

MISCELLANEOUS NOTES ON NEOTROPICAL FLORA, XVI.

NEW TAXA IN THE ESPELETIINAE

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LIBANOTHAMNUS OCCULTUS (Bl.) Cuatr. var. *SALOMONII* Cuatr. & López-Figueiras var. nov.

Arbor usque ad 5 m alta dimidia parte superiore ramosa. Gemae terminales foliaque incipendia dense crasseque fulvescenti-lanato-villosa.

Folia alterna crasse coriacea rigida. Lamina sessilis (18-)20-28(-30) x 5.4-7(-8)cm, ratio 3-4.5(-4.9):1 oblongo-elliptica apice obtusa vel subobtusa minute mucronata, circa basim attenuata usque ad 20-14(-12) mm latitudinem subite angustata, margine revoluta integra; adaxiale juvenilis dilute villosa-lanuginea denique glabra lutescenti-viridis plus minusve viscida, costa anguste impressa, nervis lateralibus leviter impressis vix conspicuis; abaxiale ochraceo-lanata indumento crasso densissimo intricatissimo superficiem totam tegenti sed costa valde elevata robusta conspicuissima, nervis secundariis crebris parum notatis sed infra indumentum prominentibus parallelis 2-4 mm inter se distantibus in angulo (70-) 80-90° divergentibus, venulis in reticulo prominulo instructis alveolis moderatis lanatisque. Vagina 2.6-3.7(-4.5) cm longa apice robusta triangulata inferne tubulosa amplectente adaxiale 1 cm alta annularis, intus glabra crebre nervata extus densissime fulvo-villoso-barbata.

Synflorescentiae terminales corymboide-paniculatae congeste floribundae inferne foliatae superne bracteatae 20-40 cm longae 20-35 cm latae folia adulta paulo superantes. Axis robustus angulatus e basi ramosus. Rami alterni principales 3-4 robusti striati erecti, vel patenti-erecti proximales 18-28 cm longi dimidia vel tertia superiore parte ramificati corymboso-paniculati 8-29 capitula ferentes, ramusculis ultimis 1-3 capitulis instructis. Pedunculi seu pedicelli crassiusculi erecti recti vel ubi vetusti valde recurvati 0.5-5 cm longi. Axes rami ramusculi pedicellique dense longeque lanati pilis tenuibus plus minusve flexuosis intricatis ad 5 mm longis vel longissimis intricato-barbatis indumento crasso ochraceo vel ochroleuco instructis. Folia subtendentia proximalia caulina similia sed breviora, lamina 12-22 x 4-6.5 cm, sursum decrescentia. Superne bracteae subtendentes ovato-oblongae acuminatissimae et acutae 14-2.5 x 5-1 cm, primum quam pedunculi longiores sed maturitate breviores.

Capitula radiata latiuscula 110-131 flores ferentia, ligulis amotis 17-22 mm diam, circulo ligularum 30-35 mm, disco 8-9 mm diametro. Involucrum cupulare circa 17 mm altum dense fulvescens

villosa-lanatum. *Phyllaria sterilia* plerumque 8, quinque exteriora 18-13 x 10-7 mm crasse herbacea ovata acuminata concava densissime fulvo-longe-villosa, altera 9-8 x 5-4 mm ovato-oblonga acutaque sursum villosa. *Phyllaria fertilia* exteriora 8-6 x 5-4 mm ovata breviterque acuminata acuta crasse membranacea plurivenia basi valde incrassata et indurata dorsale sursumque lanuginoso-villosa, medialia interioraque 7-6 x 4-3 mm, membranacea elliptica cum apice triangulato, argute navicularia amplectentia, plurivenia dorso sursumque pilosa apice dense barbata pilis rigidis erectis ad 1.5 mm, omnia eglandulosa. Receptaculum plano-convexum 8-9 mm diam glabrum. Paleae 6-6.2 x 2-2 mm, firmule membranaceae plurivenosae oblongae apice triangulato breviterque apiculato dorso distale dense barbato pilis acutis et obtusiusculis 0.5 mm longis inferne glabrae, eglandulatae.

Flores radii ligulati 24-26 in capitulo 3-seriati. Corolla alba 9-12 mm longa, tubo 1-1.5 mm longo dense piloso pilis ad 1 mm longis hyalinis obtusis vel clavatis plusminusve intricatis; lamina crassiuscula elliptica 2-3 dentata 3-5 mm lata adaxiale marginibusque papillata abaxiale sparse pilosula, eglandulata. Stylus 3-4 mm longus ramis 1 mm. Achaenia exteriora 3 x 2.8 x 2.5 mm, obovato-triangulata apice truncata basin versus attenuata basi obtusa duobus faciebus planis dorsali convexa et incurvata, interiora 3.2 x 2 x 1.5 mm, oblonga quadrangulata, carpodium callosum crassum cylindraceum 0.5 mm longum.

