PHYTOLOGIA

An international journal to expedite plant systematic, phytogeographical and ecological publication

Vol. 74 May 1993 No. 5

CONTENTS

Published by Michael J. Warnock
185 Westridge Drive Huntsville, Texas 77340 U.S.A.
PHYTOLOGIA is printed on acid free paper.

PHYTOLOGIA (ISSN 00319430) is published monthly with two volumes per year by Michael J. Warnock, 185 Westridge Drive, Huntsville, TX 77340. Second Class postage at Huntsville, TX. Copyright ©1991 by PHYTOLOGIA. Annual domestic individual subscription (12 issues): $36.00. Annual domestic institutional subscription (12 issues): $40.00. Foreign and/or airmail postage extra. Single copy sales: Current issue and back issues volume 67 to present, $3.50; Back issues (previous to volume 67), $3.00 (add $.50 per copy postage and handling US [$1.00 per copy foreign]). Back issue sales by volume: $17.00 per volume 42-66 (not all available as complete volumes); $21.00 per volume 67-present; add $2.00 per volume postage US ($4.00 per volume foreign). POSTMASTER: Send address changes to Phytologia, 185 Westridge Drive, Huntsville, TX 77340.

Phytologia (May 1993) 74(5):349-355.

BERYLSIMPSONIA (ASTERACEAE: MUTISIEAE), A NEW GENUS OF THE GREATER ANTILLES

B.L. Turner

Department of Botany, University of Texas, Austin, Texas 78713 U.S.A.

ABSTRACT

Berylsimpsonia B.L. Turner, a new genus from the Greater Antilles (Cuba, Dominican Republic, Haiti, and Puerto Rico) is described. It is comprised of two species: **B. vanillosma**, the generitype, previously assigned to the genus *Proustia* or *Acourtia*; and **B. crassinervis**, previously assigned to *Proustia*. *Berylsimpsonia* is characterized by its clambering or viney, woody habit, bifurcate, recurved, pseudostipulary spines, yellow corollas, rounded style branches, and fusiform achenes with 5-9 ribs. In total characters it appears closest to the genus *Trixis* but is readily distinguished from that genus by its unique habit, rounded style branches, and graduate involucres. A table contrasting the more important megamorphic features of *Acourtia*, *Berylsimpsonia*, *Proustia*, and *Trixis* (s.s.) is provided, along with a map showing the distribution of the two species of *Berylsimpsonia*.

KEY WORDS: Asteraceae, Mutisieae, *Acourtia, Berylsimpsonia, Proustia, Trixis*

Preparation of a treatment of *Acourtia* for México and Central America (Turner, in prep.) has occasioned the present paper, bringing to the fore the status of *Proustia vanillosma* C. Wright, largely because the latter was recently transferred into the genus *Acourtia* by Crisci (1974), the name having been picked up by Karis *et al.* (1992; p. 422, Fig. 12D). Prior to this taxonomic realignment most workers retained the species concerned in *Proustia* (Fabris 1968).

Crisci (1974), in connection with his numerical study of the Mutisieae, attempted to justify his transfer of *Proustia vanillosma* (including *P. crassinervis*) into *Acourtia* with the following statement:

> This is a species of scandent shrubs endemic to the islands of Cuba, Santo Domingo, and Puerto Rico. The only other genus of Nassauviinae occurring in this area is *Trixis*. The position of this species in *Proustia* is doubtful because of its yellow flowers, type of style, exine stratification, and its geographical distribution disjunct from other species of *Proustia* which occur in southern South America. Hoffmann (1893: 343) pointed out that *P. vanillosma* differs from the other species of *Proustia* in having a different type of style. The results of the numerical study show that this taxon is close to *Acourtia glomeriflora* (=*Gochnatia glomeriflora*) and to the genus *Acourtia* in general. There is a gap between *Acourtia* and *P. vanillosma* in habit and in flower color, but the position of this species in *Acourtia* seems to be a natural one, representing a branch of this genus in the West Indies.

In short, Crisci transferred *Proustia vanillosma* into *Acourtia* because his numerical analyses showed the taxon to be close to *Acourtia glomeriflora* (A. Gray) Reveal & King. This does not appear likely, however, since the latter species is a stiffly erect unarmed suffruticose herb or shrublet with mostly actinomorphic pink corollas (but occasionally zygomorphic).

In my opinion, were a more informative cladistic analysis performed (as opposed to a numerical analysis) using the characters emphasized by Crisci (but perhaps with a wider grasp of the variation found in *Acourtia*), it is likely that *Proustia vanillosma* would cluster with or near *Trixis* (s.s.). Clambering, more or less shrubby vines occur in the latter genus (e.g., *T. divaricata* Spreng.), and their florets are uniformly bilabiate, yellow, and produce fusiform achenes with 5-9 clearly discernible ribs. *Proustia vanillosma*, however, differs from *Trixis* (s.s.) in having persistent, bifurcate, pseudostipulary spines at each node, and apically rounded or broadly obtuse style branches (vs. truncate).

In short, inclusion of *Proustia vanillosma* makes little or no phyletic or "numerical" sense if positioned among the approximately 70 species of *Acourtia*, all of which are confined to the mainland areas of North America. Indeed, considering its size, *Acourtia* is a remarkably uniform genus, both as to habit, head structure and floral morphology, although Cabrera (1992) has proposed, after cladistic analysis, that the approximately fifteen scapose elements of *Acourtia* be segregated as a distinct genus, a proposal that makes no taxonomic sense to me, largely because these cannot be readily related to any element of the Mutisieae other than *Acourtia*. Unfortunately, she did not account for *Proustia vanillosma* in her cladistic analysis.

In light of the above discussion I find it most reasonable to elevate *Proustia vanillosma* (and the very closely related *P. crassinervis*) to generic status, giving it the name *Berylsimpsonia*, after Dr. Beryl Simpson, monographer of the genus *Perezia*, from which *Acourtia* was removed. She is currently

Chairman of the Department of Botany at the University of Texas, Austin and fully deserving of the honor intended. Unfortunately (or fortunately, perhaps) the name *Simpsonia* has already been applied to a genus of Australian palms. In many ways the personality of the honored fits her namesake, since she is tenacious in her research, scratchy when boldly encountered, and enigmatic as to philosophical, if not phyletic, perambulations.

KEY TO *BERYLSIMPSONIA* AND RELATED GENERA

1. Achenes obpyramidal, ribless; plants with thorns formed by foreshortened stems; South America. ..... *Proustia*

1. Achenes fusiform to linear-oblanceolate, with 5-9 ribs at maturity; plants not forming thorns by foreshortened stems; North America. ..... (2)

    2. Clambering woody vine-like plants with recurved bifurcate, pseudostipulate spines. ..... *Berylsimpsonia*

    2. Perennial herbs or rarely clambering shrubs without spines. ... (3)

3. Corollas yellow; shrubs, any new growth from persistent stems. .... *Trixis* (s.s.)

3. Corollas white, pink or lavender; perennial herbs or suffruticose shrublets, any new growth from woody crowns or rhizomes. ..... *Acourtia*

Berylsimpsonia B.L. Turner, *gen. nov.* TYPE SPECIES: *Berylsimpsonia vanillosma* (C. Wright) B.L. Turner (= *Proustia vanillosma* C. Wright).

Frutices scandentes, caules spinas pseudostipulares bipartitas ferentes, flosculi lutei zygomorphi, rami stylorum apicibus rotundatis, et achenia fusiformia 5-9-costata.

Clambering woody shrubs 1-5 m high. Stems persistent and producing bifurcate short pseudostipulate recurved persistent spines at each node. Leaves alternate, simple, the margins entire to serrulate, scarcely spinulose. Heads arranged in short leafy axillary cymes. Involucres turbinate, the bracts 3-4 seriate, graduate. Receptacle pubescent. Florets 3-6 per head, the corollas bilabiate, yellow. Achenes fusiform to narrowly oblanceolate in outline, pubescent with pilose or short glandular hairs, the pappus of numerous tawny barbellate bristles in 2-3 series.

Key to Species

1. Achenes mostly pilose throughout, rarely both pilose and glandular-pubescent. ..... *B. crassinervis*

1. Achenes glandular-pubescent throughout, rarely a few pilose hairs present. ..... *B. vanillosma*

Berylsimpsonia crassinervis (Urb.) B.L. Turner, *comb. nov.* BASIONYM: *Proustia crassinervis* Urb., *Symb. Ant.* 1:470. 1899. TYPE: HAITI: prope Payan, 400 m, *Picarda 943* (HOLOTYPE: B?). While type material for this name was not examined the original description leaves little doubt as to its inclusion here.

This weakly differentiated taxon is distinguished from *Berylsimpsonia vanillosma* primarily by its pilose achenes (vs. glandular-pubescent) and somewhat thicker leaves. Crisci (1974) did not recognize the taxon, placing it in synonymy under *Acourtia vanillosma* (C. Wright) Crisci.

