 18-20, lutei; corolla 8 mm. longa tubuloso-campanulata 5 dentata, tubulo 3 mm. longo. Antherae 2 mm. long., basi auriculatae. Rami stigmatici longi appendiculati penicillati. Ovarium glabrum. Pappus sordide albidus 7,5 mm. longus.

Type: Colombia, Dep. Cauca. Cordillera Central, Cabeceras del río López: Quebrada del Duende, 3400-3450 m. alt., dic. 1944 colect. J. Cuatrecasas 18945. "Arbolito. Ramas péndulas. Hoja coriacea, flexible, gruesa, verde oscura haz, ocraceo tomentosa envés. Corolas amarillas."

The leaves of this species, belonging to the group of *G. fuliginosa* (HBK) Cass., *G. Stuebeli* Hier. and *G. buxifolia* (HBK) Cass., are dull and strongly reticulated above. The tomentum is hirsute and the flexuose inflorescence is marked by the slender branchlets, long pedicels, and short petioles.

Gynoxys sancti-antonii Cuatr., sp. nov.

Arbor parva ramis scandentibus striatis griseis terminationibus puberulentis.

Folia coriacea opposita petiolata. Petiolus 8-15 mm. longus erectus vel flexuosus supra canaliculatus, dense tomentosus. Lamina ovato oblonga polygonata basi truncata vel subcordata apice obtusa. 15-40 mm. long. x 12-28 mm. lata; supra juvenilia crispo-puberula mox glabra nitida minute reticulato-venosa; subtus dense adpresseque tomentoso-ochracea vel cinerea, nervo medio crassiusculo lateralibus 7-8 brachiatis prominulis, reliqua laxe reticulo vix conspicuo.

Cymae paniculatae in terminalium ramusculorum exitibus 5-8 cm. amplae, ramulis dense adpresse tomentosi, bracteis linearibus 2-3 mm. longis.

Capitula radiata inclinata cernua vel pendula excalyculata. Involucrum campanulatum 8 bracteis elliptico-oblongis acutiusculis, 6-7 mm. longis, 2 mm. latis, margine scariosis dorso tomentosis. Flores exteriores feminei 5 ligulati lutei, corolla 11 cm. longa tubulo 4.5 mm. longo. Flores centrales tubulosi hermaphroditi lutei, corollae 8-9 mm. long. tubulo angusto 3 mm. long. limbo tubuloso campanulato 5-fido lobulis angustis. Antherae 3 mm. longae basi lineari-auriculatae.

Type: Colombia, Comisaría del Putumayo. Páramo de San Antonio del Bordoncillo, entre el Encano y Sibundoy, 3250 m. alt. 3-I-1941 colect. J. Cuatrecasas 11722. "Arbusto ramoso scandens, corola amarilla."

Additional specimen: Dep. Nariño: Yacuanquer, 2800-3000 m. alt., M. de Garganta 504, 4-I-43.

This species is well characterized by its regularly cymose inflorescence, appressed tomentum and particularly by the polygonal or subpolygonal shape of the blade.

Gynoxys induta Cuatr., sp. nov.

Frutex 3 met. altus; rami principales robusti erecti extremis flexuosis dense lanato-tomentosis.

Folia crasso coriacea petiolata opposita. Petiolus robustus 3-6 cm. long., supra canaliculatus subtus angulosus basi vaginanti, valde

dense lanato-tomentosus. Lamina elliptica vel ovato-elliptica vel superne late elliptico-lanceolata, apice obtusa vel acuta basi cordata margine irregulariter sinuata vel laevis; supra viridis glabra nitida nervo medio et in juvenilis nervis secundariis tomentosis exceptis; infra crasso tomento lanato griseo vel ochraceo-cinereo induta; Costa crassa prominenti nervis secundariis 12-14 pro latere ± brachiatis, reliqua laxe reticulo vix conspicuo; 12-22 cm. long. x 5-10 cm. lat.

Inflorescentia perfecte paniculato-cymosa omnino pendula, 27 cm. long. vel longior, ramis flexuosis dense lanato-tomentosis; basi pari foliis, superne bracteis lanceolatis linearibusque 15-6 mm. longis valde tomentosis. Pedicelli bracteolati 2-10 mm. longi 3 bracteis superioribus vix ad instar calyculo.

Capitula discoidea pendula 18-20 floribus. Involucrum campanulatum 8 bracteis ellipticis acutiusculis margine scariosis dorso lanato tomentosis viridi-cinereis, 6 mm. longis, 2-3 mm. latis. Receptaculum 2.5 mm. diametro margine alveolorum denticulata. Flores 18-20 omnes hermaphroditi tubulosi lutei, corollae 9 mm. longae tubulo 4 mm. limbo campanulato 5-dentato dentibus triangularibus 1,2 mm. longis. Antherae 2.5 mm. longae luteae deinde fuscae basi breviter acuteque auriculatae. Rami stigmatici conici appendiculati penicillati. Ovarium glabrum. Pappus sordide albidus 8 mm. long.

Type: Colombia, Dep. Valle. Cordillera Central: Hoya del río Bugalagrande, Barragán: Páramo de Bavaya, Corrales, 3550-3400 m. alt., colect. abril 1946 J. Cuatrecasas 20546. "Arbusto tallo erguido y ramas luego torcidas. Hoja coriácea, grande, flexible, verde botella brillante haz, afelpado grisácea u ocráceo cenicienta envés. Cimas paniculoídeas largas, lacias, completamente péndulas. Involucro verde ceniciento-tomentoso. Corola amarillo claro, luego amarillo pardusca."

This species is related to *G. pendula* Wedd. Comparison of it with Linden 954 (in F.) shows that my plant has larger and thicker leaves with bigger petioles and broader blades, unlike the lanceolate leaves of *G. pendula.* The leaves of the sterile branches have a deeper cordate base and the top of the blade is generally obtuse. The ultimate branchlets, inflorescences, peduncles, petioles and lower side of the leaves are densely tomentose and different from *G. pendula,* in which the indument is short and compressed. The latter is described as being radiate, a character also found in the examined specimen. *G. induta* is homogamous.

Gynoxys Rimbachii Cuatr., sp. nov.

Arbor ramis terminalibus tetragonis adpresse tomentosae griseo-lutescentibus.

Folia opposita coriacea petiolata. Petiolus 7-12 mm. longus striatus tomentosus. Lamina lanceolata firmis, 7-14 cm. longa x 15-35 mm. lata, basi truncata vel rotundata vel raro angustata, apice attenuata acuta margine leviter revoluta obtuse crenato-dentata vel sublaevis minutissimis dentibus callosis distantibus subtus notatis; supra nervo medio ex-

cepto glabra, infra dense tomentosa costa crassa nervis secundariis notatis, reliqua nerviatione reticulata vix conspicua.

Paniculae cymosae terminales basi foliatae, ramulis striatis viridoochraceis dense tomentosis; bracteis linearibus inferioribus 6-7 mm. longis, reliquis 3-1.5 mm. longis. Pedicelli 3-7 mm. longi aliquibus bracteis linearibus acutis tomentosis muniti superioribus 3-4 fere calyculum formantibus.

Capitula erecta radiata. Involucrum 7-8 mm. long. 8 bracteis ellipticis apice acutatis, margine scariosis dorso convexo tomentosis, 2-3 mm. latis. Flores feminei ligulati lutei 4-5, tubo corollae 6 mm. longo lamina 9 mm. longa 2.5 mm. lata. Rami stigmatarum acuti pilosuli. Flores centrales hermaphroditi tubulosi 8, corollae tubulo 4 mm. longo limbo tubuloso campanulato 5 mm. longo 5 dentato dentibus profundis. Rami stigmatarum longe penicillati caudati. Ovarium glabrum. Pappus sordide luteo-albidus 8 mm. longus.

Type: Ecuador, "Eastern Cordillera, inner slope 3200 m. Middle-sized tree flowers of center and margin yellow. Coll. A. Rimbach No. 79, december."

This species is characterized by thick and firm leaves with narrowly lanceolate blades and coarsely tooth margins, by the tomentum and structure of the involucre, by the thick, enrolled tomentose phyllaries and by its long heads and ligules.

Gynoxys miniphylla Cuatr., sp. nov.

Frutex 60 cm. altus ramis griseis plus minusve striatis puberulitomentosis.

Folia rigide coriacea petiolata opposita. Petiolus 3-5 mm. longus supra sulcatus dense tomentosus. Lamina minuscula ovato-orbiculata basi et apice rotundata margine integerrima, 5-11 mm. longa x 4.5-8.5 mm. lata; supra juvenilia cinereo crispo-tomentosa deinde glabra viridis nitidissima, costa basi tomentosa excepto; subtus densissime cinereo vel albo-cinereo tomentosa tantum costa prominenti 3-5 utroque latere nervis aliquando fere conspicuis.

Cymae terminales breves in paniculas foliosas aggregatae. Ramulis pedunculisque dense tomentosae, bracteis anguste linearibus 5-3 mm. longis. Pedicelli 5-12 mm. longi recti vel curvati, 2-3 bracteis superioribus ad instar calyculum formantibus. Involucrum campanulatum 8 bracteis lineari-ellipticis acutiusculis 6 mm. longis 2 mm. latis margine scariosis dorso dense tomentosis.

Capitula radiata plus minusve inclinata 5 ligulis 12-14 flosculis luteis. Corollae exteriores feminei glabri tubulo 4 mm. longo, lamina 3.5 mm. linearis tridentata; ramuli stigmatici acuti pilosi. Corollae centrales hermaphroditi tubuloso campanulati 7 mm. long. tridentatae, lobulis anguste triangularibus. Antherae 2 mm. longae minute auriculatae, auriculis linearibus.

Type: Ecuador prov. Azuay: páramos in vicinity of Toreador, between Molleturo and Quinoas, altitude 3810-3930 meters, J. A. Steyermark 53175 collect. June 15, 1943 (Chicago Natural History Museum). "Shrub 2 feet tall; flowers yellow; bracts gray."

The shape of the leaves distinguishes *G. miniphylla* from *G. buxifolia* (HBK) Cass., which has elliptical leaves. *G. myrtoides* Mattf. has obovate leaves, which are narrower near the base. The closest related species, *G. Weberbaueri,* has cordate leaves. The hairiness on the upper side of the leaves in *G. miniphylla* cannot be found in any other species; it is also the species with the smallest leaves in the genus.

Gynoxys aquifolia Cuatr., sp. nov.

Frutex plus minusve 1 metralis ramis nodosis ochraceis vel griseis plus minusve cicatricosis superne indumento albo lanato-floccoso arachnoideo tectis.

Folia coriacea breviter petiolata opposita vel aliquando inferiora alterna. Petiolus 3-4 mm. longus viridi luteus lana floccoso archnoidea decidua tectus. Lamina ovata vel ovato-elliptica oblonga, basi cordata truncata vel rotundata, apice subite acuta, margine revoluta sinuato-dentata vel raro integra dentibus plus minusve spiniiformibus; supra juventute arachnoideo floccosa deinde glaberrima viridis valde nitida impresse reticulata nervo medio depresso; infra dense tomento albido (in sicco ochraceo) tecta, sed in juvenilis duplo indumento minuta altero superiore albo lanato-arachnoideo precipue costa marginique mox deciduo vestita; nervo medio prominenti nervis lateralibus 10-11 paribus minus conspicuis 15-35 mm. long. x 8-16 mm. lata.

Inflorescentia corymbosa terminalis oligocephala ramulis pedunculisque alternis erectis albo lanato-arachnoideis bracteis lanceolatis vel anguste linearibus albo-lanatis, 7-5 mm. longis. Pedicelli valde breves, capitulis aglomeratis congestis. Involucrum hemisphaericum 11-12 bracteis acutis 4 mm. long. 2 mm. latis margine scariosis partem superiorem glabris nitidis apice ciliatis, dorso et basim albo floccoso-lanato tomento deciduo tectis. Calyculum 4-5 bracteis anguste linearibus involucro aequilongis vel superantibus. Flores tubulosi hermaphroditi lutei in specimine statu valde juvenile.

xx*Type:* Venezuela: State of Táchira: limestone outcrops of Páramo de Tama, near Colombia-Venezuelan boundary, altitude 3045-3475 meters J. A. Steyermark 57381, collect. jul. 15, 1944. "Shrub 3-4 feet tall; leaves subcoriaceous-chartaceus, deep green and shining above, silvery white below; bracts brown-purple at tip; disk pale greenish." Closely related to *G. ilicifolia* (L.f.) Wedd., but differing from it by its double indument. In addition to the dense tomentum on the lower side, *G. aquifolia* possesses a lax arachnoid pubescence at the end of its branchlets, its inflorescences, and on the young leaves (upper and lower sides), especially on the midrib and margins; this arachnoid pubescence is more or less deciduous. In this species the leaves are more brilliant above, whereas in *G. ilicifolia* they are pruinose; the involucre is shorter and formed by narrow, acute and brilliant bracts,

whose surface can be seen through the thin and deciduous arachnoid tomentum; in *G. ilicifolia* the phyllaries are longer and broader (5 x 3 mm.), and completely covered with a densely compressed and permanent tomentum. The calycle is formed by linear bracts of the same length, or even longer than the involucre. The heads have few flowers, usually 14-16, and always less than 20, while the heads of *G. ilicifolia* have more than 40 flowers.

Gynoxys flexopedes Cuatr., sp. nov.

Arbor terminalium ramis pendulis striatis plus minusve hirsutis.

Folia membranacea opposita subsessilia. Petiolus 4-8 mm. longus hirsutus. Lamina oblongo-elliptica, apice obtusa vel rotundata basi truncata vel cordata, margine integra vel leviter sinuata, 7-18 cm. longa x 3-6.5 cm. lata; supra sparse pilosa viridis nervo medio impresso hirsutulo; infra indumento laxo viridi-cinereo tomentoso.

Inflorescentia cymosae paniculatae pendulae ramis hirsutis tantum basi foliata; ramulis et pedicellis satis gracillibus et flexuosis, capillaribus hirsutulis, 1.5-5 cm. longis bracteatis, bracteis lineari subcapillaribus circiter 4 mm. longis. Involucrum campanulatum 8 bracteis subherbaceis elliptico-acutis, 9-10 mm. longis, 3 mm. latis margine late scariosis, dorso sparse hirsutulis vel glabris. Calyculum nulum.

Corollae exteriores ligulatae paucae, 8-9 mm. longae, tubulo 3.5 mm. longae, lamina tridentata; rami stigmatici elongati acuti. Corollae centrales hermaphroditae 9 mm. long. tubulo 3.5 mm., limbo tubuloso-campanulato, rami stigmatici caudato-penicillati. Achaenia glabra 4.5 mm. longa. Pappus albo lutescens 9 mm. longus.

Type: Colombia, Dep. de Cundinamarca. Páramo de Guasca, 3000-3500 met. alt., 11 oct. 1939 collect. H. García Barriga, No. 08098.

G. flexopedes is closely related to *G. hirsuta* Wedd., but differs from it by the longer and thinner leaves and chiefly by the inflorescences which have extremely long and slender secondary branchlets and pedicels. The involucre and flowers are longer.

Gynoxys verrucosa Weddell var. **grandifolia** Cuatr., nov. var.

Lamina folii late ovato-elliptica margine repando sinuato-dentata, basi asymmetrica cordata vel truncata, apice acuta vel acuminata usque ad 22 cm. long x 12 cm. lat., subtus adpresse cinereo-vel ocharaceo-stellato-lepidota.

Type: Colombia, Dep. Valle. Cordillera Central: Hoya del río Bugalagrande: Cuchilla de Barragán 3250-3270 m. alt., 12-IV-1946 colect. J. Cuatrecasas 20615. "Arbolito 5 met. Tallo 12 cm. diam. o más; corteza 8 mm. grueso, verdoso amarillenta clara y zumosa. Madera blanca que deviene rápidamente algo rosada. Hoja coriácea, flexible, blanda, verdoso amarillenta mate haz, cinérea u ocrácea envés. Involucro verde ceniciento."

This variety is an interesting form of this curious tree, and characterized by its very large, broad, subcordate leaves with deep, irregular and distant teeth. The typical species is well represented in the Herbarium of Chicago Natural History Museum by a photograph of the types, a duplicate type from Linden 1050, and new material from the Barragan region (Cuatrecasas 20147, 20365, 21006).

Senecio Silvani Cuatr., sp. nov.

Arbuscula usque 12 m. alta, caule erecto sursum parce ramoso vel simplici valide herbaceo medulla molle.

Folia alterna firme subcoriacea. Petiolus plerumque 10 cm. longus robustus supra glabrescens profunde sulcatus marginibus involutis, infra striolatus tomentosus, basi vaginantus. Lamina elliptica vel ovato-elliptica apice attenuata acuta, basi asymmetrica truncata vel subattenuata vel subcordata, in caule primario magna usque 65 cm. longa x 24 cm. lata interdum etiam ultra, in ramis secundariis sub inflorescentiam plus minusve 28-30 cm. longa x 12-15 cm. lata; margine argute dentata dentibus callosis robustis majoribus et minoribus alternantibus; supra in juvenilibus sparse arachnoideo tomentosula, deinde glabra viridula nitida rugulosa, costa crassa convexa nervis lateralibus perpendicularibus vel angulo obtusissimo, in folia maxima 43-44 utroque latere, in folia minima 33-34, reticulo venulorum signato; subtus densissime lanato-tomentosa costa crassa valde eminenti nervis secundariis prominulis ultra dimidiam partem plus minus furcato-divaricatis, marginem versus laxe anastomosantibus, reliquis venulis inconspicuis.

Panicula terminalis maxime evoluta basi foliosa axe robusto et ramis striatis tomentulosis, bracteis inferioribus et medianis foliaceis sublandeolatis superioribus linearibus subulatis 15-3 mm. longis. Pedicelli tenues erecti vulgo 1 cm. long. subhirto tomentulosi apice 4-6 bracteolis linearibus calyculum formantibus.

Capitula creberrima radiata erecta vel nutantia. Involucrum campanulato-hemisphaericum 11-13 bracteis ovato acutis, 4-4.5 mm. long. x 2-3 mm. lat., dorso glabris apice pilosiusculo. Receptaculum 3 mm. diam. marginibus alveolorum denticulatis. Ligulae circa 10 luteae glabrae tubulo 2.5 mm. long. lamina elliptico oblonga tridentata 6.5-7 mm. longa x 2.5-3 mm. lata 4 nerviis. Flores centrales hermaphroditi 40-46, corolla tubuloso-campanulata 4.5-5 mm. long. 5-dentata, tubulo 1.5 mm. longo. Pappus sordido-albidus 5 mm. longus; achaenia paulo striata 1.8 mm. longa. (Figs. 1, 2 and 3)

Type: Colombia, Dep. Valle. Cordillera Occidental, Los Farallones, "Almorzadero," bosques 2950 met. alt. 25 jul. 1946 colect. J. Cuatrecasas 21698. "Arbolito, varas erguidas poco ramificadas en el extremo, hasta 12 met. alt. Hoja coriácea, rugosa, verde clara cenicienta envés. Ramas de la inflorescencia verde claras. Corolas amarillas."

Additional specimen examined: Dep. El Valle: Los Farallones, Almorzadero, bosques 2980 m. alt. colect. 13 oct. 1944 J. Cuatrecasas 18114. "Arbolito 4-10 met. Tallo indiviso. Hojas grandes terminales

en penacho, alternas (ejemplares mutilados presentan ramificaciones)."

This species is well characterized by the size, shape and indument of the leaves which are densely tomentose underneath. The upper side is glabrous, or provided with small isolated short and smooth hairs. Because of their large size, the plant and its inflorescence are very showy in the forest. *G. Silvani* is related to *S. lloensis* Hier., *S. Dielsii* Domke, *S. sibundoyensis* Cuatr., and *S. ingens* Benoist. It differs from *S. lloensis* Hier. by its sharper and deeper leaf teeth, smaller heads and involucres, and smooth branchlets and leaves. From *S. Dielsii* it differs by the acute, narrow and separated leaf teeth, the lack of rough tubercules above, more numerous and open nerves, and its shorter involucre. By its smooth leaves it differs also from *S. sibundoyensis*. The size and structure of its heads and the indument of its leaves differentiate it from *S. ingens*. Another closely related species, *S. tipocochensis* Domke, has crispate hairs on the branchlets, inflorescences, and smaller flowers. The leaves of *S. Silvani* are extraordinarily large, a character which distinguishes this species from all others.

Fig. 1 *Senecio Silvani* Cuatr.

Fig. 2 *Senecio Silvani* Cuatr.

Senecio moscopanus Cuatr., sp. nov.

Arbor 10 met. alta sursum parce ramosus, ramis striatis glabrescentibus.

Folia subcoriacea alterna petiolata. Petiolus crassus, 7-10 cm. longus supra profunde sulcatus glabrus subtus farinaceo-araneosotomentosus, basim versus subito et ample auriculato-vaginatus auriculis foliaceis rotundatis vel ovatis usque 4 cm. longus x 1.5 cm. latus. Lamina elliptico-lanceolata oblonga basi sub-trundata vel rotundata petiolum anguste decurrens, apice attenuata acutissima, margine minute dentata dentibus 1 mm. callosis obtusiusculis, 35-40 cm. longa x 13.5-14 cm. lata; supra glabra lutescenti-viridis nervo medio crasso eminenti, nervis secundariis perpendicularibus utroque latere 36-40 plus minusve brachiatis marginem versus in reticulo anastomosantibus, reticulo venulorum signato; subtus indumento araneoso-farinaceo cinereo valde tecta, nervo medio valde prominenti et secundariis signatis sed nervulorum reticulo inconspicuo.

Paniculae terminales vel axillari-subterminales magnae foliosi apicem versus magnitudine folia decrescenti; ramis striatis parce pubescentibus. Bracteae ramusculorum lineares subulatis 2-6 mm. longae. Pedicelli 4-10 mm. longi bracteolulati apice aliquibus bracteis linearibus vel lineari-lanceolato-acutis instar calyculum.

Capitula erecta vel inclinata radiata. Involucrum hemisphaericum 13 bracteis ovato acuminatis, 3.5-4 mm. longis 1.5-2 mm. latis, margine scarioso apicem versus ciliatis, dorso minute calloso-tuberculatis. Receptaculum 2 mm. diametiens marginibus alveolorum dentatis. Flores exteriores feminei 8-10 lutei ligulati, corollis tubulo 3 mm. longo, lamina elliptico oblonga 7-8 mm. longa 2 mm. lata, 4 nerviis apice

minute tridentata. Flores centrales hermaphroditi, corolla lutea tubuloso-campanulata 5 mm. longa 5-dentata dentibus triangularibus tubulo 2 mm. long. Antherae 1.8 mm. long. Stigmata truncata. Ovarium glabrum. Pappus albidus 4 mm.

Type: Colombia, Dep. Cauca. Cordillera Central, region de Moscopán: Aguabonita, bosques 2280 m. alt., 30 enero 1947 colect. J. Cuatrecasas 23512. "Arbol 10 met. Hoja flexible verde amarillenta haz, cenicienta envés."

This species differs from the preceeding *(S. Silvani)* and other related species by the size of its heads and flowers, by its leaves with their very large auricles at the base of the petiole, and by the cinereous tomentum giving the lower sides of its leaves a farinaceous appearance.

Fig. 3 *Senecio Silvani* Cuatr., natural habitat in the forest of the eastern slopes of "Los Farallones de Cali", at 2950 m.h.

Senecio Arboluco Cuatr., sp. nov.

Arbor 5 met. alta caule herbaceo-valido 8 cm. diametro sursum mamagis folioso.

Folia alterna petiolata subcoriacea. Petiolus 8-11 cm. longus, robustus striatus, supra canaliculatus anguste membranaceo marginatus margine involuta valde tomentosus. Lamina elliptico lanceolata vel elliptico oblonga, basi plus minusve inaequilatera rotundata, apicem versus angustata acuta vel acuminata, margine minute et argute dentata dentibus 1 mm. callosulis acutiusculis; 36-42 cm. longa x 11.5-16.5 cm. lata; supra lutescenti-viridis subnitida, leviter ruguloso reticulata sparsissime minutis pilis munita costa crassa pubescenti, nervis lateralibus subperpendicularibus 37-40 paribus signatis puberulis; subtus dense tomentosa tomento albido spisse intricato arachnoideo, nervo medio valde prominenti secundariis prominulis.

Panicula corymbosa terminalis, cum 6-8 robustis ramis 40-60 cm. longis foliorum superiorum axillaribus composita. Ramis ramulisque sparse arachnoideo-tomentulosis, bracteis inferioribus foliosis 8-20 cm. long., 1-5 cm. latis, petiolatis, supra sparse arachnoideo-tomentosis; supremis linearibus subulatis 6-2 mm. longis. Pedicelli 3-10 mm. erecti hirto-tomentosuli bracteolati, apice 3-4 bracteolis 1-2 mm. longis instar calyculum muniti. Capitula hemisphaerica erecta, radiata. Involucrum pallido-viride 11-12 bracteis ovalis acuminatis 3-3.5 mm. long. x 1,5-2 mm. lat. apice ciliatis dorso sparse pilosis. Receptaculum 1.8 mm. lat. Flores radii 8 feminei ligulati; corolla flava tubulo 3 mm. longo lamina elliptica 6.5 mm. longa 2 mm. lata 6-8 nervis minute 3-dentata; rami stigmatici obtusi. Flores disci hermaphroditi 36-40; corolla tubuloso-infundibuliforme lutea 4,5 mm. longa. Pappus 4 mm. long., sordide albidus.

Type: Colombia, Dep. Cauca. Cordillera Central; Cabeceras del río Palo: Quebrada de Santo Domingo, bosques 2700-2800 m. alt. dic. 1944 colect. J. Cuatrecasas 19216. "Arbolito 5 met. Tallo 8 cm. diam. Inflorescencias terminales en panículas corimbosas 50 x 60 cm. o mas, con 6-8 ramas axilares de hojas bracteales grandes superiores (40-30 cm. long.). Hojas más abundantes en la parte superior, subapenachadas, verde amarillento semibrillante haz, blanquecino tomentoso envés. Invólucro verde claro. Lígulas y flósculos amarillentos, nombre local "Arboluco de montaña."

This species, close to the two preceding ones, differs from them by the form of its leaves, the smaller size of its flowers and heads, and by the ligules generally marked by 8 nerves. *S. tipocochensis* Domke has even smaller heads.

Senecio balsapampae Cuatr., sp. nov.

Arbor 8 met. alta parum ramosa. Rami terminales striati pubescenti-hirsutuli.

Folia subcoriacea alterna petiolata. Petiolus circa 6 cm. longus supra sulcatus. Lamina usque 40 cm. longa x 10 cm. lata oblongo lanceolata basi subrotundata apice acutissime acuminata margine dentato-serrata dentibus majoribus minoribusque alternantibus; supra viridis rugulosa sparse puberula subnitida nervo medio crasso tomentuloso, subtus viridi-cinereo-tomentosa tomento arachnoideo tecta costa valde prominenti rubescenti nervis secundariis utroque latere 40 rubescentibus angulo valde obtuso marginem versus brachiatis anastomosantibus.

Inflorescentia terminalis corymboso paniculata, ramis rubro violaceis puberulis bracteis linearibus 5-6 mm. longis. Pedicelli tenues breves 1-4 mm. longi bracteolati.

Capitula parva plus minusve nutantia 3-5 ad apicem ramusculorum glomerata. Calyculus 4-5 bracteolis anguste linearibus brevibus. Involucrum hemisphaerico-campanulatum 13 bracteis 3.5 mm. longi oblongis apice acutissimis ciliatis margine scariosis dorso glabris. Receptaculum 2 mm. diam. leviter alveolatum. Flores radii feminei praecipue 8 tubulo 1.5 mm. longo lingua linearis 4 mm. longa. Flores disci hermaphroditi 26-30 corola tubulosa lutea 4.5 mm. longa. Pappus sordide albidus 4.5 mm. long.

Type: Ecuador: W. Cordillera above Balsapampa, 2600 met. alt. Forest tree 8 m. high little branches, colect. Oct. 1934, Dr. A. Rimbach, No. 240.

Closely related to *S. tipocochensis* Domke, *S. balsapampae* differs from it by slightly larger heads, glabrous backs of the phyllaries, short pedicels bearing glomerate heads in groups of 3-5, small ligules, the shape of the leaves, and by the lax pubescence on the lower side of the leaves. In addition, the branchlets of the inflorescences and nerves of the leaves are reddish.

Senecio Pururu Cuatr.. sp. nov.

Frutex altus. Rami terminali cortice rugoso, foliorum cicatricibus impressis, hirtuol-tomentoso.

Folia charthacea alterna petiolata. Petiolus 5-7 cm. longus (et fortasse longior) hirto-tomentoso supra valde sulcato. Lamina elliptico-lanceolata basi rotundata apicem versus attenuata et acuta, margine minute dentata dentibus 1 mm. acutiusculis parce callosis; supra viridis subnitida sparsis pilis minutis crassis applicatis substrigosis munita, nervo medio valde signato tomentoso nervis lateralibus 33 utroque latere angulo quasi recto signatis; subtus dense tomentosa virido-grisacea, nervo medio crasso prominenti nervis lateralibus elevatis, furcato ramificatis anastomosantibus, reliquis nervulis venulisque reticulum cum tomento velatum formantibus. Lamina (unici folii speciminis nostrum) 28 cm. longa x 9 cm. lata et verossimiliter valde major.

Panicula terminalis inferne foliosa; ramis axeque robustis rubescentibus leviter striatis tomentulosis. Bracteolae lineares 20-2 mm. long. Pedicelli 1-10 mm. longi tenues rigidi tomentulosi bracteolati.

Capitula hemisphaerica radiata. Calyculus 4-6 bracteolis lineari lanceolatis, 2-3 mm. longis. Involucrum 12-13 bracteis lanceolatis 5 mm. longis, 1-2 mm. latis, margine scariosis dorso leviter tomentulosis. Flores feminei radii 12-15 corolla ligulata 6 mm. longa, tubulo 1.5 mm. longo, lamina anguste elliptica, bidentata. Flores centrales hermaphroditi 4-4.5 mm. longi lutei tubulo 2 cm. limbo ampliato quinquedentato. Ovarium glabrum. Pappus sordide ochraceo-albidus.

Type: Ecuador, prov. Santiago-Zamora: dense forest between Campanas and Arenillas, along rio Tintas, 10 leagues southeast of El Pan, altitude 2195 met. Collect. Julian A. Steyermark 53544 July 13, 1943. "Shrub 10 feet tall, flowers yellow, leaves grayish below, common name "pururu."

This plant is related to *S. sibundoyensis* Cuatr. and *S. Dielsii* Domke. In addition to a remarkable difference in the indument of the upper and lower sides (less rough) of the leaves, *S. pururu* is distinguished by the structure of the much smaller heads. The specimen collected by Steyermark has heads of variable size, some of which are very large and deformed, possibly as a result of insect attacks.

Senecio bugalagrandis Cuatr., sp. nov.

Herba robusta 2 metralis. Folia alterna petiolata crasiusculo-herbacea. Petiolus longus robustus crassus 10 cm. longus plus minusve pilosus supra sulcatus margine involutus subtus striolatus. Lamina rhomboideo-ovata basi rotundato-cordata apice triangularis acuta margine repando sinuata utroque latere supra mediam partem uno lobo triangulari eminenti; supra glabra viridis subnitido nervo medio impresso, nervis lateralibus distantibus plus minusve brachiatis anastomosatis; subtus viridis parcissime arachnoideo-pubescenti costa crassa eminenti nervis secundariis prominulis, reliqua tenuiter laxissime reticulata.

Panicula corymbiformis terminalis ampla ramis glabris sed sursum parce tomentuloso-puberulis. Bracteae lineares subulatae, 2-3 mm. longae, ramuli erecti. Pedicelli tenues erecti 3-10 mm. longi 2-3 bracteolati, apice ad instar calyculum 4-5 bracteolis 1-2 mm. longis, pilis crispis vestitis.

Capitula erecta vel inclinata radiata. Involucrum pallido viride campanulatum 8 bracteis 9 mm. long. x 2 mm. lat., lineari ellipticis margine scariosis apice obtusiusculis ciliatis, reliquis glabris sed tenuissime tomento arachnoideo deciduo. Flores exteriores feminei ligulatae 2-4 corolla lutea tubulo 6 mm. longo lamina elliptica 8-nerviis 4.5 mm. longa x 2 mm. lata. Flores centrales hermaphroditi 7-8. Corolla lutea 6-7 mm. longa, tubuloso-infundibuliformis tubulo 3 mm. longo dentibus anguste triangularibus. Rami stigmatici truncati. Pappus albidus 7 mm. long. Ovarium glabrum.

Type: Colombia, Dep. Valle. Cordillera Central. Márgenes del río Bugalagrande, entre El Puente y Las Salinas, 2000 m. alt., 27-III-1946 colect. J. Cuatrecasas 20486. "Hierba de 2 met., robusta. Invólucro herbáceo, verde claro. Hoja semibrillante, crasiúscula, Corolas amarillas."

Among the herbaceous *Senecios* this species is remarkable because of its large size, the shape of the inflorescence and the structure and size of its heads.

Senecio silvascandens Cuatr., sp. nov.

Frutex plurimetralis caule valido scandenti ramis foliosis floriferisque supra ramorum silvam evolutis. Rami curvati teretes badi peridermato-squamosi.

Folia crasso-coriacea alterna petiolata. Petiolus 15-20 mm. longus basi incrassatus glaber. Lamina elliptico-oblonga vel ovato-elliptica basi cuneata apice attenuata acuta margine integra plana vel in sicco anguste revoluta, 11-15 cm. longa x 5-7.5 cm. lata, utrinque glabra viridis et nitida; costa crassa supra sulcata subtus valde eminenti, nervis lateralibus utroque latere 6-8 arcuato ascendentibus apicem versus plus minusve anastomosatis; reliquis conspicuis nervulis leviter et laxe reticulatis.

Inflorescentiae corymboso-paniculatae terminales et axillares axe robusto et ramulis erectis vel erecto-patulis, plus minusve striatis et pubescentibus, parum arachnoideis. Bracteae inferiores subfoliaceae lamina viridis elliptico-lanceolata 5-1 cm. long. 20-4 mm. lat., superiores subulatae parvae. Pedicelli 4-14 mm. long., erecti 3-8 in terminalibus ramusculis graciliter corymbosi dispositi arachnoideo-pubescenti plurimis bracteolis 2 mm. long. lanceolatis apice scariosis acutiusculis plus minusve lacerato-ciliatis muniti. Calyculum saepe 5 bracteolis.

Capitula erecta vel inclinata radiata. Involucrum hemisphaerico-campanulatum viride 13 bracteis oblongis apice acutis 4.5 mm. longis, 2 mm. latis margine scariosis dorso sparse arachnoideo-puberulis apice plus minusve ciliatis. Receptaculum 1.5 mm. latum longe fimbriatum. Flores radii feminei ligulati plerumque 8 corolla lutea tubulo 3 mm. longo lamina elliptica bi-tridentata 3.5-4 mm. longa 2 mm. lata 4-nerviis. Flores centrales hermaphroditi 30-34 corolla tubulosae 6 mm. longa glabra lutea tubulo 2.5 mm. longo 5-dentatis dentibus triangularibus elongatis 1 mm. longis. Antherae 2 mm. longae. Ovarium glabrum. Pappus albo-sericeus 5 mm. longus.

Type: Colombia, Dep. Valle. Cordillera Occidental, filo de la Cordillera: Mares, 1970-2000 m. alt., 13-III-1947 colect. J. Cuatrecasas 23768. "Bejuco. Hoja gruesa coriácea, crasiúscula, verde brillante haz y envés. Invólucro verde. Flósculos y lígulas amarillos."

Additional specimens examined: Dep. Cauca, Cordillera Central; región de Moscopán: Hoya del río San José, Aguabonita, bosques 2280 met. alt. colect. I-1947 J. Cuatrecasas 23541. "Gran bejuco.

Ramas hojosas y floríferas aglomeradas encima de los árboles. Invólucro verde. Corolas amarillas." This plant has a little smaller heads than the type and the leaves are larger (18 x 8.5 cm.). Dep. Valle, Cordillera Occidental; Hoya del río Dígua, lado izquierdo del río San Juan en la región de Queremal, 1350-1400 met. alt., Quebradita del km. 51, colect. 25-II-1947 J. Cuatrecasas 23696. "Bejuco robusto. Hoja subcoriácea verde clara. Invólucro verde. Corola amarilla." This specimen has rotundate leaves at the base and narrower phyllaries and ligules than the type.

Senecio silvascandens is related to *S. huilensis* Cuatr., *S. Aschersonianus* Hier. and *S. Magnusii* Hier. It can be distinguished by the involucre with its 13-14 phyllaries, the fimbriate receptacle, the larger number of flowers in each head, the smaller size of the flowers, the large, glabrous leaves and by the arachnoid pubescence of the branchlets of the inflorescence.

Senecio bejucosus Cuatr., sp. nov.

Frutex validus plurimentralis caule et ramis scandentibus. Rami curvati striolulati minute tomentulosi.

Folia subcoriacea crassiuscula alterna petiolata. Petiolus 2.5-4 cm. longus supra sulcatus puberulo-tomentulosus tenuis basi incrassatus. Lamina ovalis basi rotundata apice acutata vel acuminata margine laevis et plana, 10-15 cm. longa x 6-9 cm. lata, utrinque pallido viridis, pilis minutis simplicibus vel furcatis sparsissime munita nervo medio puberulo nervis secundariis 7-10 utraque latere ascendentibus notatis; subtus magis prominentibus, nervorum reticulo laxo vix conspicuo.

Inflorescentiae paniculatae axillares et ad terminationem ramorum valde evolutae, axe ramulisque striatis viridis puberulo-tomentulosis, inferne bracteis foliis simillimis sed minoribus superne bracteis lanceolatis 5-20 mm. longis herbaceis. Pedicelli 5-10 mm. longi 1-2 bracteolis muniti, teneres praecipue flexuosi apice 2-4 bracteis 1-2 mm. longis instar calyculum.