Flores disci 85-106 in capitulo. Corolla lutea vel luteo-lividis 6-6.4 mm longa, tubulo 2.5 mm longo sparse piloso pilis obtusissimis vel parvis clavatis 0.2-0.6 (-1) mm longis basin versus glabro, limbo tubuloso tantum basin parvis pilis, lobis 0.7-0.8 mm longis triangulatis dorso parvis pilis obtusis vel subclavatis 0.1-0.5 mm interdum duobus lobis abaxialibus glabris, marginibus longi-papillatis, haud glandulis. Antherae 2.2 mm longae appendicibus ovato-lanceolatis 0.5 mm longis. Stylus 6 mm sursum argute papillosum apice emarginato brevius papilloso. Nectarium tubulosum 5-lobatum 0.6-0.7 mm altum.

Typus: Venezuela, Táchira: Pico de Horma, laderas occidentales, zona paramera 7.5 km al SE de Mesa Quintero, 3100 m; arbol hasta 5 m, tronco ramoso a partir de 2.80 m, hoja envés pardo leonada, lígulas amarillo-pálidas, 11 enero 1985, López-Figueiras, H. Rodríguez & N. Rengifo 31344 (Holotypus, US); isotypus MERF). Id. small individual, sterile, n^o 31345. Alrededor de pequeña laguna cerca Pico de Horma ladera sur, 3000 m, 11-I-1985, López Figueiras, H. Rodríguez & N. Rengifo 31346 (US, MERF). Id. plantas n^o 31347.

Var. salomonii, an endemic form of Pico de Horma mountain, differs from the typical L. occultus of Páramo de Quirorá, by the elliptic leaf lamina which is less restricted at its base (13-20 mm wide), and from the common form found at the neighboring Páramo del Batallón by the outline of the leaf lamina. It differs also by the absolute lack of glands on the phyllaries and pales, and by the light-yellow color of the ray flowers, which in the typical variety of the Páramo de Quirorá are white or cream. From all populations known to me of L. occultus, this variety from the subparamo region

of Pico de Horma, differs by its dense, thick, lanate-barbate tawny indument that covers the young parts, the inflorescence branchlets and the undersurface of the leaves.

ACKNOWLEDGMENT. This new variety is dedicated to Ingeniero Agrónomo Salomón López Coordinator of a Unidad Técnica for a Conservation Program, CADAPE, of State Táchira, Venezuela, who provided important logistic help to the collector's, including helicopter transportation to reach the isolated almost inaccessible hill of Pico de Horma. His generous help facilitated an initial exploration by Drs. López-Figueiras and Henry Rodríguez, who brought interesting collections among them the new variety of Libanothamnus here described and other taxa under study.

RUILOPEZIA USUBILLAGAE Cuatr. sp. nov.

Caulis brevis lignosus probabiliter pauciramosis, ramis brevibus lignosis omnibus rosulam multifoliatam terminalem efferentibus.

Folia rigidule chartacea rosulata. Lamina 12-20 cm longa 3-3.3 cm. lata elliptico-lanceolata acuta deorsum attenuata basi angustata brevem pseudopetiolum alatum simulans, basi in vaginam triangularem 18-24 mm longam ad 12-14 mm latam gradatim ampliata, margine adaxialiter visu integra vel leviter crenata, sed denticulis mucroniformibus minutis recurvis tantum abaxialiter conspicuis 2-6 mm inter se distantibus; superficie adaxiale viridis minute rugulosa costa impressa reliquis nervis paulo notatis juvenilis copiose villosa-sericea plerumque costa albo-sericea deinde glabrata tantum pilis sericeis tenuibus sparsis fere obsoletis munita; abaxiale costa prominenti nervis lateralibus prominulis numerosis 2-4 mm inter se distantibus inaequalibus in angulo 50-60° ascendentibus distaliter gradatim tenuioribus et cum venulis anastomosatis, venulis reticulum prominentem formantibus, alveolis polygonalibus profundis cum lana minuta alba crispa repletis; superficie abaxiali tota cum indumento denso sericeo albido vel ochroleuco pilis longis sericeis adpressis instructo omnino tegenti.