So far as known it is confined to the Dominican Republic and closely adjacent Haiti (Fig. 1). Occasional plants have achenes with both pilose and short glandular-capitate hairs; because of this, future workers might reduce the taxon to varietal rank, although it is possible that such intermediates reflect *in situ* hybridization.

Berylsimpsonia vanillosma (C. Wright) B.L. Turner, *comb. nov.* BASIONYM: *Proustia vanillosma* C. Wright *in* Sauvage, Anal. Acad. Ci. Habana 6:212. 1860. *Perezia vanillosma* (C. Wright) Molt. & Gómez, Anal. Soc. Hist. Nat. Madrid 19:268. 1890. *Acourtia vanillosma* (C. Wright) Crisci, J. Arnold Arb. 55:605. 1974. TYPE: CUBA. w/o specific locality, w/o date, *C. Wright 3616* (HOLOTYPE: GH; Isotype: US!).

Proustia krugiana Urb., *Symb. Ant.* 1:471. 1899. TYPE: PUERTO RICO: "Coamo, in sylvis circa Farajones," 13 Dec 1885, *P. Sintenis 3039* (LECTOTYPE [selected here]: B; Isolectotype: US!). In his description Urban cited six separate collections by Sintenis (*2920, 2989, 3038, 3039, 3258, 3598*) all from Puerto Rico.

Proustia stenophylla Urb. & Ekman, Ark. Bot. 20A(5):65. 1926. TYPE: HAITI: "Massif de la Selle in Morne Cabaio in declivibus petrosis inter frutices, 2200-2300 m," w/o date, *Ekman 1596* (HOLOTYPE: B?). I have not examined type material; leaf descriptions and locality suggest that the name resides in synonymy here.

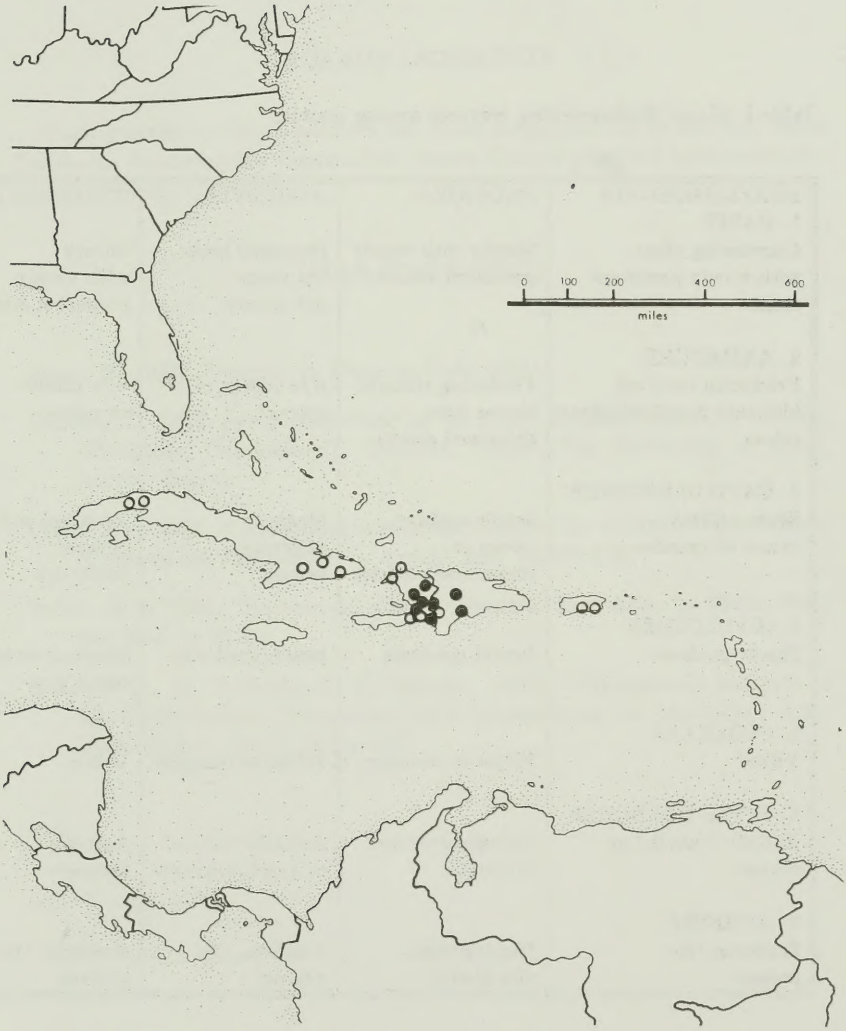

Fig. 1. Distribution of *Berylsimpsonia crassinervis* (closed circles) and *B. vanillosma* (open circles).

Table I. Major distinguishing features among genera.

BERYLSIMPSONIA	*PROUSTIA*	*ACOURTIA*	*TRIXIS* (s.s.)
1. HABIT			
Clambering vines with woody persistent stems	Shrubs with woody persistent stems	Perennial herbs, the stems not woody	Shrubs with woody persistent stems
2. ARMATURE			
Producing recurved bifurcate pseudostipulate spines	Producing straight thorns from shortened shoots	w/o thorns or spines	w/o thorns or spines
3. CAPITULESCENCE			
Short axillary cymes or cymules	Sessile axillary cymes or corymbose panicles	Single to variously cymose	Terminal and cymose, rarely not
4. INVOLUCRES			
Bracts graduate	Bracts graduate	Bracts graduate	Bracts 2-seriate, rarely not
5. COROLLAS			
Yellow	White to lavender	White to lavender	Yellow
6. STYLE BRANCHES			
Apically rounded or obtuse	Apically rounded or obtuse	Apically rounded to nearly truncate	Apically truncate
7. ACHENES			
Fusiform, ribs present	Obpyramidal, ribs absent	Fusiform, ribs present	Fusiform, ribs present

This species is amply described by Urban and yet others who have contributed to the floras of the area concerned (*e.g.*, Alain 1962; etc.).

ACKNOWLEDGMENTS

I am grateful to Guy Nesom for the Latin diagnosis, and to him and Carol Todzia for reviewing the manuscript. James Grimes provided important bibliographic help.

LITERATURE CITED

Alain, H. 1962. *Proustia*, in Flora de Cuba 5:311.

Cabrera, L. 1992. Systematic study of the genus *Rzedowskiela* R.L. Cabrera (Mutisieae, Compositae). Doctoral Thesis, The University of Texas, Austin, Texas.

Crisci, J.V. 1974. A numerical taxonomic study of the subtribe Nassauviinae (Compositae, Mutisieae). J. Arnold Arb. 55:568-610.

Fabris, H.A. 1968. Revisión del género *Proustia*. Rev. Mus. La Plata, N.S., Sec. Bot. 11:23-49.

Karis, P.O., M. Kallersjo, & K. Bremer. 1992. Phylogenetic analysis of the Cichorioideae (Asteraceae) with emphasis on the Mutisieae. Ann. Missouri Bot. Gard. 79:416-427.

Phytologia (May 1993) 74(5):356-366.

TWO NEW MEXICAN SPECIES OF *VIOLA*

Harvey E. Ballard, Jr.

Department of Botany, Birge Hall, University of Wisconsin-Madison, 430 Lincoln Dr., Madison, Wisconsin 53706 U.S.A.

ABSTRACT

Newly described here are the petite, white-flowered **Viola cochranei**, a morphologically isolated member of subsection *Stolonosae*, and the blue-flowered **V. oxyodontis**, a member of the *V. grahamii* Bentham complex in subsection *Mexicanae*. The first species is known only from southwestern Querétaro, in moist rocky soils of ravines along streams. The second species is widely distributed from southernmost Sinaloa to Michoacán and Guerrero, in oak-pine forests on the Neo-Volcanic Plateau.

RESUMEN

Se describen como nuevas **Viola cochranei**, planta diminuta de flores blancas, aislada morfológicamente en la subsección *Stolonosae*, y **V. oxyodontis**, planta diminuta de flores azules, miembro del complejo *V. grahamii* Bentham en la subsección *Mexicanae*. La primera especie se conoce solamente del suroeste de Querétaro, en suelos pedregoso-húmedos en las cañadas al borde de los arroyos. La segunda especie tiene una distribución amplia, de la parte más sur de Sinaloa a Michoacán y Guerrero, en bosques de pino-encino en la planicie Neo-Volcánica.

KEY WORDS: Violaceae, *Viola*, México

During revisionary systematic studies of Mesoamerican *Viola*, approximately 36 species and species complexes have been delimited, including several distinctive undescribed taxa. Two of these, belonging to acaulescent subsections of section *Plagiostigma* (Godron) Kupffer, are described below.

Viola cochranei Ballard, *sp. nov.* (Fig. 1). TYPE: MEXICO. Querétaro: 2 km al S de Puerto Alegrías, municipio de San Juan del Río, bosque de encino en cañada a la orilla de un arroyo, alt. 2000 m., planta herbácea de 5 cm de alto, flor blanca con venas moradas, fruto verde, abundante, 26 May 1986, *Fernández N. 3329* (HOLOTYPE: NY; Isotypes, reportedly at CHAPA,ENCB,IEB,TEX; photos, WIS).