Capitula nutantia vel cernua raro erecta heterogama discoidea. Involucrum campanulatum 8 bracteis glabris 2-seriatis 4 exterioribus lineari-ellipticis acutis 5.5 mm. long. 1.5 mm. latis, 4 interioribus 5.5 mm. longis x 3 mm. latis ellipticis acutis margine valde scariosis; interdum bracteis per pares coalitas involucrum asymmetricum 6-5 vel 4 partibus formantibus. Receptaculum 2 mm. marginibus alveolorum denticulatis. 28-32 lutei. 2-8 flores exteriores feminei corolla tubulosa 5 mm. longa teneri apice 3-5 dentibus asymmetricis dispositis stili non superanti. Flores disci hermaphroditi corolla 6 mm. longa, tubulo 3 mm. limbo campanulato 5 dentibus 1 mm. longis. Rami stigmatici truncati. Ovarium glabrum. Pappus albidus 5 mm. longus.

Type: Colombia, Dep. Valle. Cordillera Occidental: Hoya del río Cali, vertiente izquierda del rio Pichindé, El Cairo 2100-2180 met. alt., 6 agosto 1946 colect. J. Cuatrecasas 21970. "Gran bejuco.

Hoja crasiúscula flexible verde clara. Invólucro verde. Corolas amarillas. Invólucro 7 mm. long. 4.5 mm. diám."

Senecio bejucosus Cuatr. var. **lancifolius** Cuatr., nov. var.

Folia ovato-lanceolata 13-15 cm. longa x 4.5-6 cm. lata, longe attenuata acuta.

Type: Colombia: Supatá. San Francisco Road (Cundinamarca) alt 2000 met. alt. "Slender climber with pendant shoots to 5 m. long. Leaves smooth, thick. Inflorescence very showy, heads bright yellow, but not lasting long." Collect. Haught 6125.

S. bejucosus differs from all other climbing species of *Senecio* by the scarce indument of the leaves and branches, the broad phyllaries, the inconspicuous tubular female flowers, the flexuose pedicels and long petioles.

Senecio vallecaucanus Cuatr., sp. nov.

Frutex scandens caule valido ramis robustis striato-sulcatis punctato-cicatricosis et sparse puberulis.

Folia subcoriacea rigida alterna petiolata. Petiolus robustus 3.5-5.5 cm. longus supra late sulcatus subtus teretis glabris. Lamina ovato-elliptica vel elliptica saepe curvato-asymmetrica basi rotundata vel subcordata apice acuta vel apiculata, 24-32 cm. longa x 11-13 cm. lata, margine argute dentata dentibus 1 mm. profundis 2 mm. distantibus paulo callosis et margine revolutis; supra griseo-viridis opaca nervato-rugoso nervo medio sparse piloso reliqua glabra; subtus pallido-viridis sparsissime et tenuissime arachnoideo pilosa, valde nervosa costa crassissima eminenti nervis secundariis utroque latere 20-24, prominentibus extremum versus vel partem mediam furcato-anastomosantibus inter nervos laterales prominulum reticulum venulis venulosisque formantibus.

Inflorescentiae thyrsoideo-paniculata terminales exfoliatae valde evolutae (50-60 cm. longae) vel axillares foliam longitudinem non superantes. Pedunculus paniculae viridis axillaris robustus 8-11 cm. longus striatus parce pilosus; parte floriferae 12-22 cm. longae ramusculis viridibus erectis pubescentibus bracteis lanceolato-linearibus inferioribus 4-5 cm. longis 3-5 mm. latis superioribus anguste linearibus longis flexuosis 1.5-2 cm. longis. Pedicelli racemiformes dispositi, erecto-patuli rigidi hirtuli 7-8 bracteatis bracteolis flexuoso-intricatis superioribus 3-4 ad instar calyculum.

Capitula discoidea heterogama 21-23 floribus. Involucrum campanulatum 8 bracteis lanceolatis elliptico-lanceolatis vel ovato-lanceolatis, 10 mm. longis 2-3.5 mm. latis margine late scariosis dorso viridibus apice acuto ciliolulatis. 2-4 flores exteriores feminei, corolla lutea brevissime ligulata tubulo subcapillari 5 mm. longo limbo angusto ligulato 3 mm. longo vel subcapillari-tubuloso 4-5 profunde fisso 8 mm. long.; rami stigmatici obtusi. Flores disci hermaphroditi corolla lutea

tubulo 5.5 mm. longo limbo campanulato 4 mm. longo dentibus 1.2 mm. profundis. Rami stigmatici truncati et subconico apiculati ciliati. Achaenia costata fusiformia 5 mm. longa. Pappus 8.5 mm. longus palleo-albidus.

Type: Colombia, Dep. Valle. Cordillera Occidental; Los Farallones, Alto del Buey, bosques 3450-3300 m., 13 oct. 1944 colect. J. Cuatrecasas 18062. "Gran bejuco. Hoja grande, subcoriácea, rígida, muy nervuda, verde grisáceo mate haz, claro envés. Ramillas inflorescencias verdes. Involucro verde."

This species of *Senecio,* though heterogamous and practically discoid, is distinguished from all other climbing and discoid species of the genus by the shape of the large leaves which are strongly reticulate and rugose, the large inflorescence, the large linear flexuose curly intricate bracteoles at the pedicels, branchlets and calycle. *S. aberrans* Greenm., described as an erect shrub, has radiate heads with 13 phyllaries and different leaves. *S. Pennellii* Greenm., too, has radiate but smaller heads. *S. vallecaucanus* has a remarkable stigma, that is, truncate at the margin and conical in the center, as described by Greenman for *S. aberrans.* This character and the linear flexuose bracteoles are reminiscent of some *Gynoxys* species, e.g., *S. perbracteosa* and related ones.

Senecio vallecaucanus Cuatr., var. **corralensis** Cuatr., nov. var.

Differt: folia minora vulgo 18 x 7 cm., margine dentibus angustioribus, infra magis arachnoideo-tomentulosa. Rami ramulique inflorescentiae pubescenti-tomentulosi. Capitula et flores parce breviores. Bracteae 8.5 mm. long. Corolla disci 8 mm. longa.

Type: Colombia, Dep. Valle. Cordillera Central; Hoya del río Bugalagrande, Barragán: Páramo de Bavaya, Corrales 3450-3520 met. alt. colect. III-1946 J. Cuatrecasas 20153. "Gran bejuco. Hoja semicoriácea, crasa, verde oscura rugosa semibrillante haz, verde clara envés. Involucro verde. Corolas amarillas."

Senecio calianus Cuatr., sp. nov.

Frutex plurimetralis caule robusto scandenti. Rami ochraceo-brunnei terminales virides glabri leaves.

Folia coriacea alterna petiolata utrinque pallido viridia glaberrima. Petiolus 5-10 mm. longus subteres. Lamina elliptica 6-11 cm. longa x 2.5-3.8 cm. lata basi cuneata apice acuta vel acuminata margine anguste revoluta costa supra crassiuscula subtus valde prominenti, nervis secundariis distantibus 7-8 paribus plus minusve angulo 45°, utrinque signatis sed apicem versus minor prominulis tenuibus anastomosantibus inter eos tenuissimis venulis anastomosatis minutum conspicuum reticulum formantibus.

Paniculae corymbosae terminales, ramis ramulisque subglabris, sparse et minute puberulis. Bracteae inferne foliosae sessiles parvae, superne lineari-lanceolatae acutissimae, 3-1.5 mm. longae. Pedicelli

teneres erecto-patuli 2-10 mm. long., puberuli bracteati ad apicem 3-5 bracteis lanceolatis minutis ad instar calyculum. Capitula radiata 20-22 floribus erecta vel inclinata. Receptaculum 2 mm. diam. leviter alveolato-dentatum. Involucrum campanulatum viride 8 bracteis elliptico-linearibus acutis glabris margine scariosis 5.5-6 mm. longis, 2 mm. latis. Flores feminei exteriores ligulati, corolla lutea tubulo angusto 5 mm. longo lamina elliptica 2 mm. longa 1-1.5 mm. lata minute tridentata. Flores centrales hermaphroditi corolla lutea 6 mm. longa tubuloso-infundibuliformi limbo profunde 5-partito. Rami stigmatice truncati. Achaenia striata 1.7 mm. long.

Type: Colombia, Dep. Valle. Cordillera Occidental: La Cumbre, entre residuos de monte 1680 m., febr. 1945, J. Cuatrecasas 19616. "Bejuco grande. Hoja coriácea verde claro. Involucro verde. Corola amarilla."

This species is easily confused with *S. ellipticifolius* Hier. I checked it with an isotype in the Herbarium of Chicago Natural History Museum (Lehmann 8508) and I found that it is readily distinguishable by its coriaceous leaves. They are minutely reticulate, unlike the leaves of Lehmann's plant despite Hieronymus' description ("inter nervos laterales reticulato-venosis venulosisque venis venulisque utrinque parum conspicuis vix in sicco prominulis.")

Senecio Haughtii Cuatr., sp. nov.

Frutex scandens ramis pallido-brunneis subteretibus glabris.

Folia membranacea alterna petiolata utrinque viridia laevia et glabra. Petiolus 10-15 mm. longus tenuis basi incrassatus. Lamina obovato-elliptica apice obtusa vel subrotundata basim versus attenuata cuneata margine laevis et minute revoluta, costa crassiuscula utrinque prominenti, nervis secundariis inmersis levissime conspicuis 6-7 utroque latere tenuibus ascendentibus inter eos venulis reticulatis fere inconspicuis; 4-7.5 cm. longa x 1.8-3.2 cm. lata.

Paniculae terminales corymbiferae ramis ramulisque glabris ascendentibus, basi folioso-bracteatae sursum bracteis ellipticis vel lanceolatis 8-4 mm. longis munitae. Pedicelli 3-8 mm. longi erecti vel patuli levissime puberuli, aliquibus minutis bracteolis lineari-lanceolatis amplectentibus ferenti; 2-3 bracteolis superioribus vix calyculum formantibus. Capitula radiata erecta vel nutantia. Involucrum cylindricum 8 bracteis linearibus 8.5-9 mm. longis 2.5 mm. latis margine scariosis dorso viridibus apice acuto subciliolato. Flores exteriores feminei 5 ligulatae, corolla aurea tubulo angusto glabro 6 mm. longo, lamina late lineari-elliptica 8 mm. longa 2.5-3.5 mm. lata apice obtusa 3-dentata, 5-6 nerviis; stylus brevis ramis stigmaticis obtusis glabris. Flores centrales hermaphroditi 10, corolla tubulosa lutea 10 mm. longa tubulo angusto 5 mm. longo, limbo infundibuliformi apice 5-lobato dentibus 1 mm. profundis triangulare-elongatis. Antherae 3 mm. longae. Rami stigmatici lutei truncati papillosi. Ovarium glabrum. Pappus albo-sericeus 9 mm. longus.

Type: Colombia, Dep. Cundinamarca. Ubaté-Carupa Highway, alt. 2800 met., colect. Oscar Haught 6173, Sept. 14, 1947. "Stem soft, flexible, very tough. Leaves smooth, rather thick. Heads showy, bright yellow."

This species is closely related to *S. sylvicola* Greenman but differs from the latter by its smooth leaves with inconspicuous nerves, the practically glabrous inflorescence, the bright yellow corollas, and the longer involucre and flowers.

Senecio vulpinaris Cuatr., sp. nov.

Caulis scandens ramis curvatis rubescenti-viridis striatis parce araneoso-puberulis.

Folia membranacea alterna petiolata. Petiolus 12-25 mm. longus tenuis rigidus supra sulcatus basi vaginantis, leviter araneosis. Lamina ovato-acuminata basi rotundata vel subcordata apice acutissima, 5-9 cm. longa x 2.5-5 cm. lata; margine tenuissime revoluta repando denticulata dentibus minutis 0.6-0.8 mm. longis 3-6 mm. inter eos distantibus; supra viridis laevis glabra; subtus plus minusve puberuli-arachnoidea nervo medio prominenti nervis lateralibus 5-6 utroque latere valde ramificatis in prominulo venulorum reticulo anastomosatis.

Paniculae terminales usque ad 20 cm. longae et axillares (9-10 cm.); ramis ramulisque rubescenti-viridibus striolatis sparse araneosis, bracteis inferioribus foliaceis superioribus lanceolatis vel linearibus rubescentibus plus minus puberulo-araneosis 12-6 mm. longis. Pedicelli 4-8 mm. longi tenues erecto-patuli 2-5 bracteis ornatis et ad apicem 4-5 bracteolis linearibus vel lanceolatis 2-4 mm. longis ad instar calyculum instructi. Capitula patula heterogama. Involucrum campanulatum 8 bracteis elliptici-lanceolatis 6 mm. long. x 1.5-2.5 mm. latis margine scariosis dorso viridibus leviter puberulo-araneosis vel glabris sed apicem versus ciliolatis. Flores feminei exteriores ligulatae corollae tubo 1.5 mm. longo lamina linearis 4 mm. longa apice tridentata. Flores centrales hermaphroditi corolla lutea tubuloso-infundibuliformis 6 mm. longa. Ovarium glabrum. Pappus albidus 5.5 mm. longus.

Type: Venezuela: State of Lara between Buenos Aires and Páramo de las Rosas, altitude 2285-3290 meters. Collect. Julian A. Steyermark 55432, febr. 11, 1944 "bejuco de zorro." "Climbing; involucre pale green."

Senecio vulpinaris can be differentiated from *S. serratifolius* Klatt by its shorter ligules and heads, the shape and consistency of the leaves, and other characters. The same differences distinguish them from both the other climbing and discoid species, or those with short ligulate flowers.

Senecio ptarianus Cuatr., sp. nov.

Frutex scandens. Rami cortice peridermato-squamosa ochraceo-badii, terminali viriduli plus minusve striati minute et sparse puberuli.

Folia alterna petiolata subcoriacea. Petiolus 1-2 cm. long. sparse puberulus supra sulcatus basi incrassatus erectus vel basim versus curvatus retrorsus. Lamina late ovalis inaequilatera basi cuneata vel rotundata apice acuta vel acuminata vel rotundata obtusa utrinque glaberrima margine laevis angustissime revoluta; nervo medio supra signato subtus prominenti nervis lateralibus utroque latere 4-6, arcuatis ascendentibus marginem versus anastomosantibus reliqua superficie laevi nervulis venisque inmersis parum conspicuis; 7-12 cm. long. x 4.5-9 cm. lata.

Inflorescentiae axillares (quam foliam paulo superantes) et terminales corymboso-paniculatae, axe tantum tercio superiore ramificato, ramulis pedunculisque pallide viridibus breviter puberulis. Bracteae lanceolatae 6-3 mm. longae. Pedicelli subtenues recti vel curvati aliquibus bracteis muniti vel ebracteatis 2-3 superioribus vix calyculum formantibus. Capitula nec numerosa angusta cylindraceae erecta vel inclinata discoidea heterogama. Involucrum cylindricum 8 bracteis late linearibus acutis albido viridibus margine scariosis 7 mm. longis 2 mm. latis parce puberulis. Flores 9-12, 1-2 exteriores feminei, corolla 6 mm. longi tubulo capillari 3 mm. longo minute puberulo limbo angustissime 3-laciniato 2.5-3 mm. longo stigmatis subconica. Flores centrales hermaphroditi corolla lutea 7.5 mm. longa tubulo angusto 4 mm. longo minute puberulo limbo subcampanulato profunde 5-dentato lobulis triangulari-elongatis 1.5 mm. longis; stigmata obtusa truncatula. Ovarium glabrum. Pappus sericeus 7 mm. longus.

Type: Venezuela, State of Bolívar. Ptari-tepui, on densely forested steep south-facing slopes overlying sandstone between "Cave Rock" and base of high sandstone bluffs, altitude 2285-2405 meters, collect. Julian A. Steyermark 59567, oct. 30, 1944.

Related to *Senecio cucullatus* Klatt, *S. ptarianus* can be distinguished from the former by the larger, ovoid and nearly orbiculate leaves, short pedicels, smaller heads, shorter (7 mm. not 9 mm. long) but somewhat pubescent phyllaries, 1-2 female flowers which are not really ligulate and the pubescent corolla tube.

Senecio cobrensis Cuatr., sp. nov.

Frutex scandens plurimetralis. Rami terminales volubili viridogrisei peridermato-squamosi.

Folia crassa subcoriacea alterna petiolata. Petiolus usque ad 3 mm. longus supra sulcatus glaber erectus vel basi curvatus. Lamina ovoidea vel elliptico ovata basi cuneata apice attenuata acuta margine integerrima in sicco anguste revoluta, utrinque glabra et laevis nervo medio subtus valde prominenti secundariis utroque latere 5 curvato ascendentibus parum conspicuis reliquis inmersis vix conspicuis, 5.5-8 cm. x 3.2-4.5 cm. lat.

Inflorescentiae in corymbis ramulorum terminales subsimplices pauce capituliferae basi foliosae. Pedicelli longissimi tenues sed robusti erecti 2-3.5 cm. longi glabri 3-5 bracteolis linearibus acutis

7-3 mm. longis munitis, apice 2-3 bracteolis simillimis ad instar calyculum.

Capitula radiata erecta. Receptaculum 2.5 mm. diam. margine alveolorum dentata. Involucrum campanulatum saepe 8 bracteis membranaceis elliptico-lanceolatis margine scariosis dorso glabris viridibus apice acutis ciliolatis, 10 mm. longis x 2-3 mm. latis. Flores feminei exteriores ligulatae 5-6, corolla flava tubulo 5.5 mm. longa lamina oblongo elliptica 11 mm. long. x 3-3.5 mm. lata 6-8 nerviis apice 3-dentata; rami stigmatici minute papillosi obtusi. Flores centrales hermaphroditi 15-18, corolla lutea 9 mm. long. tubuloso infundibuliformis tubulo 4 mm. longo basi subite dilatato limbo 5-dentato lobulis triangulari-ellipticis 1.5 mm. longis; ramis stigmaticibus truncatis penicillatis. Ovario glabro. Pappus sordide albidus 9 mm.

Type: Venezuela, State of Táchira. Wet thickets, between El Cobre and Cordero, altitude 1520-1820 meters. Collected Julian A. Steyermark 57128, July 8, 1947. "Vining over tree; rays pale yellow; disk deep yellow; leaves fleshy-subcoriaceous, deep green above, pale green below, involucre grass green."

This species is unique among the climbing *Senecios*. It is glabrous and characterized by the shape of the inflorescence, consisting of 3-4 simple axillary corymbs (each with 3-5 flowers); these corymbs are gathered at the end of the branchlets and form a composite terminal corymb whose heads are situated at the same level. It is also well marked by its long pedicels and the large size of the heads.

Senecio riotintis Cuatr., sp. nov.

Frutex scandens ramis tortuosis cortice rugoso glabro ochraceo-brunneo plus minusve peridermato-squamoso terminantione laevi striolulato viridulo.

Folia alterna petiolata crassa coriacea. Petiolus 1-2 cm. longus glaber subtenuis basi incrassatus. Lamina late ovata basi subtruncata vel pauce cuneata apice attenuata acuta vel subite acuminata margine integerrima revoluta utrinque glabra supra atroviridis laevis nervis medio et lateralibus paulo notatis infra caesia costa crasso-prominenti nervis lateralibus 4-5 paribus arcuato-ascendentibus nervulis venulisque inmersis inconspicuis. 5-7 cm. long. x 3.5-5 cm. lat.

Inflorescentiae paniculatae axillares longe pedunculatae 3-4-plo foliam superantae. Axis robustus striatus nudus parce puberulus. Ramusculi tenues erecti vel flexuosi puberuli bracteis ovato ellipticis plerumque 1 cm. long. x 4-5 mm. latis. Pedicelli 5-1.5 mm. longi. Bracteoli lineari vel lanceolati 2-3 mm. longi 3-4 ad instar calyculum.

Capitula radiata erecta vel nutantia. Involucrum campanulatum 5-7 bracteis ellipticis acutatis, 6 mm. longis x 1.5-3 mm latis, margine scariosis apice ciliolatis dorso viridibus glabris vel parcissime araneoso-puberulis. Receptaculum 1.5 mm. diam. fimbriatum. Flores feminei exteriores 3-7 ligulati. Corolla tubulo 3 mm. long. lamina elliptica 3-dentata 4 nerviis 3-4 mm. longa x 1.5 mm. lata. Flores

centrales hermaphroditi 13-16, corolla lutea 6 mm. longa tubuloso-infundibuliformi 5 dentata lobulis ellipticis 1.5 mm. longis. Ovarium glabrum. Pappus albidus 5.5 mm.

Type: Ecuador, prov. Santiago-Zamora. Dense forest between Campanas and Arenillas, along Rio Tintas, 10 leagues southeast of El Pan, altitude 2195 meters. Collect. Julian A. Steyermark 53625, July 13, 1943.

Closely related to *S. huilensis* Cuatr., this species can be distinguished by its smoother leaves, lacking every trace of reticulation. The branchlets of the inflorescences and peduncles are more slender and flexible, but less pubescent; the phyllaries are broader, and less numerous, and tend to fuse; the ligules are smaller.

Senecio pseudoformosus Cuatr., sp. nov.

Herba robusta ramosa usque ad 1.5 met. alta caulis ramique striolulati virides glabri vel superne paulo subpubescentes.

Folia herbacea alterna sessilia late ovato-vel elliptico-lanceolata basi amplectantia cordata auriculata auriculis latis angulatis, apice acuta vel acuminata margine denticulata paulo revoluta; supra viridia glabra vel sparsis pilis nervo medio notato; subtus pallido-viridia tenuiter pubescenti-arachnoidea nervo medio crasso eminenti nervis lateralibus filiformibus ascendentibus; 10-14 cm. long. x 4-5.5 cm. lat. (et fortasse majora).

Inflorescentia corymbis pedunculatis axillaribus et terminalibus in paniculam terminalem compositae. Pedunculi corymborum foliis longiores erecto-patuli glabri vel subglabri. Pedicelli subtenues levissime puberuli-araneosi suberecti 4-40 mm. longi. Calyculum 5-7 bracteis linearibus involucrum aequilongis vel brevioribus.

Capitula radiata inclinata mediocria. Involucrum late campanulatum 21-24 bracteis lineari-lanceolatis acutis, 9-10 mm. longis, 1.5-2 mm. latis apice acutis ciliolulatis margine scariosis dorso viridibus glabris vel subtilissime puberulo-araneosis. Flores exteriores feminei ligulatae 12-20, corolla cardeno-rubra tubulo angusto 4 mm. longo apicem versus puberulo lamina elliptica tridentata 4 nerviis, 8-9 mm. longa x 3-3.5 mm. lata. Flores centrali crebri hermaphroditi corolla rubra 8,5-9 mm. longa, tubulo 4 mm. longo glabro limbo tubuloso campanulato 5-dentato; rami stigmatici truncati penicillati. Ovarium glabrum. Pappus sordide albidus 8 mm. longus.

Type: Colombia, Departamento Norte de Santander. Vertiente oriental de la Cordillera: Quebrada de Cariongo sobre Pamplona, matorrales, 2500 m. alt., 26 Jul. 1940, colect. J. Cuatrecasas et H. Garcia Barriga 10247.

This species is closely related to *S. formosus* HBK, var. *latifolia* Wedd., but can be distinguished by its larger size, by being glabrous or sparsely pubescent at the top of the branchlets and on the lower side of the leaves, and by its shorter heads.

Senecio summus Cuatr., sp. nov.

Herba aculi-rosulata rhizomate profunde inclinato radicellis capillaceis.

Folia crassiuscula omnia basi late vaginata amplectantia fasciculata; vagina submembranacea 8-10 cm. longa 1-1.5 cm. lata extus glabra intus lanato arachnoidea. Lamina elliptico-oblonga lanceolata basi parum attenuata apice acuta, 9-14 cm. long. x 10-16 mm. lata, supra luteo-viridis subnitida in juvenilis sparse floccoso arachnoidea lana decidua nervo medio impresso; subtus nervo medio luteo-viridi nitenti excepto albo-arachnoideo-tomentoso-lanata costa valde crassa parcis nervis secundariis ascendentibus parum notatis margine valde revoluta.

Scapus albo lanato-arachnoideus folia non superans, inflorescentia corymboso-paniculata, ramulis inferioribus cum bracteis foliaceis axillaribus superne bracteati bracteis late ovato-acuminatis vel oblongis 3-1 cm. long. x 12-4 mm. latis supra araneosi lanatis extus glabriusculis. Pedicelli crassiusculi albo tomentulosi, 3-15 mm. longi bracteolati apicem aliquibus bracteolis involucro simillimis ad modum calyculum 2-3 seriatum formantibus.

Capitula discoidea plus minus nutantia vel cernua, plus 200 floribus. Involucrum spheroideo-campanulatum saepe 21 bracteis late lanceolatis 11-12 mm. longis 3 mm. latis apice acutis minute ciliatis margine scariosis dorso luteo viridibus glabris vel sparsissime tomento araneoso albo deciduo. Receptaculum 7-8 mm. diam. marginibus alveolorum argute dentatis. Flores omnes hermaphroditi, corollae tubulosae flavae 8 mm. longae tubulo 2.5 mm. longo limbo infundibuliformi-campanulato 5 dentato lobulis ellipticis 1 mm. long. Rami stigmatici truncati papilloso penicillati. Ovarium glabrum. Pappus sordide albidus 7 mm. longus.

Type: Colombia, Dep. Caldas. Cordillera Central, vertiente occidental: Nevado de Santa Isabel, arenales 4420 m. alt. (cabeceras del río Otún), 25-XI-46 colect. J. Cuatrecasas 23207. "Hoja verde amarillenta semibrillante haz, blanca envés con nervios verdoso amarillentos. Involucro verde amarillento. Flósculos amarillos."

Closely related to *S. culcitioides* Sch. Bip. *S. summus* can be distinguished by its shorter and broader leaves, larger heads, broadly ovate (not linear-lanceolate) bracts of the inflorescence and the broader phyllaries.

Senecio onae Cuatr., sp. nov.

Frutex 1-2 met. altus. Rami extremum versus curvati tomentoso-hirti.

Folia alterna petiolata coriacea. Petiolus robustus suberectus vel curvatis hirto-tomentosus basi incrassatus 6-14 mm. longus. Lamina elliptico-oblonga lanceolata basi paulo attenuata rotundata apice acuta acuminata margine anguste revoluta et minute arguteque denticu-

lata dentibus callosis; supra viridis glabra costa impressa tomentulosa nervis secundariis et nervulis reticulatis anguste prominulis; subtus puberulo-tomentulosa costa bene prominenti nervis secundariis 20-22 paribus angulo obtuso angustis prominulis partem mediam bifurcato anastomosantibus cum reliquis nervulis reticulum elevatis formantibus; 9-11 cm. longa, 3-3.5 cm. lata.

Inflorescentia terminalis corymboso-paniculata basi foliata, folium superiorem paulo excedens. Ramuli paulo striolati araneoso-puberuli. Bracteae lanceolatae vel lineares acutae arachnoideo-puberulae 10-4 mm. longae. Pedicelli teneres sed rigidi aliquibus bracteolis muniti 6-12 mm. longi. Calyculus 5-6 bracteis linearibus quam involucro minoribus vel subaequantibus.

Capitula erecta vel inclinata radiata. Involucrum sphaerico-campanulatum praecipue 13 bracteis oblongo lanceolatis 4.5 mm. longis 1.7-2 mm. latis dorso viridibus parcissime araneoso-puberulis margine scariosis apicem versus ciliolulatis apice ciliato-penicillatis. Receptaculum 2 mm. latum margine alveolorum dentato. Flores exteriores feminei ligulatae 9-12, corolla lutea tubulo glabro 2.5 mm. longo lamina elliptica minute 3-dentata 4 nerviis 5 mm. longa 2 mm. lata. Flores centrales hermaphroditi corolla lutea tubulosa tubulo glabro 2 mm. long. limbo tubuloso 4 mm. long. breviter 5-lobato. Ovarium glabrum. Pappus pallido-albidus, 6 mm. longus.

Type: Ecuador, Prov. Azuay. Between kilometer 67 and south towards Oña, altitude 3715 meters, Julian A. Steyermark 53688, colect. aug. 3, 1943. "Shrub 5-8 feet tall, rays rich yellow, disk dull yellow."

Related to *S. semidentatus* Klatt and *S. xanthopappus* Klatt, *S. onae* differs from them by its fine denticulate leaves, its less developed panicules and by the shape of the heads.

Senecio onae Cuatr. var. **leonis** Cuatr., nov. var.

Folia angustiora lanceolata basi attenuata.

Type: Ecuador, Prov. Azuay. Dry rocky slopes bordering Río León towards Oña, on north side of Río León, altitude 1970 met., collect. 3-VIII-1943, Julian A. Steyermark 53697. "Shrub 5 feet tall; flowers yellow."

Senecio venezuelae (Badillo) Cuatr., nov. comb.

Cacalia venezuelae Badillo, Boletin Soc. Venez. de C. Nat., 10(68): 319, jul.-sept., 1946.

This beautiful species is quite different from all others and characterized by its large elliptical, coriaceous leaves with long petioles and a dense tomentum on the lower side, and the tomentose terminal stem or branches. The heads are remarkable in that they never have more than 5 phyllaries and 5 flowers. The laciniate limb of the corolla has 5 linear lobes. The androecium is generally abortive and lacks anthers.

Senecio Steyermarkii Cuatr., sp. nov.

Arbor usque ad 8 met. alta caule simplice vel pauce ramoso. Rami terminali dense et crasse lanato tomentosi.

Folia maxima alterna valde coriacea petiolata. Petiolus validus 10-12 cm. longus 8 mm. crassus satis verrucosus et spisse lanato tomentosus supra profunde sulcatus basi ampliatus vaginato-amplexicaulis. Lamina firmis ovata base profunde cordata sinu 6-9 cm. profundo lobis ample rotundatis apicem versus paulo attenuata obtusa vel subrotundata vel acutiuscula, 36-50 cm. longa x 27-36 cm. lata, margine laevis plana; supra atroviridis nervo medio prominenti crasso valde tomentoso nervis lateralibus 8-10 utroque latere, medianis angulo recto, superioribus arcuatis ascendentibus, inferioribus descendentibus, tomentulosis reliqua laminae laxe venuloso-reticulata notata et glabra; infra crasse et dense badi-viridi-tomentosa costa valde crassa et prominenti verrucosa nervis secundariis prominentibus ultra partem mediam furcato anastomosantibus, cetera laxo reticulo plus minus conspicuo. Folia juvenilia terminalia utrinque valde crasse lanato-tomentosa indumento pagina superiori denique deciduo.

Inflorescentiae subterminales pedunculatae quam folia breviores 30-35 cm. altae, in statu compresso 20-25 cm. latae. Rachis robusta plus minusve verrucosa dense tomentosa ramis alternis divaricatis tomentosis. Bracteae lanceolatae vel anguste lineares tomentosae 25-10 mm. long. Pedicelli tomentosi 2-4 mm. longi 2-3 minute bracteolis subulatis muniti.

Capitula homogama pentamera erecta plus minus glomerata. Calyculum nulum vel 1-2 bracteolis basilaribus. Involucrum cylindricum pentamerum glabrum 5 bracteis membranaceis elliptico-linearibus apice attenuato acutiusculo ciliato 7,5 mm. longis x 2.5-3 mm. latis. Flores omnes hermaphroditi 5, corolla 9,5-10 mm. longa glabra leviter strangulata tubulo 3.7 mm. long. limbo 6 mm. longo usque ad basim in 5 lacinias lineares fisso. Antherae 3 mm. longae basi breviter auriculatae raro presentes in speciminibus nostris plerumque abortivae sed filamentis persistentibus. Rami stigmatici 2 mm. longae apice obtuse conici papilloso-pilosulo. Achaenia inmatura fussiformia 4.5 mm. longa. Pappus pallide-brunneus 9 mm. longus.

Type: Venezuela, State of Mérida. Páramo de Pozo Negro between San José and Beguilla, altitude 2590-3220 meters, Julian A. Steyermark 56268, collected May 3, 1944. "Tree 20-25 feet tall, simple-stemmed or several branched, involucre pale green; leaves dark green above, buff-yellowish-gray below; petioles verrucose, covered with buff-yellowish tomentum. In dwarfed wet woods bordering paramo." = *Gynoxys verrucosa* Badillo, Boletin Soc. Venez. de Ciencias Naturales, tomo X, no. 68 (jul.-sept., 1946), pag. 312, no *G. verrucosa* Weddell, Chloris Andina, I., pag. 77 (1855).

Senecio Steyermarkii is a very remarkable species, closely related to *Senecio venezuelae* from Venezuela and to *Senecio neodendroides* Cuatr. from certain paramos of the East Cordillera in Colombia. These

three species represent the same life form, being small trees with simple stems or stems slightly branched at the top; the leaves are large and tufted at the apex of the stem and the tips of the branches. This group of species is intermediate between the genera *Senecio* and *Gynoxys* on account of the appearance, shape of the heads, the reduced number of flowers per head, foliar structure (compare f.i. *G. puracensis, G. laurifolia, G. nitida)* and the subtruncate stigma bearing a short conical protuberance, which is either acute as in *S. neodendroides* or obtuse as in *S. Steyermarkii.* In addition, these species have a small number of phyllaries, 5 or 6 in the first, but only 5 in *S. Steyermarkii* and *S. venezuelae;* they bear few flowers, from 6 to 9 in *S. neodendroides* but only 5 in the other two. The deep division of the corolla limb is another remarkable character common to these three species; whereas in many *Gynoxys* species the laciniation of the corolla is incomplete and the limb is divided only to the middle, the division extends to the base of the limb in *S. Steyermarkii* (and in the other two). Finally, in this species the androceum s completely reduced, as anthers are generally lacking in the specimens observed. The same is true for *S. venezuelae*, while *S. neodendroides* has hermaphroditic flowers. In addition to these characteristics, *S. Steyermarkii* is very distinct from all other *Senecios* on account of its striking appearance, the extraordinarily large coriaceous leaves, thickly tomentose underneath, the typical inflorescence and pentamerous heads.

Senecio gesnerifolius Cuatr., sp. nov.

Herba 1 met. alta caule simplici erecto pubescenti.

Folia alterna membranacea crassiuscula petiolata. Petiolus 15-30 mm. longus erectus vel curvatus supra sulcatus subtus striatus hirtotomentosus. Lamina ovoidea basi cordata apice attenuata acuminata margine dentato-serrata 8-15 cm. longa x 4,5-9 cm. lata; supra pallido-viridis calloso-tuberculata nervo medio signato lateralibus paulo conspicuis; subtus dense mollis tomentella viridulo-grisea costa striata hirtulo tomentosa valde prominenti nervis secundariis prominulis ascendentibus apicem versus curvatis 9-12 utroque latere, inter eos nervulis laxe reticulatis.

Inflorescentia corymboso-paniculata terminalis ramis hirtulo-tomentosis. Bracteae lanceolatae vel lineares acutae 10-3 mm. longae. Pedicelli longi rigidi minute bracteolatae 2-3 cm. longi. Capitula erecta radiata. Calyculum 4-5 bracteolis linearibus brevibus. Involucrum campanulatum 11-13 bracteis elliptico-lanceolatis 6 mm. longis 2 mm. latis margine scariosis, dorso viridibus arenoso puberulis. Flores feminei exteriores 10-12, corolla ligulata lutea tubulo glabro 4 mm. longo, lamina 10 mm. longa 2.5 mm. lato late linearis 4 nerviis. Flores disci hermaphroditi tubulosi 8 mm. longi glabri tubulo 4 mm. limbo campanulato 5-dentato. Antherae 2 mm. longae minute auriculatae. Rami stigmatici truncato-obtusi papilloso-pilosi. Ovarium glabrum. Pappus stramineus 7,5 mm. longus.

Type: Ecuador, Prov. Santiago-Zamora. Trail between Achupallas

and Nudo de Sabanillas, altitude 3000-3500 meters, Julian A. Steyermark 54743, oct. 17, 1943.

The general appearance of *Senecio gesnerifolius* is unlike that of any other species of the genus. The leaves are very similar to those of some Gesneriaceae, hirsutulous above and softly tomentose below, and marked on the lower side by prominent nerves. Its well-formed inflorescence with long rigid erect pedicels is another outstanding character of this species.

Senecio toreadoris Cuatr., sp. nov.

Herba 1-1.5 met. alta inferne simplex superne parce ramosa. Caulis striolatus puberulis plus minusve strigosus.

Folia sessilia alterna membranacea. Lamina ovato-acuminata basi cordata lobulis late rotundatis valde amplectentibus apicem versus attenuata acuta margine parum revoluta parce repando dentata et ciliolata 12 mm. longa 6 cm. lata; supra viridis glabra nitida nervo medio signato; subtus glabrescens pallido-viridis, nervis pilosulis costa prominula, nervis secundariis 5 utroque letere tenuiter signatis ascendentibus, reliquis nervulis minus elevatis laxe reticulatis.

Corymbis axillaribus et terminalibus paniculatis ramulis striatis divaricatis bracteis linearibus subulatis. Pedicelli bracteolati divaricati rigidi 1.5-4.5 cm. longi. Capitula erecta vel cernua radiata. Involucrum campanulatum 13 bracteis lanceolatis 7-7.5 mm. longis 2-3 mm. latis margine scariosis dorso viridibus glabris apicem versus tomentulosis ciliolatis. Receptaculum 3.5 mm. diam. marginibus alveolorum argute dentatis. Flores exteriores feminei ligulatae 13-14, corolla lutea tubulo 4 mm. long. lamina elliptico oblonga 8 mm. longa 2.5-3 mm. lata 4-5 nerviis apice minute 3-dentata. Flores disci hermaphroditi numerosi tubulosi, corolla lutea 9 mm. longa tubuloso-infundibuliforme 5-dentata, tubulo 3 mm. longo. Rami stigmatici truncati papilloso-pilosi. Ovarium striatum plus minusve strigosum. Pappus sordide albus 7.5 mm. longus.

Type: Ecuador, Prov. Azuay. Between Molleturo and Toreador altitude 2590-3900 meters, Julian A. Steyermark 53021 collect. june 14, 1943 "herb 3-5 feet tall; rays yellow; disk dull yellow."

This species is well characterized by its deeply cordate, amplexicaul, stiff and membranaceous leaves, the divaricate branches, long pedicels and the structure of its heads.

Senecio Pittieri Cuatr., sp. nov.

Herba 20-30 cm. alta. Caulis erectis albo-lanato-arachnoideus foliosus.

Folia membranacea lineari-lanceolata basi angustata et sessilia apicem versus attenuata acuta 3-5.5 cm. long. x 4-5 mm. lata, margine minutissime denticulata et revoluta; supra albo tomento-lanato tecta sed denique glabrescente viridula subtus dense albo lanato-tomentosa.

Inflorescentia terminalis corymbosa saepe simplex vel paniculata ramulis strictis albo-tomentoso-arachnoideis. Pedicelli plus minusve curvati tenues 0.5-3 cm. longis. Bracteis anguste linearibus.