Synflorescentia terminalis corymboide paniculata circa 56 cm longa 18-20 cm ampla (in specimine unico). Axis fere tener sed rigidus erectusque copiose foliato-bracteatus supra basim 5-6 mm diametro, medulosus striatus copiose subadpresse vel adpresse villosa-sericeus pilis 1-3 mm longis strictis supra basem conicam induratum geniculatis, ceterum antrorsis rectis et plus minusve adpressis 1-3 mm longis. Pars proximalis sterilis circa 22 cm longa basi congeste foliata foliis 10-12 spiraliter subrosulatis instructis cum vaginis imbricatis, sursum duobus internodiis nudis 10-12 cm longis. Pars fertilis 34 cm longa duobus ramis inferioribus in specimen incoatis, internodiis 7-6 cm longis sursum gradatim brevioribus, ramis medialibus 15-14 cm longis 6-7 capituliferis, proximalibus 7-6 cm longis, omnibus tenuibus striolatis erecto-patentibus; pedunculis pedicellique longis gracilibus 8-20 cm vel usque 40 cm longis. Rami ramusculi pedicellique densiuscule ochraceo-villosi pilis 1-2 mm longis subpatulis plus minusve flexuosis. Folia alterna basilaria sterilia

cum rosularia similima, in parte media folia (seu bracteae) sterilia vel subtendentia etiam similia sed sessilia amplectentia 16-12 x 3-2.7 cm, sursum gradatim breviora bracteosa 5.5 x 1.7, 5 x 1.5 cm ovata acutaque; bracteae supremae oblongae vel lineares acutae 30-12 x 5-1.5 mm, omnes copiose villosae.

Capitula radiata ligulis amotis semiglobosa 15-18 mm ampla 105-128 flores ferentia, circulo ligularum ad 25 mm disco 12-14 mm diametro. Involucrum cupulare ubi complanatum ad 21 mm diam, subadpresse fulvescente villosum. Phyllaria sterilia circa 9 biseriata herbacea anguste ovato-lanceolata acuminata apice callosa acutoque, 11-10 x 4.2-3 mm, adaxiale glabra multinervata nervis laticiferis prominulis, abaxiale dense subadpresse pilosa pilis rigidis antrorsis acutis ad 0.6 mm longis. Phyllaria fertilia exteriora sterilia similia 10-8 x 3-2.6 mm late lanceolata acuminata basi attenuata et incrassata multinervia, dorsale dense vel moderate subadpresse pilosa, ad marginem raris minutissimis glandulis, interiora 7-6 x 2.4-2 mm oblonga subacuta tenuiter membranacea amplectentia inferne crassiora et glabrescentia superne abaxiale adpresse fusci-villosa pilis acutis sed sursum margineque obtusis 0.2-0.3 mm, haud glandulis. Receptaculum circa 4.5 mm diam glabrum. Paleae membranaceae 7-6.5 x 2 mm amplectentes obovato-oblongae distale acute triangulatae dorso sursum dense adpresseque fulvo-pilosae pilis acutis sed in marginibus apiceque obtusissimis seu pyriformi-triangulatae basi cuneata acutaque; interiora 2.3 x 1 mm quadrangulatae.

Flores marginales feminei ligulati 3-seriati 43-58 in capitulo. Corolla fortasse alba violaceo-maculata, 6-7.5 mm longa tubo 1 mm longo dense hirsutulo pilis brevibus obtusis curvato-patentibus hyalinis seu albis 0.3-0.5 mm et parcis patulis acutis; lamina tenuiter membranacea elliptica vel oblongo-elliptica apice obtusa 2-3 denticulata, 1.9-2.3 mm lata 6-7 nervata basi aperta abaxiale sparsis pilis antrorsis acutis 0.2-0.4 mm longis. Stylus 2.5-3 mm ramis 0.7-0.8 mm lineis stigmaticis marginalibus valde crassis. Achaenia immatura exteriora 2-2.3 x 1.2 x 1 mm, atra argute pyriformi-triangulata basi cuneata acutaque; interiora 2.3 x 1 mm quadrangulata.

Flores disci pseudohermaphroditi 62-72 in capitulo. Corolla lutea 5-5.5 mm longa, tubulo 2-2.5 mm dimidia parte superiori pubescenti sparsis pilis hyalinis acutis et obtusis 0.2-0.3 mm; limbo tubuloso basim parcis pilis reliquo glabro; lobis triangularibus 1 mm longis dense brunneo-barbatis pilis obtusis vel clavatis fulvis 0.1-0.2 mm longis, marginibus adaxiale papillois. Antherae circa 2 mm basi acute sagittatis appendice apicali ovata subacuta 0.35 mm longa. Stylus distale papilloso-pilosus apice acuto triangulato inciso-bifido. Nectarium tubulosum strictum 1 mm altum. Ovarii rudimentum pediciformi 0.3 mm longum.

Typus: Venezuela, Mérida, Páramo de Aricagua, 3000 m alt., "tronco leñoso", 31 Mar 1922, Alfredo Jahn 1021; US, holotype; VEN, isotype.