Plantae perennae, inter species sectionis *Plagiostigmatis* subsectionis *Stolonosarum* floribus parvis albis et rhizomatis stoloniformatis accedens, a *V. jalapaensis* Becker statura patenter minore foliorum basi truncata vel vix cordata lamina anguste ovata marginis remote serratis recedit.

Acaulescent perennials to 9.5 cm tall; rhizome erect, woody, 1.5-3.0 cm long, 1.0-1.5 mm thick; stolons surficial or subsurficial, to 6 cm long and 1 mm thick, arising prostrately from the crown or a short distance below it, chlorophyllous the first year and with up to 2 small initial leaves, nonchlorophyllous and without leaves in subsequent years, with nodes rooting intermittently, the apex proliferating a rooting plantlet.

Leaves from the crown with stipules semi-herbaceous, free, lacerate with 3-several long gland-tipped segments, lanceolate, the inner and outer similar in size, 3.9-4.4 mm long; petioles of larger leaves 5-65 mm long; smaller blades ovate, truncate at base and obtusely pointed at apex, larger ones narrowly ovate, subcordate at base and acutely pointed at apex, 6-20 mm long and 5-18 mm wide, the margins distantly low-serrate, with 5-10 teeth on each side; blades of stolon leaves reniform, rounded-obtuse at apex, truncate at base, up to 5 mm long, 5 mm wide. Chasmogamous flowers 1-2; peduncles 1.5-9.5 cm long, its two bracts 2 mm long, 1/5-1/3 below apex; sepals eciliate, hyaline-margined, narrowly lanceolate to lance-linear, attenuate, the lowest 1.8-3.0 mm long and 0.7-1.1 mm wide, auricles 0.4 mm long; corollas 6-9 mm long, greenish-white in throat, petals cream-white, the laterals with one or two long purple-black nectar guides, the spurred petal with an extensive nectar guide network; spur broadly quadrate-rounded, exceeding auricles slightly, 0.7-1.0 mm long from apex to middle of base of lowest sepal; lateral and upper petals lance-obovate and narrowly rounded, the laterals glabrous or with a small tuft of filiform hairs within near the throat, the spurred petal broadly oblong-spatulate and truncate or slightly emarginate at apex; style scarcely

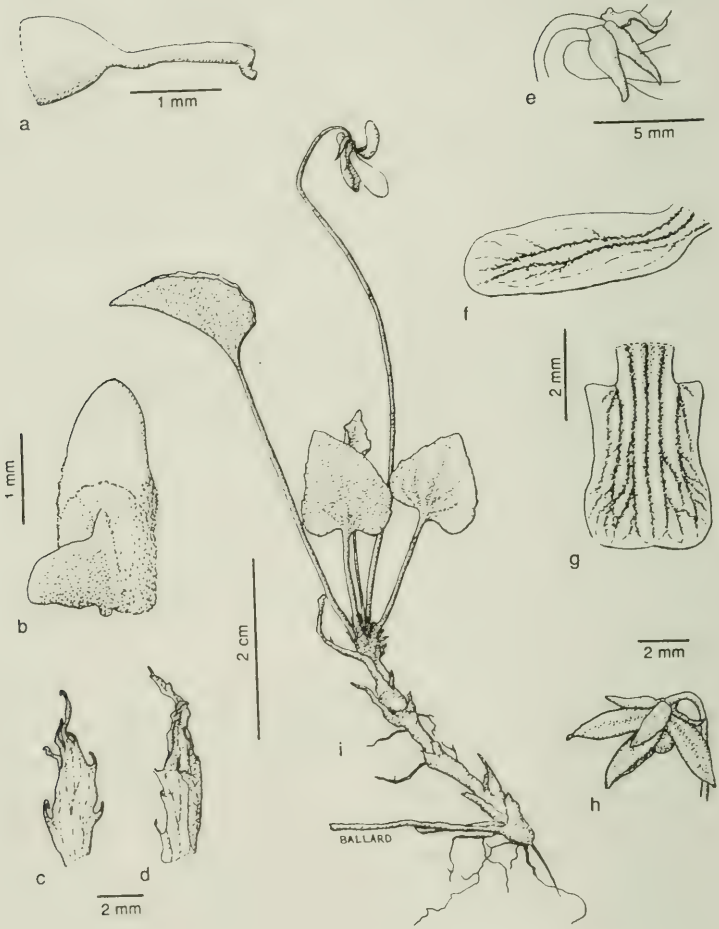

Fig. 1. *Viola cochranei sp. nov.* (a) pistil; (b) stamen with nectary; (c) outer stipule; (d) inner stipule; (e) sepals in flower profile; (f) lateral petal, adaxial surface; (g) spurred petal, adaxial surface; (h) dehisced capsule with seeds; (i) flowering habit.

geniculate immediately above ovary, expanded slightly near apex, ending in a concavity flanked dorsolaterally by two inconspicuous wing-like protuberances and terminating ventrally in a short scoop-shaped, ventrally oriented stigmatic orifice; fruits 1 per crown.

Cleistogamous flowers with peduncles erect, 15 mm long. Capsules ovoid, green, 3-4 mm long; mature seeds not seen.

Paratypes: MEXICO. Querétaro: El Batán (camino a Amealco), encino, chaparral, tierras de cultivo, cerca de la presa, principio de la barranca de Amealco, sobre rocas, casi en el agua, 20 Apr 1980, *Argüelles 1362* (IBUG); camino entre carr. a México y Amealco, Km. 18 aprox., tierras de cultivo y campo abierto, 2150 ms., fondo da la barranca, borde del río, arena, rojiza, *Taxodium mucronatum*, *Salix*, *Alnus*, fresno, *Quercus*, *Prunus*, laurel, 3 Apr 1977, *Argüelles 749* (IBUG).

It is a pleasure to name this distinctive and handsome member of subsection *Stolonosae* in honor of Theodore S. Cochrane, who has made numerous contributions–so often "behind the scenes", without credit to himself–to the floras of México and Wisconsin, and to our understanding of the taxonomy of the Cyperaceae and Capparidaceae.

While not a great geographic distance away from the related *Viola jalapaensis* Becker in Veracruz (Fig. 3), *V. cochranei* is quite different from all members of subsection *Stolonosae* in North and Middle America. It is distinguished by its narrowly ovate, remotely serrate, truncate to subcordate, glabrous leaves and thickish stoloniform rhizomes and stolons.

Thus far only three locations are known for *Viola cochranei*, all in southwestern Querétaro, from red rocky (limestone?) soils of ravines along streams at or above 2000 m elevation. The several sheets representing these stations were referred erroneously to *V. flagelliformis* Hemsley and *V. humilis* H.B.K. by Argüelles *et al.* (1991).

Viola oxyodontis Ballard, *sp. nov.* (Fig. 2)–TYPE: MEXICO. México: District of Temascaltepec: Nanchititla, llano, 15 Jun 1934, *Hinton 6167* (HOLOTYPE: ARIZ; Isotypes: BM,F,US).

Plantae perennae, *V. grahamo* Bentham gregi sectionis *Plagiostigmatis* subsectionis *Mexicanarum* affinis, cujus corollas violaceos suffusos stolones frondosus, distinguenda petalis apico rotundato petiolis quam laminis 3-5plo longioribus foliis perfecte glabris margino patenter acute serrato.

Acaulescent glabrous perennials, to 27 cm tall; rhizome upright to ascending, 8-30 mm long, 3.5-6.0 mm thick; stolons surficial, to 32 cm long, 1.5 mm thick, produced during anthesis from the crown, initially erect, later arching

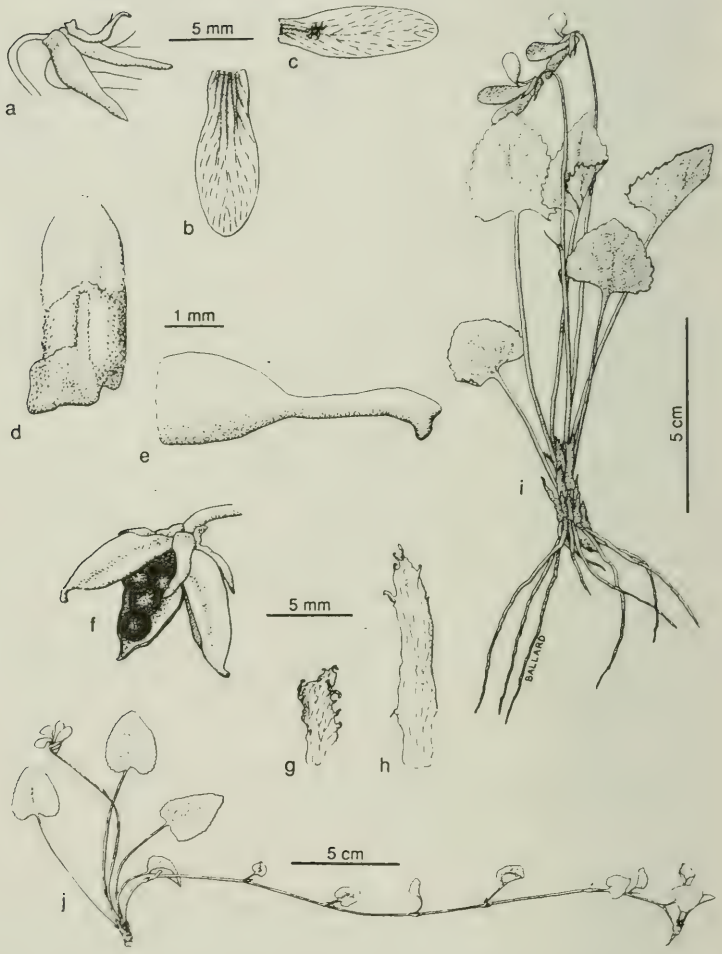

Fig. 2. *Viola oxyodontis sp. nov.*: (a) sepals in flower profile; (b) spurred petal, adaxial surface; (c) lateral petal, adaxial surface; (d) stamen with nectary; (e) pistil; (f) dehisced capsule with seed; (g) outer stipule; (h) inner stipule; (i) flowering habit; (j) stoloniferous plant.