Capitula discoidea cernua nutantia. Involucrum hèmisphaerico-campanulatum, 1 serie bracteis interioribus 18-20 lanceolatis 10 mm. longis 1.5 mm. latis pallido-viridibus glabris. Calyculum plurimis bracteis imbricatis plus minusve 2-seriatis interioribus involucrum subaequantibus vel aequantibus exterioribus gradatim minoribus. Flores omni hermaphroditi corolla lutea glabra tubulo 4 mm. long. limbo tubuloso-campanulato 4 mm. longo breviter 4 dentato. Antherae 2.5 mm. longae basi minute auriculatae. Rami stigmatici truncati sed caudato-penicillati.

Type: Venezuela: Páramo de Timotes, 4000-4200 met. alt., Mérida, fl. jan. 24, 1928. Forming small colonies. Collected A. Pittier 12712.

This species is well defined by its narrow wooly leaves, corymbose inflorescence with cernuous heads and general white wooly appearance. It is closely related to *S. subarachnoideus* Sch. Bip. ex Wedd., which is barely hairy. *Senecio Pittieri* really belongs to *Culcitium* on account of the numerous 2-3 seriate phyllaries of the calycle, the inner ones of which are as long as the periclinal ones; thus, the calycle and the involucre are not separated. Furthermore, the stigma is caudiculate as in *Gynoxys*.

Senecio latiflorus Weddell var. **lacunosus** Cuatr., nov. var.

Rami foliosi et floriferi elati. Ramusculi pedunculique longi divaricati. Caulis submersus radiciferus longe evoluti.

Type: Colombia, Dep. Caldas, Cordillera Central, cabeceras del río Otún; Laguna Roja arriba de Bosque, formación de páramo inundado, 3600 m. alt. colect. 26-XI-1946 J. Cuatrecasas 23295. "Tallo horizontal ramoso y sumergido en la base. Ramas erguidas blanco cinéreas. Hojas cinéreas. Invólucro verde cinéreo. Lígulas amarillas. Flósculos amarillos."

Senecio rubrilacunae Cuatr., nov. hybr.

Herba elata basi stagnanti, ramis erectis 40-50 cm. altis striatis roseo-cinereis tomentoso-pubescentibus.

Folia herbacea alterna sessilia late lanceolata acuta, 12-22 cm. longa, 2-3 cm. lata basim versus sine sensu angustata basi auriculatis amplectantia auriculis obtusis vel rotundatis margine minutissime et repando denticulata, utrinque virido-cinerea tenue tomento arachnoideo-pubescenti tecta.

Inflorescentia terminalis corymbosa simplex vel paniculata ramusculis pedunculisque roseo-cinereis longis, bracteis foliis simillimis gradatim minoribus ramulos vel pedunculos subaequantibus.

Capitula hemisphaerica radiata cernua vel nutantia. Involucrum

20-24 bracteis interioribus 13-14 mm. long., 2-3 mm. latis, acute lanceolatis viridibus vel viridi-rosaceis arachnoideo pubescentibus. Calyculum 1-2 seriebus bracteis linearibus involucrales aequilongis simillimis sed angustioribus. Corollae ligulatae tubulo angusto pubescenti 4 mm. longo, lamina elliptico oblonga extus lilacina intus roseo-lutescenti 13 mm. longa 3,5 mm. lata apice integra vel 3-denticulata. Corolla disci tubulosa lutea 9 mm. longa. (=*S. latiflorus* v. *lacunosus* Cuatr. x *S. formosus* HBK., hybr. nov.)

Type: Colombia, Dep. Caldas. Cordillera Central cabeceras del río Otún: Laguna Roja (arriba de Bosque), formación de páramo inundada, 3600 m. alt. 26 nov. 1946 colect. J. Cuatrecasas 23297. "Tallo sumergido, horizontal, ramoso; ramas erguidas, cinéreo rosadas. Hoja verdoso cinérea. Pedúnculos rosados. Involucro verde o verde rosado. Lígulas exteriormente lilas, interiormente rosado amarillentas. Flósculos amarillos. ¿Híbrido de los anteriores?"

This plant, found in a large community of *Senecio latiflorus* v. *lacunosus* Cuatr., seems to be a hybrid between this species and *S. formosus* HBK., as several well developed specimens of the latter were growing near the mentioned community. *S. rubrilacunae* shows many characters intermediate between those of the other two species, as the shape, margin and tomentum of the leaves, rose color under the tomentum of the branchlets, stem and involucre; ligules which are liliaceous outside and yellowish-rosaceous inside. In appearance it is more similar to *S. latiflorus*.

SENECIO VERNICOSUS Weddell, Chl. And. I: 94

S. VERNICOSUS var. MICROPHYLLUS Wedd. loc. cit.
Senecio Weddellianus Hieron.

The type of this species is from Tolima, Linden 899, and unquestionably belongs to var. *microphyllus* Wedd. It is completely different from *Cacalia ledifolia*, the synonymy of which is established in this paper.

I concur with Greenman's opinion (An. Mo. Bot. Garden 10: 76, 1923) that *Senecio vernicosus* β *major* Weddell is distinct from *S. vernicosus*, but that it belongs to *S. andicola* Turcz., as suspected by Weddell. Therefore, the name *S. andicola* is appropriately used for the plants with elliptical and larger leaves and *S. vernicosus* for those with narrower, lanceolate or linear leaves.

The following specimens are referred to this species: Linden 899 and Cuatrecasas 9306, 23230, 23234.

Senecio vernicosus Wedd., var. **nanus** Cuatr., nov. var.

Fruticulus 5-20 cm. alt. Folia imbricata. Capitula congesta. Forma versus *S. gelidum* convergens.

Type: Colombia, Dep. Cauca. Cordillera Central, arenales contiguos al Alfrombrado, base del Volcán Puracé, 4000 met. alt. colect.

24-VII-43 J. Cuatrecasas 14707. "Frútex 10-20 cm.; hojas coriáceas, erguidas, verde claro brillante haz, ceniciento tomentosas envés; involucro amarillo; puntas de las brácteas interiores parduscas; corolas amarillo pálidas."

SENECIO ANDICOLA Turcz., Bull. Soc. Nat. Mosc. XXIV II: 91 (1851)

S. vernicosus B *major* Weddell

The following specimens belong to this species: Linden 1283, Moritz 1421 (photo), Lehmann 8499, Holmgreen 874 (Ecuador), Steyermark 57500 (Venezuela), Cuatrecasas 5929, 9314, 9314-A, 11821, 14583, 14702, 14702-A.

Senecio andicola Turcz. var. **paniculatus** Cuatr., nov. var.

Inflorescentia magis evoluto-paniculata quam typus; folia planiora et magis denticulata.

Type: Colombia, Dep. Cauca. Cordillera Central: Cabecera del río Palo, Quebrada del río López: Las Casitas, 3640-3680 m. alt., colect. 3-XII-1944 J. Cuatrecasas 18995. "Arbolito. Hoja coriácea, flexible, verde brillante ház, blanquecino tomentoso envés."

SENECIO NITIDUS (HBK) DC. *Cacalia nitida* HBK.

This species can be definitely separated from *S. andicola* Turcz., especially on the basis of its leaves, which are cordate at the base, sessile or subsessile and amplexicaul. The branchlets are densely lanuginous. The leaves are coriaceous, brilliant on the upper side, and eventually subtriangular as the edges turn up. It is very probable that the plant used by Kunth for the original description came from Bogota and not from Ecuador, a record indicated as doubtful. I believe that two collections from Bogota (Killip 34134 and Apolinar Ma. 420) agree exactly with the original description and the photo of the type specimen from the Paris herbarium.

SENECIO LEDIFOLIUS (HBK) DC., Prodr. VI: 421 (1837)

Cacalia ledifolia HBK., Nov. Gen. et Sp. IV: 162 (1820)
Cacalia lanata HBK., Nov. Gen. et Sp. IV: 162 (1820)
Senecio lanatus DC., Prodr. VI: 422 (1837)

The authors had an erroneous idea about *S. ledifolius*. By examining fragments of type material in Chicago Natural History Museum herbarium and studying photographs of the types, I have been able to prove that *Cacalia ledifolia* HBK. and *Cacalia lanata* HBK., described by Kunth on the same page, are the same species. As *Senecio lanatus* has been used by Linneus for other species, the valid name for the Colombian plant is the second one in HBK., *C. ledifolia*. The typical form has relatively short and wide leaves, which are sessile or subsessile and short inflorescences. It is common in the paramo hills near Bogota and extends northward through the mountains of Boyaca,

where it occurs together with forms intermediate between the typical species and var. *Schlimii* Wedd.

SENECIO LEDIFOLIUS var. SCHLIMII Wedd., Chl. And. I: 94 (1855)

Senecio Schlimii Sch. Bip., Wedd. loc. cit.
Senecio chitaganus Cuatr., Not. a la Fl. de Col. VI: 23 (1944)

While under the impression that *C. ledifolia* (HBK) belonged to *S. vernicosus* (Wedd.) (Greenman, South Am. Senecios II, Ann. Mo. Bot. Gar. 25: 807) I described this related form from the paramos of the North Cordillera (Dep. Santander and Norte de Santander) as a new species *(S. chitaganus).* Study of additional material proved that Weddell's idea of considering this plant as a variety of *S. ledifolius* (HBK) DC. is correct. The only differences are that var. *Schlimii* has more elongated leaves, which are narrower at the base, and larger inflorescences; the intermediate forms, as stated above, cannot be regarded as specifically distinct. By analogy Hieronymus' species *S. Lehmannii* can be transferred to varietal status under *Cacalia ledifolia.* This plant has narrower leaves and more pilose inflorescences but intermediates are also known. Consequently, I propose the following combination:

Senecio ledifolius (HBK) DC. var. **Lehmannii** (Hier.) Cuatr., nov. comb.

S. Lehmannii Hier., Engl. Bot. Jahrb. 19: 66, 1894.

Very different from *S. Lindenii* Sch. Bip., contrary to Greenman's opinion (loc. cit.: 807).

The following specimens were examined: of *Senecio ledifolius* (HBK) DC.: Herb. Bonpland, fragment type (Chicago N. H. Mus. 972238); Linden 1248, Bogotá; Photo type Ch. N. H. Mus. 37871; Cuatrecasas 2877, 2878, 342, 1322, 5148, 5546, 9761; Killip 34057, 34211, 38005; Hno. Tomas 2376. Intermediary forms: Cuatrecasas 9910, 10268, 10196. *Senecio ledifolius* var. *Schlimii* Wedd.: Funck and Schlim 1291 (Herb. Ch. N. H. Mus. 1023092 type collection; Cuatrecasas 13417 (iso-type of *S. chitaganus)* 13522A; Cuatr., Schultes & Smith 12279; Garganta 942, 757, 888, 963, 679, 678, 677; Steyermark 57226 (Venezuela). *Senecio ledifolius* var. *Lehmannii* Hier.: Lehmann 7434 (type collection Ch. N. H. Mus.); Cuatr. & Metcalf 30155; Hno Daniel 1300, 2809; Hno. Tomas 95.

SENECIO LINDENII Sch. Bip. ex Wedd., Chl. And. I: 101

This species is quite different from *Senecio ledifolius* (HBK) DC. under which Greenman listed it as a synonym (An. Mo. Bot. Gar. 25: 807). However, it is related to *S. abietinus*, the differences of which I discussed elsewhere (Not. Fl. Colomb. VI: 25). *S. elatoides* Wedd., which I only know by description, is probably the same species.

Senecio otophorus Wedd. var. **panduratus** Cuatr., nov. var.

Folia rigidiora coriacea saepe integra panduriformia basi late

amplectantia raro petiolata sed semper auriculato amplexicaulia. Involucrum plus minusve pubescens.

Type: Ecuador. Prov. Azuay. Páramos in vicinity of Toreador, between Molleturo and Quinoas, altitude 3810-3930 met. collect. J. A. Steyermark 53206 jun. 15, 1943. "Flowers greenish-yellow."

Senecio Mutisii Cuatr., var. **congestus** Cuatr., nov. var.

1-3 capitula terminalia pedicellis brevioribus.

Type: Colombia, Dep. Cauca, Cordillera Central. Cabecera del río Páez, páramos entre Perro Muerto y La Laguna del Páez, 3550-3450 m.alt., colect. 4-XII-1944 J. Cuatrecasas 19019-B. (Herb.Facultad Agronomia del Valle, Colombia).

Senecio Mutisii Cuatr. var. **lanceolatus** Cuatr., nov. var.

Folia longiora lanceolata, 10 mm. long., 2-3 mm. lat. Capitula graciliter longe pedicellata (pedicellis 15 mm. longis) terminalia corymbosas (corymbis 4 capitulis) vel solitaria.

Type: Colombia, Dep. Cauca. Cordillera Central, Cabecera del río Páez: páramos de La Laguna del Páez, 3450 met. alt. colect. 4-XII-1944 J. Cuatrecasas 19019-A.

Senecio Badilloi Cuatr., nom. nov.

Senecio laetivirens Badillo, Bol. Soc. Venez. Cienc. Nat., t. X, no. 68: 317, Caracas 1946.

This name is homonym of *S. laetevirens* Phillip published in 1894 (An. Univ. Chile 88: 30).

SENECIO HYPSOBATES Weddell..

My no. 23443 collected in the páramo of Puracé represents this species. Penland 916 is intermediate between the species and a variety collected by me in the Central Cordillera in respect to the shape of heads and leaves as follows:

Senecio hypsobates Wedd. var. **parvulus** Cuatr., nov. var.

Folia basilaria breviora et angustiora 2-3.5 cm. longa x 1.5-3 mm. lata. Scapus gracilis erectus 12-30 cm. longus violaceus. Involucrum bracteis 2-3 seriatis, 9 mm. longis.

Type: Colombia, Dep. Valle. Cordillera Central, Páramo de Las Vegas, divisoria de las cuencas de los ríos Tuluá y Bugalagrande, 3600-3800 m. alt., colect. 22-III-1946 J. Cuatrecasas 20328. "Acaule. Hoja herbácea, verde o sórdido violácea. Escapo violeta. Hojas caulinares mas menos violáceas."

Additional specimen: Colombia, Dep. Cauca, Cordillera Central: Cabecera del rio Palo, altos páramos entre Quebrada de San Paulino

y Quebrada del río López: Lagunilla de Las Casitas, 3700 m. alt., colect. 3-XII-1944 J. Cuatrecasas 19008. "Escapo violáceo. Hoja verde con la base y nervios violáceos. Brácteas escapulares violáceas. Brácteas involucrales violetas en 4 filas. Corola amarilla. Capítulos 14 mm. long., 17-18 mm. diám."

SENECIO GELIDUS Weddell Chl. And. I: 95 (1855).

Senecio crymophillus Weddell l. cit.

Senecio paramensis Cuatr. pro synon., Pl. Nov. Colomb. Ser. Alt. Trab. Mus. Nac. Cienc. Nat., no. 29: 37, Madrid, 1935.

Culcitium paramense Cuatr., in id. page 36.

Specimens examined: Cuatrecasas 2883, 9260, 9260-A, 23212.

Senecio gelidus Wedd. fma. **latifolius** Cuatr., nova

Folia late elliptica vel ovato-elliptica 20 mm. long. x 12-13 mm. lat. lat.

Type: Colombia, Dep. Caldas. Cordillera Central: Nevado del Ruíz, arenales de páramo 4300-4500 met. alt., colect. 5-V-1940 J. Cuatrecasas 9260-B. "Fruticuletum de tallos rastreros y ramas floríferas erguidas. Corolas amarillas."

THE GENUS CULCITIUM H. ET B.

Humboldt and Bonpland founded this genus for the Andean species *C. rufescens* H. et B. and *C. canescens* H. et B., striking plants whose large heads differed greatly from the species of *Senecio* known at that time. Later, Weddell on the basis of much more material, emended the genus, defined as its distinctive character the involucre with several rows of bracts and limited it to homogamous plants. Theoretically, species of *Senecio* have only one apparent row of bracts which generally is accompanied by a short series of external basal bracts called calycle. But examination of many Andean plants belonging to *Senecio* and *Culcitium* discloses many intermediate forms. Prominent development of the calycle in some species of *Senecio* accounts for the appearance of several series of bracts similar in form and shape to those of the involucre. Apparently this seriation of the calycle bracts progresses from cases in which a single row of unequal bracts is present to cases with two, three or more series of bracts functioning as a multiseriate involucre. The special ecological conditions of the Andean paramos are reflected in the xeromorphic structure to the *Senecios* living there, and probably brought about the evolution of the multiseriate involucre. For several rows of involucral phyllaries express here a psychrophytic (xerophytic) adaptation which is best developed in these species, the whole structure of which is highly psychrophytic (rosette or subrosette plants, extremely thick coat of wooly hairs, as for example, *C. canescens*

H. et B., *C. rufescens* H. et B., *C. boyacense* Cuatr., *C. nivale* HBK. and *S. niveo-aureus* Cuatr.). The same tendency of changing the involucre and acquiring a xeromorphic habit is found in the different sections of *Senecio* which reach the paramos. Thus, I do not believe that the many species now referred to *Culcitium* belong to the same relationship; rather, they originated independently from several groups of *Senecio* (discoidea, radiata, herbacea, suffruticosa, fruticulosa).

Taxonomically it is often difficult to decide whether a plant belongs to *Culcitium* or *Senecio,* if the phyllaries of the calycle are disposed in one or two rows; this character varies even within the same species and, as a result, many species have been described in different genera by different authors. For instance, Weddell (Chl. And. I: 95) described a plant from the Nevado del Tolima as *Senecio gelidus;* due to its variability, the same species was also described by him in the same book and on the same page as *S. crymophillus.* I found this plant on the Nevado del Tolima in 1932 and took it at first for a *Senecio,* but after careful examination concluded that it was a *Culcitium* and described it as *C. paramense.* Dusen, who also had studied this plant, interpreted it as a *Culcitium* and described it in 1914 as *C. Panizzae;* at that time it was difficult to identify it with the species so briefly described by Weddell as *Senecios.* Subsequently, after observing this species and its variations on the paramos of Ruiz and Santa Isabel (boundary of Tolima) and studying rich material and type photographs of Weddell's species, I identified it and its synonyms. The identity of Dusen's species is based on the opinion expressed by Dr. Sandwith (Bull. Roy. Bot. Gard. Kew: 225, No. 3, 1941), since I had not seen Dusen's publication. Other examples are: *Senecio depressus* Hook. et Arn. and *S. Gilliesii* Hook. et Arn., which were considered by D. Don as species of *Culcitium; Culcitium Poeppigii* DC., *C. humile* DC., *C. Gayanum* Remy, and *C. Lechleri* Sch. B. were considered by Weddell as species of *Senecio; S. sabulosus* DC., a plant known to Weddell, and *S. pachypus* Greenman in my opinion should be species of *Culcitium; S. hypsobates* Wedd. is one of those many intermediate forms and the rich material I have collected shows that the calycle is 2-4-seriate in spite of Weddell's sentence "calyculi bracteis 6-8 uniseriatis linearibus involucro vix brevioribus." Another intermediate form among the herbaceous species is *S. culcitioides* Weddell, which he considers close to *Culcitium longifolium* Turcz.; it is probably a synonym of *S. summus* Cuatr. The existing confusion between *Senecio* and *Culcitium* is evident from the following list of synonyms. The artificial status of this genus is even more obvious in the light of the arbitrary decision by Weddell of regarding this beautiful plant with large yellow ligules as *Senecio latiflorus;* in spite of the typical *Culcitium* involucre, he put this species in *Senecio* because it is heterogamous and has the general *Senecio* habit. Later, I found other radiate species with 2-3 seriate involucres *(S. niveo-aureus, S. almorzaderonis)* which show the above mentioned tendency of different species of *Senecio* living near the paramos, to have pluriseriate involucres. Other species of *Senecio,* quite different from

Andean species, also have a long or multiseriate calycle with a tendency to form multiseriate involucres (for instance *Senecio paniculatus* Berg., South African, and other species). Another tendency in the evolution of *Senecio* species from the neighborhood of the paramos brings about a reduction in the number of ligulate flowers; Weddell recorded the fact that high in the Andes the proportion between discoid and radiate *Senecios* is 3 to 1, while in South Africa it is 1 to 2. I believe this ratio is a result of psychrophytic adaptation.

Therefore, I feel that it is no longer justifiable to maintain this unnatural genus whose artificial characterization breaks down completely in the presence of so many intermediate forms. Although *Culcitium* has long been recognized, many authors have advocated its abolishment. Thus, Weddell wrote (Chl. And. I: 89): "Le caractere essentiel du genre *Senecio* est d'avoir un involucre forme d'un seul rang de folioles de longueur egale entoure le plus souvent d'un nombre plus ou moins grand de bractees beaucoup plus petites, et ordinairement de forme un peu differente auxquelles on est convenu de donner le nom de *calycule.* On verra que le genre *Culcitium* ne differe des *Senecio* qu'en ce que les bractees interieures et exterieures, ou si l'on veut, l'involucre et le calycule se confondent par suite de la degradation insensible (et non subite) des bractees ou folioles qui concourent a les former."; page 137: "mais dans l'etat actuel, autant il est aise de distinguer les especes vraiment typiques, autant on est embarrasse parfois pour classer celles qui ne le sont pas; aussi y en aura-t-il probablement toujours un certain nombre qui voyageront, selon la fantaisie des auteurs, d'un groupe a l'outre. J'ai dit (p. 89) en quoi consiste surtout pour moi la distinction des deux genres, mais je ne puis me vanter d'etre reste partout fidele a mon principe, temoin le *Senecio latiflorus*, que je n'ai pas place parmi les Senecons qu'en raison de ses capitules radies. Toujours est-il qu'il n'est aucune Senecionee meritant quelque peu, par son *habitus* et par ses caracteres, d'occuper une place dans le genere *Culcitium*, qui n'appartienne aux hautes regions des Andes, ou bien aux terres magellaniques, et c'est la, a mon avis, une puissante raison pour que ce genre continue d'avoir droit aux menagements des botanistes."; page 126: "il n'y a aucune ligne de demarcation entre le calycule de cette espece *(Senecio latiflorus)* et son involucre; aussi en avais-je, par cette raison, d'abord fait un *Culcitium*, sous le nom *C. radiatum.*" Bentham and Hooker (Gen. Pl. v. II: 445) state: "Genus, *Senecioni* quam maxime affine, differt involucro; species tamen nonnullae subintermediae ab auctoribus nunc ad *Culcitium* nunc ad *Senecionem* referuntur." Sandwith (Kew Bull. 3: 225) writes: "The involucre of Mr. H. Tracy's plant shows how poor is the distinction between *Senecio* and *Culcitium:* the fact is that the outer rows of bracts are merely members of the "calyculus" placed at slightly different levels up the back of the receptacle, and in this instance they all differ markedly in breadth from those of the innermost series ....." According to James Small (The Origin and Development of the Compositae 1919: 131): "As is usually the case where an artificial distinction is made, the

two genera *Senecio* and *Culcitium* pass into each other by intermediate species which have been placed sometimes in one genus and sometimes in the other. Indeed a new genus *Shafera*, has been founded which differs only in the 3-4 seriate involucre and obtuse style branches, and which is regarded by the author as intermediate between *Senecio* and *Culcitium*." Small also believes that the multiseriate involucres originated from the calycle the bracts of which cannot be distinguished from those at the top of the peduncle. With regard to what he says about *Shafera*, I believe that this genus cannot be considered as intermediate; the plants really intermediate between *Senecio* and *Culcitium* are many species placed in this genus and many others referred to *Senecio*. But *Shafera* is a very interesting genus with respect to its morphology and habit. It is very different from all species of *Culcitium*, and its affinity must be sought in other sections of the *Senecioneae* among arboreous and shrubby forms, and in connection with *Gynoxys*.

For these reasons which I expect to illustrate in greater detail in a later paper, I am proposing the elimination of the genus *Culcitium* and the transfer of its species to the genus *Senecio* L. As I pointed out above, I believe that these species have different origins; they can, therefore, be grouped in three separate new sections of the genus *Senecio*, as defined below. The following list of new names and new combinations is the result of the transfer proposed above:

Senecio austrorufescens Cuatr., nom. nov. *Senecio rufescens* DC., Prodr. VI: 413 (1837).

Senecio boyacensis (Cuatr.) Cuatr. nov. comb. *Culcitium boyacense* Caldasia I: 5 (1940).

Senecio canescens (H. et B.) Cuatr., nov. comb. *Culcitium canescens* H. et B., Pl. Aeq. II: 44, t. 67.

Senecio cocuyanus (Cuatr.) Cuatr., nov. comb. *Culcitium cocuyanum* Cuatr., Caldasia I, no. I: 5 (1940).

Senecio culciklattii Cuatr., nom. nov. *Culcitium peruvianum* Klatt (1894), Naturhof. Hofm. 9: 363 (1894).

Senecio culciremyi Cuatr., nom. nov. *Culcitium Gayanum* Remy, in Gay, Fl. de Chile IV: 130 (1849).

Senecio culcitenellus Cuatr., nom. nov. *Culcitium tenellum* Dusen, Scott Rep. Princenton Univ. Exp. Patag. VIII Supl. 267 (1914) tab. III. 6.

Senecio dasyphyllus (Gand.) Cuatr., nov. comb. *Culcitium dasyphyllum* Gandoger, Bull. Soc. Bot. Fr. IX: 27 (1913).

Senecio discoloratus Cuatr., nom. nov. *Culcitium discolor* Raimondi, ex. Herrera, Contr. Fl. Dep. Cuzco, ed. 2, part I: 207 (1921) (Index Kewensis).

Senecio Don-candidus Cuatr., nom. nov. *Culcitium candidum* D. Don ex Hook. et Arn., pro synon., Journ. of Bot. III: 343 (1841). *Senecio Poeppigii* Hook et Arn. (no DC.), in id.: 342.

Senecio ferrugineus (Klatt) Cuatr., nov. comb. *Culcitium ferrugineum* Klatt, Ann. K. K. Naturh. Hofmus. Wien, 9: 363 (1894).

Senecio Gargantanns (Cuatr.) Cuatr., nov. comb. *Culcitium Gargantanum* Cuatr., Rev. Acad. Colomb. C.E.F.y Nat. vol. 5: 29, fig. 16 (1942).

Senecio glacialis (Meyen et Walp.) Cuatr., nov. comb. *Culcitium glaciale* Meyen et Walp., Nov. Act. Nat. Cur. XIX, Supl. I: 278 (1843).

Senecio Haenkeanus Cuatr., nom. nov. *Culcitium Haenkei* Weddell Chl. And. I: 139 (1855).

Senecio lingulatus (Schlecht.) Cuatr., nov. comb. *Culcitium lingulatum* (Schlecht.) Blake, Journ. Wash. Acad. Sc. XXVII: 390 (1937). Probably synonym of *C. ledifolium* HBK.

Senecio Neeanus Cuatr., nom. nov. *Culcitium Neaei* Sch. Bip., Weddell, Chl. And. I: 140 (1855). *Senecio Neaei* Wedd. pro synon., no DC., *Culcitium nivale* HBK. var. Neaei DC., Prodr. IV: 325 (1837).

Senecio neoascendens Cuatr., nom. nov. *Culcitium adscendens* Benth., Pl. Hartw.: 205 (1845). Possibly identical with *C. hypoleucum* Turcz.

Senecio neodenticulatus Cuatr., nom. nov. *Culcitium denticulatum* Turcz., Bull. Soc. Nat. Mosc. XXIV, I: 205 (1851).

Senecio neosessilis Cuatr., nom. nov. *Culcitium sessile* Speg., Rev. Agron. La Plata 3: 533 (1897).

Senecio nivalis (HBK) Cuatr., nov. comb. *Culcitium nivale* HBK, Nov. Gen. Sp. Pl. IV: 171 (1820).

Senecio Pavonii (Wedd.) Cuatr., nov. comb. *Culcitium Pavoni* Wedd., Chl. And. I: 141 (1855).

Senecio Pflanzii (Perkins) Cuatr., nov. comb. *Culcitium Pflanzii* Perkins, in Engl. Bot. Jahrb. XLIX: 229 (1913).

Senecio pichinchensis (Cuatr.) Cuatr., nov. comb. *Culcitium pichinchense* Cuatr., An. Univ. Madrid IV, fasc. 2°: 215 (1935).

Senecio Poeppigii (DC.) Cuatr., nov. comb. *Culcitium Poeppigii* DC., Prodr. VI: 324 (1837). *Cacalia candicans* Poepp. pl. exs. 670 ex DC. pro synon. "a Senecione candicante omnine differt."

Senecio puracensis (Cuatr.) Cuatr., nov. comb. *Culcitium puracense* Cuatr., Not. Fl. Colomb. VI: 31 (1944).

Senecio reflexifolius Cuatr., nom. nov. *Senecio reflexus* HBK, Nov. Gen. et Sp. Pl. IV: 182 (1820).

Senecio reflexus (HBK) Cuatr., nov. comb. *Culcitium reflexum* HBK,

Nov. Gen. et Sp. Pl. IV: 171 (1820).

Senecio rex (Sandwith) Cuatr., nov. comb. *Culcitium rex* Sandwith, Kew Bull. 1941: 224 (1942).

Senecio romeroides Cuatr., nom. nov. *Culcitium rosmarinifolium* Benth., Pl. Hartw.: 207 (1845).

Senecio santanderensis (Cuatr.) Cuatr., nov. comb. *Culcitium santanderense* Cuatr., Rev. Acad. Colomb. C.E.F.y Nat., vol. V: 28 t. 3 (1942).

Senecio serratifolius (Meyen et Walp.) Cuatr., nov. comb. *Culcitium serratifolium* Meyen et Walp., Nov. Acta Natur. Cur. XIX Supl. I: 279 (1843).

Senecio Sodiroi (Hieron.) Cuatr., nov. comb. *Culcitium Sodiroi* Hieron., Engl. Bot. Jahrb. 29: 63 (1900).

Senecio vulcanopichis Cuatr., nom. nov. *Senecio pichinchensis* Greenman, An. Miss. Bot. G. XXV: 814 (1938).

Senecio Wedglacialis Cuatr., nom. nov. *Senecio glacialis* Weddell Chl. And. I: 113 (1855).

Senecio rufescens (H. et B.) Cuatr., nov. comb. *Culcitium rufescens* H. et B., Pl. Aeq. II: 1, t. 66 (1809).

Senecio Sodirscandens Cuatr., nom. nov. *Senecio Sodiroi* Hieron., Engl. Bot. Jahrb. 29: 73 (1900).

LIST OF PUBLISHED SPECIES OF *CULCITIUM* WITH THEIR SYNONYMS:

Culcitium adscendens Benth., Pl. Hartw. 205 (1845) see **Senecio neoascendens** Cuatr. nom. nov.

Senecio adscendens Bojer ex DC. Prodr. VI: 378 (1837) is an earlier African species.

Culcitium boyacense Cuatr., Caldasia I: 5 (1940) see **Senecio boyacensis** (Cuatr.) Cuatr., nov. comb.

Culcitium candidum D. Don ex Hook. et Arn., pro synon., Journ. of Bot. III: 343 (1841) see **Senecio Don-candidus** Cuatr., nom. nov., *Senecio Poeppigii* Hook. et Arn., not DC., loc. cit.: 342.

The name *Senecio candidus* is not available for this species because it was used before by De Candolle for another species from Sicily (Prodr. VI: 355, 1837), (*Cineraria candida* Presl., 1821). The epithet *Poeppigii* is a homonym of the earlier name *Culcitium Poeppigii* DC., Prodr. VI: 324 (1837).

Culcitium canescens H. et B., Pl. Aeq. II: 41, t. 67 see **Senecio canescens** (H. et B.) Cuatr., nov. comb.

Culcitium cocuyanum Cuatr., Caldasia I, n.° I: 5 (1940) see **Senecio cocuyanus** (Cuatr.) Cuatr., nov. comb.

Culcitium dasyphyllum Gandoger, Bull. Soc. Bot. Fr. IX: 27 (1913) see **Senecio dasyphyllus** (Gand.) Cuatr., nov. comb.

Culcitium dentatum D. Don msc. ex Hook. et Arn., pro synon. *Senecio Gilliesii* Hook. et Arn., Journ. of Bot. III: 343 (1841).

Culcitium denticulatum Turcz., Bull. Soc. Nat. Mosc. XXIV, I: 205 (1851) see **Senecio neodenticulatus** Cuatr., nom. nov.

The name *Senecio denticulatus* O. F. Muell. is pre-occupied for a European plant (Fl. Dan., 791; 1766); it is a form of *S. vulgaris L.*

Culcitium depressum D. Don msc. ex Hook. et Arn. pro synon. *Senecio depressus* Hook. et Arn., Journ. of Bot. III: 342 (1841).

Culcitium discolor Raimondi, ex Herrera, Contr. Fl. Dep. Cuzco, ed. 2, part I: 207 (1921) according to Index Kewensis. See **Senecio discoloratus** Cuatr., nom. nov.

Previously published names: *Senecio discolor* DC., Prodr. VI: 412 (1937), plant from Jamaica; *S. discolor* Bojer in DC., Prodr. VI: 379 (1937) and *S. discolor* Desf. *Gynura hematophylla* DC., Prodr. VI: 299.

Culcitium ferrugineum Klatt, Ann. K. K. Naturh. Hofmus. Wien, 9: 363 (1894). See **Senecio ferrugineus** (Klatt) Cuatr., nov. comb.

Culcitium Gargantanum Cuatr., Rev. Acad. Colomb. C. E. F. y Nat., vol. 5: 29, fig. 16 (1942). See **Senecio Gargantanus** (Cuatr.) Cuatr., nov. comb.

Culcitium Gayanum Remy, in Gay, Fl. de Chile IV: 130 (1849). See **Senecio culciremyi** Cuatr., nom. nov.

The epithet of Remy cannot be used for this species because it would be a homonym of an earlier different species *(Senecio Gayanum* DC., Prodr. VI: 414 (1837)).

Culcitium glaciale Meyen et Walp., Nov. Act. Nat. Cur. XIX, Supl. I: 278 (1843). See **Senecio glacialis** (Meyen et Walp.) Cuatr., nov. comb.

This new combination eliminates *Senecio glacialis* Sch. Bip. (which is a *Doronicum*) and *S. glacialis* Weddell, Chl. And. I: 113 (1855). For the latter I proposed *Senecio Wedglacialis.*

Culcitium Gilliesii Speg., An. Soc. Cient. Arg. 53: 12 (1902). *Senecio Gilliesii* Hook. et Arn., Journ. of Bot. III: 343 (1841).

Culcitium Haenkei Weddell, Chl. And. I: 139 (1855). See **Senecio Haenkeanus** Cuatr., nom. nov.

The name *Senecio Haenkei* DC., Prodr. VI: 413 (1837) is preoccupied for another species.

Culcitium Herrerae Mattf. ex Herrera, An. Univ. Cuzco, I: 189 (1926). This is a nomen nudum.

Culcitium humile DC., Prodr. VI: 325 (1837). See *Senecio Candolii* Wedd., Chl. And. I: (1855).

Senecio humilis Desf. (Fl. Atl. II: 271 (1798) is preoccupied for a plant from Sicily. *Cacalia humilis* HBK. (1820) is *S. repens* DC.

Culcitium hyoseridis Benth., Pl. Hartw.: 204 (1845).

According to Weddell this plant could be a synonym of *Senecio repens* DC.

Culcitium hypoleucum Turcz., Bull. Soc. Nat. Mosc. XXIV, I: 206 (1851).

An Australian plant is named *Senecio hypoleucus* F. Muell. ex Benth., Fl. Austr. III: 672 (1866). As the plant of Turczaninow is not well known, I want to avoid giving it a new name. Weddell suggested the possibility that it is a synonym of *Culcitium adscendens* Benth.

Culcitium ilicifolium Sprengel, Synop. III: 431 (1826). *Gynoxys ilicifolia* (L.) Wedd., *Stahelina ilicifolia* L., *Cacalia ilicifolia* HBK, *Senecio Scrobicaria* DC.

Culcitium Lechlerii Sch. Bip., Bonplandia, IV: 55 (1856), nomen nudum.

Senecio Lechlerii Philippi is another species (An. Univ. Chile: 499 (1873)).

Culcitium ledifolium HBK., Nov. Gen. et Sp. Pl. IV: 170 (1820).

According to Hieronymus, this species is a synonym of *C. reflexum* HBK. I accepted this synonymy in an earlier paper after seeing the type specimens in the Willdenow and Dahlem herbaria. But after examining the photograph of the type of the Paris Herbarium, *C. ledifolium* seems to be different from *C. reflexum* and is possibly a synonym of another published species. Weddell considered it as similar to *Senecio sabulosus* DC., but I think it is very close to *C. puracense* Cuatr. and *C. lingulatum* Blake. It would be premature to name this plant before it has been identified correctly. *Senecio ledifolius* (HBK) DC., is an earlier published homonym of a plant described by Kunth as *Cacalia ledifolia* on a preceding page of the book (p. 160) previously mentioned.

Culcitium lineare Spreng., Synopsis III: 431 (1826).

This name is a synonym of *Cacalia linearis* Labill., an Australian plant belonging to the genus *Bedfordia (B. linearis* DC., Prodr. VI: 333 and 441).

Culcitium lingulatum (Schlecht.) Blake, Journ. Wash. Acad. Sc. XXVII: 390 (1937). See **Senecio lingulatum** (Schlecht.) Cuatr., nov. comb.

This inadequately known species might be a synonym of *C. ledifolium* HBK.

Culcitium longifolium. Turcz., Bull. Soc. Nat. Mosc. XXIV I: 206 (1851).

This epithet has also been given to another species: *Senecio longifolius* L., Sp. Pl. ed. II: 1222 (1763), a South African plant. As the plant of Turczaninow is poorly known, and the possibility remains that a valid synonym exists for it, I am not giving it a new name here. Weddell (Chl. And. I: 139) expressed the idea that it is similar to *Senecio culcitioides* Wedd. and stated that is is identical with some leaves collected by Bonpland. I have seen some of these leaves and am of the opinion that they probably belong to the species here described as *Senecio summus.*

Culcitium magellanicum Hombr. et Jacq.; Dcne., Bot. Voyag. Astrol. et Zel.: 45 (1837-1840). *Senecio magellanicus* Hook. et Arn. in Hook. Journ. Bot. III: 343 (1841).