The type collections of R. usubillagae have been formerly identified as to E. bracteosa. Espeletia bracteosa was described by Standley using specimens from Páramo de La Cristalina, Trujillo

(Jahn 156) with only fragmentary inflorescence parts and few incomplete old heads. Unfortunately, the collection Jahn 1021 from Páramo de Aricagua, Mérida, was also attributed by A. C. Smith (1935) to E. bracteosa St. and was used by him to make his description and illustrations of the flowers of the latter. (Figs 1, 5-8 of plate 2 in A.C. Smith are based on Jahn 1021). Aristeguieta (1965) followed Smith in his description of the Standley species, but he did not make any mention of the Jahn 1021 specimens. In fact, the two species can be perfectly distinguished through the leaves alone, R. bracteosa St. having very rigid, coriaceous with long, robust pseudo-petioles, and a thick lanate indument covering the abaxial side of the blades. R. usubillagae has chartaceous thinner flexible, shortly contracted at base leaf blades covered by a appressed sericeous indument abaxially, they resemble rather the leaves of R. atropurpurea, being only less rigid and lacking the long pseudopetiole also characteristic of that species. Aristeguieta recognized this similarity when he wrote the following annotation on a piece of paper attached to the sheet of Jahn 1021 at VEN. "Las hojas pertenecen probablemente a E. atropurpurea Smith, las cabezuelas son probablemente E. bracteosa o de otra especie. Por otra parte, si hojas y flores provienen de la misma planta es seguro que esta colección representa una especie nueva". The VEN specimen annotated by Aristeguieta has only a bunch of leaves and two small fragments of a flowering branch. The specimen at US which shows the mutual belonging of both parts (leaves and flowers) of the Jahn 1021, was not annotated by Aristeguieta.

I am pleased to dedicate the new species to Dr. A. Usubillaga, professor at the University of Mérida, who made and promoted important contributions to the chemical compounds of the Espeletiinae especially on the Kauranoid diterpenes.

The new species is distinguished from the closely related species according to the following key.

1--Capitula radiate. Ray corollas ligulate.

2. Leaves rigidly coriaceous, long-pseudopetiolate 20-75 x 2-9 cm, the lamina oblanceolate, obovate-lanceolate or broadly lanceolate, abaxially densely lanate. Ray corollas narrow-oblong, yellow. Synflorescences tall, floribundous, the axes up to 3-4 cm diam.
..... R. bracteosa (Standley) Cuatr.

2' Leaves chartaceous, flexible, sessile or sub-sessile, 12-20 x 3-3.3 cm, the lamina lanceolate-elliptic, abaxially densely, appressed villous sericeous. Ray corollas elliptic, white and more or less purplish blotched. Synflorescences moderate, laxly branched, the axes to 0.6 cm diam. R. usubillagae Cuatr.

1--Capitula pseudo-discoid. Ray corollas reduced to the short tube. Leaves rigidly coriaceous, long-pseudopetiolate, 26-65 x 4-9 cm, lamina oblanceolate, obovate-lanceolate or broadly lanceolate, abaxially densely and appressed sericeous.
..... R. atropurpurea (A.C. Smith) Cuatr.

RUILOPEZIA EMMANUELIS Cuatr. sp. nov.

Caulirosula monocarpica. Caulis erectus usque ad 1.20 m altus 4.5-6 cm diam cum foliis marcescentibus vel cum vaginis foliorum persistentibus compressissimis tectus. Cortex rugulosus transverse cicatricoso-striatus 3-4 mm crassus. Stratum lignosum 4-5 mm, inferne usque ad 8-12 mm crassum. Rosula circa 70 cm ampla visu albida. Gemma foliaque incipienda albissima, dense crasse adpresseque villososericea.

Folia coriacea rigida 43-56 cm longa. Lamina 37-48 x 3.8-5.3 cm, lanceolata sursum angustata apice acuta basim versus sine sensu attenuata basi in brevem pseudopetiolum angustata, margine visu integerrima sed dentibus callosis mucroniformibus retrorsis munita; adaxiale costa anguste lineari impressa tantum conspicua, superficie densissime adpresse villosa subsericea, leporina, pilis circa 1.5 (-2) mm inferne patulis ceterum rectis sericeis acutis antrorsoadpressis; abaxiale costa crassa eminenti, nervis secundariis moderate prominentibus 5-8 mm inter se distantibus angulo 45-66° (-70)° divergentibus, reticulo venorum valde elevato alveolis rotundis vel ellipticis parvis omnino dense sublanata, pilis strictis patentibus distale flexuosis intricatisque, ad costam pilis antrorsis rectis densissimis indumento crasso adpresse sericeo instructis. Pseudopetiolus plus minusve alatus 1-4 cm longus. Vagina oblongo-rectangularis apice obtusa basim paulo dilatata, adaxiale viridis plurinervata, sursum apiceque densissime adpresseque villososericea deorsum glabra, abaxiale dense crasseque sericeo-barbata, pilis ad 12 mm longis strictissimis parallele antrorsis inter folia adpressis; 4.8-5.5 cm longa 2-3.4 (-3.8) cm lata.