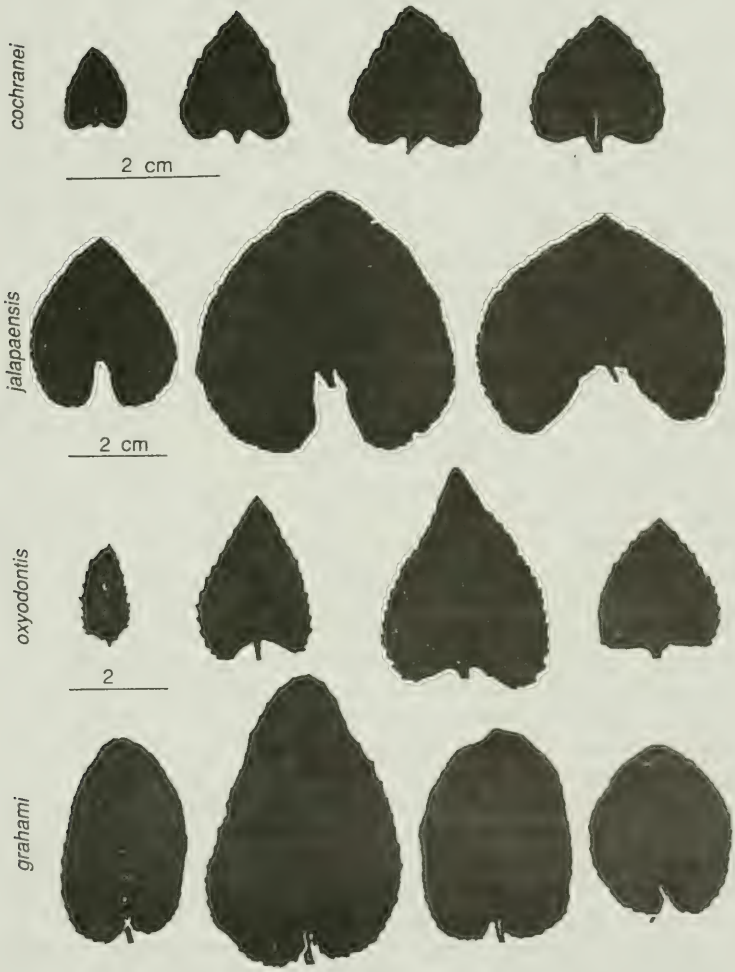

Fig. 3. Photocopies of leaves in four Mexican species of *Viola*, showing extremes of variation (left and right) and typical outline (center).

to become repent, generating 2-7 leaves along the nodes, with 1-2 nodes nearest the parent occasionally leafless, and 1-2 flowers often produced at middle nodes, the shoot apex proliferating into a rooting plantlet.

Crown leaves with stipules semi-herbaceous, adnate to petiole for up to 2 mm, fimbriate, the outer lance-ovate to ovate, acute to attenuate at apex, 7-13 mm long, the inner lance-linear to lanceolate, attenuate at apex, 16-19 mm long; petioles of larger leaves 3-21 cm long; blades narrowly deltoid-triangular (or rarely lance-oblong) to broadly deltoid-ovate, broadly cuneate to subcordate at base and obtuse or acute to acuminate at apex, 2-5 cm long and 2.0-3.5 cm wide, one-half to one-fourth the length of the petiole, the margins distinctly and sharply spreading-serrate especially in the lowest third of the blade, the teeth here falcate and subacuminate; leaves and stipules of stolons similar to those of the crown but smaller, petioles 7-10 mm, blades ovate to broadly so, 5-18 mm long, 8-22 mm wide.

Chasmogamous flowers 1-5, peduncles 3.5-15 cm long, the two bracts 2-4 mm long, one-fourth to four-ninths of the peduncle length below apex; sepals eciliate, lance-linear, acuminate, the lowest 5.5-6.0 mm long, 1.5-1.6 mm wide, auricles 0.5-1.2 mm long; corollas 10-15 mm long, greenish-white in throat, petals nearly white or the lower 3 suffused with violet, the lateral and spurred petals bearing dark blue-violet nectar guides; spur narrowly rounded, scarcely exceeding the auricles, 0.5-1.0 mm long from apex to middle of base of lowest sepal; petals lance-obovate and rounded or narrowly truncate, very rarely shallowly emarginate at the apex, the laterals 10-13 mm long, 2.5-4.0 mm wide, bearing a large tuft of filiform hairs within near the throat, the spurred petal ca. 11 mm long, 4-5 mm wide, glabrous within; style strongly geniculate immediately above the ovary, strongly expanded toward apex, ending in a concavity flanked dorsolaterally by two rounded wing-like protuberances, terminating ventrally in a short scoop-shaped stigmatic orifice; fruits all produced from crown.

Chasmogamous and cleistogamous capsules similar in morphology; peduncles erect, 4.5-14.5 cm long; sepals lanceolate to lance-linear, eciliate, 4-7 mm long, 1.0-1.3 mm wide; capsules long-ovoid, green (fresh) to tan (dry), 8-11 mm long; seeds shiny black at maturity, 1.9-2.2 mm long, 0.7-1.3 mm thick.

Paratypes. MEXICO. Guerrero: between Casahuates and small reservoir at head of waterfall above town on mountain west of and above Taxco, oak-wooded slopes and wet trailside banks, altitude 6200-6500 feet, 17 Aug 1948, *Moore & Wood 4577* (A); Taxco, 12 Jul 1937, *Abbott 233* (GH); Taxco, in oak forest, 23 Jul 1936, *Abbott 165* (GH); Puerto Rico, Mina, pine forest, 1650 m., 1 Jul 1939, *Hinton et al. 14374* (ARIZ,GH,US); Agua Zarca-Filo, Mina, pine forest, 30 Jun 1937, *Hinton et al. 10479* (GH,MICH,US). Jalisco: south of Michoacán border, ca. 3 km NE and above Puerta El Zapatero (above Rancho El Terrero and 2.5 km S. of Espinal), along road from Jiquilpan to Ciudad Guzmán, 19°52′N 103°03′W, deep, moist, very shady, cool arroyos, clay soil,