Culcitium Neaei Sch. Bip., Weddell, Chl. And. I: 140 (1855). See **Senecio Neeanus** Cuatr., nom. nov. *Senecio Neaei* Wedd. pro synon., not DC. *Culcitium nivale* HBK. var. *Neaei* DC., Prodr. IV: 325 (1837).

The epithet of Schultz Bip. and Weddell cannot be used for this species because of an earlier homonym, *Senecio Neaei* DC., Prodr. IV: 413 (1837) for another species.

Culcitium nitidum Spreng., Synopsis III: 431 (1826). *Senecio nitidus* (HBK) DC. (1837), *Cacalia nitida* HBK (1820).

Culcitium nivale HBK., Nov. Gen. Sp. Pl. IV: 171 (1820). See **Senecio nivalis** (HBK) Cuatr., nov. comb.

Culcitium niveo-aureum Cuatr., Caldasia 1: 8 (1940), pro synon. *Senecio niveo-aureus* Cuatr., loc. cit.

Culcitium ovatum (Schlecht.) Blake, Journ. Wash. Acad. Sc. XXVII: 390 (1937). See **Senecio reflexus** (HBK) Cuatr., nov. comb. *Culcitium reflexum* HBK (1820) Nov. Gen. et Sp. Pl.: 171. *Lasiocephalus ovatus* Schlecht., Ges. Nat. Fr. Berl. Mag. VIII: 308 (1814). *Culcitium uniflorum* Hieron. Engler Bot. Jahrb. XIX: 63 (1894).

The epithet *ovatus* cannot be used for this species because of the earlier homonym *Senecio ovatus* Willd. Sp. Pl. III: 2004 (1804), designating a European plant. According to Blake the binomial *Gnaphalium uniflorum* Lam. is invalidated by *G. uniflorum* Miller (1768). But Kunth's name has priority. The new combination *S. reflexus* (HBK.) Cuatr. eliminates another name of Kunth, *Senecio reflexus* HBK., Sp. Pl. IV: 182, for which I have proposed the new name of *Senecio reflexifolius.*

Culcitium Panizzae Duse, Nuovo Giornale Bot. Ital., Ser. II, XII: 285 (1914). *Senecio gelidus* Wedd., Chl. And. I: 95 (1855).

Culcitium paramense Cuatr., Trab. Mus. Nac. Cienc. Nat. n. 29: 36, fig. 14 (1935). *Senecio gelidus* Wedd., Chl. And. I: 95 (1855).

Culcitium Pavoni Wedd., Chl. And. I: 141 (1855). See **Senecio Pavoni** (Wedd.), Cuatr. nov. comb.

According to Weddell it is related to *S. Hohenackeri.*

Culcitium pedunculare Macloskie, in Scott. Rep. Princenton Univ. Exp. Patag. VIII Supl. Bot.: 267 (1915). *Plagiocheilus pedunculare* (HBK) Wedd., Chl. And. I: 61. *Leptinella pedunculare* DC., Prodr. VI: 141 (1837). *Hippia pedunculare* HBK., Sp. Pl. IV: 301 (1820).

Senecio pedunculare Griseb., Spicil. Fl. Rumelica II: 224 (1843-44) is a very different plant.

Culcicium peruvianum Klatt, Naturhof. Hofm. 9: 363 (1894). See **Senecio culciklattii** Cuatr., nom. nov.

The name *Senecio peruvianus* Pers. (Synops. II: 436, (1807)) refers to another species.

Culcitium Pflanzii Perkins, in Engl. Bot. Jahrb. XLIX: 229 (1913). See **Senecio Pflanzii** (Perkins) Cuatr., nov. comb.

Culcitium pichinchense Cuatr., An. Univ. Madrid, IV, fasc. 2°: 215 (1935). See **Senecio pichinchensis** (Cuatr.) Cuatr., nov. comb.

This invalidates the later name of Greenman, *S. pichinchensis* An. Miss. Bot. G. XXV: 814 (1938) for which I have proposed the new name *Senecio vulcanopichis.*

Culcitium Poeppigii DC., Prodr. VI: 324 (1837). See **Senecio Poeppigii** (DC.) Cuatr., nov. comb. *Cacalia candicans* Poepp. pl. exs. 670 ex DC. pro synon. ("a Senecione candicante omnine differt.").

Culcitium puracense Cuatr., Not. Fl. Colomb. VI: 31 (1944). See **Senecio puracensis** (Cuatr.), Cuatr., nov. comb.

Culcitium reflexum HBK, Nov. Gen. et Sp. Pl. IV: 171 (1820). See **Senecio reflexus** (HBK) Cuatr., nov. comb. See above *Culcitium ovatum.*

Culcitium rex Sandwith, Kew Bull. 1941: 224 (1942). See **Senecio rex** (Sandwith) Cuatr., nov. comb.

Apart from its affinity with *S. gelidus* Wedd., suggested by Sandwith in his original paper, it is probably also related to *Senecio quicanensis* Cuatr.

Culcitium rosmarinifolium Benth., Pl. Hartw.: 207 (1845). See **Senecio romeroides** Cuatr., nom. nov.

Linnaeus designated earlier another species as *Senecio rosmarinifolius* (L.f., Supl.: 369).

Culcitium rufescens H. et B., Pl. Aeq. II: 1, t. 66 (1809). See **Senecio rufescens** (H. et B.) Cuatr., nov. comb.

For *Senecio rufescens* DC., Prodr. VI: 413 (1837) I have proposed *Senecio austrorufescens*.

Culcitium salicinum Spreng., Synop. III: 431 (1826). *Bedfordia salicina* DC., Prodr. VI: 333 and 441 (1837). *Cacalia salicina* Labill. This is an Australian species.

Culcitium suntanderense Cuatr., Rev. Acad. Colomb. C. E. F. y Nat., vol. V: 28, t. 3 (1942). See **Senecio santanderensis** (Cuatr.) Cuatr., nov. comb.

Culcitium serratifolium Meyen et Walp., Nov. Acta Natur. Cur. XIX Sup. I: 279 (1843). See **Senecio serratifolius** (Meyen et Walp.) Cuatr., nov. comb.

Culcitium sessile Speg., Rev. Agron. La Plata 3: 533 (1897). See **Senecio neosessilis** Cuatr., nom. nov.

Earlier two species of *Senecio* were given the same epithet by Spegazzini: *S. sessilis* Thumb., Prodr. Pl. Cab.: 158 (1794-1800) and *S. sessilis* Vell., Fl. Flum. VIII t. 106 (1827).

Culcitium Sodiroi Hieron., Engl. Bot. Jahrb. 29: 63 (1900). See **Senecio Sodiroi** (Hieron.) Cuatr., nov. comb.

In place of *S. Sodiroi* Hieron., Engl. Bot. Jahrb. 29: 73 (1900) I have proposed *Senecio Sodirscandens*.

Culcitium Stuckertii Beauv., Bull. Sc. Bot. Geneve, ser. 2, 7: 185 (1916). Nomen nudum.

According to Beauver this plant was found in Cordoba (Argentine) by Th. Stuckert, but was never published.

Culcitium tenellum Dusen, Scott Rep. Princeton Univ. Exp. Patag. VIII, Supl. 267 tab. III. 6 (1914). See **Senecio culcitenellus** Cuatr., nom. nov.

Senecio tenellus DC., Prodr. VI: 379 (1837), is another species from the Cape of Good Hope.

Culcitium uniflorum Hieron., Engl. Bot. Jahrb. 19: 63 (1894). See **Senecio reflexus** (HBK) Cuatr., nov. comb., not *S. reflexus* (HBK). See above *Culcitium ovatum*.

Culcitium radiatum Wedd., Chl. And. I: 126 (1855). See **Senecio latiflorus** Wedd., loc. cit. 125.

Sect. **Culcitium** (H. et B.) Cuatr., nov. comb. *Culcitium* H. et B., Pl. Aeq. II: 1.

Homogama. Herbacea foliis basilaribus plerumque elongatis rosulatis subrosulatis vel fasciculatis. Calyculus plus minusve manifeste pluriseriatus.

Senecio rufescens (H. et B.) Cuatr., *S. canescens* (HBK) Cuatr., *S. boyacensis* Cuatr., *S. Candollii* Wedd., *S. cocuyanus* Cuatr., *S. culcitenellus* Cuatr., *S. culcitioides* Wedd., *S. ferrugineus* (Klatt) Cuatr.,

S. glacialis (M. et W.) Cuatr., *S. Haenkeanus* Cuatr., *S. hypsobates* Wedd., *S. magellanicus* H. et A., *S. Neeanus* Cuatr., *S. neosessilis* Cuatr., *S. nivalis* (HBK) Cuatr., *S. santanderensis* Cuatr., *S. serratifolius* (M. et W.) Cuatr., *S. summus* Cuatr.

Sect. **Reflexus** Cuatr., nov. sect.

Homogama. Suffruticosa vel fruticulosa basi plerumque ramosa reptans ramis foliosis erectis alternifoliis. Calyculus pluriseriatus vel irregulariter 2-1 seriatus.

Senecio reflexus (HBK) Cuatr., *S. culciklattii* Cuatr., *S. Gargantanus* Cuatr., *S. gelidus* Wedd., *S. guicanensis* Cuatr., *S. lingulatum* (Schlecht.) Cuatr., *S. neoascendens* Cuatr., *S. neodenticulatus* Cuatr., *S. Pavonii* (Wedd.) Cuatr., *S. pachypus* Greenm.. *S. Pflanzii* (Perk.) Cuatr., *S. pichinchensis* Cuatr., *S. puracensis* Cuatr., *S. rex* (Sandw.) Cuatr., *S. romeroides* Cuatr., *S. sabulosus* DC., *S. sodiroi* (Hier.) Cuatr., *S. viridi-albus* Cuatr.

Sect. **Latiflorus** Cuatr., nov. sect.

Heterogama. Herbacea foliis basilaribus plus minusve rosulatis vel fasciculatis. Calyculus pluriseriatus gradatim in involucrum commutatus.

Senecio latiflorus Wedd., *S. niveo-aureus* Cuatr., *S. almorzaderonis* Cuatr., *S. rubrilacunae* Cuatr.

Gongylolepis colombiana (Cuatr.) Cuatr., nov. comb.—*Neocaldasia colombiana* Cuatr., Notas a la Flora de Colombia VI: 16, Cali 1944.

When I described this species, I failed to consider the genus *Gongylolepis* because it was not included in the treatise of the Compositae by Hoffmann in the Pflanzenfamilien and it appeared as a synonym of *Stifftia* in Bentham and Hooker's Genera Plantarum. At that time I did not have access to the original article by Schomburgk and the later one by Blake as well as other necessary literature. Thanks to the Library and Herbarium of the Chicago Natural History Museum and fine specimens received in loan from the U. S. N. H., I was able to determine the true affinity of this species.

G. colombiana is a rather rare species of the low Andean region of the mountains at the boundary between Colombia and Venezuela, where it had been collected before I found it in Colombia. In spite of this fact, it remained unknown because it was confused with *G. Benthamiana* Rob, Schomb. and was filed as such in herbaria. On the basis of the original description, type photograph and the excellent material recently collected by Steyermark near the locality (Gran Sabana, Venezuela-Guayana) where Schomburgk collected the plants originally, I was able to establish the characteristics of this species and to compare it with the plants from the Cordillera.

G. colombiana can be distinguished by the following characters: corymbose or corymbose-paniculate inflorescence born on branchlets and peduncles covered with leaves; leaves more elliptical, less coriaceous, flexible, with more delicate reticulation; larger heads with an involucre 42-45 cm. high; receptacle with deep alveoles the edges of which have thick and high scales; long corolla; tube of the anther 15 mm. long; appendix of the anthers truncate or obtuse; style globate-bulbose at the base, in the mature flower separated from the ovary by a small pedicel; pappus 22-25 mm. long, with stiff hairs.

By comparison, *G. Benthamiana* has: inflorescences elevated on long exfoliate peduncles much higher than the leaves and subtended by a few bracts at the point of branching off; leaves very thick, stiff, coriaceous, more spathulated, with much more prominent reticulation; smaller heads with involucre 32-35 mm. high and a greater number of orbiculate bracts; alveoles of the receptacle less deep; shorter corolla; tube of the anthers 6-7 mm. long; appendix of the anthers acute or attenuate; base of the style slightly conical and sometimes bulbose (Schomburgk described the style as not bulbose); shorter pappus, 15 mm. long., with finer hairs.

I have seen the following specimens:

Gongylolepis colombiana (Cuatr.) Cuatr.

Cuatr. 13435 - Colombia, Dep. N. de Santander: Sarare, Estrecho o Callejón de Margüa en Peña de los Micos, 1100 m. alt. (H.N.C., U.S., F.).

Mosquera 2 - Colombia, Dep. Santander: San Juan, 2000 met. alt. (H.N.C., F.).

Woronow 7062 - Colombia (?). In sylva ad fincam "Francia" 22 Aug. 1926 (US).

A. Jahn 91 - Venezuela, Táchira; El Alto, between Pregonero et Guaraque, alt. 1700 m., March 1911 (US).

J.A.Steyermark 56445 - Venezuela, Mérida: along head waters of Río Canaguá at Río Arriba, southwest of Canaguá, alt. 1800-1890 met. May 10, 1944 (F.).

J.A.Steyermark 56561 - Venezuela, Mérida: dwarf woods below páramo above San Isidro Alto, alt. 1820 met., May 14, 1944 (F.).

Gongylolepis Benthamiana R. Schomb.

G.H.H. Tate 1323 - Venezuela: Mount Auyan-Tepuí 1937-1938 (US)

J.A.Steyermark 59501 - Venezuela, Bolívar: Ptari-tepui on forested south facing slopes overlying sandstone on Cave Rock above Cave Camp, alt. 1810 m.,

Oct. 29, 1944 (F.)

J.A.Steyermark 59392 - Venezuela, Bolívar: Gran Sabana between Misión of Santa Teresita de Kavanayen northwest to Rio Karuai, on large mesa, alt. 1220 m., Oct. 26, 1944 (F.).

STUDIES IN SOUTH AMERICAN PLANTS - II

This second series[1] includes taxonomic considerations and descriptions of plants collected mainly by the author in Colombia, chiefly new species of Santalaceae, Rosaceae, Meliaceae, Celastraceae, Sterculiaceae, Bombacaceae, Lacistemaceae, Violaceae, Flacourtiaceae, Rhizophoraceae, Combretaceae, Symplocaceae and Styracaceae.

SANTALACEAE

Acanthosyris colombiana (A. C. Smith) Cuatr., nov. comb.--*Cervantesia colombiana* A. C. Smith, Trop. Woods 51: 14, 1937.

Colombia, Atlantico, Arroyo Piedras collected Dugand 991; Juan Mina, Dugand 1090; Guajaro, Dugand 563; Casacoima, Dugand 409 & 858 (Field Museum No. 782238).

The foliage of Dugand 858 agrees completely with other numbers quoted by A. C. Smith in his original description, in spite of being the end of a young branch. The fruits of this number, as stated by A. C. Smith, are very different from those of the other species of *Cervantesia*. For this reason I believe that this interesting plant, known as "Matamaiz" in the North Atlantic region of Colombia, belongs to the genus *Acanthosyris*. The characters of the flowers, too, agree with this genus.

Cervantesia macrocarpa Cuatr., sp. nov.

Arbor 15 met. alta caule 20 cm. diam., ramulis terminalibus dense crispo-tomentosis rubescentibus.

Folia coriacea simplicia alterna. Petiolus 8.12 mm. longus tomentosus. Lamina elliptico-oblonga, utrinque obtusa vel rotundata, plerumque 7.5-13 cm. long. 22-38 mm. lata, margine revoluta; supra denique glabra nitida, nervo medio signato plus minusve tomentuloso, lateralibus 8-10 utroque latere patulis parum conspicuis; subtus densissime crasseque ferruginoso crispo-tomentosa, nervo medio valde prominenti rubrotomentoso, reliquis nervis inconspicuis.

Ramuli fructiferi elongati tortuosi crassiusculi rubescenti-tomentosi. Fructi drupacei sessiles rubri subrotundati profunde 5-sulcati maturitate plerumque 2.5 cm. diam.

Type: Colombia, Dep. Cauca. Cordillera Central: Quebrada de Santo Domingo 2740-2640 m. alt. 15-XII-1944 colect. J. Cuatrecasas

[1]The first installment of this series was published in Lloydia, vol. XI: 185 (Sept. 1948).

19330. "Arbol 15 met. alt. Tallo 20 cm. diam. Frutos rojos con 5 profundos surcos y costillas estrellados, 25 mm. diam."

This species of *Cervantesia*, the first record of this genus actually known from Colombia, is very closely related to *C. tomentosa* R. & P. and *C. bicolor* Cav. From these it can be distinguished for its elongate, elliptical, mostly larger leaves, and the larger fruits. The dense indument of the lower side of the leaves is definitely crisp and, in this respect, *C. macrocarpa* approaches *C. bicolor;* the latter, however, has thicker, coriaceous leaves.

ROSACEAE

Prunus strobilifera Cuatr., sp. nov.

Arbor 20 met. alt. Caulis 50 cm. diam. cortice pallido-brunneo rugoso sectione roseo-brunneo. Lignum durum roseo-ochraceum demum rubescenti. Ramuli grisei rugosi satis lenticellati glabri.

Folia simplicia alterna petiolata coriacea glaberrima. Petiolus longus erectus viridi-rubescens 10-14 mm. longus supra canaliculatus. Lamina elliptica vel obovato elliptica basi apiceque obtusiuscula 6-11 cm. longa x 2.6-5 cm. lata, margine integerrima leviter incrassato-revoluta, supra viridis nitida, in sicco lutescens, laevis nervo medio sulcato reliquis obsoletis; infra valde pallida, in sicco luteo-rubescens costa crassa nervis lateralibus 6 paribus ascendentibus angulo acuto prominulis reliquis immersis inconspicuis.

Racemi axillares solitarii quam folia valde breviores sessiles. Rhachis robusta angulata 2-4 cm. longa glabra. Pedicelli mediocri, 1-2 mm. longi glabri albidi. Cupula turbinata 1.5-2 mm. longa glabra. Sepala triangularia 1 mm. longa glabra. Stamina 16-20 alba antheris ellipticis 0.5 mm. longis. Petala alba glabra unguiculata suborbiculata 1,5-2 mm. lata longeque. Stylus staminibus brevior. Drupa viridis 10 x 12 mm. sub-globosa apiculata, nucula 9-10 mm.

Gemmae inflorescentiae strobiliformes ellipticae sessiles 8-12 mm. long. 4-5 mm. latae, alabastra bracteis squamiformibus viridi-albis late ovatis acutis 2-3 mm. longis amplectentibus dense imbricatis sufulcientia.

Type: Colombia, Depart. Valle. Cordillera Occidental, filo de la Cordillera al sur de Las Brisas 1850-1750 m. alt. (entre Las Brisas y La Marina), 27-X-1946 colect. J. Cuatrecasas 22674. "Arbol 20 met. Tallo 50 cm. diám. Corteza pardo clara rugosa sección pardo rosada. Madera dura, ocráceo rosada que va enrojeciendo. Hoja coriácea, flexible, verde brillante ház, blanquecina envés. Capullos de la inflorescencia blanco verdosos. Pétalos blancos. Filamentos y anteras blancos. Fruto verde claro, apiculado 10 x 12 mm. (F.).

P. strobilifera is well characterized by the young strobiliform axillary inflorescences bearing imbricate whitish bracts which persist for a long time. Characteristic of this species are also its rather small elliptic leaves with thick margins and long petioles. These characters differen-

tiate it from the closely related species *P. Ruiziana* Koehne. Contrary to the opinion of Koehne himself, the latter in turn is very different from *P. Moritziana* Koehne.

Prunus falcata Cuatr., sp. nov.

Arbor 10 metralis. Caulis 40 cm. diam. cortice griseo ruguloso, sectione roseo succoso, ligno sub-duro albo mox roseo. Rami ramulique glabri brunnei lenticellati, conferti, visu densi virides nitidi.

Folia alterna simplicia petiolata crasso-coriacea glaberrima. Petiolus 3-4 mm. longus crassiusculus supra sulcatus. Lamina obovata 4-6 cm. longa 3-4 cm. lata, basi truncata vel rotundata apice abrupte attenuata acutiuscula margine integra crassa revoluta; supra atroviridis opaca laevis nervo medio impresso secundariis parum notatis; infra pallido-viridis costa crassa nervis secundariis 6 utroque latere divergentibus prominulis marginem versus anastomosantibus evanescentibus reliquis nervulis laxe reticulatis obsoletis. Rami hornotini valde foliosi stipulis (per pares) 6-7 mm. longis 2-3 mm. latis valde falcatis persistentibus ornati.

Racemi axillares vel subterminales solitarii, longe pedunculati 9-12 cm. longi, rhachi erecta robusta angulata glabra. Pedicelli mediocri 2.5-3.5 mm. longi glabri. Cupula turbinata 2 mm. longa utrinque glabra. Sepala triangularia 1 mm. longa. Stamina circa 20, antheris 1 mm. longis. Stylus 2.5 mm. longus. Drupa circa 2 cm. diam. subglobosa, nucula 12-14 mm. diam.

Type: Colombia, Departamento del Valle. Cordillera Central, Hoya del río Bugalagrande: Cuchilla de Barragán, entre Las Azules y Las Violetas 3100 m. alt. 16 abril 1946 legit. J. Cuatrecasas 20816. "Arbol. Tallo 40 cm. diam. copa densa, verde brillante a distancia. Corteza gris, rugulosa, sección cárnea zumosa. Madera blanca que se torna rosada, bastante dura. Hoja coriácea, crasiúscula, verde oscuro mate ház, verde claro envés." (F.)

Prunus falcata is well characterized by its coriaceous leaves, which have revolute margins and slightly raised veins, by the relatively large fruits, and especially by the sickle-shaped persistent stipules.

Prunus muris Cuatr., sp. nov.

Arbor circa 8-metralis. Ramuli brunnei cortice ruguloso plus minusve tuberculati lenticellati glabri.

Folia simplicia alterna coriacea petiolata. Petiolus 7-10 mm. longus glaber supra sulcatus basi incrassatus. Lamina ovata 7-11,5 cm. longa 3.7-6.3 cm. lata basi rotundata margine levissime ad petiolum decurrens, apice attenuata acutiuscula, margine integra utrinque glabra; supra atroviridis nervo medio depresso lateralibus et laxo reticulo notatis; infra pallido virens costa valde crassa, nervis secundariis 7-8 utroque latere valde prominentibus arcuato patentibus marginem versus anastomosantibus, tertiaribus laxum reticulum prominulum formantibus.

Racemi axillares solitarii fructiferi 7-10 cm. longi rhachi robusta glabra angulato-striata rubescenti. Pedicelli fructiferi erecti crassiusculi glabri 6-7 mm. longi, in sicco 1.5 mm. crassi, apice parum discum reliqui cupulis ferentes. Drupae globosae parum elongatae apice mucronata nigra 15 mm. diam. putamine crasso nucula coriacea 10 mm. diam.

Type: Colombia, Dep. del Valle. Los Farallones, vert. NW: Quebrada del Ratón, sobre la Mina El Diamente, 2950-3000 m. alt., 30-VII 1946 legit. J. Cuatrecasas 21765. "Arbol. Hoja coriácea, verde oscura ház, verde clara envés. Fruto negro globoso alargado, 15 mm." (F.)

Although closely related to *P. rugosa* Koehne, *Prunus muris* differs from it by the prominent veins on the lower side of the leaves, which are not bullate as in the Equatorian species. *P. buxifolia* Koehne has much smaller leaves which have less prominent nerves and shorter petioles.

Hirtella enneandra Cuatr., sp. nov.

Arbor grandis, 20 met. alta. Caulis 40 cm. diam. cortice sublaeve fusco, interiore facie opaco-ochraceo, ligno lutescenti-albo. Ramuli grisei cortice subruguloso lenticellati-tuberculato, valde juveniles virides sparse pilosi mox glabri.

Folia simplicia alterna petiolata coriacea glabra. Petiolus teneris sed robustus teres 2-4 mm. longus aliquando sparsis minutis pilis munitus. Lamina elliptico-lanceolata basim versus paulum angustata obtusa apice longe acuminata 4.5-11.5 cm. longa x 18-38 mm. lata, margine integra et plana; supra in vivo atroviridis nitens, nervo medio incrassato glabro vel sparsis minutis pilis, nervis secundariis filiforme prominulis reliquis minutum reticulum prominulum formantibus; subtus viridis costa crassa prominenti praecipue glabra nervis lateralibus 8-10 utroque latere arcuato ascendentibus, linearibus parum elevatis reliquis venulis subinmersis reticulatis minus conspicuis. Stipulae lanceolatae hirsutae 2-3 mm. longae valde deciduae.

Inflorescentiae axillares vel pseudoterminales racemosae, circa 12 floribus foliis breviores. Rhachis 3-5 cm. longa parce puberula. Bracteae lanceolatae acutae 1-1,5 mm. longae. Pedicelli 6-10 mm. longi puberuli parte media subarticulati bibracteolati. Hypanthium campanulatum 5-6 mm. long., 2.5 mm. crassum extus viride parce puberulum intus pariete glabro sed fauce annulo hirsutissimo praeditum. Sepala viridia ovata 4 mm. longa 2-2.5 mm. lata obtusa extus puberula intus dense adpresseque tomentulosa. Petala elliptica glabra alba 4 mm. longa. Stamina 9 omnia fertilia filamentis albis circa 10 mm. longis plus minusve pilosis antheris rotundatis 0.5 mm. Stylus erectus parce pilosus stamina paulo longior stigmate subtruncato.

Type: Colombia, Dep. del Valle. Cordillera Occidental Hoya del río Cali: Baga de la Tulia, monte 2000-1850 m. alt. 30-X-1944 colect. J. Cuatrecasas 18370. "Arbol 20 met. alt. Tallo 40 cm. diam. Corteza

pardo rojiza, interiormente ocráceo apagada. Madera blanco amarillenta. Hoja coriácea, delgada, rígida, verde oscura, brillante ház. Cáliz y capullos verdes. Pétalos y estambres blancos." (F.)

Hirtella enneandra differs from all other species of this genus by its coriaceous, glabrous leaves and flowers with nine fertile stamens.

Hirtella tubiflora Cuatr., sp. nov.

Arbor grandis, 20 met. alta. Caulis 30 cm. diam. cortice sublaevi fuscescenti sectione carneo ligno duro rubescenti. Ramuli grisei juveniles tomentulosi denique glabrati.

Folia simplicia alterna membranacea. Petiolus valde brevis teres robustus hirsutulus circa 2 mm. longus. Lamina lanceolata vel elliptico-lanceolata basi attenuata obtuse cuneata apice angustata acuminata, 5-10 cm. longa, 2-3 cm. lata margine integra; supra viridis vel griseo viridis subnitida sparsis minutis pilis munita nervo medio elevato minute pubescenti, nervis secundariis obsoletis reliquis minute reticulatis reticulo sublente elevato conspicuo; subtus pallidior sparse pilosa costa eminenti hirsutula nervis lateralibus arcuatis ascendentibus 10-12 utroque latere plus minusve prominulis puberulis alliquis venulis laxe reticulatis obsoletis. Stipulae anguste lineares acutae pubescentes circa 5 mm. longae.

Inflorescentiae axillares racemosae 12-20 floribus precipue curvatae quam folia breviores vel aequilongae. Rhachis tenuis pubescenti-hirsuta 3-6 cm. longa. Bracteae lanceolatae acutae puberulae 2-3 mm. longae. Pedicelli bractea breviores 1-1.5 mm. longi, pubescentes, apice duobus bracteis ad florum muniti.

Hypanthium anguste longeque tubulosum 5-6 mm. long. 0.6-0.7 mm. lat. extus luteolo-viride pubescente intus glabrum sed fauce valde hirsutum. Sepala elliptica luteo viridia 2.5-3 mm. longa 1-1.5 mm. lata extus villoso pubescentia, intus adpresse tomentulosa, margine subdenticulata dentibus glandulis rotundatis nitidis valde conspicuis ornata. Petala alba elliptico-oblonga, obtusa basi anguste unguiculata 4 mm. longa 1-1.5 mm. lata glabra. Stamina plerumque 7 fertilia filamentis albis 6-7 mm. longis, antheris rotundatis. Stylus parum longior albus sparse hirtus stigmate subtruncato. Ovarium hirsutum. Drupa elliptico-obovoidea basim angustata epicarpio violaceo-nigrescenti parce puberulo, 22 mm. longa x 12 mm. lata nucula elongata 18-20 mm. longa, 6 mm. crassa.

Type: Colombia, Dep. del Valle. Río Calima (región del Chocó) loma frente a Quebrada de la Brea, 30-50 met. alt. 22-V-1946 colect. J. Cuatrecasas 21183. "Arbol 20 met. Tallo 30 cm. diam. Corteza delgada, sublisa, pardusca, sección cárnea. Madera dura roja albura rosado ocrácea. Hoja delgada rígida, semicoriácea, verde grisácea semibrillante. Cáliz amarillo verdoso claro. Pétalos y filamentos blancos. Fruto negro violáceo, 22 x 12 mm." (F.)

Hirtella tubiflora can readily be distinguished by two important characters, namely the long, capillary tube of the receptacle and the sepals which bear at their margins thick, rounded glands.

Hirtella racemosa Lam. var. **metallica** Cuatr., var. nova.

Folia ovato elliptica basi rotundata emarginata apice obtusiuscule acuminata coriacea margine parum revoluta in vivo pallido-viridia, in sicco supra virido-violacea, subtus roseo-violacea utrinque visu metallico-nitida, nervis subtus eminentibus inter eos superficie depressa, aspectu suaviter subbullata.

Type: Colombia, Dep. del Valle. Costa del Pacifico: Bahía de Buenaventura, Quebrada de San Joaquiń 0-10 met. alt. colect. 22-II-1946 J. Cuatrecasas 19925. "Arbol 15 met. Tallo 12 cm. diam. Corteza sublisa, grisáceo-ocrácea clara, sección sepia. Madera pardo rosada clara, exteriormente ocrácea. Hoja coriácea, delgada rígida, verde clara semibrillante haz, mas clara envés. Inflorescencias terminales o subterminales largas; raquis verdoso rojizo. Capullos verdosos." (F.)

The texture and shiny appearance of the leaves of this variety of *Hirtella racemosa* are striking. The nerves on the lower side are prominent, whereas those of the upper side are depressed, forming an undulated surface. When dry, they become violaceous and are especially shiny on the under side.

Licania velata Cuatr., sp. nov.

Arbor usque ad 35 met. alta. Caulis ad 40 cm. diam. cortice granuloso fusco fragili sectione roseo-brunneo, ligno fusco-rubescenti duro. Ramuli fusco-grisei plus minusve granulosi terminationes versus tomentulosi. Ramuli foliaque hornotini omnino cum tenui continuo arachnoideo velo albicanti obtecti.

Folia simplicia alterna coriacea petiolata. Petiolus validus teres puberulus satis incrassatus, apice abrupte angustatus, 12-16 mm. longus. Lamina elliptico-oblonga vel obovato-elliptico oblonga utrinque attenuata basi cuneata apice subrotundata vel parum angustata acute breviterque cuspidata margine laevis, 15-36 cm. longa x 6-11 cm. lata, juvenilis utrinque pallide glauca cum subtili fragili arachnoidea membrana velata; adultior nuda viridis, supra in sicco fuscescens glabra vel sparsissimis pilis simplicibus munita, costa elevata nervis secundariis notatis; infra sub lente minutissimo indumento araneoso veli reliquorum notato, costa valde eminenti robusta glaberrima, nervis lateralibus saepe 11 paribus prominentibus glabris angulo aperto ad marginem abrupte curvatis evanescenti-anastomosatis, nervulis prominulis vel obsoletis laxe reticulatis. Stipulae sub-intra-petiolares lineari-lanceolatae 15-25 mm. longae flexuosae intus puberulae extus arachnoideo velatae, deinde nudae, basi petiolo adnata squamosa persistenti reliqua parte decidua.

Paniculae axillares et post-axillares ex insertione valde ramosae pyramidatae floribundae 6-18 cm. longae. Rhachis ramulique dense

arachnoideo-tomentosi ochraceo-cinerei. Bracteae ovatae 5-2 mm. long. (apicem versus inflorescentiae decrescentes) puberulae at arachnoideo-tomentosae denique glabrescentes. Flores sessiles vel subsessiles solitari vel glomerati confertissimi, bracteolis ovatis obtusis puberuli-araneosis suffulti. Hypanthium campanulato-urceolatum 2 mm. longus dense tomentoso-araneosum albo-ochraceum, intus longis albis setis vestitum; sepala triangularia 1 mm. long., extus tomentello-arachnoidea, intus puberula. Petala elliptica apice obtusa basi attenuata leviter araneoso-tomentella 1,5 mm. long. 0,7 mm. lata. Stamina 10-15 valde inaequilonga filamenta basi in corona membranacea connata valde barbata tantum 3-5 fertilia, sepala longitudinem aequantia. Ovarium globoso ovoideum fundo receptaculi insertum, copiose barbato-lanatum 1 mm. longum. Stylus basilaribus 2-2,5 mm. longus longe setosus, stigmate sublobato.

Type: Colombia, Dep. Valle. bajo Río Calima (región del Chocó): margen derecha frente a Quebrada de la Brea, 30-50 met. alta, 22-V-1946 colect. J. Cuatrecasas 21179. "Arbol 25 met. Tallo 25 cm. diam. Hoja coriácea, delgada, rígida, verde clara, las tiernas glauco pálidas. Flores blanco ocráceas. Corteza pardo rojiza granulosa, quebradiza, sección pardo rosada. Madera ocráceo rosada ext., corazón pardo rojizo, duro." (F.)

Cotype: The same place. Cuatr. 21179-A. "Arbol 35 met. alt. Tallo 40 cm. diam." Form with larger leaves. (F.)

Licania velata resembles *L. platypus* in appearance but differs by its arachnoid veil which covers the leaves, stipules and young branchlets, by the shape and form of the leaves, which have more widely separated nerves, by the axillary inflorescences which are more tomentose and bear more flowers, and by smaller flowers and shorter stamens (*L. platypus* belongs to *Moquilea*, *L. velata* is a typical *Licania*). From its closest relative, *L. macrophylla*, *L. velata* is distinguished by the indument which protects the young branchlets and leaves, and the indument remaining on the lower side of the leaves, which are cuneate rather than round at the base, by the stronger and shorter panicles bearing a larger number of sessile flowers, and by the very different tomentum of the receptacle.

Licania durifolia Cuatr., sp. nov.

Arbor magna. Caulis 20 cm. altus 50 cm. diam., cortice roseo fusco granuloso sectione rubescenti-fusco, ligno duro roseo centro rubescenti. Ramuli crassi grisei rugulosi lenticellati juniores pubescenti-tomentosi denique glabrati.

Folia simplicia alterna petiolata crasso-coriacea rigida. Petiolus satis robustus 8-12 mm. longus teres supra sulcatus tomentellus. Lamina elliptica vel elliptico-oblonga basi rotundata vel truncata apice subrotundata abrupte breviterque cuspidata margine laevis anguste revoluta, 13-24 cm. longa, 4.5-9.5-12 cm. lata; supra viridis opaca, in sicco lutescens praeter costam puberulam glabra, nervo medio prominenti lateralibus depressis sub lente minutissimum prominulum reticu-

lum visibilis; subtus cinerea, in sicco ochracea, costa valida glabra, nervis lateralibus valde eminentibus circa 20 utroque latere angulo aperto ad marginem curvatis ascendentibus evanescentibus glabris inter nervos reticulum venulorum plerumque inconspicuum dense adpresseque crispo tomento tectum. Stipulae subulatae membranaceae 5-8 mm. longa valde deciduae.

Inflorescentiae terminales valde robustae divaricatae cum paniculis axillari-terminalibus compositae. Singulae paniculae usque ad 25 cm. longae 17 cm. latae basim ramosae pyramidatae; rhachis crassisima dense tomentoso-velutina basi bractea late ovata obtusiuscula 15 mm. longa, 20 mm. lata intus glabra extus tomentulosa suffulta; bracteis ramulorum parvis ovatis tomentulosis deciduis. Flores confertissimi sessiles tribracteolati bracteola ovato-acuta supra pubetula infra tomentulosa 2-3 mm. longa 1,5-2 mm. lata. Hypanthium urceolatum, basi rotundatum 3 mm. altus extus ochraceo-tomentosum, intus hirsutum. Sepala ovato-triangularia 1.5 mm. longa acutiuscula extus ochraceo-tomentosa, supra pubescentia albicantia. Petala alba orbicularia cochleata, 2.5-3 mm. mm., lamina glabra margine praeter basim dense ciliato-barbata. Stamina 15-25 basi in annulum membranaceum extus glabrum intus barbatum connata, filamentis albis inaequalibus glabris perianthium satis excedentis antheris globoso-ellipticis glabris lutescentibus. Ovarium globosum arachnoideo-tomentellum 1.5 mm. Stylus basilaris longe barbatus 6 mm. longus, stigmate breviter bilobato.

Fructus (no. 15331) subglobosus basi brevissime pyriformi attenuatus, 6-8 cm. long. pericarpio crasso coriaceo superficie tomentulosa irregulariter obtuseque angulata, monospermus. Semen subovoideum cotyledonibus magnis plano-convexis crassis fibrosis.

Type: Colombia, Dep. del Valle. Cordillera Occidental: monte La Güarida, filo de la cordillera sobre La Carbonera (entre Las Brisas y Albán) 1950-2000 m. alt. 18-X-1946 colect. J. Cuatrecasas 22251. "Gran árbol. Tallo 20 met. alt., 50 cm. diám. Corteza pardo rosada granugienta, sección pardo rojiza 12-15 mm. Madera dura rosada, centro rojiza. Hoja coriácea, rígida, frágil, verde medio mate ház, envés ceniciento. Inflorescencias terminales robustas divaricadas. Cáliz ocráceo, int. blanquecino." (F.)

Cotype: Colombia, Dep. del Valle. Cordillera Occidental: Hoya del río Dígua, lado derecho, La Elsa, bosques 1000-1200 m. alt. 9-XI-1943 colect. J. Cuatrecasas 15331. "Gran afbol, 40 met. alt. Tallo 70 cm. diam. Corteza gris verdosa clara, sección cárnea superficie interior rojo cárnea, zumo rojo resinoso fluido. Madera dura, rojiza. Hoja coriacea, rígida, verde ház, grisácea o sepia envés. Frutos en panículas terminales." (F.)