Synflorescentia terminalis corymbiforme paniculata ampla floribunda circa 60 cm alta vel probabiliter ultra. Axis robustus lignosus basi ad 4 cm crassus, fistulosus et superne medullosus, argute angulato-costatus striatusque, dense albo-lanuginosus et basi foliosus et copiose ramosis ramis alternis. Folia proximalia sterilia vel aliquando fertilia alterna numerosa a rosularia similima sed minora, lamina 25-20 x 2.8-2 cm sursum decrescenti lanceolato-oblonga acutaque basi attenuata sessili cum vaginam oblongam producta, sursum gradatim breviora et bracteosa. Rami copiosi ascendentes, in speciminibus valde vetustis siccisque effractis tantum fragmentis adsunt. Ramuli alterni et pedicelli dense fulvo-hirsutuli pilis tenuibus flexuosis ad 2 mm longis patulis tecti; pedicelli 1-3 cm longi rigiduli ebracteati, tantum bractee subtendentes lineari-lanceolatae acutae hirsutulae 18-7 mm longae ad ramulos presentes.

Capitula radiata ligulis amotis semiglobosa vel subglobosa 10-12 mm lata, 74-125 flores ferentia, circulo ligularum 20-25 mm, disco 9-10 mm diametro. Involucrum cupulatum dense villosum fusco-brunnescens. Phyllaria sterilia 6-8, herbacea crassiuscula lineari-lanceolata vel triangulari-linearia, apice acutissima 5.5-8 x 1.4-2 mm, 5-7 nervis plus minusve conspicuis, abaxiale dense villosa pilis pluricellularibus rigidis antrorsis acutis moderate flexuosis 0.5-

1.5 mm longis, et sparsis glandulis 0.01-0.02 mm longis praedita, adaxiale glabra. Phyllaria fertilia (5.3-) 4.8-4 x 2-1.8 mm obovato-oblonga apice acutata breviterque apiculata plus minusve concava, intima amplectentia membranacea margine scariosa basim incrassata dorso praecipue sursum et apicem dense hirto-barbata pilis fere rectis antrorsis acutis vel obtusiusculis 0.2-0.5 (-0.8) mm longis brunneo-rubescens et glandulis sparsis, marginibus sursum ciliato-pectinatis pilis obtusiusculis.

Receptaculum valde convexum, subconicum, 3.8 mm diam, subglabrum (sparsissimis pilis). Paleae 4.5-5 x 1.8-2 mm ellipticae apice saepe incurva attenuatae apiculatae amplectentes saepe 3 nervis conspicuis abaxiale sursum antrorso-pilosae pilis obtusiusculis ad 0.5 mm longis plus glandulis minutis intermixtis.

Flores marginales feminei ligulati 2-3-seriati 24-30 in capitulo. Corolla lutea 8-10 mm longa, tubo 0.5-1.5 mm longo, crasso, dense antrorso-piloso hyalinis crassiusculis obtusis vel subclavatis 0.2-0.4 mm longis, apice interdum appendice adaxiali lineari erecta 1-2 mm longa obsita; lamina crassiuscula oblonga apice 3-dentata deorsum paulo angustata abaxiale deorsum sparsis minutis pilis et glandulis, 5-7 nervis plus minusve conspicuis, adaxiale margineque dense arguteque papillosa papillis rotundatis prominentibus. Stylus 2-3 mm ramis complanatis 0.8-1 mm longis 0.2 mm latis, lineis stigmaticis crassissimis violaceis. Achaenia prismatico-obovoidea argutissime triangulata apice truncata basi cuneata, 2-2.8 mm longo 1.2-1.5 mm lata, abaxiale curvata.

Flores disci pseudohermaphroditi 45-99 in capitulo. Corolla lutea 4.2-5 mm longa, tubulo 2-2.5 mm longo crassiusculo basim crassius adaxiale sparsis pilis crassis subclavatis vel obtusis 0.2-0.5 mm reliquo glabro; limbo campanulato inferne sparsis pilis obtusis crassiusculis 0.2-0.5 mm, lobis triangularibus 1.2-1.5 mm longis 1 mm latis margine incrassatis papillosisque adaxiale apiceque dense arguteque papillosis papillis oblongo-clavatis, abaxiale parvis pilis obtusis crassis 0.1-0.4 mm. Antherae sulphureae 1.6-1.8 mm longae basi sagittatae appendice apicali anguste ovato-triangulata 0.25-0.35 mm longa. Cellulae endotheciales brevi-rectangulatae cum nodis ad parietes transversas horizontales. Grana pollinis echinata 0.025-0.030 mm. Stylus 4-5 mm longus crassus apice emarginatus dense papillosus papillis 0.02-0.05 mm longis. Nectarium tubulosum 0.6-0.8 mm denticulatum. Ovarium pediculiforme crassiusculum 0.3 mm altum.