along road from Jiquilpan to Ciudad Guzmán, in mountains, 30 Jul 1960, *Iltis, Koeppen, & Iltis 547* (WIS); 17-18 km al E de C. Castillo, 3 km al NEE de Las Joyas, Estación Científica Las Joyas, Autlán, 19°35′19″N, 104°16′02″W, Vegetación secundaria, *Senecio*, *Rubus*, *Buddleia*, *Acacia*, *Zea*, 1800 msnm, 21 Jul 1988, *Santana & DeNíz 3504* (ZEA); Tierritas Blancas, Predio Las Joyas, bosque de *Pinus*, 1800 msnm, 27 Oct 1985, *Ramos 21* (IBUG); San Campus, Las Joyas, Mpio. de Autlán, bosque de pino con vegetación secundaria, *Pinus*, *Solanum*, *Quercus*, 13 Jul 1986, *Cuevas R. 1323* (WIS); Sierra de Manantlán, ridge SW of Rincón de Manantlán, 19°35.5′N, 104°13.5′W, dry, open *Pinus oocarpa-Quercus* forest, the area had been burned and was grazed by cattle, but there was so little vegetation in the understory that the grazing was not obvious, 1600 m, 9 Jan 1980, *Kowal 2825* (IBUG,WIS); Puerto de la Moza, Las Joyas, Autlán, bosque de pino y algunos encinos, *Pinus*, *Quercus*, *Agave*, 1900 msnm, 30 Jul 1985, *Vázquez 3459* (WIS); 18-19 km al NE de Cuautitlán, 1-2 km al NNE de El Zarzamoro, Picacho del Sol y La Luna, Autlán, 19°35′50″N, 104°16′14″W, bosque de *Pinus*, *Pinus herrerae*, *P. maximinoi*, *P. douglasiana*, 2150 msnm, 16 May 1990, *Guzmán & Hernández 1016* (ZEA); Cerro de Tequila, bosque de *Pinus* y *Quercus*, 11 Aug 1968, *Villareal P. 1618* (IBUG); km 17 de la terracería a Jilotlán de Dolores (Sierra de Halo), Mpio. Tecalitlán, bosque de pino y encino, 28 Oct 1988, *González C. 49* (IBUG); 3.3 miles E of Route 110 on lumber road that begins 7.3 miles S of Tecalitlán, 19°28′N, 103°16′W, 1800 m, pine woods, red soil, 26 Jun 1974, *Wendt & Chiang 325* (TEX); Sierra del Halo, near a lumber camp leaving the Colima highway 7 miles south-southwest of Tecalitlán and extending southeasterly, steep slopes in pine forest, in red clay soil, elevation 1530 m., 5 Aug 1957, *McVaugh 16001* (MICH); Sierra del Halo, near a lumber road leaving the Colima highway 7 miles south-southwest of Tecalitlán and extending southeasterly, steep slopes in pine-oak forest, elevation 1400-1500 m., 23 Jun 1957, *McVaugh 15012* (MICH); Mpio. Tecalitlán, 48 km. al S de Cd. Guzmán por carr. a Pihuamo, luego 32 km al S de Llanitos por brecha a San Isidro y Mexiquillo, bosque de pino y encino, degradado, con dominancia de *Pinus douglasiana*, alt. 2080 m., 30 Jun 1988, *Gaona P. 365* (MICH); El Fraile, Tapalpa, bosque de *Quercus* y *Pinus*, 2400 m., 26 May 1968, *Villareal P. 1699* (IBUG); 5 km. al Noreste de Tapalpa camino a Chiquilistlán, Mpio. Tapalpa, bosque de pinos y encinos, alt. 2100 msnm, 15 Jun 1985, *Soltero & González s.n.* (IBUG); steep mountainsides 4.5 miles north-northeast of Talpa de Allende, north of the road summit, in ravines, with oaks on the southeast-facing slopes and pines on the opposing slopes, elevation 1450-1500 m., 12 Oct 1960, *McVaugh 20125* (MICH); 1-2 miles east of Tapalpa, rocky soil on broken hills, elevation 2100-2200 m., 1 Nov 1960, *McVaugh 20549* (MICH); Cerro El Fraile, al NW de Tapalpa, Mpio. Tapalpa, bosque de pino-encino, asociado con *Pinus lumholzii*, *Quercus castanea*, *Q. obtusata*, *Arbutus glandulosa*, *Arctostaphylos pungens*, *Comarostaphylis discolor* ssp. *discolor*, 30 Jul 1986, *Ramírez Del-*

gadillo & Reyna Bustos 376 (IBUG); Sierra de Tapalpa (Cerro de Talcozagua), ca. 3 km. NNE of Tapalpa, on west-side of road to Laguna Sayula at ca. km. 29, 19°58′N, 103°45′W, top, ridges, and crevices of large NE-facing (50 m) steep basalt (?) cliffs, with scattered *Pinus* and *Quercus*, in rich loose soil, 18 Jun 1984, *Iltis 29169* (IBUG,WIS); Mpio. Concepción de Buenos Aires, 26 km. al E de Cd. Guzmán, carr. a Tamazula, y 33-40 km por brecha de Vista Hermosa a C. de B. Aires, bosque de pino y encino, degradado, con dominancia de *Pinus oocarpa*, alt. 1900-2060 m., 5 Jul 1988, *Gaona P. 386* (MICH); 2 km. antes de llegar a las Pilas camino a Manantlán, Cuautitlán., bosque mesófilo de montaña, entremezclado con encinares, *Quercus*, *Ardisia*, *Miconia*, 1800 m., 9 Jul 1985, *Vázquez 3333* (ZEA); Pte. de Guadelupe, Mpio. Ixtlahuacán del Río, matorral subtropical, 800 m., 19 Jul 1975, *Villarreal 7667* (IBUG); El Terrero, on route 110 at km. 59-60, about 20 mi. due WSW of Jiquilpan, Mich., & several miles beyond Mazamitla, Jal., in relatively undisturbed pine forest, 18 Jun 1956, *Gregory & Eiten 91* (MICH); Volcán Tequila, due south of Tequila, woods of *Quercus*, and also *Pinus* and *Arbutus* in some places, summit, rim of ancient crater, elev. 2750 m., 11 Aug 1968, *Anderson & Anderson 5115* (MICH); Cerro de Tequila, Mpio. de Tequila, bosque de encino y pino en ladera de cerro, 2000 m., 12 Jul 1971, *González T. 212* (MICH); Mpio. Tequila, [Cerro de la Torre de] microondas del Cerro de Tequila, bosque de *Quercus laurina* y *Q. rugosa*, 2800 m., 18 Jul 1990, *Ramírez Delgadillo, Tamayo, & Portillo Mtz. 2087* (IBUG); Cerro de Tequila, Mpio. de Tequila, bosque de encino en ladera pedregosa, 2750 m., 13 Jul 1971, *González T. 229* (MICH); Rancho la Calaverna 25 km al NE de Zapotlán Mpio. de Goméz Farías, bosque de pino y encino, suelos lateríticos arenosos con buen drenaje, 1800 m, 25 Jun 1980, *Trujillo F. 5* (IBUG); Ladera N del Cerro de Tequila, Mpio. de Tequila, cerca de la Tetilla, bosque de *Pinus* sp., *Quercus rugosa*, *Q. fulva* y *Juniperus* sp. suelos forestales degrados, 2800-2950 m., 7 Jul 1977, *V. de Puga & Carvajal 10528* (IBUG). México: 8 km NE of Temascaltepec on road to Toluca, 19°5′N; 100°00′W, oak-pine forest with bunch grass understory and many herbs with bulbous underground storage organs including *Oxalis*, *Cyperus seslerioides*, *Begonia* and liliaceous plants, 11 Jul 1969, *Marcks & Marcks 1144b* (WIS); Ypericones, Temascaltepec, llano on top, 28 Jun 1935, *Hinton et al. 7940* (B,GH); Nanchititla, District of Temascaltepec, llano, 11 Oct 1933, *Hinton 4986* (B); Cañada de Nanchititla, ladera húmeda, bosque mixto de encinos y pinos, en 1600 m. de alt., 25 May 1954, *Matuda et al. 30813* (IBUG). Michoacán: 17 m N of Aguililla on road to Dos Aguas, pine-oak woods; elevation 1820 meters, 8 Aug 1972, *Denton 2030* (MICH); Pto. Zarzamora, Coalcomán, pine forest, 2 Jul 1939, *Hinton et al. 13876* (ARIZ,GH,LL,US). Sinaloa: 60 road miles NE of Mazatlán on Mex. 40 to Durango mid-way between villages of Santa Lucía and Potrerillos, 23°27′N; 105°48′W, oak forest with many shrubs and grasses on SE facing slopes of Sierra Madre Occidental, alt. ca. 1600 m., 21 Jul 1969, *Marcks & Marcks 1188* (WIS).

As a representative of the *Viola grahamii* complex, *V. oxyodontis* (Greek *oxys*, sharp and *odontis*, with teeth, for the spreading-serrate margins of well developed leaves) is morphologically well-marked, and widely distributed throughout southwestern and south-central México. It ranges from the Mazatlán area in southernmost Sinaloa south to Aquililla in Michoacán, thence eastward to Taxco in Guerrero, largely on the Neo-Volcanic Plateau. According to label data, it frequents oak and pine forests in relatively dry sandy, rocky or clay soils, often in sparsely vegetated sites and mostly above 1400 meters elevation.

Milo Baker evidently suspected it to be an undescribed species in the late 1940s, annotating several sheets as "*Viola triangularis* ined.". Norman Russell also annotated sheets in the mid 1960s as something unknown to him. Systematic studies of the *V. grahami* complex in progress, including examinations of type material for the names *V. ciliata* Schlecht. *non* R. & S., *V. grahamii* Bentham, *V. reptans* Robinson, and *V. schaffneriana* Becker, have revealed *V. oxyodontis* to diverge from other taxa in the complex (Fig. 3) in numerous characteristics of foliage, flowers, capsules, and seeds. Diagnostic features include strictly glabrous foliage; leaves with long petioles and truncate-based blades, often sharply acute to acuminate at the apex and narrowly to broadly ovate-triangular in outline; blade margins sharply spreading-serrate; sepals sharply acuminate at the apex; and petals commonly rounded or truncate at the apex.

The remainder of the complex ranges mostly southeast of *Viola oxyodontis* but is sympatric with it in Jalisco. A sheet at MICH (*McVaugh 15012*) has specimens of both *V. oxyodontis* and *V. grahamii* s.l., indicating that the two taxa are occasionally sympatric. A very few specimens with sparsely villous petioles, otherwise resembling the new species, have been collected in the zone of sympatry and probably represent hybrids with *V. grahamii* s.l.