Licania durifolia is characterized by elliptic, large, thick, coriaceous leaves with prominent parallel nerves, by especially strong inflorescences, crowded at the end of the branches and forming a large, divaricate, terminal panicle, and by the size and shape of the numerous and sessile flowers. Among other members of the genus the large size

of the rotund or somewhat pyriform fruit with irregular angulate surface in *L. durifolia* is a striking feature. Specimen no. 15331 comes from a larger individual bearing larger leaves. It was used to characterize the fruit. I have no doubt that it belongs to the same species as the specimen from the forest of La Guardia.

Licania bullatifolia Cuatr., sp. nov.

Arbor magna. Ramuli grisei rugulosi tomentuloso-puberuli, hornotini dense ochraceo-tomentosi.

Folia simplicia alterna petiolata coriacea. Petiolus rigidus teres tomentulosus 8-12 mm. longus. Lamina ovato-orbiculata vel leviter oblonga basi profunde cordata apice rotundata, valde concava margine recurvata, inter nervos superficie bullata, 6-11 cm. longa x 5-9 cm. lata; supra juvenilis sparsis minutis pilis munita adulta glabra nitida in sicco rubescens, costa et nervis secundariis depressis; subtus cinerea adpresse arachnoideo-tomentosa, costa crassa valde elevata, nervis secundariis circa 15 paribus vix perpendicularibus tantum marginem versus ascendentibus valde elevatis reliquis nervulis minutum reticulum obsoletum formantibus. Stipulae ovato-lanceolatae acutae ochraceo-tomentosae 3-4 mm. longae deciduae.

Paniculae terminales divaricatae 15-22 cm. longae. Rhachis ramulique dense ochraceo-tomentosi. Bractea basilaris membranacea late ovato-oblonga circa 12 mm. longa, 5-6 mm. late extus ochraceo-tomentosa intus pubescens. Bracteae florales concavae late ovatae acutiusculae tomentosae 2-3 mm. longae basi amplectentia, alterae bracteolae lineari-ovatae 1.5 mm. longae x 1 mm. latae. Flores sessiles saepe 1-3 glomeratae. Hypanthium campanulato-urceolatum 2 mm. altus, extus et intus ochraceo tomentosum. Sepala triangularia acuta 1 mm. longa extus dense intus parce tomentulosa. Petala lineari-elliptica apice obtusa basim angustata 1.6-1,8 mm. longa, 0.6 mm. lata sparse lanato-tomentella. Stamina basi tubum lanatum coalita, filamentis fertilis circa 8 lanatis sepala aequilonga vel leviter excedentia. Ovarium 1.5 mm. tomentosum. Stylus basilaris filiformis pilosis 3 mm. longis.

Type: Colombia, Comisaría del Putumayo: selva higrófila del río Putumayo en Puerto Ospina ± 230 m. alt. 20-XI-1940 colect. J. Cuatrecasas 10865. "Gran árbol, madera blanca, dura." (F.)

Licania bullatifolia is closely related to *L. arborea* Seem. but differs from it by the bullate, concave leaves with bent margins, the basal sinus is much deeper and the petiole much longer than they are in the species from Panama. The flowers are hardly different, as they are only slightly smaller, the sepals are relatively longer, the hypanthium has a glabrous zone in the inside, the bracteoles are amplexicaul and broader not narrower at the base.

The rediscovery by P. H. Allen (no. 1741) of *L. arborea* Seeman in Panama enables me to state that this species is quite different from the species found in Mexico and Guatemala and assumed to be the same by the authors; Loeser was right in describing the last one as *L. Sesleriana*.

Licania calvescens Cuatr., sp. nov.

Arbor grandis. Ramuli grisei cortice ruguloso terminationibus hornotinis plus minusve pubescenti-hirtis.

Folia simplicia alterna coriacea petiolata. Petiolus teretiusculus paulo incrassatus 3-5 mm. longus puberulus. Lamina late lanceolata vel elliptico-lanceolata margine integra basi obtusa apice attenuata cuspidata 7-10.5 cm. longa 2.3-3.8 cm. lata; supra viridis vel lutescenti-viridis glabra nervo medio elevato, nervis secundariis filiformibus parum conspicuis, minuto reticulo venulorum bene notatis; subtus ferruginea costa crassiuscula eminenti hirsutula nervis lateralibus elevatis 10-11 utroque latere angulo acuto ascendentibus puberulis reliqua lamina minute venuloso-reticulata et araneoso-tomentulosa.

Panicula terminalis mediocris 6-7 cm. longa et expansa rhachi ramulis puberulis. Bracteae ovato lanceolatae parvae sub-glabrae. Flores sessiles solitariae vel binis insertae. Hypanthium 1-1,2 mm. longum extus parce puberulum palido-luteum intus glabrum. Sepala ovata obtusiuscula 1.4 mm. longa luteola extus subglabra intus tomentella. Petala nulla. Stamina circa 20 basi in brevem tubum extus glabrum intus barbatum adnata filamentis elongatis glabris calicem excedentibus, antheris orbicularibus luteolis. Ovarium globosum vix 1 mm. glabrum nitidum tantum basi longe barbatum. Stylus 2.5 mm. longus basi longe dense barbatus reliquo glaber.

Type: Colombia, Dep. del Valle. Costa del Pacífico; río Yurumanguí Veneral, bosques 5-50 met. alt., 31-I-1944 colect. J. Cuatrecasas 15835. "Árbol. Hoja coriácea verde o ± amarillenta ház, ferruginosa en el envés. Flor amarillo pálida."

Otro ejemplar (esteril) Colombia, Dep. del Valle, Costa del Pacífico; río Cajambre: Silva 5-80 met. alt., 8-V-1944 colect. J. Cuatrecasas 17431. "Árbol 25 met. alt. Tallo 30 cm. diám. Madera color castaño. Hoja coriácea, verde ház, verde grisácea envés." (F.)

Licania calvescens is similar to *L. Sprucei* (Hook. f.) Fr. but differs by its scarcely pubescent inflorescence and flowers. It is actually nearly glabrous. The species is named for the glabrous flower and ovary bearing only some long hairs at the base.

Licania minutiflora Cuatr., sp. nov.

Arbor grandis ramis divaricatis, ligno duro. Ramuli fusci lenticellato-tuberculati hornotini puberuli deinde glabri nitidi.

Folia membranaceo-coriacea simplicia alterna petiolata. Petiolus brevis crassus teres 4 mm. longus glaber. Lamina late elliptico lanceolata basi cuneata apice cuspidata 11-20 cm. longa x 4.2-8.5 cm. lata, margine integerrima, utrinque viridis subnitida; supra glabra costa paulo eminenti nerviis secundariis filiformibus notatis reliquis reticulo vix inconspicuo; subtus tantum minutis sparsissimis pilis munita costa prominenti, nervis lateralibus 6-8 paribus elevatis angulo obtuso marginem versus curvato ascendentibus inter eos arcuato anastomosatis,

reliquis nervulis obsoletum laxum reticulum formantibus. Stipulae lanceolatae hirsutulae valde deciduae.

Inflorescentiae axillares et subterminales copiosae, axi et ramis divaricatis teneribus pallide viridibus plus minusve flexuosis, saepe ad basim ramificatae fasciculatae simulantes, 10-20 cm. longae. Rhachis ramulique tenues puberuli minutis bracteis ovato lanceolatis (circa 1 mm. long.) muniti. Flores perparvae breviter pedicellati 1-4 in brevibus ramusculis dispositi; bracteolis fertilibus brevissimis ovatis acutis amplexi caulibus. Pedicelli teneres 0.5-1.5 mm. longi puberuli. Hypanthium turbinatum 9.7 mm. altum, 1.5 mm. amplum, extus sparsis adpressis pilis munitum intus villosum. Sepala albida late triangularia 0.4 mm. longa extus sparse pilosa intus glabra. Petala alba subrhomboideo spathulata basi attenuata apice obtusa inferne glabra apicem versus pubescentia. Filamenta staminorum in tubum monadelphum margine erosodentatum pilosumque extus glabrum intus subpuberulus, calycem aequilongum adnata. Antherae suborbiculares 3 vel 4 ad marginem tubum subsessiles. Ovarium longe barbatum. Stylus lateralis 0.8-1 mm. longus hirtus stigmate truncato glabro.

Type: Colombia, Intendencia del Chocó. Río San Juan, margen derecha, Quebrada de la Gloria (abajo de Palestina), 5 met. alt., 31-V-1946 colect. J. Cuatrecasas 21546. "Arbol. Madera dura. Hoja membranoso-cartilaginosa, verde semibrillante ház y envés. Ramas de la inflorescencia verde palídas. Perianto blanco." (F.)

Cotype: Colombia, Dep. del Valle; Río Calima (región del Chocó), margen derecha, playas en Pailón, 60 met. alt., 23-V-1946 colect. J. Cuatrecasas 21234. "Arbol con ramas divaricadas (en la orilla). Perianto blanco amarillento." (F.)

Licania minutiflora differs unmistakably from other known species of the genus by its minute flowers which scarcely exceed 1 mm. The receptacular tube is short, the staminal filaments form a tube as long as the sepals and irregularly dentate at the edge, the anthers are almost sessile and frequently only three are developed. The inflorescences of this species consist of numerous, thin, flexuose branchlets, and pedicellate flowers. The branchlets, bracts, and flowers are slightly pubescent. The leaves are flat but have on the lower side prominent secundary nerves which are widely separated, arched and fuse a short distance from the margin.

Licania chocoensis Cuatr., sp. nov.

Arbor. Ramuli extremis flexuosis pendulis cortice fusco granuloso glabrato.

Folia simplicia alterna petiolata membranaceo-coriacea. Petiolus teres incrassatus minute sparse pilosus, 8-11 mm. longus. Lamina viridis elliptico oblonga vel ovato-elliptica basi subrotundata vel obtuse cuneata apice leviter abrupte attenuata cuspidata, margine integerrima, 9-14 cm. long. 3.5-5.5 cm. lata, utrinque glabra; supra laevis nervo medio elevato secundariis depressis parum conspicuis nervulorum

reticulo inconspicuo; infra costa prominenti nervis lateralibus 9-11 paribus bene eminentibus arcuato ascendentibus ad marginem evanescentibus, venulorum reticulum minutum obsoletum.

Inflorescentiae terminales paniculatae 10-15 cm. longae usque ad 12 cm. expansae ramulis patentibus divaricatis. Rhachis ramulique plus minusve dense cinereo-tomentulosi. Bracteae inflorescentiae basi late ovatae obtusiuscula membranaceae puberulae rubescentes circa 7 mm. longa, 5 mm. lata; bracteae principales superiores late lineari-oblongae 7-4 mm. longae 3-2 mm. latae parce puberulae rubescentes, bracteae florales ovato-acutae amplectentes puberulae 3-1.5 mm. longae omnes deciduae (no. 17752). Brevissimi ramuli 1-3 mm. longi 1-5 flores pedicellatos ferentes. Pedicelli 0.1-2 mm. longi teneres tomentulosi.

Hypanthium hemisphaericum 1.2-1.8 mm. altum viride extus adpresse tomentulosum intus densissime tomentosum. Sepala deltoidea crassiuscula utrinque tomentoso-viridia 1 mm. longa. Petala alba orbicularia 1 mm. diam. extus glabra margine tomentuloso intus basi glabra apicem versus margineque tomentulosa (leviter ampliora quam longa) decidua. Stamina basi in annulum membranaceum crassiusculum valde barbatum coalita filamentis fertilibus glabris 12-14 sepala non superantia, antheris ellipticis glabris. Ovarium in crasso floccoso indumento lanato albo involutum. Stylus basilaris basi longe hirsutus apicem versus glaber 1 mm. longus.

Type: Colombia, Intendencia del Chocó; Río San Juan: Quebrada del Taparal, 5-20 m. alt. 30-V-1946 colect. J. Cuatrecasas 21455. "Arbol. Hoja membranoso-coriácea, verde. Cáliz verde. Pétalos amarillo-pálidos." (F.)

Cotype: Colombia, Dep. del Valle, Costa del Pacífico: río Cajambre, Quebrada del Corosal, 0-5 met. alt. 17-V-1944 J. Cuatrecasas 17752. "Arbol. Ramas pendulas. Hojas coriáceas. Flor blanca." (F.)

Licania chocoensis is related to *L. Poeppigi* Fritz and *L. heteromorpha* Benth. but can be distinguished by its thinner and more densely tomentose branchlets of the inflorescense, by its pedicellate flowers, by the lanate envelope of the ovary and also by its thinner leaves.

Number 15941 is a fruiting specimen, the leaves of which have slightly more distant nerves and in dry state are reddish on the upper side. In spite of this I think it belongs to the same species. Its fruits are elliptical or ovate-elliptic, 4 cm. long., 3 cm. lat., with a coriaceous, strongly granulate pericarp (background brown and the granules gray or ochraceous), and contain a simple seed with 2 large plano-convex cotyledons.

Couepia platycalyx Cuatr., sp. nov.

Arbor. Ramuli griseo-badi squamoso-striolulati lenticellati.

Folia alterna simplicia petiolata rigide coriacea glabra. Petiolus cylindraceus crassus 7-8 mm. longus. Lamina obovata vel obovato-

orbicularis basi rotundata vel truncata apice rotundata margine integra 8.5-12 cm. longa, 7-9 cm. lata, in sicco fusco-rufescens; supra laevis nervo medio elevato secundariis subimpressis bene notatis; subtus costa crassa elevata minutissimis sparsis adpressis pilis munita nervis secundariis 10-12 paribus elevatis angulo obtuso marginem versus arcuato ascendentibus anastomosantibus, reliquis nervulis laxe reticulatis conspicuis.

Inflorescentiae terminales basi foliosae paniculatae paucis ramis robustis patentibus praeditae, 15-25 cm. longae. Rhachis ramulique aspectu glabri sed minutissimis pilis sub lente conspicuis muniti. Flores zygomorphi subsessiles pedicellis usque 1.5 mm. longis crassis 1-4 in brevibus ramulis, 1-5 mm. longis glomerati. Receptaculum conico-planum obliquum 2 mm. profundus uni latero 3 mm., 4-5 mm. diamitens extus cum pedicello et calyce pallido-viride adpresse villosum intus tomentellum. Sepala 3-4 mm. longa ovato oblonga obtusa extus dense villosa, intus tomentulosa. Petala alba glabra inaequalia late rotundata 4 mm. longa, 5 mm. lata, vel ovato-rotundata plana vel cochleariformia. Stamina creberrima margine receptaculo inserta in orbem completum disposita, filamentis basi breviter connatis glabris filiformibus tortuosis sepala excedentia aestivatione circinnatis, evolutis 5-7 mm. longis.

Antherae parvae orbiculato-elliptica. Ovarium 2 mm. altus biovulatum angulatum densissime villosum, latere inferiore (magis elongato) marginis receptaculi insertum. Stylus basilaris crassiusculus basi villosus reliqum glaber curvatus 3 mm. long.

Type: Colombia, Dep. Cundinamarca, Cord. Oriental: Dintel, entre Facatativá y La Vega, 2700-2300 m. alt. 4-VI-1939 J. Cuatrecasas & E. Pérez Arbelaez 5336. "Arbol. Corolas blancas." (F.)

Couepia platycalyx represents an extraordinary member of this genus and of the *Chrysobalanoideae*. The receptacle is very short and open, nearly flat and oblique, 2 mm. high on one side and 3 mm. on the other, the ovary being inserted on the latter. On account of the strongly lateral insertion of the ovary and the numerous stamens this species must be included in *Couepia* in spite of the fact that it has commonly a long tubular receptacle. The genus *Hirtella*, too, contains several species with short receptacles.

MELIACEAE

Cedrela subandina Cuatr., sp. nov.

Arbor alta. Caulis 60 cm. diam. cortice crasso fusco-griseo sectione fusco-ochraceo, ligno albo roseo aromatico. Ramuli glabri fusci extremis viridibus lenticellati.

Folia alterna paripinnata subcoriacea glabra. Rhachis robusta cylindracea viridis 25-50 cm. longa. Foliola 7-9 paribus opposita ovato-elliptica oblonga asymmetrica basi truncata vel rotundata apice acuminata saepe cuspidata, 9-15 cm. longa x 3.3-5.5 cm. lata, margine inte-

gra supra nitida viridia nervo medio impresso lateralibus plus minus conspicuis minute reticulo elevato manifesto, subtus pallido-viridia costa prominenti nervis lateralibus 5-10 mm. distantibus prominulis patentibus ad marginem curvatis, reliquum reticulum conspicuum. Petioluli mediocres subcrassiusculi 2-3 mm. longi.

Panicula terminalis ramosa 15-25 mm. longa ramis viridibus glabris nitidis parce lenticellosis mediocriter robustis. Flores saepe subsessiles pedicellis brevissimis crassiusculis usque ad 2 mm. longis, puberulis. Bracteae ovato-lanceolatae puberulae minutae 1-2 mm. longae. Alabastra ovoideo-elliptica 2 mm. longa viridia nitida parce puberula. Calyx elongato-cupuliformis 3 mm. longus viridis parce puberulis 5-dentatus lobis brevibus triangularibus. Petala non totaliter evoluta verossimiliter magna extus dense albida tomentoso-villosa. Stamina glabra.

Capsula grandis 5 valvis coriaceo-lignosis 4-6 cm. longis. Semina elliptica basim versus abrupte unilateraliter angustata 3.5 cm. longa 13 mm. lata. (Fig. 4)

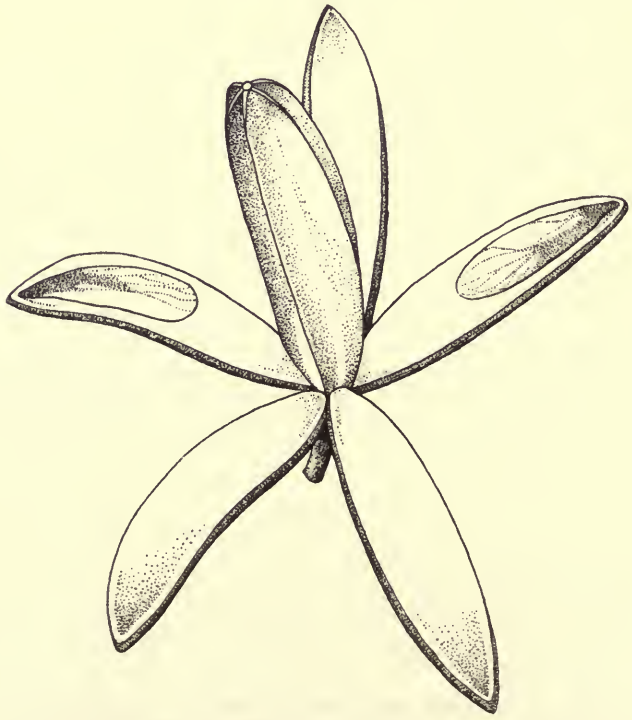


Fig. 4 *Cedrela subandina* Cuatr., open fruit (x 4/5)

Type: Colombia, Dep. del Valle. Hoya del río Cali, río Pichindé; entre Los Cárpatos y El Olivo, 1920-2025 met. alt. 6-VIII-1948 colect. J. Cuatrecasas 21956. "Tallo 60 cm. diám. Corteza gruesa gris pardusca clara, agrietada longitudinalmente sección ocráceo pardusca, algo zumosa. Madera blanco rosada aromática. Hoja subcoriácea, flexible, verde brillante haz, verde claro envés. Ramas inflorescencia y cáliz verde brillantes. Capullo de la corola blanquecino." (F.)

Cedrela subandina, a mountainous species, is closely related to *C. odorata,* from which it is distinguished by the larger, more elongate, cupuliform calyx with shorter teeth. The buds and immature flowers are larger. The inflorescences are firmer with nearly sessile flowers and short thick pedicels. The fruit of *C. subandina* is larger than that of typical *C. odorata* L. from the Antillean Islands, usually being 5 cm. and occasionally 6 cm. long, whereas the fruit of the Linnean species is only 3 cm. long. It differs from *C. mexicana* by its very short petioles, and from *C. bogotensis* Tr. et Pl. by its larger and more flexible leaves, the more acute calyx teeth, the less firm inflorescence which lacks the rufescent tomentum typical of the plant from Bogota. Three other specimens collected without flowers can be referred to this species: Cuatr. 18407 (Quebradahonda, hoya del rio Cali), 15570 and 15698 (La Laguna, hoya rio Sanquinini).

Guarea caulobotryis Cuatr., sp. nov.

Arbuscula. Folia paripinnata 4-5 jugis ad apicem caulis fasciculata. Rhachis modice robusta subcylindrica viridi-cinerea pubescens minutissimis pilis plus minus adpressis vestita circa 34 cm. longa basi cum petiolo 5-8 cm. longo 5-6 mm. crasso supra planiusculo basi incrassato. Foliola coriacea laete viridis opposita breviter et crasse petiolulata petiolulis 4-7 mm. longis; lamina elliptico-oblonga basi obtusa vel rotundata apice angustata acuta 28-38 cm. longa, 7-10.5 cm. lata sed inter eis inferiore paris ovata vel ovato-oblonga 8-15 cm. longa 6-8.5 cm. lata, margine integra subplana vel angustissime revoluta; supra glabra minute granulato-punctata et elevato reticulata nervo medio depresso parum conspicuo secundariis obsoletis; subtus puberula minutis sparsis pilis munita costa valida pubescenti nervis lateralibus minute pubescentibus elevatis 14-21 utroque latere ascendentibus ad marginem arcuatis evanescenti-anastomosantibus, venulis prominulis reticulatis.

Inflorescentiae simplices vel subsimplices racemosae cauligenae, breves ramos crasso-lignosos 0.5-2 cm. long. aphyllos terminantes. Axis racemi 8-26 cm. longus minute pubescens plus minusve flexuosus. Flores breviter pedicellati, pedicelli 0.5-2 mm. long circa basim articulati pubescentes, bracteis minutis triangularibus acutis pubescentibus quam pedicello brevioribus. Calyx cupuliformis minute puberulis 4 mm. diam., 2-3 mm. longus 4 lobulis subrotundatis parum profundis. Petala 4, late linearia obtusa 10 mm. longa, 3 mm. lata intus glabra extus sericea. Staminorum tubus glaber 8 mm. longus margine subintegrus. Antherae 8 oblongae utrinque obtusae 2 mm. longae sub margine sessiles inclusae. Gynophorum breve crassum cylindricum glabrum 1.5 mm. long. Ovarium dense sericeo-villosum 2.5 mm. long. Stylus

3 mm. longus dimidia parte inferiora villosulus apicem glaber. Stigma crassum discoideum.

Type: Colombia, Dep. Valle. Costa del Pacífico: río Naya bosque en Puerto Merizalde 20 met. alt. 23-II-1943 colect. J. Cuatrecasas 14103. "Arbolito. Racimos caulinares. Hojas en penachos terminales." (F.)

Cotype: Rhachis valde robusta 40 cm. longa. Foliola crasissime petiolulata petiolulo usque ad 15 mm. longo 7 mm. lato, maxima lamina 42 cm. longa et 20.5 cm. lata. Capsula obovato-oblonga plus minusve sulcata, 4 cm. long., pericarpio coriaceo ruguloso parce tomentuloso, 4 valvis. Semina elliptica rubra nitida, 18 mm. longa.

Colombia, Dep. El Valle, Costa del Pacífico: Rio Yurumanguí en Veneral, bosques 5-50 met. alt., 29-I-1944 colect. J. Cuatrecasas 15739. "Arbolito 10 met. alt. Tallo 10 cm. diam. Hoja coriácea, verde amarillenta envés con 3-4 pares de folíolos. Frutos caulinares. Semillas rojas, brillantes."

Guarea caulobotryis is characterized by the size of the elliptic, oblong leaflets, the upper side of which is minutely glandular-granulose. Other important characters of this species are: the racemose, short and cauline inflorescences, the leaves grouped in fascicles near the top of the trunk, the pentamerous flowers, and the villose ovary.

Guarea cartaguenya Cuatr., sp. nov.

Arbor magna ad 40 cm. altitudinam attingens. Caulis ad 60 cm. diam., cortice roseo-ochraceo peridermis separabilis, ligno lutescenti-rubescenti. Ramuli terminales badi tomentulosi.

Folia grandia paripinnata 7-9 paribus foliolis oppositis inferioribus alternis. Rhachis robusta adpresse viridi-ferrugineo-tomentosa plus minusve sulcata, ad 70 cm. longa. Petiolus brevis valde robustus subteres supra profunde sulcatus basi incrassato-vaginanti tomentulosus brunneus. Foliola coriacea petiolulo brevi robusto 4-8 mm. longo 3-5 mm. crasso; lamina elliptico-oblonga vel obovato oblonga basi obtusa vel rotundata vel interdum cuneata, apice rotundata vel obtusa mutica vel abrupte breviterque apiculata, margine integra, 22-38 cm. longa, 8-15 cm. lata, supra atroviridis glabra laevis tantum nervo medio impresso valde notato, lateralibus obsoletis reticulo venulorum parce prominulo plus minusve conspicuo; subtus pallido viridis pubescens pilis plus minus curvatis acutis subadpressis munita costa crassa tomentulosa eminenti nervis lateralibus prominentibus 18-28 utroque latere (vulgo 22-25) tomentulosis patentibus angulo obtuso ad marginem abrupte curvatis evanescentibus, venulis transversalibus prominulis reticulatis.

Paniculae fructiferae caulinares 20-40 cm. longa subsimplices rhachis valde robusta lignosa basi incrassata parce tomentulosa vel puberula ferruginea, ramulis, simili aspectu, superioribus unifloris inferioribus 1-3 floribus. Pedicelli fructiferi brevi valde incrassati lignosi. Fructus obovato-pyriformis 8-9 cm. long., 5-7 cm. latus apice rotunda-

tus basi valde angustatus, extus puberulus viridi-ferrugineus vel viridi-fuscus; pericarpio semi-duro fibroso 1 cm. crasso in vivo albo sed postremo ochraceo et rubescenti; 6 loculis seminibus albis superposite biseriatis.

Type: Colombia, Dept. del Valle. Cordillera Occidental, Hoya del río Anchicayá, rivera derecha bajando a La Planta bosques 200-350 m. alt. 27-XI-1943 colect. J. Cuatrecasas 15218. "Gran arbol, 30 met. alt. Tallo 60 cm. diám. Hojas paripinadas muy grandes, raquis 60 cm. long. folíolos coriáceos verde oscuros haz, claro envés, peciolo muy grueso con vaina gruesa parda. Frutos en panículas 40 cm. long. con ramitas gruesas robustas pardo tomentosas. Frutos piriformes, semiduros, gruesos 8 cm. long, 5-7 cm. lat. puberulentos, verdoso sucios o verdoso rojizos; carne blanca, al aire ocrácea o rojiza, pericarpo 1 cm. grueso. 6 cavidades con 6 filas de semillas regulares blancas. Pedúnculo corto, grueso." Nom. loc. "cartagüeño".

Cotype: Id. id., ribera derecha: Monos 250 m. alt. 5-X-1943 colect. J. Cuatrecasas 15258. "Arbol muy grande, 40 m. alt. 35 cm. diam., corteza ocráceo-cárnea con peridermo separable; base algo estribosa. Madera amarillo rojiza. Hoja paripinada con peciolo muy robusto y folíolos coriáceos. Fruto piriforme rojizo, 8-9 cm. long. x 5-6 cm. lat.," nom. loc. "cartagüeño". (F.)

Although *Guarea cartaguenya* is closely related to *G. caulobotryis*, it is a much better developed tree whose leaves are made up of more leaflets (7-9 pairs). The leaflets are more obtuse, larger and lack the granulate glands on the epidermis or they are very scarce, the pubescence is more obvious on the lower side of the leaves and the secondary nerves are closer together. The inflorescences are probably longer. The presumably indehiscent fruits are typical, have a thick, fibrous pericarp and 6 cavities each of which contains the superimposed seeds, usually 2; the base of the fruit is very narrow and looks like a continuation of the woody peduncle.

Guarea mancharra Cuatr., sp. nov.

Arbor 20 met. alt. Caulis 30 cm. diam., cortice albido-ochraceo sublaevi ligno brunnescenti extus pallido.

Folia paripinnata quinque juga, petiolo 6-9 cm. longo semiteres supra plano-canaliculato basi ampliato-vaginanti; rhachis subteres 24-35 cm. (cum petiolo) puberula minutissimis pilis munita. Foliola opposita coriacea petiolulata, petiolulo crasso-cylindraceo 7-10 mm. longo minute puberulo; lamina elliptico-oblonga, valde elongata 12-22 cm. longa 5-6 cm. lata pare inferiori adhuc quam proximo valde breviore (6.5-7 cm. long), margine integra leviter revoluta vel plana, in vivo atroviridis in herbario viridi-grisea supra laevis; glabra tantum nervo medio depresso notato reliquis obsoletis; subtus copiosis minutis pilis conicis acutis patentibus sub lente visibilis munita, nervo medio tomentello valde prominenti, secundariis 7-12 utroque latere prominentibus ascendentibus ad marginem curvatis evanescentibus, venulorum reticulo tenui parum prominulo.

Paniculae axillares subsimplices breves foliolis valde minores in specimina mea valde juveniles alabastrifera 2-3 cm. longa rhachi tomentella plus minusve striata bracteis triangulari-lanceolatis 2 mm. longis puberulis. Sepala petalaque extus pubescenti-villosa. Staminorum tubus glaber minute crenatus 9-10 antheris (in alabastris vidi) infra marginem insertae leviter exsertis. Ovarium glabrum.

Ramulus fructiferus valde brevis 2.5 cm. longus, robustus 3-5 fructos ferens. Fructus ficiformis puberulus 5 cm. longus pericarpio crassofibroso 6-locularibus.

Type: Colombia, Dep. del Valle. Bajo Calima (región del Chocó): La Esperanza 10 met. alt., 7-III-1844 colect. J. Cuatrecasas 16748. "Tallo 30 cm. diam. con estribos tabulares, corteza ocráceo blanquecina, casi lisa; madera con una faja externa amarillenta, el resto castaño. Hoja coriácea, verde oscura. Fruto en forma de higo, pardo, 5 cm. long.;" nombre local "mancharro". (F.)

Guarea mancharra is related to *G. cargaguenya* but differs by its smaller leaves and leaflets, the terminal ones being narrower and elliptic-elongate, longer petiolules, more widely separated and ascendent secondary nerves, the kind of indument and the shorter fruit shaped like a fig.

Guarea corrugata Cuatr., sp. nov.

Arbor 12 met. alta. Folia grandia paripinnata, 6-8 paribus foliolis oppositis inferioribus quam caeteris similibus pari superiore abbreviato tenui. Rhachis satis robusta sparse tomentulosa vel subglabra tetragona plus minusve quadrifariam sulcata. Petiolus usque 12 cm. longus subteres supra plano-sulcatus basi incrassatus. Petioluli 10-18 mm. long. robusti teretes supra sulcati. Lamina foliolorum coriacea atroviridis late elliptica basi subrotundata vel obtuse cuneata apice attenuata acuta vel breviter cuspidata, margine integra 12-30 cm. long., 6.5-12 cm. lat.; supra glabra nervo medio sulcato lateralibus parum conspicuis minuto reticulo venulorum prominulo; subtus subglabra subnitida sparsis pilis squamosis munita costa valida prominenti nervis secundariis 12-18 utroque latere eminentibus ascendentibus ad marginem curvatis evanescentibus reticulo venulorum elevato.

Paniculae racemiformes vel pseudoracemosae saepe extraaxillares ad vetustos ramos gerentes, axe simplici 8-18 cm. longo minutissime pubescenti. Pedicelli 2-4 mm. longi articulati puberuli saepe uniflori vel raro 2-3 flores ferentes. Bracteolae valde minutae triangulares. Calyx cupuliformis 4 lobis rotundatis extus minute pubescens. Petala 4 oblonga 7-8 mm. longa 3-3.5 mm. lata luteola intus glabra extus pubescenti-sericea. Staminorum tubus cylindricus glaber 5 mm. longus. Antherae 8 ellipticae infra marginem insertae inclusae vel leviter excedentes. Ovarium late breve stipitatum, ovoideum apicem versus sensim angustatum 4-loculare dense villosum. Stylus brevis infra villosus apice glaber. Stigma discoideum. Fructus pyriformis apice obtusus basi longe stipiforme angustatus 5-7.5 cm. long, x 4-6 cm. lat. pericarpio lignoso extus ruber irregulariter plicato-corrugatus, 4 loculis bispermis seminibus superpositis.

Type: Colombia, Dep. del Valle; Cordillera Occid. Hoya del río Albán, Quebrada Robada, Alto Bonito, 1800-1900 m. alt. 20-X-1946 colect. J. Cuatrecasas 22337. "Arbol 12 met. Hojas paripinadas, coriáceas, verde oscuras. Racimos caulinares (en las astas). Capullos amarillentos. Frutos rojos colgantes piriformes 5-7.5 cm. long. 4-6 cm. late." (F.)

Guarea corrugata is closely related to *G. caulobotrys* and *G. cartaguenya*. It differs from the first of these by having a greater number of smaller leaflets with a smooth upper side and from the second by the smaller size of the leaves. But the best distinguishing character is seen in the fruit which in *G. corrugata* is pyriform and whose surface is marked by longitudinal furrows and verrucose ribs.

Guarea megaphylla Cuatr., sp. nov.

Arbor 12 met. alta. Folia magna paripinnata 8-jugata. Rhachis validissima lignosa viridi-fusca lenticellata minutissime pubescens vel glabriuscula 95-110 cm. longa teretiuscula superne plus minusve sulcata basim versus 8-12 mm. crassa. Petiolus robustissimis basi valde incrassatus, circa 9 cm. longus. Foliola opposita brevissime petiolulata, petiolulo robusto 4-6 mm. crasso, 3-5 mm. longo. Lamina coriacea late elliptica 35-40 cm. longa, 20-21 cm. lata utrinque obtusa sed apice abrupte brevissime cuspidata margine irregulariter sinuata supra glabra laevis atroviridis costa late depressa nervis secundariis notatis reliquis inconspicuis; infra costa valde eminenti et crassa minutissime puberulenta, nervis secundariis prominentibus circa 27 utroque latere angulo obtuso marginem versus arcuatis evanescentibus minutissime puberulis, reliquis nervis laxe reticulatis visibilibus, minutis sparsissimis pilis munita.

Paniculae fructiferae extra-axillares breves sub-simplices, axe lignoso robusto 10-17 cm. longo, ramulis brevibus fructos subsessiles ferentibus. Capsula circa 4 cm. globoso-obovata granuloso-callosa pericarpio crassiusculo lignoso 4-locularis quibusque loculis 1-2-spermis in 4 valvis dehiscens. Semina rubra oblonga plano-convexa utrinque acutiuscula 22 mm. longa x 14 mm. lata, vel oblique truncata subtetraedrica 14-16 mm. tantum longa.

Type: Colombia, Dep. del Valle. Cordillera Occid.: monte La Guarida, filo de la cordillera sobre La Carbonera (entre Las Brisas y Albán, 1950-2000 m. alt. 24-X-1946 colect. J. Cuatrecasas 22510. "Arbol 10 met. Hojas paripinadas con 8 pares de folíolos, 1 met. long." (F.)

Although lacking flowers, *Guarea megaphylla* can easily be distinguished by the extraordinary size of the leaves, for the rhachis exceeds 1 meter in length and each leaflet is 30 cm. long. The fruits are characteristic, too.

Guarea rubrisepala Cuatr., sp. nov.

Arbor magna, 30 met. alt. Caulis 75 cm. diam. sulcatus cortice badi ligno rubescenti. Ramuli badi teretes minute rugulosi glabri.

Folia paripinnata vel pseudo-imparipinnata alterna 4-5 jugis. Rhachis cum petiolo 16 cm. longus viridi-rubescens minute verruculoso-rugulosus. Petiolus circa 6 cm. longus basi ampliatus vaginatus. Petioluli 5-11 mm. longi teretiusculi supra sulcati glabri rugulosoverrucoso. Lamina foliolorum tenui–coriacea elliptico-oblonga vel ovato-elliptica-oblonga basi obtusa apice breviter acuminata margine integra, 8-14 cm. longa x 3.2-5 cm. lata non pellucido punctata; supra atroviridis laevis glabra nervo medio impresso lateralibus obsoletis; subtus lutescenti viridis glabra sed epidermo minutissime squamuloso, costa rubra eminenti et minute verruculosa nervis secundariis circa 9 utroque latere arcuato ascendentibus marginem versus sensim sine sensu evanescentibus reticulo venulorum conspicuo.

Paniculae compositae multiflorae axillares circa 20 cm. longae ramulis patentibus 2-14 cm. longis. Rhachis ramulique minute sed argute striato-rugulosi et minutissime squamulosi. Bracteolae ovatae vel lanceolatae acutae 1-1.5 mm. longae. Pedicelli 1-2 mm. longi teneres minutissime squamoso-pilosi. Calyx cupuliformis rubescens circa 2 mm. altus 4-lobatus lobulis ovatis acutiusculis inaequalis saepe subbilabiatis quoque labio bidentato, raro trilobatus extus sparse puberulus. Petala oblonga obtusa 7 mm. longa 2-2.5 mm. lata albida apicem versus rosea in sicco rubescens, extus minute puberula. Staminorum tubus cylindraceus infra apicem leviter contractus albus, in herbario rubescens, glaber, 5 mm. longus, 8 antheris ellipticis infra marginem subintegram sessilibus inclusae. Gynophorum fere 2 mm. longus capituliformibus glaber. Ovarium parce puberulum 4-loculare. Stylus 2 mm. long glabrescens. Stigma discoideum.

Type: Colombia, Dep. del Valle. Cordillera Occid.: Hoya del río Sanquininí, lado izquierdo: La Laguna, bosques 1250-1400 m. alt. 12-XII-1943 colect. J. Cuatrecasas 15444. "Enorme árbol 30 met. alt. Tallo 75 cm. diam., acanalado, estriboso en la base, corteza color canela claro, madera rojiza principalmente en el centro. Calíz rojizo. Corola blanco crema, en el extremo rosada (ext). Corona estaminal blanca. Hoja coriácea, delgada, verde oscuro haz, amarillenta envés." (F.)