Typus: Venezuela, Trujillo: Páramo de Las Rosas, between Las Lajas and Barro Amarillo, 2900-3000 m, extensive open paramo zone with community of Ruilopezia vergarae and Chusquea sp, the vegetation very much damaged by intermitent fires and grassing, this new species building also a large community of "frailejona", the caulirosulas up to 1.5 m tall, all in vegetative stage except the collected damaged specimen with many bourgeoning new shoots at the base of the old inflorescence, flowers bright yellow, 8 Mar 1985, Manuel López-Figueiras & Dana Griffin 32405 (Holotypus US; isotypus MERF). Other collections: Páramo de Las Rosas at Barro Amarillo, 2800-3000 m, damaged specimen with incomplete axis of central inflorescence (distal part lacking), some basal new floral shoots

and few flowering heads, ligules bright yellow, 14 Sept 1985, M. López-Figueiras 32490 (paratypus US). Id. id. sterile, trunk 30 cm long, López-Figueiras 32491 (US); id. id. trunk 55 cm long, López-Figueiras 32492 (US).

Ruilopezia emmanuelis is closely related to R. josephensis from which it differs by the shape and indument of the leaves. The blades are more lanceolate and acutely attenuate; the sheaths are oblong or slightly trapezoid and much longer than wide, in contrast with the broad semiorbicular shape exhibited by those of R. josephensis, and the adaxial side of the lamina is permanently densely appressed subsericeous with leporine touch, rather than becoming glabrous as in R. josephensis. R. emmanuelis has also narrower blades, with a ratio of 9-9.7:1, and the secondary nerves have a more acute deviation angle ($45-66^\circ$), whereas in R. josephensis the ratio is 6-6.6:1, and the deviation angle $65-80^\circ$. The involucre bracts are also more narrowly-lanceolate, longer, and densely villous, whereas in R. josephensis they are ovate-acuminate, sparsely villous, and more copiously glandular.

R. emmanuelis is dedicated to Dr. Manuel López Figueiras an indefatigable explorer of the Venezuelan Andes flora and my close collaborator in the Espeletinae collecting. The species is found in communities near the top of the hills at the eastern end of the Cordillera of Venezuela (Páramos of Nepe-Cende-Rosas-Jabón). The caulirosettes are of all sizes up to 1.5 m. I have seen it in sterile stage every time that I have been in the region, especially at the Páramo del Turmal close to formations of Ruilopezia jabonensis which dominates some open areas of the paramo between this and Páramo del Jabón. It seems that R. emmanuelis shares the area at some more humid depressed spots. This monocarpic species, R. emmanuelis, similar in habit and ecology to R. josephensis and R. coloradarum, shows an intriguing rate of flowering. My associates (mainly López Figueiras), in spite of repeated visits made almost yearly and in different months of the year, were not able to find the species in flower for fifteen years, since the time of our first observation in 1969. In March 1985 Manuel López Figueiras finally reported that the reticent Ruilopezia of the Páramo del Jabón had been found with flowers in the Páramo de Las Rosas. Only one flowering individual was found, severely damaged, with the inflorescence broken by cattle with still enough burgeoning branchlets and flowering shoots available for a preliminary study. Manuel persisted visiting the area again in September walking across extensive formations of the species. He could only find one other specimen with a dry, old, and damaged central inflorescence, bearing a few flowers and fruits. This fragmentary material, in spite of lacking the distal part and most branches, shows the kind of inflorescence and allows for a diagnosis and a fair interpretation of the species.

RUILOPEZIA VERGARAE Cuatrecasas & López-Figueiras sp. nov.

Caulirosula sessilis copiosissime foliosa ad 60 cm lata visu albida et argenteo-sericea, caule brevi robusto 10-15 cm longo ad 5

cm diam, radice axonomorpha parce ramosa.

Folia crassa coriacea sessilia 23-41 cm longa. Lamina lineari-oblonga vel oblanceolato-linearis vel linearis subobtusata vel subacuta saepe basim versus paulo angustata sed basi denuo ampliata, 19-38 cm longa 1.1-2 (-2.8) cm lata, supra basim 0.8-1.2 cm minima latitudine, margine revoluta; adaxiale crasse densissime adpressaque vestita, pilis sericeis circa 1 mm longis basi recta patentissima ad mediam geniculatis parte distali horizontaliter antrorsa adpressaque superficie visu uniformiter plana sericea vel subsericea instructis, tantum nervo medio cum depressione lineari parum signato; abaxiale costa ampla crassissima densissime adpressa sericea, infra indumento argute reticulato-venosa et parvis nervis secundariis elevatis 10-15 mm inter se distantibus angulo acutissimo 5-20° (-35)° ascendentibus evanescentibusque, ubique dense subadpressa sericea pilis 1.5-2 mm longis geniculatis obtecta sed imo alveolis candido tomentoso pilis brevioribus sericeis rectis patulis spisse praedito. Vagina crassa rigida in folia rosularia adulta late ovata usque ad 3 x 4 cm, apice subrotundato, altera ovato-oblonga vel oblonga apice obtuso vel gradatim attenuata 2.5-3.5 (-4) x (2-) 2.6-3 cm, adaxiale viridis glabra conspicuissime nervata, abaxiale spisse villosa-sericea.