ACKNOWLEDGMENTS

I thank the curators of A, AMES, ANSM, ARIZ, B, BM, BR, C, CAS, CM, DS, F, GH, IBUG, ILL, JBSD, LL, MEXU, MICH, MO, MSC, NY, SMU, TAES, TENN, TEX, U, UC, UCWI, US, and ZEA for loans of specimens. I am grateful to H. Iltis and R. Kowal for guidance and review of the manuscript, M. Wetter for reviewing the manuscript and for curatorial assistance, and A. Vázquez G. for providing the Spanish translation of the abstract and reviewing locality data. I appreciate the help of K. Elliot and C. Lipke with illustrations.

LITERATURE CITED

Argüelles, E., R. Fernández, & S. Zamudio. 1991. Listado florístico preliminar del estado de Querétaro. Flora del Bajío y de regiones adyacentes, Fasc. II. Instituto de Ecología A.C., Centro Regional del Bajío, Pátzcuaro, Michoacán, México. 155 pp.

Phytologia (May 1993) 74(5):367-368.

A NEW SPECIES OF *SENECIO* (SECT. *PALMATINERVII*) FROM THE "ANTLER" REGION OF NORTHERN JALISCO

Billie Lee Turner

Department of Botany, University of Texas, Austin, Texas 78713 U.S.A.

ABSTRACT

A new species of *Senecio*, **S. floresiorum** B.L. Turner, belonging to the sect. *Palmatinervii* is described. It is closely related to *S. mezquitalanus* but differs in having smaller heads with smaller florets and fewer involucral bracts.

KEY WORDS: Asteraceae, Senecioneae, *Senecio*, *Roldana*, México

Routine identification has revealed the following novelty.

Senecio floresiorum B.L. Turner, *sp. nov.* TYPE: MEXICO. Jalisco: Mpio. Totatiche, Rancho Acaspulco, 8 km al SW de Temastian, ca. 2000 m, 28 Jun 1991, *A. Flores M. y J. Ma. Flores M. 2688* (HOLOTYPE: TEX!; Isotype: IGE).

Senecione mezquitalano B.L. Turner similis sed involucris 4-5 mm altis (vs. 7-8 mm) bracteis paucioribus (ca. 8 vs. 11-13) et flosculis radii ligulis minoribus (2-4 mm longis vs. 7-8 mm) differt.

Shrub to 1.5 m high. Stems densely velvety-tomentulose. Leaves mostly 9-12 cm long, 3.0-4.5 cm wide; petioles 2.0-2.5 cm long; blades weakly lobate, elliptic in outline, pinnately nervate, sparsely pilose-tomentulose beneath, especially along the major veins, the margins remotely serrulate. Capitulescence a terminal congested rounded cyme ca. 5 cm high, 8 cm wide, the ultimate peduncles mostly 3-5 mm long. Involucres campanulate, 4-5 mm high, the calyculus of 1-4 minute bractlets, the bracts ca. 8, lanceolate, glabrous, the apices acute. Receptacle convex, ca. 1.5 mm across, glabrous, markedly alveolate. Ray florets 3-5, fertile, the ligules yellow, 2-4 mm long, 1.0-1.5 mm wide, 4-nervate. Disk florets 17-21, the corollas yellow, glabrous, 5-6 mm long, the

tubes ca. 2 mm long, the lobes ca. 1 mm long. Achenes (immature) narrowly obpyramidal to columnar, glabrous, 5-ribbed, the pappus of numerous fragile, readily deciduous white bristles 3-5 mm long.

Senecio floresiorum belongs to the sect. *Palmatinervii* as envisioned by Barkley (1985) where it relates to the recently described *Senecio gesnerifolius* B.L. Turner of Durango, which has been changed to *S. mezquitalanus* B.L. Turner because of the earlier *S. gesnerifolius* Cuatrecasas (Turner 1992). *Senecio floresiorum* is virtually identical to the latter in its habit and vegetative features, but has markedly different capitulescences and much smaller heads, the involucres 4-5 mm high, (vs. 7-8 mm high) having ca. 8 bracts (vs. 11-13 bracts) and larger florets, the rays with ligules 2-4 mm long (vs. 7-8 mm long).

It is a pleasure to name this species for the two collectors who have gathered an interesting set of plants from a previously poorly collected area of Jalisco, the "antlers" of Jalisco, specifically the more eastern prong, which is closely adjacent to the state of Zacatecas.

ACKNOWLEDGMENTS

I am grateful to Guy Nesom for the Latin diagnosis, and to him and Mahinda Martinez for reviewing the manuscript.

LITERATURE CITED

Barkley, T. 1985. Intrageneric groups in *Senecio*, S.L., and *Cacalia*, S.L. (Asteraceae: Senecioneae) in Mexico and Central America. Brittonia 37:211-218.

Turner, B.L. 1992. New name for *Senecio gesnerifolius* Turner (Senecioneae, Asteraceae). Phytologia 71:56.

Phytologia (May 1993) 74(5):369-370.

A NEW SPECIES OF *STEVIA* (ASTERACEAE) FROM THE "ANTLER" REGION OF NORTHERN JALISCO

Billie L. Turner

Department of Botany, University of Texas, Austin, Texas 78713 U.S.A.

ABSTRACT

A new species, **Stevia baccharifolia** B.L. Turner, is described from northernmost Jalisco. It is a shrublet belonging to a group of woody species centering about *S. macvaughii* Grashoff. It is readily distinguished from the latter by its congested capitulescence and eglandular involucres.

KEY WORDS: Asteraceae, Eupatorieae, *Stevia*, Jalisco

Routine identification of Mexican Asteraceae has revealed the following novelty.

Stevia baccharifolia B.L. Turner, *sp. nov.* TYPE: MEXICO. Jalisco: Mpio. Totatiche, Rancho Acaspulco, 8 km al SW de Temastian, ca. 2,000 m, 28 Jun 1992, *A. Flores M. & J. Flores M. 2684* (HOLOTYPE: TEX; Isotype: IGE).

Steviae macvaughii Grashoff similis sed capitulescentia congesta (vs. laxa), capitulis sessilibus (vs. brevi-pedicellatis) trichomata eglandulosa (vs. valde capitati-glandulosa) efferentibus differt.

Sparsely branched shrublet to 1 m high. Stems densely puberulent, glabrescent with age, new shoots arising from persistent woody stems. Leaves opposite, mostly 4-5 cm long, 1.5-3.0 cm wide; petioles 0.6-1.0 cm long; blades ovate-elliptic, thick, weakly pinnately nervate, the veins not raised, scarcely tapering upon the petiole, if at all, glandular-punctate above and below, sparsely puberulent along the mid ribs, otherwise glabrescent, the margins serrate. Heads sessile or nearly so, arranged in tightly congested corymbs. Involucres 4-5 mm high, the bracts mostly acute at the apices, puberulent to glabrescent.

Corollas ca. 6 mm long, the tube ca. 1.5 mm long, the lobes ca. 1 mm long, pubescent beneath with short appressed hairs. Achenes (immature) ca. 3 mm long, sparsely hispidulous, the pappus a crown of lacerate scales ca. 0.5 mm high.

Stevia baccharifolia belongs to the series *Fruticosae* subseries *Scabrella* as conceived by Grashoff (1972). Within this complex, which is distinguished by its thick nearly glabrous leaves and hispid exaristate achenes, it appears closest to *S. macvaughii* Grashoff, having the habit, foliage, involucral shape and corollas of that taxon, but differs markedly in having a more congested capitulescence, the heads with eglandular involucres. The leaves superficially resemble those of several species of *Baccharis* known to the author, hence its name.

ACKNOWLEDGMENTS

I am grateful to Guy Nesom for the Latin diagnosis, and to him and Luis Hernández for reviewing the manuscript.

LITERATURE CITED

Grashoff, G. 1972. A systematic study of the North and Central American species of *Stevia*. Doctoral dissertation. Univ. of Texas, Austin, Texas.

Phytologia (May 1993) 74(5):371-381.

THE DELETION OF *SPOROBOLUS HETEROLEPIS* (POACEAE) FROM THE TEXAS AND LOUISIANA FLORAS, AND THE ADDITION OF *SPOROBOLUS SILVEANUS* TO THE OKLAHOMA FLORA

Larry E. Brown

Department of Biology, Houston Community College, 1300 Holman Street, Houston, Texas 77004 U.S.A.

and

[1]Department of Ecology & Evolutionary Biology, Rice University, Houston, Texas 77251 U.S.A.

ABSTRACT

Sporobolus heterolepis (A. Gray) A. Gray is not present in Texas and Louisiana. Herbarium specimens from these two states identified as *S. heterolepis* are either *Sporobolus junceus* (Michx.) Kunth or *Sporobolus silveanus* Swallen. *Sporobolus silveanus* is reported new for Oklahoma from Bryan Co. A map of the southern limits of *S. heterolepis* in Arkansas and Oklahoma, and the distribution of *S. silveanus* in Texas, Louisiana, and Oklahoma are included. A key to separate these often mis-identified *Sporobolus* species and new descriptions of *S. heterolepis* and *S. silveanus* are also included.