Guarea rubrisepala is similar and closely related to *G. trichilioides* L. (=*G. Guara Jacq.*) Wilson but has more elliptical-oblong leaves which are more obtuse at the base, leaves minutely squamose on the lower side, verruculose rhachis and midribs of the leaves, and strongly rugulate-striate branchlets of the inflorescence. The calyx is higher and reddish, while the top of the petals is pink. The ovary is only slightly puberulous and the gynophore is not articulated under the ovary. In its calyx this species resembles *G. fissicalyx* Harms from Peru, which has larger leaves and flowers, and more coriaceous leaflets.

Guarea Chalde Cuatr., sp. nov.

Arbor. Folia paripinnata 4-9 foliolis oppositis. Rhachis 30-50 cm. longa viridibadia minutissime puberula vel glabrescens, teretiuscula apicem versus plus minusve angulata petiolus robustus supra plano sulcatus basi incrassato vaginatus. Petioluli 6-12 mm. longi in foliis

adultis valde incrassati. Lamina foliolorum subcoriacea elliptico-oblonga basi cuneata apice angustata acuminata margine integra 15-28 cm. longa, 4.5-8 cm. lata; supra viridis glabra nervo medio leviter impresso, lateralibus et venulorum reticulo parum conspicuis; subtus pallido-viridis glabra sed epidermis minutissime squamulosa, costa prominenti nervis secundariis elevatis 10-17 utroque latere curvato ascendentibus marginem versus evanescentibus, reticulo venulorum leviter elevato parum conspicuo.

Ramuli fructiferi verossimiliter breves. Capsula globosa fusco-rubescens minute pubescens 3.5 cm. diam. epicarpio coriaceo, mesocarpio molle endocarpio coriaceo 4-loculare loculis monospermis, semina rubra.

Type: Colombia, Dep. del Valle. Río Calima (región del Chocó): Quebrada de la Brea, 20-40 met. alt. 24-V-1946 colect. J. Cuatrecasas 21292. "Arbol. Hoja subcoriácea, paripinada 9 pares folíolos. Fruto redondo, pardo rojizo, 3.5 cm. diam., nom. local: "chalde". (F.)

Guarea Chalde is characterized by its large leaves with elliptic or elliptic-lanceolate leaflets and by the rotundate capsules, with a slender coriaceous pericarp similar to that in the genus *Ruagea.* Because of its consistently paripinnate leaves I consider this species a *Guarea.* The leaves are similar to those of *G. Trompillo* G. DC. but the fruit is very different.

Ruagea silviandina Cuatr., sp. nov.

Arbor modice alta. Caulis 20 cm. diam. cortice griseo facile separabili rugoso-fissurati sectione crassa rosea. Ligno fibroso rubescenti. Ramuli foliiferi dense fissurato-rugoso.

Folia alteran imparipinnata 8-19 paribus foliolis suboppositis valde approximatis confertis saepe plicatis plerumque imbricatis. Rhachis robusta 6-26 cm. longa plus minusve angulata crasse denseque hirsutulo-tomentosa. Petiolus brevis basi incrassato-vaginatus 1-2.5 cm. longus. Petioluli 0-2 mm. longi crassi dense hirsuto-tomentosi. Lamina foliolorum coriacea elliptica vel elliptico-oblonga basi rotundata vel subcordata vel truncata asymmetrica apice rotundata vel paulo attenuata et obtusa, in foliolo terminali basi cuneata, margine integra; supra atroviridis valde nitens minutissime et sparse glanduloso-punctata visu glabra sed sparsis tenuis pilis obsoletis munita, nervo medio tomentuloso conspicuo lateralibus subimmersis vel paulo elevatis nitentibus venulis inconspicuis; subtus viridis vel griseo-viridis pubescens glanduloso-punctata nervo medio eminenti hirsuto-tomentoso, lateralibus 8-18 utroque latere prominulis marginem versus anastomosatis evanescentibus venulorum reticulo laxo obsoletis; 1.5-7.5 cm. longa, 1-2.8 cm. lata foliolis superioribus maximis inferioribus minimis.

Paniculae foliis breviores axillares subterminales 3-12 cm. longae. Rhachis erecta striolulata hirsutulo-tomentosa. Ramuli breves maximi 15 mm. longi. Bracteae ovato-lanceolatae 1-3 mm. longae hirsutulae. Flores subsessiles pedicellis crassis circa 1 mm. long. hirsutulis. Calyx 5 sepalis liberis rotundato-ovatis viridi-pallidis 2 mm. long. et

lat. extus tomentulosis margine ciliatis. Petala 5 libera aestivatione quincuncialia pallido-viridula in sicco rubescentia late lineari-oblonga apice rotundata glabra vel margine minute ciliolata. Staminorum tubus cylindraceus infra apicem contractus, glaber viridi-pallidus, in sicco ruber margine minutissime denticulatus, 10 antheras elliptico-oblongas basi ciliato-caudatas infra marginem sessiles inclusas ferens. Gynophorum crassum glabrum 1 mm. longum. Ovarium lageniforme plus minusve sulcatum glaber triloculare loculis biovulatis ovulis superpositis. Stylus robustus 3 mm. longus glaber. Stigma late discoideum supra fissuratum.

Panicula fructiferae (no. 19271) usque ad 15 mm. longa axillaris, rhachi robusta hirsuto-tomentosa ramulis lateralibus inferioribus usque 2 cm. longis. Capsulae inmaturae virides sparse squamulosa coriacea globosa circa 1 cm. diametro saepe 2-3-spermae.

Type: Colombia, Dep. Caldas, Cordillera Central: Hoya del río Otún, Guayabal abajo de El Bosque 3250 met. alt. 27-XI-1946 colect. J. Cuatrecasas 23308. "Arbol. Hoja imparipinada, subcoriácea, verde semioscuro brillante haz. Cáliz verde. Corola verde pálida." (F.)

Cotype: Colombia, Dep. del Cauca. Cordillera Central: Cabeceras del río Palo Quebrada de Santo Domingo (arriba de Tacueyó) bosquecillos subiendo al páramo 2950-3150 m. alt. 13-XII-1944 colect. J. Cuatrecasas 19271. "Arbol 15 met. alt. Hoja imparipinada coriácea verde oscura billante haz, mate envés. Frutos verdes." (F.)

Colombia, Dep. del Valle. Cordillera Central: Hoya del río Bugalagrande; Cuchilla de Barragán, entre Las Azules y Las Violetas 3100 m. alt. 15-IV-1946 colect. J. Cuatrecasas 20802. "Arbol grande tallo 20 cm. diam. Hoja paripinada, coriácea verde oscura brillante ház, verde envés. Perianto verdoso amarillento. Corteza gruesa, facilmente separable, agrietada, gris oscura, sección rosada. Madera fibrosa, centro mas rojizo." (F.)

Other specimen: Id. id. Cabeceras del río Tuluá, Quebrada de Las Vegas, montes 3280-3380 m. alt. colect. 24-III-1946 J. Cuatrecasas 20415. "Arbol. Hoja imparipinada, verde oscura brillante ház verdoso grisácea envés."

Ruagea silviandina is a species characteristic of the Andean forest below the paramoline. It is striking because of its many short petiolated leaves found at the end of branchlets and composed of numerous elliptical, small, coriaceous, closely placed leaflets, imbricate and often folded along the midrib, brilliantly vernicose on the upper side and tomentulose on the lower. The rachises of the branchlet and inflorescences are axillary and short, the petals and ovary are blabrous. Consequently, this is a very distinct, microphyllous species of *Ruagea*.

In his monographic study of the Meliaceae (Pflanzfam. 19 b. I: 138, 1944 and Notizbl. Bot. Gart. Berlin-Dhl. 9: 427) Harms lists for Colombia *Ruagea pubescens* Karsten on the authority of C. De Candolle (Monogr. Phanerog. I: 577), who cited the data on the species given

by Triana and Planchon (Ann. Soc. Sc. Nat. Ser. V, vol. 15: 367-368). These authors recorded *R. pubescens* from the Quindio mountains on the basis of one specimen collected there by Goudot. The Herbarium of the Chicago Natural History Museum contains only a single duplicate leaflet of the Goudot plant which enabled me to identify it with my specimens referred to *R. silviandina*. *R. pubescens* Karsten (=*Guarea Ruagea* C. DC.), minutely described by its author in Fl. Columb. II: 51, t. 126, is a very different species well represented by specimens of Karsten and Steyermark in the Herbarium of this Museum; it is an exclusively Venezuelan species and the old records of its occurrence in the Central Cordillera of Colombia must now be transferred to *R. silviandina*.

I agree with Harms (l.c.), Triana and Planchon regarding the validity of the gen. *Ruagea*. All material I have so far studied shows a clear distinction between *Ruagea* and *Guarea*.

Rugea trisperma Cuatr., sp. nov.

Arbor magna. Ramuli terminales griseo badi rugosi puberuli plus minusve peridermato-squamulosi, fistulosi.

Folia grandia imparipinnata vel paripinnata 5 paribus foliolis oppositis vel suboppositis. Rhachis robusta 45-50 cm. longa teretiuscula superne plus minusve sulcata viridi-grisea subglabra minutissimis pilis squamulosis munita. Petiolus robustus 9 cm. long. basi incrassato-vaginatus. Foliola coriacea petiolulo crasso 0.3-0.5 mm. longo puberulo, in terminalibus usque ad 2 cm. longo. Lamina obovato oblonga apice obtusa basi cuneata margine integra vel levissime undulata, 17-30 cm. long. x 8.5-13 cm. lata (pari inferiori valde breviori terminalia adjacentibus similia sed majore vel breviore); supra viridis aspectu laevi et glabro sed sub microscopio epidermo ruguloso et minutissimis sparsis acutis pilis visibilis, nervo medio valde conspicuo depresso lateralibus plus minusve impressis alteris nervulis non conspicuis; subtus pallidior viridis costa valida nervis secundariis valde eminentibus 20-25 utroque latere angulo obtuso prope marginem curvatis evanescentibus reliqua lamina laevis subnitida minutissimis pilis sparsis munita.

Paniculae floriferae axillares subterminales 18-40 cm. longae compositae ramulis lateralibus saepe brevibus. Rhachis robusta rugulosa minutissime puberula, ramulis 1-3 cm. longis ibidem, bracteis primariis triangularibus acutis 2 mm. long. puberulis, bracteolis floriferis confertis brevioribus ovatis puberulis. Flores sessiles vel subsessiles glomeratae. Calyx brevis 5 sepalis liberis imbricatis dispositis ovatis, obtusis 1-1.5 mm. longis minutissime puberulis. Petala viridi-alba 5 aestivatione quincuncialia ovato-elliptica elongata vel elliptico-oblonga 6-7 mm. long. 2.5-3.5 mm. lata intus glabra extus puberula. Staminorum tubus 3.5 mm. longus glaber margine subintegra, antherae 10 submargine sessiles inclusae. Ovarium sessile late lageniforme in brevem stylum attenuatum subglabrum, tantum minutissimis pilis sparsis instructum, triloculare, stigmate truncato.

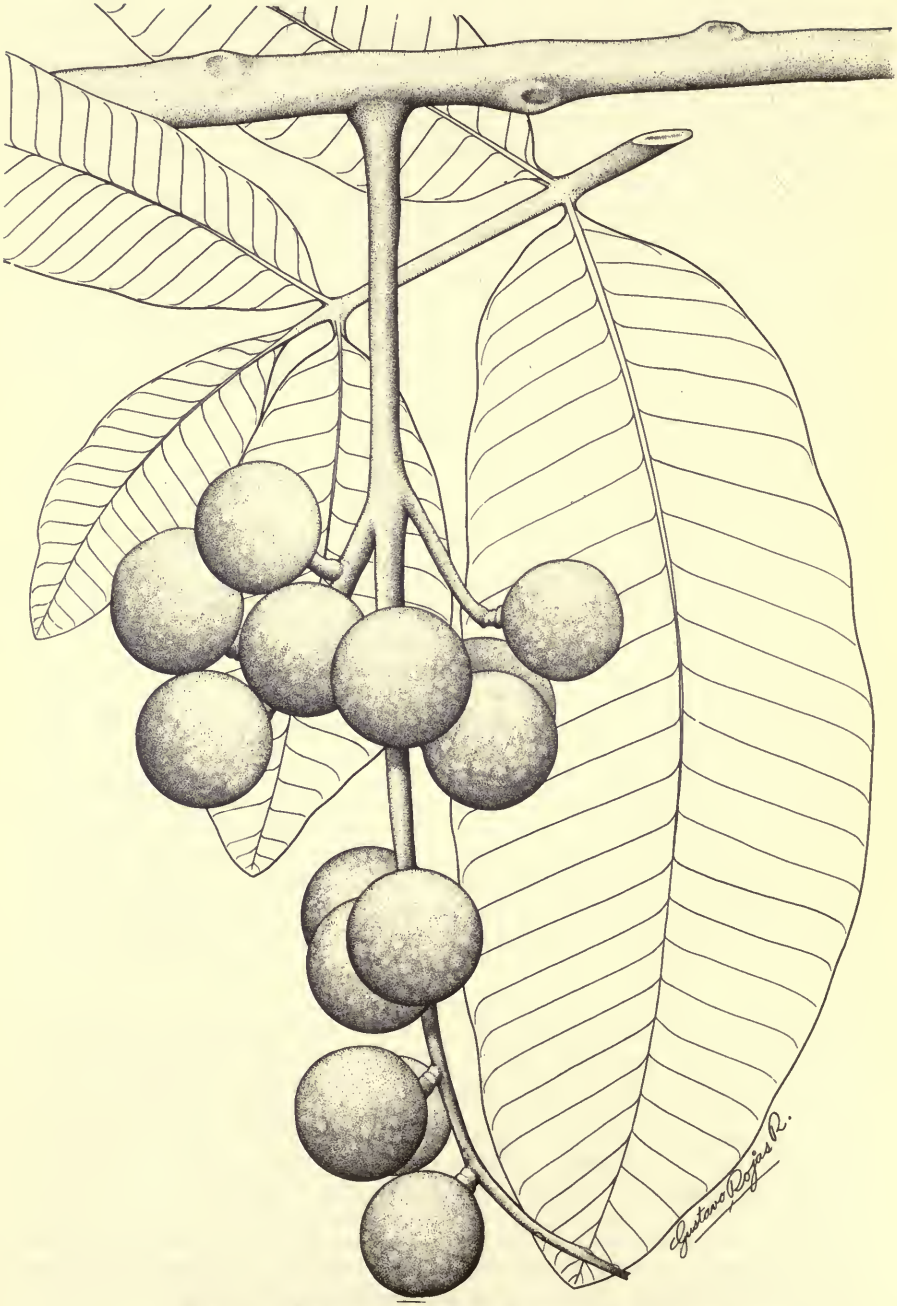


Fig. 5 *Ruagea trisperma* Cuatr., (x 1/3).

Inflorescentiae fructiferae extra-axillares valde robustae patentes, axe valido lignoso circa 30 cm. longo ramulis brevibus fructos subsessiles ferentibus. Capsula globosa 4.5 cm. diam. aurantiaca glabra mesocarpio crasso submolle albo, epicarpio in sicco coriaceo, endocarpio rigide coriaceo triloculare loculis monospermis denique dehiscens loculicida. Semina rubescentia plano-convexa umbilico valde evoluto infra calloso acuto, cotyledonibus parallelis verticalibus valde crassis. (Fig. 5, Fig. 6-a-b).

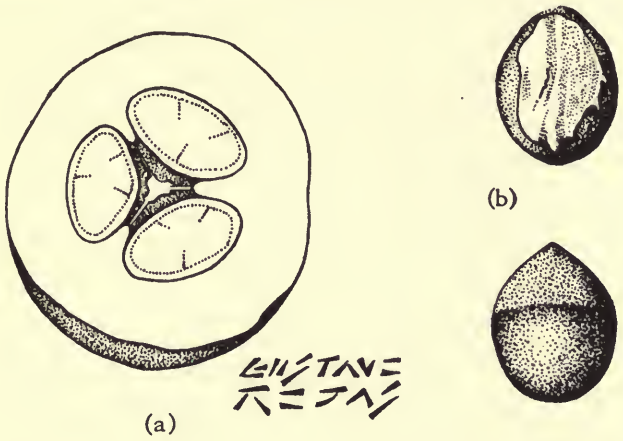


Fig. 6 *Ruagea trisperma* Cuatr. (a) cross section of fruit (b) seed

Type: Colombia, Dep. del Valle. Cord. Occid.: Hoya del río Sanquininí, ribera izquierda en La Laguna bosques 1250-1400 m. alt. 14-XII-1943 colect. J. Cuatrecasas 15521. "Arbol grande. Hoja imparipinada, coriácea verde medio. Flores verdoso blanquecinas en panículas terminal axilares, al caerse las hojas quedan las panículas fructíferas caulinares (extra-axilares). Frutos casi maduros esféricos 4.5 cm. diam., anaranjados, pericarpo grueso, blanco, 3 semillas con placentación axil." (F.)

The species most closely related to *Ruagea trisperma* is probably *R. glabra* Tr. et Pl. of which I know only the brief original description. But the minutely pilose appearance of several organs of *R. trisperma* would be sufficient to distinguish the two species. The combination of characters noted for *R. trisperma* in the above description differentiate it from all other species of the genus.

Ruagea floribunda Cuatr., sp. nov.

Arbor grandis. Ramuli terminales grisei rugosi puberuli. Folia imparipinnata 4 paribus foliolis suboppositis vel oppositis. Rhachis robusta cum petiolo 40-50 cm. longa brunneo-viridis basi teretiuscula reliqua obtuse striata adpresse pubescenti-tomentulosa. Petiolus ad

15 cm. long. basi incrassatus vaginatus. Petioluli robusti circa 5 mm. longi 4 mm. lati tomentulosi, supra plani vel sulcati infra carinati. Foliolorum lamina subcoriacea obovato-elliptica oblonga basi cuneata apice rotundata vel paulo attenuata obtusa margine integra, 20-32 cm. longa x 9-16 cm. lata, tria superiores valde minores (13-15 cm. longa, 5-6.5 cm. lata); supra viridis vel atroviridis sparse pilosa et glanduloso punctata nervo medio lato impresso tomentulóso secundariis conspicuis tomentellis; subtus pallido-virens copiosis acutis adpressis pilis tecta costa valde eminenti obtuse carinata pubescenti tomentulosa nervis secundariis 12-18 utroque latere elevatis obtuse ascendentibus marginem versus arcuatis evanescentibus; reliquis nervulis inconspicuis.

Inflorescentiae paniculatae valde evolutae axillares subterminales, 35-60 cm. longae ramulis patentibus usque ad 10 cm. longis. Rhachis erecta vel leviter flexuosa plus minusve striata adpresse pubescenti-tomentulosa. Flores sessiles vel subsessiles ad breves ramusculos bracteolatos glomerulatae. Bracteolae ovato-triangulares acutae pubescentes parvae. Calyx minutus 5 sepalis liberis (vel basi levissime coalitis) ovato-acutis pubescentis viridis, 1.5 mm. long. Petala pallido-viridia libera praefloratione quincuncialia oblonga obtusa 7 mm. longa 2-2.5 mm. lata utrinque glabra sed margine superiorem partem minutissime ciliata. Tubus androcei subcylindricus apicem versus angustatus margine crenata leviter dilatata utrinque glaber albus, 5-6 mm. longus. Antherae ellipticae 10 sub marginem insertae cum dentibus alternantibus. Gynophorum breve glabrum. Ovarium elongatum glabrum sensim sine sensu in stylum angustatum triloculare loculis saepe uniovulatis. Stylus 2 mm. long. crassiusculus glaber. Stigma crasso-discoideum.

Inflorescentia fructifera magna conferta pendula circa 40 cm. longa rhachi ramulisque lignosis robustis puberulis. Fructi subsessiles trigono-rotundatis 23-26 mm. diam. fusci lenticellati pericarpio coriaceo, triloculari saepe trispermi, seminibus rubris ovalibus depressis cotyledonibus crassis parallelis.

Type: Colombia, Dep. Valle. Cordillera Occidental, Hoya del río Dígua: Quebrada del San Juan arriba de Queremal: Las Colonias 1950-2050 m. alt. colect. 20-III-1947 J. Cuatrecasas 23927. "Gran árbol. Hoja membranácea o subcoriácea verde o verde oscuro haz, verde claro envés. 5 foliolos o más. Cáliz verde. Corola verde pálida. Corona blanca. Frutos esfero-trígonos parduscos 23x26 mm." (F.)

Ruagea floribunda is well characterized by its dense and compressed pubescence, subcoriaceous leaves, large inflorescences, pale viridous petals, glabrous ovary and the size and consistency of the fruit. For these reasons it differs considerably from *R. pubescens* Karsten, *R. mollicoma* (Pitt.) Harms and *R. trisperma* previously described.

Ruagea tomentosa Cuatr., sp. nov.

Arbor. Ramuli terminales viridi-ochracei dense tomentosi. Folia imparipinnata alterna 4-5 paribus foliolis oppositis terminali maximo, deorsum decrescentibus, interdum paripinnata. Rhachis 24-32 cm. longa fere teres dense ochraceo-viridi tomentosa. Petiolus circa 6 cm. longus

basi paulo dilatatus. Petioluli breves crassiusculi dense tomentosi 3-5 mm. longi. Lamina foliolorum subcoriacea ovato-elliptica vel late elliptica basi rotundata vel truncata apice attenuata breviter cuspidata, terminalis obovato-oblonga cuspidata basi cuneata margine integra, 14-24 cm. longa x 5.5-10.5 cm. lata, inferiores valde minores usque ad 5x3.4 cm. reductae; supra atroviridis (in herbario pallida) plus minusve pilosa et sparse glanduloso punctata, nervo medio lato valde tomentoso notato secundariis tomentulosis conspicuis reliquis nervulis obsoletis; subtus pallido-viridis tomentosa nervo medio eminenti, lateralibus prominentibus 14-20 utroque latere patentibus angulo valde obtuso ad marginem curvatis, venulis laxum reticulum prominulum formantibus.

Inflorescentiae axillares paniculatae abbreviatae 5-10 cm. longae. Axis ramulique valde tomentosis plus minusve striatis, bracteolis lanceolatis circa 1 mm. longis extus tomentosis. Pedicelli 0-2 mm. longi crassiusculi. Calyx 5 sepalis fere liberis ovatis obtusiusculis viridi-luteolis 2 mm. longis et latis extus dense hirsutulis. Petala 5 libera aestivatione quincuncialia pallide viridi-luteola, in sicco rubra, utrinque glabra margine parum cilio lata oblonga obtusa 10 mm. longa 3-4 mm. lata. Tubus stamineus cylindraceus 8 mm. long. glaber apicem versus paulo angustatus, apice crenulatus, 10 antheris elliptico-oblongis sub margine dispositis minime exsertis cum dentibus alternantibus. Gynophorum breve cylindricum 0.8 mm. longum glabrum. Ovarium angustatum dense villosum 3.5 mm. long., triloculare. Stylus 2.5 mm. longus glaber. Stigma crasso-discoideum.

Paniculae fructiferae axillares 7-10 cm. longae axe ramulique lignosis tomentosis. Capsullae subglobosae apice brevissime apiculatae basi abrupte stipiforme angustatae, epicarpio crasso-coriaceo extus rubescens maculato-lenticelloso, trivalvatae saepe trispermae, seminibus rubris.

Type: Colombia, Dep. del Valle. Cordillera Occidental, Hoya del río Cali, rio Pichindé entre Quebrada de Juntas y El Recreo, 2070-2260 m. alt. 7-VIII-1946 colect J. Cuatrecasas 21988. "Arbol. Hoja subcoriácea, flexible, verde amarilloso oscuro haz, clara envés. Flor totalmente amarillo verdoso clara." (F.)

Ruagea tomentosa is very different from all other known species of *Ruagea*. It can be distinguished by the soft tomentum of its branchlets, inflorescences and leaves, by the short pseudoracemose inflorescences, large slightly greenish flowers, glabrous petals and villous ovary, and even by the form of the leaves and size of the fruit.

Trichilia colombiana Cuatr., sp. nov.

Arbor. Ramuli cortice griseo rubuloso pubescenti-tomentulosi. Folia imparipinnata alterna 3-4 paribus foliolis sub-oppositis breviter petiolulatis. Rhachis robusta teres 14-15 cm. longa dense hirsuto-tomentosa, petiolo basi vaginato incrassato. Petioluli 2-4 mm. longi crassiusculi supra plani dense hirsutulo-tomentosi. Lamina coriacea in sicco grisea obovata vel obovato oblonga basi cuneata vel obtusa vel truncata apice abrupte attenuata et breviter obtuseque cuspidata margine subintegra,

supra sparse hirsutula-mollis nervo medio lato et nervis lateralibus hirsuto tomentosis, subtus subtomentosa copiosis sparsis longis pilis munita nervo medio robusto elevato dense tomentoso, nervis lateralibus 10-15 paribus elevatis hirtulo-tomentosis patentibus marginem versus arcuatis anastomosati-evanescentibus, reliquis nervulis obsoletis, 6-11 cm. longa, 3-6 cm. lata, vel inferiora minora.

Paniculae fructiferae axillares 4-8 cm. longae, axe ramulisque valde hirsuto-tomentosis. Capsulae ovato trigonae obtusae tomentulosae aurantiacae circa 1 cm. long. irregulariter 3 valvis dehiscens. Semina elliptico-oblonga plus minusve sulcata, arillo cornoso rubescenti.

Type: Colombia, Dep. Cundinamarca. Limoncito, entre Melgar y Arbeláez, 500 m. alt., 7-VIII-1939 colect. J. Cuatrecasas & E. Pérez Arbeláez 6586. "Gran árbol. Frutos amarillo anaranjados." (F.)

Trichilia colombiana is easily distinguished by the tomentose indument of its branchlets, leaves and fruits. The broader, larger and less numerous leaflets clearly differentiate this species from *T. tomentosa* H B K.

Trichilia laxipaniculata Cuatr., sp. nov.

Arbor grandis. Folia magna imparipinnata 11 foliolis alternis petiolulatis. Rhachis 35 cm. longa valde robusta plus minusve angulata rubescens glabra laevis vel sparse lenticellata, petiolo supra leviter canaliculato alato basi incrassato. Petioluli crassiusculi plus minusve flexuosi glabri fere 1 cm. longi. Lamina foliolorum crasse coriacea superioribus oblongo elliptica valde elongata basi obtusa apice abrupte attenuata mutica vel breviter apiculata usque ad 30 cm. longa x 8.5 cm. lata, medianae elliptica vel ovato-elliptica basi rotundata apice acute-apiculata 13-20 cm. longa 6-6.5 cm. lata, inferioribus lamina valde breviora ovata 4 cm. longa 3.5 cm. lata; margine integra leviter revoluta; supra glabra subnitida nervo medio impresso lateralibus leviter conspicuis reticulum obsoletis; subtus glabra in sicco pallide ferruginea, costa crassa eminenti nervis lateralibus usque ad 22 utroque latere (in foliolis maximis) prominulis divergentibus prope margine arcuatis evanescentibus, venulorum reticulum laxum obsoletum.

Panicula magna, 40 cm. longa, rhachi tenui fistulosa basim versus incrassata glabra, sed sursum minutissime puberula. Ramulis alternis inferioribus usque 15 cm. long. laxe dispositis et ramificatis tenuibus delicatis plus minusve flexuosis minutissime puberulis, ramulis teneribus divaricatis, floribus breviter pedicellatis, bracteolis minutissimis linearibus. Calyx breviter cupuliformis subdiscoidalis obtuse 5-lobatis vel subintegris 2 mm. diam. puberulus. Petala 5.2 mm. longa albida ovata dimidio inferiora connata extus parce puberula intus glabra lobis triangularibus margine revolutis minute ciliolatis aestivatione valvatis. Staminorum tubus urceolatus glaber 1.5 mm. longus, 5 dentibus linearibus acutis 0.3 mm. cum antheris alternantibus. Antherae 5 ovato-oblongae obtuse breviter stipitatae. Ovarium triloculare sessile amplum depressum dense breviterque hirsutum. Stylus brevis glabratus. Stigma capitatum.

Type: Ecuador, frontera Colombo-ecuatoriana: selva higrófila del río San Miguel o Sucumbíos, entre los afluentes Bermeja y Sipenae, 350-400 m. alt. 11-XII-1940 colect. J. Cuatrecasas 10942. "Arbol. Pétalos blanquecinos." (F.)

Trichilia laxipaniculata belongs to Sect. *Moschoxylum*. It differs from the other members of this section by its large, glabrous leaves with their strong rachis and large coriaceous leaflets, by the long panicles with lax, more or less divaricate and flexuose branchlets, and by its small flowers. The most closely related species are *T. guianensis* Kl., *T. Ruiziana* D. DC. and *T. appendiculata* (Tr. et Pl.) DC. In addition to the characters listed above *T. laxipaniculata* differs also by its petals being united in the lower middle part, its almost entire calyx, its urceolate 5 dentate, staminal tube, its 5 anthers, alternate petiolate leaflets and valvate petals.

CELASTRACEAE

Maytenus novogranatensis Cuatr., sp. nov.

Arbor 4-8 met. alt. Ramuli fusco-grisei rugulosi juveniles minutissime puberuli.

Folia coriacea vel subcoriacea simplicia alterna. Petiolus 4-7 mm. longus subteneris rigidus minute papilloso-pilosus. Lamina junior pallido-viridis membranacea denique robustiora et obscure viridis utrinque glabra, ovata vel ovato-oblonga basi rotundata vel late cuneata apice abrupte attenuata vel attenuata obtusa vel acutiuscula, 2-6 cm. longa x 12-28 mm. lata, margine serrato-dentata, supra nitida nervo medio impresso reliquis obsoletis vel inconspicuis, subtus pallidior nervo medio elevato, 6-7 paribus lateralibus nervis filiformibus ascendentibus marginem versus arcuato anastomosantibus. Stipulae minutae deciduae, lanceolatae laciniatae, 1 mm. longae.

Inflorescentiae axillares solitariae quam folia valde breviores, 3-9 floribus, rhachi ramulisque teneribus viridulis glabris. Bracteolae ovatae acutae amplectentes dentato-ciliatae. Pedicelli teneres 1-2 mm. longi. Flos pallido-virido-luteus expansus 3-4 mm. latus. Sepala 5 late ovata 0.6-0.8 mm., obtusa glabra integra vel lacerato-ciliata. Petala ovato-oblonga obtusa 1.6 mm. longa, 1 mm. lata, margine minute lacerata. Stamina petalis dimidio breviora antheris ovato-subcordatis. Stigma sessile obscure 2-3 lobatum, ovarium ovato-conicum subinmersum. Discus pentagonus fere 1 mm. latus.

Fructus capsularis 2-3 lobatus 6-7 mm. longus vulgo bispermus. Semina oblonga 4.5-5 mm. longa, 3 mm. lata rubescentia.

Type: Colombia, Dep. Valle. Cordillera Central: Hoya del río Bugalagrande, Barragán: Páramo de Bavaya, Corrales 3550-3400 m. alt., colect. 11-IV-1946 J. Cuatrecasas 20596. "Arbolito 4 met., Hoja membranosa, verde clara, semibrillante haz, mate envés. Perianto amarillo verdoso claro." (F.)

Cotypes: Colombia, Dep. Cauca. Cordillera Central, Cabeceras del río Palo, Quebrada del río López: Alto del Duende, matorrales y bosquecillo de páramo, 3300-3350 m. alt. colect. 2-XII-1944 J. Cuatrecasas 18897. "Arbol fruto trímero. Semillas anaranjadas." Id. loc. colect. 1-XI-1944 J. Cuatrecasas 18842. "Arbolito. Hoja membranosa verde oscura en el ház, clara en el envés. Perianto verdoso claro." (F.)

Other specimen: Colombia, Dep. Valle. Cordillera Occidental, Los Farallones, filo de la Cordillera, extr. N., Alto del Buey, 3330 met. alt. 2-VIII-1946 J. Cuatrecasas 21913. "Arbol. Hoja coriácea, flexible, verde clara haz, verde amarillenta pálida envés. Cáliz verde. Corola rosada." Form little different (fma *roseopetala*).

Maytenus novogranatensis is closely related to the chiefly Peruvian *M. verticillata* (R. et P.) DC. which extends to Ecuador and Colombia in various forms but always has lanceolate, long angustate, cuneiform leaves. *M. novogranatensis* has ovate leaves with shorter teeth.

Other species recorded from Colombia are quite different as for instance *M. Trianae* Briq. and *M. laxiflorus* Tr. et Pl. which have entire leaves and glabrous branchlets.

STERCULIACEAE

Theobroma stipulatum Cuatr., sp. nov.

Arbor 32 met. alt. trunco 24 met. alt. 45 cm. diam. basi triangulare, cortice rugoso-granuloso rubescenti brunneo, ligno obscure ochraceo duro. Ramuli grisei rugoso-squamuloso glabrescens terminationibus ornotinis dense pallido-ferrugineo-tomentosis pilis stellatis et fasciculatis obtecti.

Folia simplicia alterna grandia satis coriacea. Petiolus 5-10 mm. long robustus valde crassus dense ferrugineo-tomentosus. Lamina obovato-elliptica oblonga saepe parce asymmetrica basi aequilatera leviter emarginato-cordata apice rotundata vel truncata vel obtusa, margine integra vel irregulariter levissime sinuata plana; 23-45 cm. longa x 11-17 cm. lata; supra viridis pilis stellulatis sparsis munita nervo medio et lateralibus linearibus tomentulosis impressis; subtus tomentosa viridi-ochracea minutis pilis stellatis tecta costa valida prominenti nervis secundariis circa 12 utroque latere valde eminentibus densiusculi tomentosis, basi sub-quintuplinervia sed lateralibus nervis quam costa valde angustioribus reliquis nervulis elevatum reticulum formantibus. Stipulae coriaceae dense tomentosae ovatae vel ovato-oblongae obtusae persistentes 8-12 mm. longae 5-9 mm. latae, pallide ferrugineae.

Inflorescentiae caulinares. Rami fertiles brevia tubercula congesta ad truncum formantes quae ramulos lignosos saepe furcato-ramificatos plus minusve tortuosos et intricatos tomentulosos bracteatos usque ad 1-3 cm. longos ferentia; bracteis ovatis brevibus. Ramuli fertiles terminales solitarii 5-10 mm. longi teneres stellato-tomentosi apice tribracteolati 1-flori pedicellati, bracteolis linearibus acutis 2-3 mm.

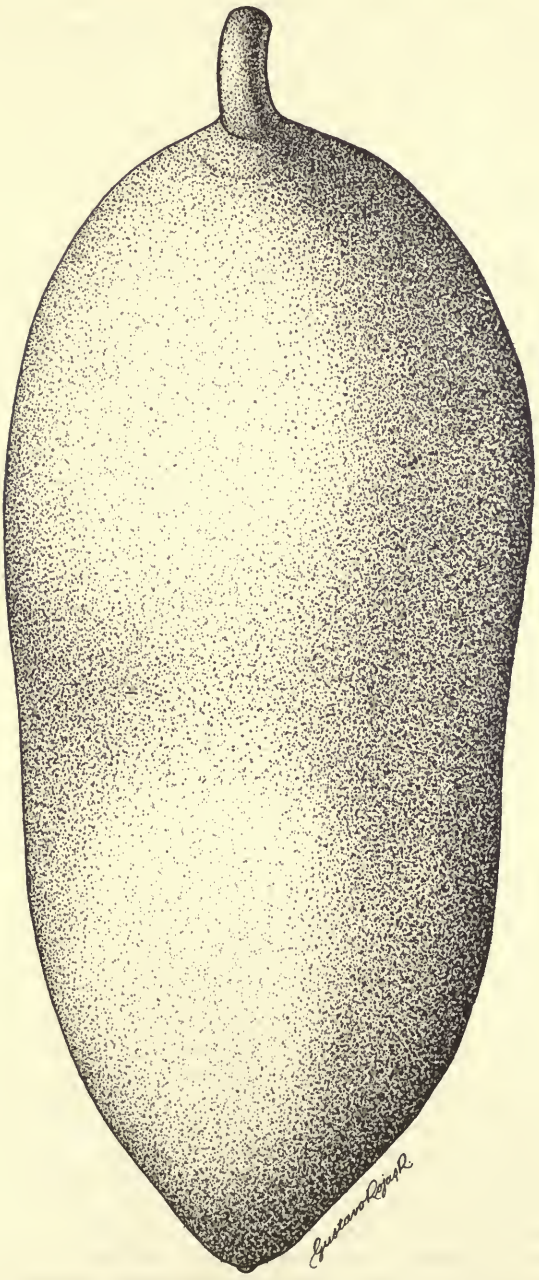


Fig. 7 *Theobroma stipulatum* Cuatr., fruit (x 3/4).

longis. Pedicelli erecti teneres circa 10-22 mm. longi dense tomentosi. Alabastra globosa 12-14 mm. diam. sublanato-tomentosa. Sepala 5 ovato-triangularia valvata crassa intus glabra extus dense stellato-tomentosa sublanata 10-15 mm. longa, tertio inferiore coalita basi umbilicata deinde reflexa. Petala 5 libera ungue late obovato-elliptico concavo 6-sulcato-venoso margine involuto apice obtuso valde cucullato circa 6 mm. longo, ligula dimidio inferiore valde anguste lineari 3-4 mm. longa dimidio superiore subite ampliata late spathulata vel rhomboidea 3-4 mm. lata et longa.

Stamina 5 fertilia cum 5 staminodiis petaloideis alternatim coalita. Tubus, 1.5-2 mm. longus. Staminodia obovato oblonga spathulata apice rotundata, 11 mm. long. 5 mm. lata. Stamina fertilia filamento crasso brevi curvato reflexo 2 mm. long. antheris tribus bilobulatis lobis ellipticis bilocularibus. Ovarium 2 mm. longum ovato oblongum 5 sulcatum 5 loculis dense tomentoso hirsutum. Stylus filiformis 2 mm. glaber stigmate punctiformi.

Fructus ellipticus vel ovato-ellipticus oblongus basi rotundatus apice rotundatus vel obtusus laevis dense adpresseque brunneo-tomentosus, pericarpio coriaceo 18-22 cm. long., 9-10 cm. latus. Pedunculus fructiferus brevis validus crassus lignosus. (Fig. 7)

Type: Colombia, Intendencia del Chocó. Río San Juan, junto a Palestina, 30 met. alt., 28-V-1946 colect. J. Cuatrecasas 21339. "Arbol 32 met. alt. Tallo sencillo hasta 24 met. alt., base 45 cm. diam. (triangular); corteza rugoso granulosa, con la capa externa fácilmente separable, pardo rojiza, sección pardo rojiza. Madera ocráceo oscura, dura. Hoja coriácea, verde ház, verde ocrácea envés, tierna verde amarillento claro haz. Ramas tiernas hojosas y estípulas ferruginoso claras. Frutos elípticos oblongos obtusos tomentosos, pardo oscuros, pericarpo coriáceo-subleñoso, 20-22 cm. long., 9-10 cm. lat."