Synflorescentia terminalis thyrsideo-paniculata valde ramosa floribundaque ad apicem late corymbosa, plerumque circa 1 m alta. Axis robustus striatus medullosus et fistulosus, basi 2.5-4 cm diam, sursum gradatim angustatus, visu albo-cinereus pilis tenuissimis longis et longissimis albo-sericeis nitidissimis antrorsis sed intricatis vestimento sericeo gossypino subcompressa ubique ad modum veli sericeo-arachnoidei instructis; inferne valde vel dense foliatus foliis cum rosularibus similis sed minoribus, 20-24 x 0.9-1.2 cm, saepe supra basim vel etiam e basi ramosus. Rami alterni numerosi erecto-ascendentes, proximales saepe magis robusti longioresque ad 70 cm longi, sursum gradatim minores, distales saepe breves mediales longiores non attingentes. Rami tantum ad extremum corymboso-ramulosi, plerumque nudi vel basales longiores copiose foliati; ramuli corymborum 3-10 etiam alterni, 0.5-8 cm. longi 6-3 capitula breviter vel longe pedicellata ferentia, tantum 1-4 ramuli distali monocephali. Rami principales subapicales 1-4 etiam ad modum pedunculorum monocephali. Pedicelli erecti 0.4-4 (-5) cm longi. Bracteae subtendentes foliaceae cum ramis valde breviores proximales 24-18 x 1.2-0.9 cm, lanceolato-lineares, sursum gradatim minores, mediales 12-8 x 0.9-0.8 cm, distales lineares circa 20 x 2-3 mm. Bracteolae subtendentes 30-10 mm longae 3-1.5 mm latae, lineares. Bracteae bracteolae sicut pedunculi pedicellique albo villosa-lanugini.

Capitula radiata erecta vel reclinata, 100-180 flores ferentia, ligulis amotis 12-17 mm diam, circulo ligularum 26-35 (-40) mm, disco (9-) 10-16 mm diametenti. Involucrum cupulatum dense albifloccoso-lanatum. Phyllaria exteriora sterilia 8-14, lineari-lanceolata vel lineari-subulata, acutissima, crassiuscule herbacea, rigidula, (14- 12-7 x 1-2 (12.4) mm, abaxiale densiuscule barbato-lanata pilis ad 5 mm longis tenuibus intricatis, adaxiale glabra 3-5 nervis notatis. Phyllaria fertilia anguste elliptico-lanceolata acuminata vel acuta plana basim incrassata, 7-4.5 x 2-1.4 mm etiam

acuminata, 3-5 nervata plus minusve amplectentia margine scariosa dorso subcarinata, breviter sericeo-villosa sursum barbata pilis 0.5-1 mm subacutis vel obtusis. Receptaculum convexum (4-) 5-7 mm diam hirtulum pilis erectis 0.3-0.8 mm. Paleae 4.5 x 1.5-2.5 mm scariosae dorso brunnescenti rigidulo, ovales subacutae vel acutae late hyalino-marginatae, costa subcarinata pilosula, 2-4 nervis utroque latere, sursum barbatae pilis erectis acutis et supremis obtusis 0.4-0.8 mm.

Flores radii ligulati 3-4 seriati 28-60 in capitulo. Corolla lutea 11-19 mm longa tubulo 1.2-2 mm longo dense piloso pilis hyalinis patulo ascendentibus, crassiusculis obtusis vel subclavatis 0.2-0.5 (-0.8) mm longis, ad apicem interdum appendice abaxiali lineari 0.5-3.5 mm longo; lamina crassiuscula firmula anguste elliptica apice obtusa, 2-3-dentata, 2-3 mm lata, 5-8 nervata, nervis arurantiaco-notatis subtus prominulis, abaxiale sparse inferne copiose pilosa pilis obtusis 0.15-0.3 mm longis, adaxiale minutissime velutino-papillosa. Stylus 3-5 mm longus ramis 1-2 mm longis. Achaenia exteriora 2-2.4 x 1.3-1.7 mm abovata triangulata angulis argutis dorso arcuato basi acuta, interiora 2.4-3 x 1-1.2 mm, oblonga, quadrangulata.