KEY WORDS: Poaceae, *Sporobolus heterolepis*, *Sporobolus silveanus*, *Sporobolus junceus*, Texas, Louisiana, Oklahoma

INTRODUCTION

The genus *Sporobolus*, positioned in the subfamily Chloridoideae, tribe Eragrostideae, and subtribe Sporobolinae, comprises about 160 species in the tropical, and subtropical regions of both hemispheres (Clayton & Renvoize 1986). Thirty three species are reported for the United States (Kartesz &

[1]visiting instructor spring 1993

Kartesz 1980) and twenty three of these are listed for Texas by C. Reeder (1975) and unchanged in Hatch *et al.* (1990). Allen (1992) reports twelve species for Louisiana. *Sporobolus heterolepis* (A. Gray) A. Gray is included for both Texas and Louisiana. The scope of this paper is to demonstrate that the inclusion of *S. heterolepis* for Texas and Louisiana is based on mis-identified herbarium specimens of either *Sporobolus junceus* (Michx.) Kunth or *Sporobolus silveanus* Swallen. Therefore, *S. heterolepis* should be deleted from the Texas and Louisiana floras. *Sporobolus silveanus* should be added to the Oklahoma flora from a collection in Bryan County mis-identified as *S. heterolepis.*

MATERIALS AND METHODS

Specimens were examined from the following herbaria (acronyms follow Holmgren *et al.* 1990) with the number of specimens examined from each herbarium in parentheses: ASTC (5), BRIT/SMU (19), LAF (2), LSU (1), NCU (2), NLU (4), OKL (4), OKLA (7), SBSC (17), TEX-LL (12), TAES (9), and US (5). During the earlier stages of this study, it was believed that *Sporobolus heterolepis* and *S. silveanus* could be separated only by a statistical analysis of spikelets traits. Therefore, measurements were made on the lengths of the lemma and glumes of *S. heterolepis* and *S. silveanus.* The mean and standard deviation were calculated and the difference between these means analyzed with a two-tailed *t* test at the 95% confidence limit. But as the study progressed, many non-statistical traits were found to be more useful. The two letter state acronyms are from the U.S. Postal Service.

DISCUSSION

Thieret (1969) first reported *Sporobolus heterolepis* new to Louisiana from Calcasieu Parish based upon his collection *Thieret 27977.* Although he offered no reason for his determination, he did provide an important observation that this specimen possessed brownish purple panicles and not the gray or lead color mentioned by Hitchcock (1950, *sic*). In 1971 Thieret annotated a 1940 collection from Allen Parish (*Brown 5717*, LSU) also as *S. heterolepis.* These two collections are the sole documentation for the inclusion of *S. heterolepis* for Louisiana (Allen 1992). Both specimens are *S. silveanus* with somewhat shorter inflorescence branches.

These two Louisiana collections (*Thieret 27977* and *Brown 5717*) have the following *Sporobolus silveanus* traits: purple or purple-tinged spikelets; lemmas longer than 2nd glume, longer than 4 mm with some ca. 5 mm long; a non-subulate 1st glume; and entire or minutely serrate blade margins. The primary panicle branches of both specimens are somewhat shorter than is typical for

S. silveanus, especially the Allen Parish collection where many of the panicle branches are no longer than 3 cm. These short branches may have accounted for their mis-identification as *S. heterolepis*. *Sporobolus heterolepis* usually has shorter primary panicle branches than those of *S. silveanus*.

Hitchcock (1935) was among the first to report *Sporobolus heterolepis* in Texas and because of his professional stature, it has been included in the Texas flora by subsequent authors. However, it should be kept in mind that the closely related *S. silveanus* was not described until 1941 and thus many of the pre 1941 collections of *S. silveanus* were mis-identified as *S. heterolepis*. The 1935 Hitchcock report was based, at least in part, on these early Texas collections at US identified as *S. heterolepis*: *Hosterman & Solomon 2267* from Paris, Lamar Co., 1941; *Tharp 2064* from Paris, Lamar Co., 1923; and *Reverchon 3484* from Wills Point, Van Zandt Co., 1903 which are all *S. silveanus*. A 19th century collection (*Neally s.n.*) from College Station, Brazos Co. is *S. junceus*. The two early collections from Lamar Co. are of significance because Riskind (1978) mistakenly reported *S. silveanus* new to Lamar Co. without being aware that it had been collected, probably at the "Tridens Prairie" site, first in 1923 and later in 1941.

The following four collections from Texas herbaria are identified as *Sporobolus heterolepis*: *Shinners 10239*, Rains Co. (BRIT/SMU); *Parks & Cory 10832*, Newton Co. (TAES); *Parks & Cory 10148*, Walker Co. (TAES); *Gould 5385*, Robertson Co. (TEX). The former two are *S. silveanus* and the latter two are *S. junceus*. These four collections are probably the basis, at least in part, for the report of *S. heterolepis* from vegetational regions 1 and 3 by Reeder (1975) and Hatch *et al.* (1990).

At OKLA is a 1953 collection of *Sporobolus silveanus* from Bryan Co., Oklahoma. The specimen was collected as *S. heterolepis* and annotated the same in 1975. This plant differs in no way from *S. silveanus* in Texas and Louisiana, and is only the second collection to have mature fruits. This is the first report of *S. silveanus* in Oklahoma and is mapped as *S. heterolepis* by the Great Plains Flora Association (1977). The populations of *S. silveanus* in Van Zandt, Lamar, and Rains cos., Texas, and Bryan Co., Oklahoma are slightly geographically isolated from those of southeast Texas and western Louisiana.

In summary, there are no specimens in the consulted herbaria to support the inclusion of *Sporobolus heterolepis* for Texas or Louisiana. The nearest documented locations for *S. heterolepis* are two counties in northern Oklahoma and four counties in northern Arkansas (fig. 1). It is unlikely that *S. heterolepis* occurs much farther south.

Table 1 is a summary of the most salient character states of the three *Sporobolus* taxa.

TAXONOMY

A key To *Sporobolus silveanus* and two other *Sporobolus* frequently misdetermined as it.

1. Most primary panicle branches in distinct verticels; verticels 5 or more per inflorescence axis, most verticels with 5 or more branches; spikelets usually less than 3.5 mm long. ..... *S. junceus*

1. Most primary panicle branches not in distinct verticels; verticels 3 or less per inflorescence axis, verticels with 4 or less branches; spikelets usually more than 3.5 mm long.

   2. Most lemmas shorter than 4.0 mm, $\leq$ 2nd glume; primary panicle branches usually shorter than 5 cm; 1st glume usually subulate above an expanded base; blade margin obviously serrate, teeth 0.1-0.2 mm long as measured along the longer side; lemmas gray to black-tinged or pale; mature caryopsis globose. ..... *S. heterolepis*

   2. Most lemmas longer than 4.0 mm, $\geq$ 2nd glume; primary panicle branches usually longer than 5 cm; 1st glume merely acute or acuminate at tip of longer wider base; blade margins entire or obscurely serrate, teeth less than 0.1 mm long as measured along the the longer side; lemmas purple or purple tinged; mature caryopsis obovate, laterally flattened. ..... *S. silveanus*

Sporobolus silveanus Swallen, J. Wash. Acad. Sci. 31:350. fig. 3. 1941. SILVEANUS DROPSEED. TYPE: UNITED STATES. Texas: open woods about 10 miles northeast of Orange, 1940, *W.A. Silveus 6441* (HOLOTYPE: NA 98476). Not at NA for P.M. Mazzeo (NA) writes that all of the type specimens housed at NA were transferred to US many years ago. Accordingly, the type specimen should be at US.