Theobroma stipulatum is closely related to *Th. Cirmolinae* Cuatr., chiefly because of the similarity of the leaves, inflorescences and the flowers. We do not know the color of the flower, as it was collected dry. In spite of the pronounced similarity between these two species, *Th. stipulatum* can easily be distinguished from *Th. Cirmolinae* by the cylindrical ovate fruit with a smooth coriaceous pericarp. Besides the leaves have a shorter petiole, are less deeply emarginated at the base and more obovate (the largest part towards the apex), slightly pubescent on the upper side and more tomentose on the lower side (in *Th. Cirmolinae* the indument is more compressed and scarce), less coriaceous and somewhat hirsutulous along the veins, as are the branchlets. The flowers, too show some differences, for the lower part of the petals is more hooded and the ligule is of different form. The stipules of both species are persistent but those of *T. stipulatum* are much stronger and obtuse.

While *Th. Cirmolinae* is a mountaineer species of the lower sub-Andean forest (1000-1400 m. alt.), *Th. stipulatum* grows in the lowland forest of occidental Choco, where it is not a common tree. Further

investigation is necessary to determine the possibility of economic importance of this species.

BOMBACACEAE

Huberodendron Patinoi Cuatr., sp. nov.

Arbor magna, 40 met. alta basi robustissimis radicibus epigaeis tabularibus sursum decurrentibus fulta. Caulis 7 met. supra basim 50 cm. diam., cortice brunneo rugoso squamuloso sectio badi. Ramuli obscure grisei plus minusve granulosi teretes.

Folia alterna unifoliolata longe petiolata. Petiolus teres subteneris sed rigidus sub-apice incrassatus articulatus basi paulo dilatatus minutissimis sparsis pilis substellatis munitus vel glaber 4.5-8 cm. longus. Lamina firme membranacea viridis ovato-oblonga vel ovata vel elliptico-ovata basi late obtusa vel truncata vel subrotundata apice obtusiuscula acuminata vel mutica 9-17 cm. longa, 5-12 cm. lata, margine integra; supra nervo medio lateralibusque signatis munitissimis pilis stellulatis sparsis munita vel (in vetustioribus) glabra; subtus pallidior costa crassa valde elevata nervis secundariis prominentibus 6-7 utroque latere ascendentibus marginem versus arcuato-anastomosatis, nervulis tertiariis transversis cum venulis in laxum tenuem reticulum anastomosatis saepe sparsissimis minutissimis pilis stellatis munita.

Inflorescentiae terminales cymoso-paniculatae usque ad basim foliosae, pedunculo brevi ramisque valde robustis. Rami paniculae saepe 3-5 subumbellati aliquando uno ramo inferiore inserto, rigidi inaequilongi (4-10 cm. long.) extremo bi-tri-furcati in ramulis floriferis cincinnatis ferrugineo-tomentosis 4-5 cm. longis. Flores secundae breviter pedicellatae congestae. Bracteae lineares obtusae 3-4 mm. longae tomentosae deciduae. Pedicelli crassi 3-5 mm. longi tomentosi.

Calyx subcoriaceus conico-campanulatus 12 mm. longus, quinquelobatus lobulis triangularibus acutis 4 mm. longis aestivatione valvatis, extus ferrugineo tomentosus pilis stellatis vel fasciculatis obtectus, intus sericeus. Corolla crassiuscula circa 18 mm. longa tubo cupulliformi 2-3 mm. alto tomentoso, petalis 14-15 mm. longis, 7-8 mm. latis, obovato-ellipticis vel oblongo-obovatis apice rotundatis basi supra tubum angustissime contractis; extus adpresse stellato-pilosis tomentulosis, intus sericeis aestivatione contortis. Columna staminea supra basim cupuliformem 3 mm. longa inferiori parte pilosa apicem unilatero fissa. Lobi antheriferi 5 basi coaliti 3-4 mm. longi 5 thecis valde congestis pluriseptatis ellipticis 1.5 mm. longi (inferiori breviore), apice obtusis tenuissimam caudam filiformem ad 2 mm. longam productis. Lobi antheriferi inferiori parte connati valde congesti figuram subglobosam formantes. Ovarium ovoideum 3 mm. longum tomentulosum, 5 loculare septis contortis. Stylus glaber filiformis tubo staminibus brevior infra apicem subito incrassatus et per fissuram staminorum exsertus. Stigmata 5 lanceolata stellata exserta.

Fructus capsularis ellipticis utrinque obtusis 20-30 cm. longus, circa 10-12 cm. latus extus badi tomentuloso-granulosus, 5 locularis endocarpio papiraceo in 5 saccos papiraceos valde fragilis dirempto, pericarpio lignoso in 5 valvis 10-12 mm. crassis 5-6 cm. latis apice acutis basi acutis contortisque dehiscente. Semina in unoquoque loculo in duabus seriebus longitudinalibus dispossita, uno latere quinque inferiora ala sursum ascendenti, utroque latere quinque superiora ala deorsum descendenti, quae alae utriusque series alternatim adpresseque interpossitae sunt. Semina epispermo suberoso fusco obscure ovato-deltoidea 15 mm. lata et longa, extremo longam alam suberoso-membranaceam oblongam obtusam vel truncatam 8 cm. longam 2.5-3.5 cm. latam producta. Columella dissepimenta loculorum saccique papiracei facile dirumpo. (Fig. 8, 9, 10 and 11)

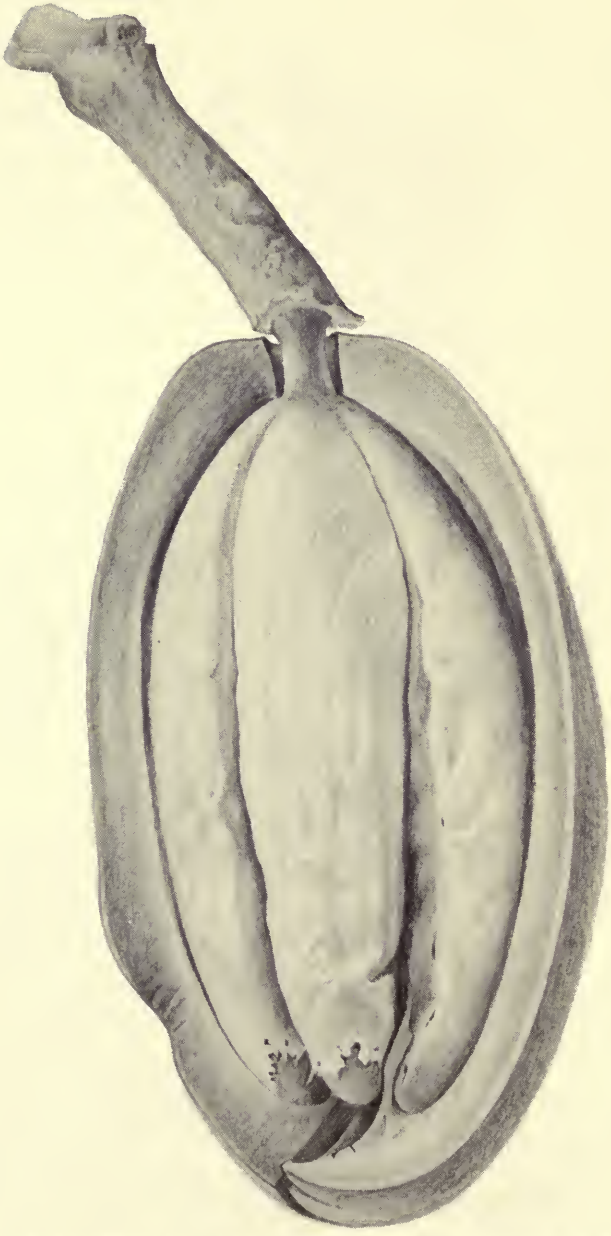
Type: Colombia, Dep. del Valle. Río Calima (región del Chocó): La Trojita, bosques 5-50 met. alt., 10-III-1944 colect. J. Cuatrecasas 16837. "Gran árbol, 40 met. alt. Estribos tabulares grandes, delgados y robustos, decurrentes sobre el tallo en una extensión de 6 o 7 metros hacia arriba, en cuyo punto el tallo tiene 50 cm. diam. Corteza pardo clara, pardo grisácea, rugoso escamosita, sección sepia. Frutos oblongos, 20-30 cm. long., 10-12 cm. lat., tomentuloso granuloso; pericarpo coriáceo, 10-12 mm. grueso, 5 cavidades. Semillas provistas de una gran ala terminal, 12 cm. long., 35 mm. lat." (F.)

Cotype: The same locality, near La Brea, collected by V. M. Patiño, C. Pontón and L. B. Bermúdez, October 1948 (F). Specimens with flowers.

Another specimen: Colombia, Dep. del Valle; Costa del Pacífico: río Cajambre, Silva, 30 met. alt., 14-V-1944 colect. J. Cuatrecasas 17652. "Arbol muy grande con largos estribos tabulares decurrentes. Semillas aladas 10-11 cm. long. (recogidas del suelo)." (F.)

In 1943 Gleason described the first species of this genus from specimens collected by Krukoff in the Purus river region as *Bernouillia swietenioides* (Phytologia I: 109), and added this commentary: "Few, if any, of the plants recently brought back from Brazil by Mr. Krukoff have as great an interest to the taxonomist as the tree described above. The family to which it belongs remains in question. There is little doubt as to the genus to which it is most closely related and in which it is here placed, but a study of the flowers, as yet unknown, may indicate that it deserves the erection of a new genus." About the same time (1935, Arch. Inst. Biol. Veget., 2: 59) Ducke published the new genus *Huberodendron* on the basis of two species which possess unifoliate leaves, a stamineous tube partly open near the end, and a short style. On the basis of these characters he separated the new genus from *Septotheca* and from *Bernouilla* because of the shape of the staminal tube and 5-lobed style. Ducke did not know the fruits and Gleason missed the flowers. On account of its peculiar inflorescence Ducke paid special attention to the similarity between his new genus and *Bernouilla*. In a statement added at the end of his paper (p. 72), Ducke reduced *Huberodendron Styraciflorum* Ducke (type of the genus)

Fig. 8 *Huberodendron Patinoi* Cuatr., in the low Anchicayá Valley



Huberodendron Patinoi Cuatr. Fruit with some valves removed, showing the paperaceous endocarp which form the bags (3/5).

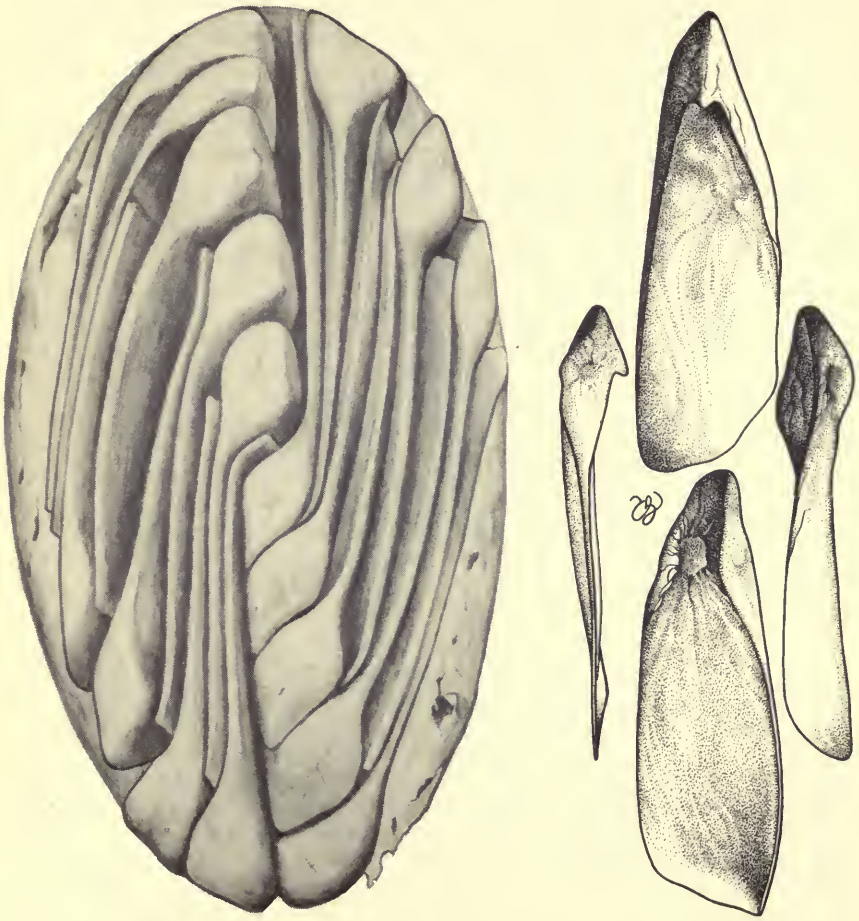


Fig. 10 *Huberodendron Patinoi* Cuatr. Fruit with pericarp removed in order to see the relative position of the seeds (x 3/4).

Fig. 11 *Huberodendron Patinoi* Cuatr. Seeds (x 1/2).

to a synonym of *Bernouillia swietenioides* Gleason. Comparison of specimens and types of these plants reaffirms this synonymy. In addition, the special structure of the fruit, so well described by Gleason, substantiates the validity of the new genus. As Gleason states, the discovery of this giant species of the Amazonian rainforest is one of the most important contributions to the knowledge of the flora of the neo-tropics in the last years.

In my botanical explorations of the Pacific coast of Colombia, I was impressed by the sight of one of the most magnificent trees growing in the forests of one of the wettest regions of the world; locally known as "carra", this tree is especially striking because of long buttresses which strengthen it. On different occasions, I tried hard to get flowers of carra but found only fruits, foliage and wood. When I saw the fruit for the first time, I entertained thoughts like those expressed by Gleason in the above statement. A similar structure of the fruit was also quoted for another genus, *Gyranthera* Pittier, but the leaves of my plant were simple. Recently I received abundant material of flowers of this species collected at the same place where I had collected the branchlets with fruits in 1944. Dr. Victor M. Patino, Director of the Estacion Agroforestal del Pacifico, Cali, and one of the most efficient men in the field of agronomic activities in Colombia, managed to get flowers and inflorescences enabling me to identify "carra" with *Huberodendron*. This discovery is an important addition to the long list of Amazonian plants now known as members of occidental flora of the continent.

Huberodendron Patinoi differs from *H. swietenioides* (Gleason) Ducke by its smaller flowers; its larger fruit is thicker and elliptic, 10-12 cm. diam. (*H. swietenioides* 7 cm. diam.), and contains 10 (5 + 5) seeds in each luculus; the seeds are larger and broader; its scorpioid cymes are shorter, bear more congested flowers on shorter pedicels; the flowers are smaller and the calyx lobules deeper and acute. The leaves of the two species do not differ in any main character, although the Ducke plants have apparently slightly smaller and more coriaceous leaves, and shorter and thicker petioles.

H. ingens Ducke has much larger flowers and petals as well as longer antheriferous lobules, which are narrow, divergent, and apiculate at the top. The anther sacs are long and interspersed. By comparison, *H. Patinoi* has thick short obtuse lobules of the androceum bearing a short, thin filiform appendix, and the whole cycle of anthers appears as a round congested figure.

I compared my specimens with type material of *H. styraciflorum* Ducke, preserved in the Herbarium of Chicago Natural History Museum, and of *H. ingens* Ducke deposited in the United States National Herbarium.

LACISTEMACEAE

Lacistema occidentale Cuatr., sp. nov.

Arbor parva. Ramuli fusci glabri.

Folia simplicia alterna membranacea. Petiolus 4-5 mm. longus, glaber vel parce puberulus. Lamina elliptico-lanceolata basi obtuse attenuata apice angustata cuspidata, 5-7.5 cm. longa, 17-27 mm. lata, margine obsolete et repando serrulato-dentata utrinque blaberrima vel aliquando infra rarissimis setis munita, supra laevis subnitida nervo medio signato, infra nervo medio eminenti lateralibus 4-5 utroque latere arcuato ascendentibus paulo elevatis. Stipulae lanceolatae, 6-7 mm. longae, 2 mm. latae, acutae dorso nervo piloso deciduae.

Inflorescentiae dense cylindricae spiciformae 3-10 sessiles in axillis foliorum glomeratae, usque ad 12 mm. longae. Bractea late triangularis cochleariformis acuta margine minute lacerato-ciliata amplectens florum tectum. Sepala 6-5 vel 4 lanceolata acuminata ciliato-lacerata. Discus cupuliformis crassiusculis antice fissus et bilobatus margine leviter sinuata. Stamini lobuli horizontaliter dispositi. Ovarium glabrum. Stigma sessile trilobatum.

Type: Colombia, Dep. Valle. Cordillera Occidental: La Cumbre, 1680 m. alt. 26-II-1945 colect. J. Cuatrecasas 19595. "Arbolito. Hoja membranosa, frágil." (F.)

Lacistema occidentale. Similar to *L. aggregatum* (Berg) Rusby, it can be differentiated by its smaller leaves, the cupuliform floral disc and its 5 or 6 sepals (rarely only 4).

Lacistema pacificum Cuatr., sp. nov.

Arbor. Ramuli grisei laeves vel cortice subruguloso, terminationibus plus minus puberulis denique glabri.

Folia alterna simplicia coriacea. Petiolus robustus glaber vel parce puberulus supra sulcatus, 5-7 mm. longus. Lamina elliptico-oblonga utrinque attenuata, basi cuneata apice acuminata, 10-17 cm. longa x 36-66 mm. lata, margine integra; supra griseo-viridis glabra nervo medio signato reticulo nervorum capillari elevato; subtus pallidior sparsis et minutissimis pilis munita nervo medio elevato secundariis 7-9 utroque latere plus minusve conspicuis arcuato ascendentibus reliquis nervulis reticulatis. Stipulae lanceolatae valde acute acuminatae 7 mm. longae, extus hirsutae deciduae.

Inflorescentiae cylindricae spiciformae luteolo-albidae 4-6 mm. longae in axillis foliorum sessiles 10-20 glomeratae congestae. Bractea late ovata depressa obtusa margine parce lacerato-ciliata concava amplectens florum incomplete tectum. Sepala 5 raro 3 ovato-lanceolata margine ciliato-lacerata. Discus latus crassiusculus concavus bracteam excedens margine plus minusve lobatus. Stamen paulo exsertum connectivi ramis divaricatis ascendentibus vel erectis. Stigma trilobatum acutum. Ovarium valde reductum. Species dioica?

Type: Colombia, Dep. del Valle. Costa del Pacífico; río Yurumanguí: Veneral, bosques 5-50 met. alt., 2-II-1944 colect. J. Cuatrecasas 15875. "Arbol. Hoja coriácea, verde grisácea. Amentos de flores blanco amarillentas." (F.)

Lacistema pacificum is also closely related to *L. aggregatum* but it has shorter and whitish inflorescences, a disc longer than the bract, a long staminal connective with erect or divaricate branchlets, commonly 5 sepals (in several flowers I have found only 3), and leaves sparsely covered by minute hairs. In the examined inflorescences the greatly reduced ovary suggests the possibility that they may be male flowers and the plant dioecious. The variation in the number of sepals noted by me in different inflorescences necessitates revising our ideas regarding the value of this character so far considered basic in the taxonomy of the genus.

VIOLACEAE

Fusispermum Cuatr., gen. nov.

Flores actinomorfi perparvi.

Calyx pentamerus quincuncialis.

Petala libera 5.

Stamina 5 squamis glandulosis dorsalis in tubum quinquelobatum crassum connatis lobulis (squamis) oppositipetalis, filamentis brevibus interiore facie tubuli adnatis, antheris ovato-cordatis dorso exappendiculatis apice crista brevi fimbriata munitis.

Ovarium ovoideum uniloculare 3 placentis parietalibus ad dimidiam superiorem partem tantum fertilis plurima minuta ovula elliptica ferentibus.

Capsula parva elliptico-oblonga leviter trisulcata pericarpio tenui coriaceo, trivalvata. Semina superiore parte placentarum inserta, lineari-fusiformia vermicularia capsula paulo breviora, formatione arilloide lutescenti crassiuscula valde elongata tegumentum oblongo-ellipticum album obtecta, hilo longitudinaliter percursa; cotyledonibus ligularibus quam embrio recto equilongis.

Inflorescentiae paniculatae reductione axe primario causa ramis fasciculatis elongatis pseudoracemosis vel breviter ramificatis.

Arbores saepe magni, foliis simplicibus alternis. Stipulae deciduae. Species typica prima sequitur.

Fusispermum minutiflorum Cuatr., sp. nov.

Arbor grandis. Ramuli badi-grisei glabri minute sparseque tuberculati.

Folia alterna integra subcoriacea. Petiolus robustus infra apicem incrassatus subcylindricus supra planus vel sulcatus glaber vel minutissime puberulus, 14-24 mm. longus. Lamina ovoideo-oblonga basi cuneata apice abrupte angustata et cuspidata, 17-27 cm. longa, 7-12

cm. lata, margine integra et plana; supra atroviridis vel viridis glabra costa robusta subelevata nervis secundariis filiformibus notatis nervulis transversalibus conspicuis; subtus viridis vel pallido-viridis nervo medio valde eminenti nervis lateralibus elevatis 11-13 paribus angulo obtuso marginem versus arcuato-ascendentibus prope marginem anastomosatis nervulis in reticulum elevatum valde conspicuum anastomosatis glabra sed nervis centrali et secundariis minutissime puberulis. Stipulae crassiusculae amplectentes deciduae ovato-lanceolatae puberulae 7-11 mm. longae.

Inflorescentiae paniculatae axillares vel postea foliorum delapsum caulinares, pedunculo comunne brevissimo tuberculato plures (vulgo 4) ramos pseudoracemosos fasciculatos ferenti. Pseudo-racemi graciles 10-20 cm. longi rhachi tenui pallido-viridi laevi glabro, ramulis brevissimis 1-6 flores fasciculatos bracteolatos pedicellatos ferentis. Bracteae fasciculorum ramulorum ovato-oblongae subscariosae semiamplectentes extus puberulae 1.5-3 mm. longae deciduae; bracteolae singuli floris perminutae ovatae vel lanceolatae puberulae 1-0.2 mm. longae. Pedicelli graciles teneres 2-4 mm. longi glabri.

Flores perparvae globosae 1.5-2 mm. diam. viridi-albidae. Sepala 5 aequilonga orbiculari-ovata apicem versus puberula 1 mm. longa, quincuncialia disposita. Petala libera aequilonga late ovata obtusiuscula aestivatione imbricata glaberrima 1.2 mm. longa, 1 mm. lata. Stamina petalis breviora. Glandulae dorsales staminorum in tubum crassiusculum continuum margine libera quinquelobatum leviter denticulatum 0.5 mm. longum connatae. Filamenta filiformia brevia interiori facie tubo adnata, 0.25 mm. longa tubulum non excedentia. Antherae 0.25 mm. longae glabrae cordatae dorso exappendiculatae tantum apice breviter crista gracile membranacea fimbriata productae. Ovarium ovoideum glabrum, stylus aequilongis glaber, stigma puntiforme. Placentae 3 parietales semina creberrima ovoidea compressa, superiore parte inserta.

Fructus parvus elliptico-oblongus trisulcatus capsularis trivalvis 3-3.5 mm. long, basi calycem paulo accrescentem et androcoeum persistentem suffultus, corolla decidua. Valvae subcoriaceae extus laeves intus linea centrale placentaria et marginibus incrassatis, extus curvatis, plurimis seminibus sublineari-vermiformibus, laevis cum longo hilo parte superiore placenta insertis, longitudinaliter dispositis valvis paulo brevioribus. Crebe ovula sterilia cum valvarum placentis persistit. Arilus valde evolutus luteolus tegumentum tectus, hilum longitudinaliter ventrali elevatum, testa interna alba 1.5 mm. long. oblongo-elliptica; cotyledones ligulares.

Type: Colombia, Intend. Chocó. Selva del río San Juan, margen derecha: Quebrada del Taparal, 5-20 met. alt. 30-V-1946 colect. J. Cuatrecasas 21493. "Arbol grande. Hoja subcoriácea, flexible verde ház, verde pálida envés. Ramillas inflorescencia ténues verde claras. Perianto blanco-verdoso." (F.)

Cotype: Colombia, Dep. Valle. Costa del Pacífico: selva del río

Cajambre: Barco, orillas de Agua Clara, 5-80 met. alt. 24-IV-1944 colect. J. Cuatrecasas 17162. "Arbol. Hoja semicoriácea, verde amarillento oscura, rígida." (F.)

The genus *Fusispermum* belongs to the tribe *Rinoreae* and is related to *Rinorea*. It differs from the American *Rinoreas* in that the bases of the stamens form a tube together with the glandulose dorsal scales, this character places this species close to the Pacific-Asiatic *Rinoreas*. But in *Fusispermum* the scales are opposite the petals and are easily separable, although the staminal filaments always adhere to the inner side of the scales. Other differences from *Rinorea* are the absence of appendicular dorsal scales on the anthers, and the presence of many ovules. *Gloeospermum* Tr. et Pl. likewise differs by the same characters and its carnose fruit, whereas *Allexis* Pierre has a different androeceum.

Fusispermum rubrolignosum Cuatr., sp. nov.

Arbor grandis, 30 met. alta. Caulis 40 cm. diam. cortice oscuro ligno rubro. Ramuli grisei vel badi-grisei plus minusve minute tuberculati et lenticellis muniti.

Folia alterna simplicia subcoriacea. Petiolus 10-15 mm. longus subcylindricus supra paulo sulcatus, leviter incrassatus glaber. Lamina viridis subopaca elliptico-ovoidea utrinque attenuata basi acute cuneata apice acuta vel breviter acuminata, 9-20 cm. longa, 4-10 cm. lata sublaevis, minutissime repando denticulata; supra glabra costa et nervis secundariis signatis; infra minute sparseque puberula nervo medio elevato lateralibus 10-11 paribus subascendentibus prope marginem arcuatis et obsolete anastomosantibus, nervulis venulisque inconspicuo reticulo anastomosatis. Stipulae membranaceae ovato-lanceolatae acutae 8 mm. longae extus puberulae deciduae.

Inflorescentiae paniculatae foliorum delapsorum causa caulinares, ramis vulgo 1-4 fasciculatis, pedunculo tuberculum caulinum reducto. Rhachis 8-12 cm. longa tenuis erecta vel plus minusve flexuosa albida tomentella, ramulis teneribus alternantibus, brachyatis 5-10 mm. longis 3-5 flores pedicellatos ferentibus, vel superne brevioribus 2-1 floris. Bracteolae pubescentes minutissimae deciduae. Pedicelli 1.5-3 mm. longi teneres tomentelli patentes.

Flores albidae parvae subglobosae 2-3 mm. latae. Sepala albida ovata obtusiuscula 1.5-2 mm. longa subaequalia quincuncialis disposita. Petala alba libera elliptica basi ampla apicem versus laevissime angustata obtusa glabra 2 mm. longa 1 mm. lata in alabastro imbricata. Stamina petalis breviora. Filamentum glandulis dorsalis in tubum crassum continuum 0.6-0.8 mm. altum margine libera denticulata quinquelobatum connatis lobulis epipetalis facile separabilibus. Filamenta filiformia 1 mm. longa, 0.5 mm. marginem tubum excedentia superne flexuosa, basi interiore facie tubo adnata. Antherae 0.35 mm. longae glabrae luteae cordatae dorso exappendiculatae apice gracile crista membranacea fimbriata coronatae. Ovarium ovatum obtusum glabrum 0.6 mm. longum 3 placentis parietalibus seminibus ellipticis

crebris parte mediam superiore insertis. Stylus linearis erectus glaber 1 mm. long. Stigma puntiforme. Capsula non totale evoluta semina vermiformia includentur.

Type: Colombia, Dep. Valle. Cordillera Occidental: Hoya del río Dígua, lado izquierdo: Piedra de Moler, bosques 900-1180 m. alt. 23-VIII-1943 colect. J. Cuatrecasas 15066. "Gran árbol, madera roja. Flor blanca. Raquis de la inflorescencia blanco crema." (F.)

Cotype: Colombia, Dep. Valle. Cordillera Occidental: Hoya del rio Digua, lado derecho: El Engano, 700 met. alt. 27-III-1947 colect. J. Cuatrecasas 24001. "Arbol grande. Tallo 40 cm. diam., corteza oscura. Ramas ascendentes. Hoja membranosa, verde semimate. Perianto blanco." (F.)

Fusispermum rubrolignosum differs from the preceding species chiefly by its leaves which are puberulent beneath, by its pubescent or tomentose, paniculate inflorescences (not pseudoracemes) and by its slightly larger flowers.

Gloeospermum sclerophyllum Cuatr., sp. nov.

Arbor. Ramuli glabri viridi-grisei vel fusco grisei leviter rugulosi.

Folia alterna simplicia coriacea. Petiolus robustus cylindricus supra sulcatus glaber, 4-6 mm. longus. Lamina ovato-elliptica basi obtuse cuneata apice abrupte angustata acute cuspidata, 7-11 cm. longa, 3.5-6 cm. lata, margine integra plana vel in sicco levissime revoluta; supra atroviridis glabra nervis principalibus reticuloque venulorum conspicuis; subtus pallido-viridis glabra vel basim versus et margine sparsis nigris setis munita; costa eminenti 4-6 paribus nervis secundariis ascendenti arcuatis elevatis, nervorum reticulo manifesto. Stipulae ovato-lanceolatae acutissimae 10-12 mm. longae valde deciduae.

Inflorescentiae axillares solitariae cymosae pauciflorae (1-6 floribus vulgo 2-3) pedunculo teneri rigido brevissimo, 1-2 mm. longo glabro, bracteis ovatis vel ovato-lanceolatis amplectentibus usque ad 1 mm. longis. Pedicelli 3-10 mm. longi, teneres erecti supra basim articulati glabri.

Sepala 5 pallido-viridia subaequalia 1.5 mm. longa ovato-rotundata glabra margine minutissime ciliata. Petala alba crassiuscula in alabastro contorta elliptico oblonga apice attenuata acutiuscula 5 mm. longa 2.5 mm. lata tertio inferiore coalita. Stamina 5 libera (tantum basi brevissime coalita) filamento plano 0.8 mm. longo, anthera 9.4-9.5 mm. longa ovata, apendice apicale acute lanceolato membranaceo 1.2 mm. longo. Ovarium glabrum conicum 1 mm. longum. Stylus simplex 1.3 mm. longus. Stygma puntiforme.

Fructus pre-maturitate viridulus rotundus 1.5 cm. diam., baccatus 1-3 seminibus. Semina subdiscoidea cotyledonibus crassis discoidalibus, embrio robustus episperme coriaceo.

Type: Colombia, Dep. Valle. Río Calima: Quebrada de la Brea 20-40 met. alt. 24-V-1946 colect. J. Cuatrecasas 21293. "Arbol. Hoja

coriácea, verde oscura haz, verde pálida envés. Pedunculo y cálices verde pálidos. Corola blanca." (F.)

Cotype: Colombia, Río Calima lado derecho: La Trojita 5-50 met. alt. 28-II-1944 colect. J. Cuatrecasas 16552. "Florecitas y frutos verdosos. Frutos esféricos 1-5 cm. diám." (F.)

This new species of *Gloeospermum* can readily be distinguished from all other known species of the genus by its coriaceous, subovate-elliptical abruptly acuminate and entire leaves with few prominent nerves. The stamens have almost free filaments and short, elliptical anthers with a very long, lanceolate appendix. The fruits of this specimen are not completely ripe but they are spherical and smooth; by boiling them the pericarp becomes somewhat flexible, and under pressure breaks irregularly exposing 2-3 seeds whose coriaceous episperm is covered by slime. Although the stamens are nearly free, I referred this species to *Gloeospermum*, because of the form of its inflorescence, its baccate fruit and the characteristic appendix of its anthers.

FLACOURTIACEAE

Hasseltia tomentulosa Cuatr., sp. nov.

Arbor mediocris. Ramuli cortice ruguloso terminationibus tomentuloso.

Folia simplicia alterna coriacea. Petiolus 2.5-3 cm. longus rigidus tomentulosus supra sulcatus. Lamina ovata basi subrotundata vel obtuse cuneata apice abrupte obtuseque cuspidata, dimidia superiore parte margine sinuato-dentata, quintuplinervia, supra atroviridis in sicco fusca, ad basim duabus glandulis concavis rotundato-ellipticis munita, tribus nervis principalibus plus minusve tomentulosis reliqua glabra vel glabrescens, infra nervis principalibus tomentosis valde eminentibus centrale parte uno nervo secundario tomentoso utroque latere valde arcuato tantum notato, laterales marginem versus 3-4 nervis secundariis ascendentibus arcuatis tomentulosis instructae; reliqua numerosis nervulis filiformibus transversalibus elevatis pubescentibus cum venulis obsoletis in reticulo anastomosatis, 10-12 cm. long., 5-7.5 cm. lat.

Inflorescentiae terminales floribundae cymoso-paniculatae ramis ramulisque quaternis raro ternatis robustis patentibus tomentosis. Bracteae minutae triangulares acutae, tomentosae 1-1.5 mm. longae. Pedicelli crassiusculi tomentosi 0.5-6 mm. longi (vulgo 2-3 mm. long.). Sepala 4, basi brevissime coalita ovato oblonga acutiuscula extus tomentosa intus pubescentia 2.5-3 mm. longa, 2 mm. lata viridulo-albida. Petala parcissime breviora, obovato linearia obtusiuscula basim versus constricta viridulo-albida, extus tomentulosa intus pubescentia. Stamina creberrima filamentis capillaribus ciliatis calyce brevioribus vel aequilongis, antheris suborbicularibus luteolis. Ovarium ovatum valde tomentosum biloculare placentis duabus connatis ovulis numerosis. Stylus simplex glaber. Fructus ignotus.

Type: Colombia, Comisaría del Putumayo: Mocóa, bosque higrófilo en la Quebrada del río Mulato, 570-600 m. alt. colect. 26-XII-1940 J. Cuatrecasas 11292. "Arbol. Perianto blanco crema o blanco verdoso, anteras amarillas." (F.)

Hasseltia tomentulosa is very different from the other known species of this genus; it has robust leaves whose nerves are tomentose on the under side, a tomentose inflorescence, shorter and thicker pedicels, and tomentose ovary, sepals, and petals. The racemose inflorescence of *Hasseltiopsis albomicans* Sleumer readily differentiates it from the former, although both have the same appearance.

Homalium chocoense Cuatr., sp. nov.

Arbor grandis. Ramuli rugulosi grisacei glabri divaricati, juveniles striolulati parce puberuli.

Folia membranacea simplicia alterna. Petiolus 5-7 mm. longus puberulus. Lamina ovato-elliptica basi rotundata vel obtusa apice abrupte attenuata et cuspidata 6.5-11 cm. long. x 3.5-5.5 cm. lata, margine sinuato-serrata, supra atroviridis glabra nervis principalibus notatis, subtus viridis costa prominenti parcissime puberula nervis secundariis 6-7 paribus ascendentibus arcuatis filiformibus reliquis venulis obsolete reticulatis, praeter saepe axillas nervorum fasciculis pilis munitas glabra.

Inflorescentiae racemosae simplices axillares, rhachi tenui parce puberuli 12-18 cm. longi. Flores sessiles vel subsessiles. Calyx tubo conico laevi fructifero depresso subhemisphaerico laevi puberulo, lobis 5 elliptico-oblongis acutiusculis 2 mm. longis tomentulosis. Petala 5 ovato triangularia quam sepala paulo majora tomentulosa viridulo-pallida. Filamenta glabra, petala aequilonga et longiora. Glandulae ellipticae 1 mm. lat. tomentosae. Ovarium conicum parcissime pilosulum. Styli 3 basi connati glaberrimi.

Type: Colombia, Intendencia del Chocó; río San Juan, cercanías de Palestina, Quebrada de la Sierpe, 5 met. alt., 13-III-1944 colect. J. Cuatrecasas 16908. "Gran árbol. Hoja membranosa rígida, verde oscura. Perianto y ovario amarillo verdoso claro." (F.)

Homalium chocoense is closely related to *H. guianense* (Aubl.) Warb. but is distinguishable from it by the almost glabrous ovary and leaves; from *H. racemosum* and *H. Pittieri* it differs not only in the smaller sessile flowers but in the nearly glabrous ovary and in the styles, which are fused at the base. Unlike the other three species, *Homalium chocoense* has a flat rotund rather than a conical calyx tube.

Casearia megacarpa Cuatr., sp. nov.

Arbor usque ad 20 met. alta. Caulis usque ad 30 cm. diam. cortice laevi griseo sectione ochraceo tenui, ligno subduro lutescenti. Rami horizontales vel penduli. Ramusculi tortuosi plus minusve penduli peridermato viridi-griseo-pallido in sicco rugoso glabro.

Folia simplicia alterna coriacea. Petiolus abbreviatus crassiusculus 0.5-2 mm. longus glaber. Lamina obovato-oblonga vel elliptico-oblonga basi cuneata apicem versus rotundata attenuata abrupte cuspidata vel cuneato-cuspidata, 12-27 cm. longa, 5-10 cm. lata, margine integra vel raro obsolete denticulata utrinque glabra opaca et pallido-viridis; supra laevis nervo medio secundariisque filiformibus apparentibus venulorum reticulo notato; subtus costa valde eminenti nervis secundariis ascendentibus marginem versus arcuatis 8-10 utroque latere, nervulis plus minusve elevato reticulatis, glandulis punctatis oblongis linearibusque pellucidis crebis. Stipulae ovato-lanceolatae circa 4 mm. longae valde deciduae.