Flores disci 68-144 in capitulo. Corolla lutea 4.7-5.5 mm longa, tubulo 2-2.3 mm angusto basi excepta dense pilosulo pilis antrorsis crassiusculis obtusis vel subclavatis 0.3-0.7 mm, limbo tubuloso-campanulato tantum basi parvis pilis, lobis triangularibus 0.7-1 mm, marginibus incrassatis papillosis abaxiale parvis pilis obtusis 0.1-0.3 (0.4) mm. Antherae 1.8-2.2 mm longae basi obtuse sagittatae appendice ovata subacuta vel subobtusa circa 0.35 mm longa. Stylus 4.8-5.2 mm, apice paulo dilatatus conicus emarginatus papilloso-pilosulus. Nectarium tubulosum crassum 0.7-0.8 mm, minute obtuseque 5-dentatum. Ovarii rudimentum pedi-culiforme 0.3 mm altum.

Typus: Venezuela, Trujillo: Sierra de Barbacoas: La Palma, between Carache and Agua de Obispo, km 10-15, secondary opening surrounded by Andean forest, 2390 m alt. acaulirosula, inflorescence central, ligules yellow, "frailejón blanco," 4 Apr 1976, López-Figueiras 12960 (Holotype, US; isotype MERF). Id. id. seedling from the same population, López-Figueiras 12961 (US). Same locality, 2400 m, sterile rosette plus an axis of a death synflorescence, 24 May 1980, Cuatrecasas, López-Figueiras & H. Rodríguez, 28985 (US, MERF). Páramo del Cendé, 3300-2900 m, vet. occid, acaulirosula 70 cm, rosula 30 cm tall, leaf indument white-greenish silvery throughout, ligules yellow, species rather rare here, 10 Jun 1971, Ruíz-Terán & López-Figueiras 2058 (US, MERF). Páramo del Cendé, 3200 m, acaulirosula, synflorescence central, "frailejón plateado de hoja ancha" 31 Mar 1976, López-Figueiras 12951 (US, MERF, paratypus). Páramo del Turmal below Páramo del Jabón, at Hoyo de Los Tábanos, 2500 m, acaulirosula, adult leaves up to 28 mm wide, "frailejón plateado hojiancho", 8 June 1971, Ruíz-Terán & López-Figueiras 1997 (US paratype). Id id, 2850-2800 m, acaulirosula, central synflorescence partially damaged, paramo between Tres Pozos and Hoyo de Los Tábanos, "frailejón plateado hojiancho", Cuatrecasas, Ruíz-Terán & López-Figueiras, 28548, 28546, 28547 (US,

MERF).

Ruilopezia vergarae is closely related to R. jabonensis from which it mainly differs by the shape of the leaves. The leaf lamina of R. vergarae is a flat lamina, ensiform, or narrow-oblong and rather subobtusate at the apex, usually 20-28 cm long and 1.1-2 cm wide, occasionally up to 3 cm wide; the large rosettes may have leaves up to 40 cm long; the length: width ratio varies (11-) 14-20:1; abaxially the nervation is conspicuous, at least in old leaves, although often the thick indument conceals it. The leaf bases in adult specimens are ovate or oblong-ovate much broader than the lamina and wider than longer, e.g. 3-3.8 x 4-4.3 cm. In contrast, the laminae in R. jabonensis are strictly narrow-linear and acute at the apex, 10-30 x 3-7 mm, and strongly revolute at the margins, converging to the midrib; the leaf bases, being narrowly rectangular, oblong, flat, almost the same width of the lamina never exceeding 7(-8) mm wide. The hairs on the leaves are at least twice as long as in R. vergarae. Both species are silvery shining but the brightness is much stronger in R. jabonensis. Both species being sympatric are found side by side. R. vergarae on slopes at lower altitude than R. jabonensis which dominates the top of the hills and their upper slopes, as e.g. in Páramo del Jabón, Páramo del Turmal, and Cendé. Hybrids are produced in the ecotonic zone.

The species is dedicated to Mr. Bernardino Vergara, a technician at the Facultad de Ciencias Forestales, ULA, Mérida, who discovered several species in the region of Los Granates and has efficiently cooperated with botanists and chemists in collecting Espeletia material for scientific studies.

References

Aristequieta, L., 1964. Compositae in Flora de Venezuela, Vol. 10 (1). Caracas.

Smith, A.C. & M.F. Koch, 1935. The genus Espeletia: a study in phylogenetic taxonomy. Brittonia 1 (7): 479-530, and 2 plates. New York.

Standley, P.C., 1915. The genus Espeletia. Am. Journ. Bot. 2:468-485, figs. Pl.

Usubillaga, Alfredo, 1974. Química del frailejón (Espeletia spp.). Mem. II Congr. Venez. Bot. Mérida, Univ. Andes pp. 366-374.

Usubillaga, A. & T. Nakano, 1979. Kauranoid Diterpenes in Ruilopezia margarita. Planta Medica, Journ. Med. Res. 35:331-338. Stuttgart.