Ramuli floriferi tuberculato capitiformes sessiles caulinares alternantes, axillis foliorum delapsorum dispositi, numerosis bracteolis ovato lanceolatis albidis 1-2 mm. longis, valde congestis caespitosis tecti. Flores fasciculati numerosi pedicellati. Pedicelli albi teneres puberuli usque ad 8 mm. longi parte media vel supra partem mediam articulati. Alabastra ovoidea alba. Sepala 5 ovata vel ovato oblonga obtusa alba intus tomentulosa extus parce pubescens duo interiora magis tomentulosa, 5-6 mm. longa, 3-4 mm. lata tantum basi coalita. Petala nula. Stamina antherifera alba 10 alternatim paulo inaequalia filamentis circa 2.5 mm. longa hirsutulus cum disci apendicibus linearibus crassiusculis albis hirsutulis subaequalibus alternantibus. Antherae ovato oblongae crassiuscule obtuseque apiculatae glabrae. Discus tubuliformis longis. Ovarium ovoideum dense hirsutum 3 placentis parietalibus numerosis ovulis. Stylus columnaris brevis subglaber, 0.5 mm. longus. Stigma ovoideo-capitatum glabrum subpapillosum 0.4-0.5 mm. longum et latum.

Capsula globoso-oblonga usque ad 10 cm. longa x 8 cm. lata pallido-viridis minutissime verruculosa, epicarpio subcarnoso viridi 1 mm. crasso, mesocarpio coriaceo 2-3 mm. crasso badio, endocarpio carnoso 12-15 mm. crasso albo, 3 placentis vix elevatis, denique in 3 valvis dehiscens. Semina alba cotyledonibus rugosis, in mucilago inmersa. (Fig. 12)

Type: Colombia, Dep. del Valle. Hoya del rio Sanquininí, lado izquierdo, La Laguna, bosques 1250-1400 m. alt., colect. 10-XII-1943 J. Cuatrecasas 15408. "Arbol 20 met. alt. Tallo 25 cm. diam. Madera dura amarillenta. Corteza lisa. Ramas péndulas. Flores caulinares blancas. Fruto globoso oblongo, 10 cm. long., 8 cm. lat.; epicarpo semiblando 1 mm. grueso verde exteriormente; mesocarpo delgado, subleñoso 2 mm. sepia; endocarpo carnoso 12-15 mm. blanco. 3 placentas poco salientes, gruesas. Semillas blancas cubiertas con un mucílago dulzaino, con dos cotiledones rugosos. Fruto dehiscente en 3 valvas." (F.)

Cotype: Colombia id. id. La Laguna colect. 12-XI-1943 J. Cuatrecasas 15462. "Arbol. Corteza gris pardusca. Hoja coriácea, verde clara. Flores (pedúnculos, cálices, corona y estambres) blancas, en haces caulinares." (F.)

Fig. 12 *Cassearia megacarpa* Cuatr. (x 2/5).

Casearia megacarpa of the Sec. *Pitumba*, is closely related to other species with large leaves (for instance *C. combaymensis* Tul., *C. javitensis* HBK), and readily distinguishable by its exceptionally large fruits. These capsules are rotund or slightly elongate, smooth 6-10 cm. long, and open in three valves displaying the seeds surrounded by a sweetish aromatic mucilage. By comparison *C. javitensis* has a different structure and leaf form, while *C. combaymensis* has a glabrous disc and androeceum

Casearia cordillerana Cuatr., sp. nov.

Arbor 12 met. alta. Caulis 12 cm. diam. cortice tenui griseo sectione ochraceo, ligno subduro roseo-ochraceo-albido. Rami horizontales vel paulo ascendentes. Ramuli pallidi glabri in sicco peridermato rugosi.

Folia simplicia alterna coriacea glaberrima. Petiolus brevis robustus supra sulcatus 5-6 mm. longus. Lamina elliptico-oblonga vel elliptico-lanceolata basi cuneata apice attenuata acuminata, 12-24 cm. longa 4.5-9 cm. lata, margine integra utrinque viridis et nitida; supra nervo medio et lateralibus conspicuis reticulum nervulorum notatum; subtus costa valde prominenti nervis lateralibus 7-10 utroque latere eminentibus arcuato-ascendentibus ad marginem obsolete anastomosantibus, reticulo nervulorum conspicuo; glandulis rotundatis oblongis linearibusque pellucidis satis numerosis. Stipulae deciduae lanceolatae + 7 mm. longae.

Ramuli floriferi abbreviati tuberculati sessiles axillis foliorum delapsorum prodeunti, cum bracteolis ovatis 2-3 mm. long. puberulis congestis tecti. Flores 6-10 fasciculati breviter pedicellati congesti. Pedicelli crassiusculi 1-1.5 mm. longi articulati glabrati. Alabastra ovato-rotundata. Sepala 5 ovato-orbicularia minute puberula alba, 3-4 mm. longa 2-3 mm. lata, basi coalita. Petala nula. Stamina antherifera 10 subaequilonga filamentis 2 mm. longis glabris cum disci apendicibus oblongis obtusis hirsutulis dimidio brevioribus alternantibus. Antherae ovato-oblongae crassiuscule apiculatae glabrae. Discus cupuliformis latus brevis. Ovarium ovoideum villosum. Stylus brevis glabratus, 0.5 mm. Stigma globoso-capitatum.

Fructus suborbicularis (orbiculari-oblongis) circa 6-7 cm. longus et latus (unus 7 cm. long. x 6.5 cm. lat.), pericarpio extus viridi nitido, 12-13 mm. crasso tribus placentis parietalibus parum incrassatis.

Type: Colombia, Dep. Valle. Cordillera Occidental, extremo N. filo de la Cordillera sobre Las Brisas, monte El Tabor, 1970-2100 m. alt., 22-X-1946 colect. J. Cuatrecasas 22419. "Arbol 12 met. Tallo 12 cm. Ramas horizontales o en ángulo muy obtuso. Corteza delgada, gris, seccion ocrácea. Madera semidura blanco rosado ocrácea. Hojas en un plano, coriáceas, verdes muy brillantes haz, brillantes envés. Perianto blanco. Frutos 6-7 cm. Pericarpo verde brillante 12-13 mm. grueso." (F.)

Casearia cordillerana is closely related to *C. megacarpa* from which it differs by its narrower, shiny (whether fresh or dried) leaves, larger

petioles, shorter inflorescences with fewer flowers, extremely short and almost glabrous pedicells, shorter, ovate-orbicular sepals and especially broader and shorter floral disc the appendages of which are half as long as the glabrous stamens.

Casearia cajambrensis Cuatr., sp. nov.

Arbor. Ramuli griseo-fusci puberuli.

Folia simplicia alterna membranacea. Petiolus brevis robustus parce puberulus vel glabrescens, 2-5 mm. longus. Lamina oblongo-lanceolata basi cuneata apice attenuata cuspidata acuta, 14-26 cm. longa, 4-7 cm. lata, epunctata, margine obsolete serrata; supra viridis nitida glaberrima costa paulo sulcata nervis secundariis conspicuis; subtus pallidiora glabra costa robusta eminenti nervis lateralibus 10-13 utroque latere ascendentibus ad marginem arcuatis obsolete anastomosantibus, nervulis laxe reticulatis. Stipulae lanceolatae pubescentes 4 mm. longae valde deciduae.

Fragmenta vetustorum florum tantum vidi. Sepala oblonga pubescentia. Filamenta staminum hirsutula. Appendices disci lineari-hirsuti stamina breviores. Fructus obovoideo-globosus basi cuneatus apice abrupte acuminatus 4-5.5 cm. longus 3-4.5 cm. latus luteo-badius dense tomentuloso-velutinus; pericarpio carnosulo subcoriaceo in sicco 3 costis suturalibus elevatis, in 3 valvis dehiscens. Semina polygonato-oblonga 11-15 cm. longa testa laevi cum arillis mucilagineis dulcis glomerata.

Type: Colombia, Dep. del Valle. Costa del Pacífico; río Cajambre: Quebrada de Guapecito, 0-5 met. alt., 16-V-1944 colect. J. Cuatrecasas 17717. "Arbol. Hoja membranosa, verde brillante haz, claro envés. Frutos globoso cuneiformes apuntados, hasta 5.5 x 4.5 cm., de color y aspecto de albaricoque. Pericarpo carnoso-semicoriáceo, dehiscente en 3 valvas, sección blanquecina, dejando un glomérulo de semillas amasadas en un mucílago transparente y dulce." (F.)

Casearia cajambrensis is related to *C. macrophylla* Vahl but is readily distinguished by its elongated leaves and the shape and larger size of its fruit.

RHIZOPHORACEAE

Cassipourea Killipii Cuatr., sp. nov.

Arbor usque ad 10 met. altitudinem. Caulis 20 cm. diam. cortice subfusco subruguloso sectione badi, ligno duro lutescenti. Ramuli brunnei subrugulosi glabri.

Folia crasso-coriacea vel coriacea subrigida opposita petiolata. Petiolus brevis robustus glaber 3-7 mm. longus. Lamina late elliptica vel elliptico-oblonga apice basique obtuse attenuata vel basi truncata vel apice brevissime obtuseque acuminata, margine integra, 6-13 cm. longa, 4-6.5 cm. lata; supra viridis in sicco valde pallido-viridis, laevis glabra nervo medio tantum notato; infra viridi-pallida, nervo

medio elevato secundariis 7-9 utroque latere angustissime elevatis marginem versus arcuato anastomosatis, glabra vel aliquando juvenilia parcissime puberula. Stipulae interpetiolares triangulari-lanceolatae 3-4 mm. longae pubescentes deciduae.

Flores fasciculati numerosi in tuberculis axillaribus vel ex-axillaribus inserti, sessiles vel subsessiles (pedicello infra 1 mm. longum). Bracteolae semiorbiculares obtusae pubescentes 1 mm. long. 1.5 mm. latae.

Calyx 5 mm. longus campanulatus crassiusculus viridis extus glaber vel minutissimis sparsissimis adpressis pilis munitus, intus dense villoso-sericeus, 4-5 lobatus lobis ovato triangularibus acutis quam tubo brevioribus. Petala alba lineari-spathulata, 7 mm. longa et plurimis laciniis linearibus 3-4 mm. longis satis pilosis, ungue lineari glabro calycem altitudinem excedenti. Stamina numerosa (circa 28) verticillata extra discum inserta, filamentis filiformibus glabris calycem 1-2 mm.) excedentibus, antheris lineari-oblongis glabris 1-2 mm. longis supra basim insertis. Discus crasso-membranaceus tubulosus dentatus glaber 0.8 mm. altus. Ovarium glabrum vel tantum apice pilosum triloculare loculis bi-ovulatis. Stylus sericeus longus 6 mm. Stigma puntiforme. Receptaculum extra discum ciliatum. Capsula elliptica basi attenuata apice obtusa stylo remanenti, glabra 7 mm. longa, plerumque trisperma semina oblonga laevia 6 mm. longa.

Type: Colombia, Dep. del Valle. Costa del Pacifico: Bahía de Buenaventura: Quebrada de San Joaquín, 0-10 m. alt. 20-II-1946 J. Cuatrecasas 19878. "Arbol 10 met. Tallo 20 cm. diám., corteza pardo clara, subrugulosa, sección sepia. Madera dura, amarillenta. Hoja coriácea, semiflexible verde oscura ház, clara envés semibrillante. Cáliz verde. Pétalos blancos." (F.) (US)

Cotypes: Id. id. Bahía de Buenaventura: Quebrada de Aguadulce 0-10 m. alt. 11-XI-1945 colect. J. Cuatrecasas 19717. "Arbol. Hoja craso-coriácea, verde medio ház, verde claro envés. Flores en las ramas secundarias. Cáliz verde." (F.)

Id. id. Buenaventura Bay, forest at edge of mangroves June 9, 1944 colect. E. P. Killip & J. Cuatrecasas 38975. "Tree 6-7 m. high; fruit olive-green." (F.) (US)

Id. id. near Buenaventura: El Forge, sea level, June 8, 1944 collect. E. P. Killip & J. Cuatrecasas 38958. "Tree 6-7 m. high; fruit green. Mangrove swamp." (F.) (US)

Id. id., Buenaventura Bay, mangrove swamp, April 14, 1939 collect. E. P. Killip 34987. "Tree 3-4 m. high; trunk about 15 cm. in diameter; flowers white." (US)

Id. id., Mangrove thicket along Buenaventura Bay, May 7, 1922 collect. E. P. Killip 5218. (US)

Id. id., Mangrove thicket along Buenaventura Bay, Oct. 5-10, 1922 collect. E. P. Killip 11735 (US)

Id. id., Costa del Pacífico: Estero del Encanto, entre los ríos Yurumanguí y Cajambre 0-5 m. alt. 11-II-1944 colect. J. Cuatrecasas 16165. "Arbol. Hoja craso coriacea, verde pálida en el envés." (F.)

Id. id., Intendencia del Chocó: Banks of Quebrada Togoromá dense tidal forest, June 13, 1944 collect. E. P. Killip & J. Cuatrecasas 39141. "Tree; calyx and fruit green." (F.) (US)

Cassipourea Killipii is easily distinguished by its elliptical, abruptly and shortly acuminate, obtuse leaves, which are thick and (in dried state) have slightly prominent secundary nerves.

Although closely related to *C. elliptica* Poir. and *C. guianensis* Aubl., it differs from both by its leaf characters, glabrous ovary and long anthers. The other two species, according to the abundant material examined from Central America and Guyana, have lanceolate or elliptic-lanceolate, always attenuate and acuminate leaves, pubescent ovary and more or less puberulous fruit, especially in the upper third. Actually, *C. Killipii* has a glabrous capsule, for it bears only a few hairs on the apex, namely the base of the style. In addition it differs from *C. elliptica* also by its sessile or subsessile flowers. *C. elliptica* and *C. guianensis* do not always have a dense shaggy ovary as reported, but it is at least pubescent in the upper part.

It is remarkable that the whole material examined by me reveals the great constancy of the characters described for *C. Killipii*.

Cassipourea calimensis Cuatr., sp. nov.

Arbor 5 m. alta. Caulis 12 cm. diam. cortice ochraceo ligno luteo duro. Ramuli griseo-badi glabri.

Folia grandia coriacea opposita petiolata. Petiolus robustus 6-10 cm. longus puberulus vel glabrescens. Lamina ovato-elliptica elongata vel elliptico-oblonga basi apiceque obtuse attenuata vel apice angustata, acutiuscule acuminata, margine integra et laevis 11-20 cm. longa, 6-9 cm. lata; supra atroviridis laevis glabra nervo medio paulo eminenti lateralibus obsoletis; infra pallidior tenuibus minutis pilis adpressis sparsis munita, costa crassa prominenti rufescenti nervis lateralibus 5-6 utroque latere angulo valde obtuso prominenti cum alliquis minus eminentibus alternantibus, venulis tenuibus laxissime reticulatis.

Flores permulti pedicellati fasciculati in tuberculis axillaribus inserti. Bracteae ovato-ellipticae oblongae dense pubescentes 2 mm. longae. Pedicelli 4-8 mm. longi viridi rubescentes glabri infra apicem articulati articulo superiore 1 mm. longo conico cum calyce evanescenti. Calyx campánulatus apertus 6 mm. longus extus pallide viridis glaber intus dense sericeus lutescens, lobulis plerumque 5 triangularibus acutis tubum aequilongis. Petala lineari spathulata longe laciniata pilosa. Stamina numerosa ($\pm$28) extra discum verticillata inserta, filamentis filiformibus glabris calycis longitudinem non attingentibus, antheris elliptici-oblongis glabris. Discus crasso membranaceus tubulosus lobulatus glaber circa 1 mm. altus. Receptaculum extra discum ciliatum. Ovarium triloculare loculis biovulatis supra villosum

parte media et infra glabrum. Stylus dense pubescenti-sericeus 6 mm. longus infra stigma glabrus. Stigma puntiforme papillosum.

Type: Colombia, Departamento del Valle. Rio Calima (región del Chocó) La Trojita 5-50 m. alt. 1-III-1944 colect. J. Cuatrecasas 16625. "Arbolito 5 met. Tallo 12 cm. diam. Corteza ocrácea, madera amarilla, dura. Cáliz verde pálido por fuera, verdoso amarillento por dentro."(F.)

Cassipourea calimensis can be distinguished from its closely related species, *C. elliptica* Poir. and *C. peruviana* Alston, by its size and the shape of its leaves, glabrous pedicels, abundant flowers, filaments shorter than the calyx and calyx lobes as long as the tube. The flowers are also larger and the upper part of the pedicel is thick, conical and fused with the calyx.

Cassipourea floribunda Cuatr., sp. nov.

Arbuscula. Cortex pallide griseo-brunneus rugulosus. Ramuli glabri griseo-badi lenticellato-verruculosi.

Folia subcoriacea vel coriacea opposita breviter petiolata. Petiolus 2-3 mm. longus basim versus pubescens. Lamina viridis ovata vel ovato-elliptica basi obtusa vel rotundata vel abrupte cuneata apice attenuata acute cuspidata margine integra plana, 5-12 cm. longa 2.5-6.5 cm. lata; supra glabra nervo medio signato nervis secundariis obsoletis; infra pallidior sparsis tenuis pilis adpressis munita, costa eminenti nervis lateralibus ascendentibus marginem versus arcuato-anastomosatis 4-5 utroque latere magis prominentibus reliquis nervis subobsolete reticulatis. Stipulae lanceolatae 2-3 mm. longae villoso-sericeae deciduae.

Flores pedicellati odoratissimi copiosissimi in fasciculis globosis axillaribus dispositi. Bracteolae ovatae obtusiusculae 1-2 mm. longae 1-1.5 mm. latae, pubescentes. Pedicelli teneres rigidi 6-9 mm. longi apicem versus articulati articulo inferiore pubescens superiore glabro. Calyx pallido-luteus extus glaber intus dense villoso-sericeus, 5 mm. longus campanulatus apertus 4-5 lobatus lobis triangularibus acutis patentibus quam calycis tubo longioribus (3 mm. long. lobis, 2 mm. tubo). Petala alba lanceolata 5-6 mm. longa anguste unguiculata limbo copiose laciniato laciniis 2-3 mm. longis longe pilosis. Stamina numerosa (circa 20) verticillata extra discum inserta, filamentis filiformibus glabris calyce brevioribus, antheris elliptico-oblongis glabris. Discus crassiusculo-membranaceus denticulatus glaber 0.6-0.7 mm. longus. Ovarium triloculare loculis biovulatis, apicem versus villosus. Stylus sericeus apice glabro excepto. Stigma papillosum.

Type: Colombia, Dep. del Valle. Cordillera Occidental: Hoya del río Dígua lado izquierdo: Piedra de Moler, bosques 900-1180 m. alt. 22-VIII-1943 colect. J. Cuatrecasas 15011. "Arbolito. Corteza gris sepia clara. Abundantes flores en glomérulos axilares. Cáliz amarillo crema. Pétalos blancos laciniados. Intenso olor a jazmín." (F.)

Cassipourea floribunda is closely related to *C. peruviana* Alston but differs from that species by its shorter and more ovate (rather than

lanceolate) leaves, its short petiole, the many-flowered inflorescences, its ovary which is villous only on the upper side, its stamens which are shorter than the calyx and by its calyx lobes which are longer than the tube.

COMBRETACEAE

Buchenavia pallidovirens Cuatr., sp. nov.

Arbor magna. Ramuli divaricati pseudo di-tri-chotomi angulato-sympodiales rugulosi grisacei vel griseo-badi extremis infra foliorum insertionem valde incrassatis.

Folia alterna crebre in densos fasciculos apicales glomerata coriacea minutissime et sparsissime punctata petiolata. Petiolus 7-12 mm. longus rigidus teneris pubescenti-hirsutus. Lamina oblanceolato-elliptica basim versus sensim sensu attenuata apice abrupte breviterque acuminata acuta, margine integra anguste revoluta, 7-10 cm. longa 18-30 mm. lata; supra pallido-viridis nitida laevis sparse puberula nervo medio tantum prominulo; infra pallido-viridis subnitida sparse puberula costa prominenti pubescenti, 5-6 paribus nervis lateralibus valde ascendentibus eminentibus puberulis, reliquis nervulis prominulis minute reticulatis, basi pari glandulis ellipticis elongatis minutis interdum obsoletis munita. Stipulae terminales vel cum foliis intermixae lineares subcoriaceae 7-12 mm. longae pubescenti-hirsutae.

Inflorescentiae spicatae numerosae ad foliorum fasciculos extra folia ab axillis squamorum bracteorum stipulas similium prodeuntes, pendulae omnino pallide luteolo-virides. Rhachis 9-12 cm. longa teneris plus minusve flexuosa hirsutula duobus tertiis superioribus florifera. Bracteae patentes lanceolatae basim versus valde angustatae satis barbatae 2-5 mm. longae. Flores hermaphroditi pentameri numerosi. Ovarium anguste ovatum villoso-hirsutum in brevem collum pubescentem attenuatum, 1.8-2 mm. longum. Calyx cupuliformis 2.5 mm. diam. pallide luteolo-viridis extus pubescens margine hirsutulus obsolete 5-lobatus leviter involutus intus reliquus glaber. Stamina 10 biverticillata interiora breviora exteriora calycem excedentia, filamento glabro antheris ovato-cordatis bilocularibus profunde 4-sulcatis lutescentibus glabris. Discus epigynus fundo calycis adnatus longe densissime hirsutus. Stylus lineari-fusiformis praeter basim pubescentem glaber. Stigma puntiforme. Fructus ignotus.

Type: Colombia, Dep. del Valle. Costa del Pacífico: Bahía de Buenaventura: Quebrada de San Joaquín, 0-10 met. alt. 23-II-1946 collect. J. Cuatrecasas 19939. "Arbol grande. Follaje verde claro. Hoja coriácea flexible verde claro brillante en el haz, verde claro semimate envés. Racimos péndulos verdoso amarillentos. Perianto verde amarillento claro. Anteras amarillas." (F.)

Buchenavia pallidovirens differs from *B. viridiflora* Ducke by its larger, apiculate leaves which are more attenuate toward the petiole, the more prominent and ascendent secundary nerves and the conspicuous smaller veins which are partly depressed in *B. viridiflora;* the in-

florescences are larger and the calyx is pubescent and has a densely ciliate margine. It differs also from *B. suaveolens* (Spruce) Eichl.by the shape of its leaves, its general pubescence and more prominent venation on the lower side of the leaves.

A unique character of *B. pallidovirens* which differentiates if from the great majority of the other species in the genus, is the shape of the leaves, which are narrow toward the base and continue down the petiole, the broad apex which is abruptly acute-apiculate and the secundary nerves which branch off the midrib at an acute angle.

Buchenavia vaupesana Cuatr., sp. nov.

Arbor. Ramuli divaricati pseudo di-tri-chotomi-sympodiales cortice ruguloso griseo.

Folia juvenilia membranacea ad apicem ramulorum fasciculata petiolata novellia pallido–viridia. Petiolus 8-15 mm. longus pubescenti-hirsutulus. Lamina obovato lanceolata basim versus attenuata apice modice angustata obtusiuscula, margine integra plana subtus ciliata, 3-6.5 cm. longa 14-17 mm. lata; supra laevis glabra nervo medio tantum prominulo; infra sparsissime puberula nervo medio eminenti pubescenti, secundariis 7-8 utroque latere divergenti-ascendentibus plus minusve puberulis, nervulis adpresse reticulatis, axillis nervorum secundariorum penicillis pilorum munita. Folia exteriora fasciculorum in squamas fertiles lanceolatas vel late-lineares obtusas hirsutas 7-17 mm. longas 2-4 mm. latas reducta.

Inflorescentiae spicato-capitatae rotundatae circa 1 cm. diam. pedunculatae. Pedunculus tenuis pubescenti-hirtus 15-20 mm. longus. Rhachis robustior 4-6 mm. longa hirsutula. Bracteolae hirsutae lanceolatae 1.5-2.5 mm. longae. Calyx cupuliformis 3.5 mm. diam. extus glaber margine leviter revolutus et ciliatus. 10 stamina 2-verticillata filamentis robustis glabris connectivo crasso exterioribus calycem dimidio excedentibus. Discus epigynus dense crispo-hirsutus. Stylus basi incrassatus hirsutus supra glaber acutus brevis (calicem inclusus). Ovarium cylindricum basi paulo incrassatum apicem angustatum villoso-hirsutus 3 mm. longus. Stigma puntiforme.

Type: Colombia, Comisaría del Vaupés: orilla del río Cuduyarí afluente del Vaupés no lejos de Mitú, ± 200 met. alt. 15-IX-1939 colect. J. Cuatrecasas 6828. "Arbol; copa plana verde claro, pepa blanda amarilla, comestible." (F.)

Buchenavia vaupesana is very close to *B. capitata* (Vahl) Eichl., a species widely distributed in the Amazon basin. This new species is readily distinguishable by its obovate-lanceolate, triangular-apiculate (rather than rounded) leaves, long petiole, longer flowers and the ciliate inner edge of the calyx. I checked my specimens with the isotype of *B. capitata* quoted by Eichler (Gardner 2838) in the Herb. of this Museum.

Buchenavia stellae Cuatr., sp. nov.

Arbor. Ramuli cortice griseo ruguloso glabro.

Folia alterna ad apicem ramulorum fasciculata, coriacea longe petiolata. Petiolus robustus pubescens 22-30 mm. longus, parte media conspicue vel obsolete bi-glandulosus. Lamina obovato oblonga basim versus longe cuneato-attenuata apice subrotundata abrupte breviterque cuspidata acuta, margine integra, 13-20 cm. longa, 5-7 cm. lata; supra in sicco rubescens laevis praeter costam tomentulosam glabra nervis secundariis divergentibus 10-11 paribus conspicuis; subtus pallidior sparsissimis minutis pilis munita nervo medio valido dense pubescenti lateralibus elevatis plus minusve pubescentibus reliquis nervulis minus prominulis reticulatis.

Flores non visi. Spicae fructiferae numerosae infra foliorum terminalem rosulam dispositae breves, rhachi 5-7 cm. longa pubescenti. Drupae sessiles elliptico-oblongae obtusae minutissimis sparsis pilis munita in sicco 14-18 mm. longa 7-8 mm. lata.

Type: Colombia, Comisaría del Caquetá: Florencia, en los cerros La Estrella, 400 m. alt. colect. 30-III-1940 J. Cuatrecasas 8863 (F.)

Buchenavia stellae is closely related to *B. reticulata* (Spruce) Eichl., but the plant of Spruce has thicker, lanceolate leaves which are tomentose on the lower side, a very short petiole, and acutely ascendent nerves. The fruits of *B. reticulata* (Spruce 3453) are long, acute and densely tomentose.

B. macrophylla is readily distinguished by its rather inconspicuous, reticulate, big leaves, very short petioles, and larger inflorescences.

SYMPLOCACEAE

Symplocos gibraltarica Cuatr., sp. nov.

Arbor grandis. Caulis 30 cm. diam. cortice griseo ruguloso sectione pallido-ferrugineo, ligno lutescenti-albo. Rami cinereo-grisei, terminationibus foliosis virido-ochraceis vel virido-ferrugineis hirsutis.

Folia simplicia alterna disticha subcoriacea. Petiolus robustus erectus 3-5 mm. longus dense hirsutus. Lamina elliptico-lanceolata basi plus minusve asymmetrica obtuse cuneata apice angustata acutissime acuminata, margine integerrima, 10-13 cm. longa, 2.5-4.5 cm. lata; supra obscure lutescenti-viridis hirsuta costa depressa dense tomentoso-hirsuta tantum notata, reliquis nervis vix conspicuis; subtus pallidior hirsuta costa valde eminenti et dense virido-ferrugineo hirsuta nervis secundariis 10-11 utroque latere angulo obtuso, linealibus conspicuis, circa marginem arcuato-anastomosatis, venulis obsoletis laxe reticulatis.

Inflorescentiae axillares racemosae pauciflores (3-6 fl.) congestae breviter pedunculatae, pedunculo crasso rigido hirsuto 2-8 mm. longo. Flores sessiles vel subsessiles. Bracteae ovatae 3-5 calyculiformis dispositae deciduae 4-6 mm. long., 4 mm. latae exterior usque 8-10

mm. longae dense hirsutae in sicco ferrugineae. Calyx pentamerus 6 mm. altus lobis ovatis obtusiusculis 4 mm. longis 3.5 mm. latis intus glaber, extus valde hirsutus ochraceo-viridulus in sicco ferrugineus. Corolla 15 mm. longa 5 petalis tertia parte inferiore connatis, lilacinis elliptico-oblongis obtusis intus glabris extus praeter marginem dense villosis. Stamina infinita pluriseriata monadelpha filamentis glabris in longum tubum album vel roseo-album connatis cum corolla coalita tubo 12-13 mm. long. parte libera filamentis spathulatis exterioribus 2-3 mm. longis interioribus subnullis, connectivo capillari. Antherae parvae subrotundatae luteolae. Ovarium inferum supra longe denseque hirsutum 5-4 loculare. Stylus inferiore parte hirsutulus. Stigma capitatum 5 lobatum papillosum.

Type: Colombia, Dep. Valle: Cordillera Occidental al N. de Las Brisas (entre Cartago y Albán); Gibraltar, bosque 2100-2200 m. alt., 25-V-1946 colect. J. Cuatrecasas 22524. "Cáliz verdoso ocráceo. Corola lila. Androceo blanco o blanco rosado. Arbol grande. Tallo 30 cm. diam. Corteza gris rugoso agrietada, sección sepia clara. Madera blanco amarillenta. Hoja subcoriácea, verde amarillenta, semioscura haz, más clara envés." (F.)

Symplocos gibraltarica is easy to distinguish because of the size and shape of its leaves, the conspicuous hairiness of its leaves and young branchlets, the rather large flowers, very hirsute calyx, lilac-colored corolla and the long tube of its androeceum, hirsute gynoecium and 3 or 5-septate ovary. It belongs to the subsection *Ciponimastrum* Brand and is most closely related to *S. aspera* Brand which has shorter, broader, and serrate leaves. This species has been reported from an unidentifiable locality.

Symplocos pichindensis Cuatr., sp. nov.

Arbor mediocria. Caulis 25 cm. diam. cortice sublaevi griseo tenui ligno ochraceo-albido subduro. Ramuli brunnei terminales ochraceo-virides valde hirsuti.

Folia simplicia alterna coriacea. Petiolus 2-5 mm. longus dense hirsutus. Lamina elliptico-lanceolata basi inaequalis parum attenuata obtusa apice angustata acuta, margine parce revoluta, integra vel minutissimis sparsis dentis callosis munita, 6-10 cm. longa 2-4 cm. lata; supra rugulosa atroviridis nitida glabra excepto costa depressa et pubescens, nervis secundariis filiformibus depresso-notatis nervulis conspicue reticulatis; subtus pallido-viridis pubescenti-hirsuta costa eminenti dense hirsuta, nervis lateralibus 6-7 utroque latere prominentibus ascendentibus marginem versus obsolete anastomosantibus, reliquis nervis laxe reticulatis vix conspicuis.

Inflorescentiae axillares pauciflorae racemosae valde congestae ramulis brevissimis floribus (3-10) sessilibus. Bracteae numerosae illem florem 3-4 involucrantes ovatae vel subrotundatae concavae amplectentes membranaceae dense pubescenti-hirsutae 2-3 mm. longae.

Calyx pentamerus ochraceo-pallido–viridis in sicco ochraceo-cinereus, 3-3.5 mm. longus sepalis infra partem mediam coalitis longe

denseque hirsutus lobulis ovatis obtusis vel subrotundatis. Corolla alba 4 mm. longa glabra 5 petalis infra mediam coalitis ellipticis obtusis. Stamina numerosa 3-seriata corolla breviora filamentis glabris monadelphis in tubum usque supra partem mediam connatis et cum corolla coalitis. Antherae suborbiculares parvae luteolae. Ovarium inferum supra valde hirsutum triloculare. Stylus glaber. Stigma crasso trilobato-capitatum pappillosum.

Type: Colombia, Dep. Valle; Cordillera Occidental: Hoya del río Cali lado derecho de la hoya del río Pichindé, cuchilla de Los Cárpatos, 2250-2350 m. alt., 24-V-1946 colect. J. Cuatrecasas 21662. "Arbol 10 met. alt. Tallo 25 cm. diam. Hoja coriácea, rígida, verde rugoso oscura brillante haz, verde claro envés. Corola blanca." (F.)

Symplocos pichindensis belongs to subsection *Pseudolatonia* Brand and differs from other closely related species by its short corolla, its compact inflorescence, glabrous corolla and stamens and by its hirsute branchlets, petioles, bracts, calyx and the lower side of its leaves. This species, the same as *S. gibraltarica*, is very different from other species of *Symplocos* reported from Colombia.

Symplocos venulosa Cuatr., sp. nov.

Arbor. Rami brunnei terminales fusci glabri.

Folia simplicia alterna rigide coriacea glaberrima. Petiolus robustus 2-4 mm. long. Lamina elliptica vel ovato-elliptica vel elliptico-oblonga basi rotundata vel obtuse attenuata apice obtusa vel rotundata vel parum attenuata margine dimidio superiore obsolete crenato-serrata infra medium integra, 3-5.5 cm. longa x 2-3 cm. lata; supra atroviridis nervo medio impresso nervis lateralibus 7-8 paribus ascendentibus capillaribus et cum reliquis numerosis nervulis gracilem minutum elevatum reticulum formantibus; subtus pallida costa crassa elevata, nervis secundaribus parce elevatis vel obsoletis nervulis inmersis inconspicuis.

Inflorescentiae axillares valde reductae, 1-3 floribus subsessiles, pedunculo usque ad 4 mm. longo glabro. Bracteae 3 involucrantes suborbiculares glabrae margine ciliolatae 2-3 mm.

Calyx 2 mm. altus glaber sepalis infra medium connatis, parte libera orbicularibus margine leviter ciliatis. Corolla roseo-violacea 8 mm. longa, 5 petalis ellipticis basim versus coalitis glabris. Stamina numerosa pluriseriata monadelpha alba corolla paulo breviora filamentis planis glabris in tubum longum connatis, parte libera brevis. Ovarium inferum triloculare supra longe hirsutum. Stylus glaber. Stigma trilobatum.

Type: Colombia, Dep. Huíla; Cordillera Oriental, entre Gabinete y Andalucía, 2300-2200 m. alt. 24-III-1940 colect. J. Cuatrecasas 8579. "Arbol. Corola rosado violácea. Androceo blanco." (F.)

Symplocos venulosa belongs to subsection *Pseudoalstoma* Brand and is closely related to *S. suaveolens* Klotzsch and *S. rigidissima* Brand. From the first one it is different because of its short pedicels,

glabrous calyx and style. It differs from the second one by its truly pedunculate inflorescences and hirsute ovary. But the outstanding diagnostic character of *S. venulosa* is represented by its rigid, coriaceous leaves with their delicate but prominent venation on the upper side and their flat lower side.

Symplocos sararensis Cuatr., sp. nov.

Arbor. Ramuli grisei terminales viriduli glabri.

Folia simplicia alterna subcoriacea glaberrima. Petiolus 3-8 mm. longus supra sulcatus. Lamina lanceolata basi attenuata cuneata apice angustata acuta vel obtusiuscula, margine integra vel obsolete crenulato dentata, 6-9 cm. longa x 1.8-3.5 cm. lata; supra viridis nervo medio impresso, lateralibus et nervulis filiformibus elevatis in minutum reticulum anastomosantibus; subtus pallidior costa valde prominenti, nervis secundariis valde tenuis cum reliquis nervulis in prominulum reticulum anastomosatis.

Inflorescentiae pauciflores vel solitariae (1-4 flores) breviter pedunculatae, pedunculo glabro usque 6 mm. longo (in statu fructifero). Bracteae orbiculares 2-3 mm. latae glabrae, margine parcissime ciliatae. Flores desiderati. Fructus ellipticus 6.5 mm. long., ¼ mm. lat.

Type: Colombia, Dep. Norte de Santander, región El Sarare, Quebrada del Sararito, 1930-1950 m. alt., 22-X-1941 colect. J. Cuatrecasas, R. Evans Schultes & E. Smith 12580 (F.).

Symplocos sararensis is characterized by the structure of the leaf, which is sub-coriaceous, flexible and delicately yet prominently reticulate on both sides. Undoubtedly it is closely related to *S. corymboclados* Brand but the exact affinity of the species cannot be established as flowers are lacking in the material at hand. But the characteristic leaves and the presence of the fruit enable us to distinguish this *Symplocos* from all other known species.

STYRACACEAE

Styrax leptactinosus Cuatr., sp. nov.

Arbor. Ramuli brunnei terminationibus adpresse cinereo-stellato-lepidotis.

Folia coriacea alterna petiolata. Petiolus 10-13 mm. longus striolulatus plus minusve stellato-lepidotus. Lamina lanceolata basim versus angustata cuneata apice attenuata acuta vel acuminata margine integra leviter revoluta, 11-15 cm. longa 2.5-5 cm. lata, supra viridis glabra costa impressa nervis secundariis bene notatis, reliquis nervulis in laxo reticulo conspicuo; infra cinerea densissime adpresseque tomentella pilis stellatis minutissimis valde tenuibus intricatisque munita sed nervis glabris, costa prominenti nervis secundariis 6-7 utroque latere prominentibus axillis callosis marginem versus anastomosantibus nervis tertiariis reticulatis emergentibus etiam glabris.

Inflorescentiae racemosae 5-6 cm. longae axillares, rhachi dense lepidoto-cinerei. Bracteae lanceolatae vel lineares adpresse stellato-lepidotae 2-3 mm. longae. Pedicelli patentes lepidoti 1 cm. longi. Calyx cupuliformis margine truncatus minutissime 5-dentatus viridi-cinereis minutissimis squamis stellatis adpressis obtectus et sparsis squamis etiam stellatis majoribus munitus. Corola albo rosea 5-lobis in aestivatione valvatis, tubo 3 mm. longo, lobis late linearibus 12-14 mm. longis 2-3 mm. latis extus adpresse stellato-pilosa intus glabriuscula. Stamina 10 filamentis stellato-pilosis extremis glabris. Anterae lutescentes margine pilis stellatis seriatis munitae. Ovarium trilobatum dense stellato-tomentellum. Stylus elongatus glaber. Stigma indistinctum.

Type: Colombia, Dep. Norte de Santander, región del Sarare: entre Alto del Loro y Alto de Santa Inés, bosques 1800-2300 m. alt. 20-X-1941 J. Cuatrecasas, R. E. Schultes & E. Smith 12457. "Arbol. Corola blanco rosada. Anteras amarillentas." (F.)

Styrax leptactinosus is closely related to *S. bogotensis* and to *S. hypargyreus* Perk. From these it can be distinguished by the form, size and indument of the leaf. This is longer, lanceolate, narrowly cuneiform at the base, on the under side covered with a dense toment of stellate hairs which have very soft, long interwoven radii requiring considerable enlargement for distinguishing their radiate form; the main nerves and most prominent part of the reticulum are glabrous.

Publication 643

3 0112 041645018