Plants densely caespitose perennials. Culms terete, 25-147 cm tall, minutely pubescent above and in the inflorescence (sometimes pubescent only in the inflorescence). Leaf sheaths longer than the internodes, the lower glabrous or pubescent with trichomes to 2 mm long, usually purple, upper sheaths glabrous, with purplish to pale scarious margins; collar margins usually with trichomes to 4 mm long, the dorsal surface glabrous. Leaf blades flat, folded or

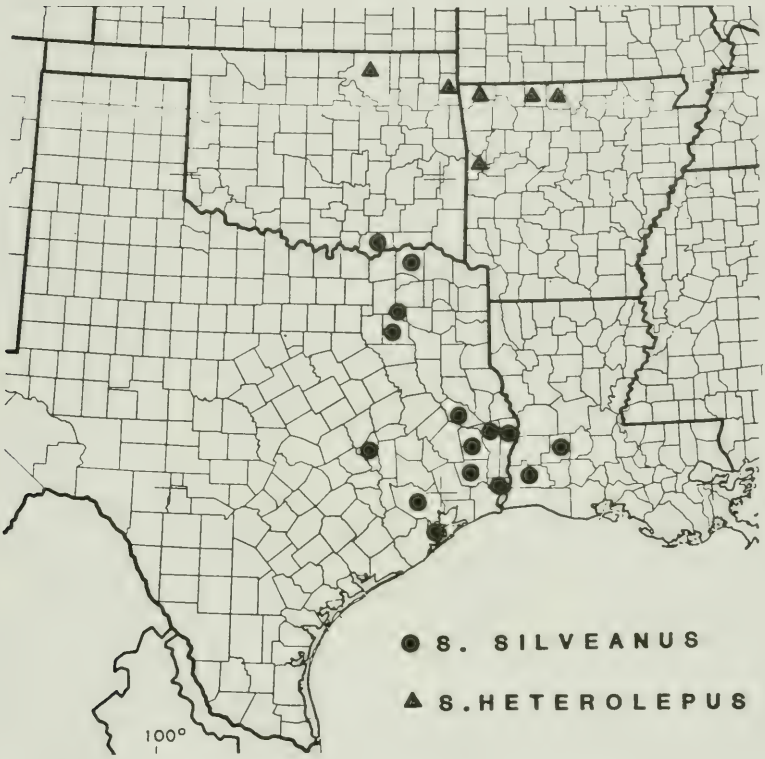

Fig. 1. Documented distribution of *Sporobolus silveanus* and *S. heterolepis* in Oklahoma, Texas, and Louisiana. The distribution in Arkansas from Smith (1988).

TABLE 1. SALIENT CHARACTER STATES OF *Sporobolus heterolepis*, *S. silveanus*, and *S. junceus*.

Feature	Taxon		
	heterolepis	*silveanus*	*junceus*
verticel number per infl-axis	0-3	0-3	5 or more
primary branch length (in cm)	0.5-5.0	(2-)5-16	to 5
spikelet pedicel length (in mm)	1-4 (mostly <4)	1.5-12 (mostly >4)	0.2-2.0 (mostly <1)
1st glume length (in mm)	1.5-4.1(-4.5) $\mu = 2.8 \pm 0.6$	2.7-4.5 $\mu = 3.5 \pm 0.5$	to 2.7
1st glume shape	mostly subulate above an expanded base	acute or acuminate at tip of a longer wider base	acute
2nd glume length (in mm)	3.1-4.8(-6) $\mu = 3.9 \pm 0.5$	3.8-5.9 $\mu = 4.7 \pm 0.5$	to 3.6
lemma/2nd glume	lemma $\leq$ 2nd glume	lemma $\geq$ 2nd glume	lemma $\leq$ glume
lemma length (in mm)	2.8-3.5(-4.0) $\mu = 3.0 \pm .2$	(3.9-)4.0-6.4 $\mu = 4.5 \pm 0.5$	to 3.5
lemma color	gray or gray to black-tinged	purple to pale	dark purple to yellowish
blade margin	serrate, teeth 0.1-0.2 mm long	entire or minutely serrate, teeth < 0.1 mm long	entire
caryopsis	globose to 2 mm wide and long	obovate, laterally compressed, to 2.6 mm long and 1 mm wide	elliptic, laterally compressed to 1.5 mm wide and 2 mm long

involute, straight or arcuate, to 62 cm long and 2.5 mm wide, the tip usually not reaching the inflorescence, the margins minutely scabrous; ligules a basal membrane with a fringe of trichomes, the upper about 0.2 mm long, the lower about 0.5 mm long. Inflorescence 9-33 cm long, usually an open panicle of purple spikelets, primary branches (2-)5-16 cm long, the upper branches more or less alternate, the lower often somewhat approximate and appearing to be in 1 or 2 verticels. Spikelets purple, pedicels 1.5-12 mm long (mostly longer than 4 mm), florets longer than glumes; glumes persistent, acuminate, the 1st glume 1-veined, 2.7-4.5 mm long, often minutely scabrous on distal portion of keel, the 2nd glume 3.8-5.9 mm long, more or less rounded on back, often 3 veins visible (one the prominent midrib vein the others formed by 2 smaller veins); lemmas (3.9-)4.0-6.4 mm long, acute, 1-veined, purple; palea subequal to lemma, 2-veined with a thin fragile groove between the ridges formed by the veins, at caryopsis maturity this fragile groove may split; caryopsis (only noted in one collection from Lamar Co., Texas and the one from Bryan Co., Oklahoma) obovate, laterally compressed, about 2.6 mm long, 1 mm wide, and 0.8 mm thick, embryo about two-thirds as long as endosperm. Chromosome number not reported.

Distribution (fig. 1). 12 counties in east TX (regions 1, 2, 3, & 4), two LA parishes (Calcasieu and Allen), and Bryan Co., OK.

Specimens examined: Louisiana: Allen Parish: longleaf pine woods, W of Kinder, 20 Oct 1940, *Brown et al. 5717* (LSU). Calcasieu Parish: longleaf pine woods, sect. 26, ca. 7.5 mi N of Starks, 26 Oct 1969, *Thieret 31899* (LAF); prairie strip along RR in sect. 6, 4 mi NE of Vinton, 24 Sep 1967, *Thieret 27977* (BRIT/SMU,LAF); sandy soil in field on W side of hwy 109, 4.5 mi S of intersection with hwy 12 in Starks, 14 Oct 1990, *Brown 14921* (LSU,NLU,SBSC). Oklahoma: Bryan Co.: prairie near Durant, 21 Oct 1953, *Jessee s.n.* (OKLA). Texas: Angelina Co.: longleaf pine uplands of the proposed Graham Creek Wilderness, 8.8 mi S of Zavalla on U.S. 69 and E on FR 314, 22 Sep 1979, *Nixon & Ward 9659* (ASTC); Brazos Co.: along hwy 6, 12 mi S of College Station, 8 Oct 1969, *Lonard 2504* (TAES); Galveston Co.: on 14th St. one block W of Ave I (FM 517), 19 Sep 1974, *Waller & Bauml 3128* (TAES,TEX,SBSC). Hardin Co.: pine forest border, 6 mi SW of Kountze, 15 Oct 1964, *Gould 11028* (BRIT/SMU,TAES,TEX); along a gravel rd W of hwy 320 S of Kountze in the Lance Rossier Unit of the Big Thicket Biological Preserve, 13 Oct 1990, *Brown 14907* (SBSC,TAES). Harris Co.: Red Bluff Rd, 1.5 mi W of SH 146, NW of Seabrook, 18 Sep 1974, *Waller & Bauml 3128* (TAES,TEX); on sandy bluff overlooking Mud Lake near the Johnson Space Center, 15 Oct 1983, *Brown 6723* (SBSC,TAES); on sandy soil at intersection of Port & Todville Rds N of Seabrook, 4 Oct 1986, *Brown 10704* (SBSC). Jasper Co.: SE of Zavalla on U.S. 63, 1.6 mi SE of the Plum Ridge Rd, 29 Aug 1978, *Marietta & Nixon 486* (ASTC,TEX). Newton Co.: 16 mi N of Newton, 11 Oct 1934, *Parks & Cory 10832* (TAES). Lamar Co.: "Tridens Prairie" 7

mi W of Paris at intersection of hwy 82 and FR 32, Nov 1971, *Collins s.n.* (TAES,TEX); hay meadow, Paris, 20 Aug 1941, *Hosterman & Solomon 2267* (US); prairie, Paris, 9 Nov 1923, *Tharp 2064* (US). Rains Co.: in fine sandy clay between RR and hwy, 3.5 mi NW of Point, 12 Sep 1948, *Shinners 10239* (BRIT/SMU). Tyler Co.: longleaf pine-grassland, 6.5 mi E of Chester on rte 1745 then left 3 mi to xeric Oligocene outcrop, 19 Oct 1967, *Correll 35172* (LL). Van Zandt Co.: sands, Wills Point, 15 Oct 1903, *Reverchon 3484* (US); Without location or date but with Texas handwritten later on label, *Reverchon 2460* (US).

Sporobolus heterolepis (A. Gray) A. Gray, *Man.* 576. 1848. PRAIRIE DROPSEED. TYPE: UNITED STATES. New York: Watertown, *Crawe s.n.* (HOLOTYPE: NY; Microfiche: NCU!). BASIONYM: *Vilfa heterolepis* A. Gray, Ann. Lyc. N.Y. 2:233. 1835. *Agrostis heterolepis* A. Gray *in* Wood, *Class-book*, ed. 2. 598. 1847.

Plants densely caespitose perennials. Culms terete to 108 cm tall, glabrous above and below (sometimes minutely scabrous in the inflorescence). Leaf sheaths longer than internodes, pale or purple-tinged, the lower glabrous or pubescent with trichomes to 1.5 mm long, the upper glabrous; margins scarious, pale; collar margins glabrous or pubescent with trichomes to 3 mm long, the dorsal surface glabrous. Leaf blades 2.5 mm wide (measured flat) and to 60 cm long, folded along the midrib with the lateral margins appressed (rarely involute), margins distinctly scabrous; ligules about 0.3 mm long, a membrane with a fringe of cilia, the upper and lower equal in length. Inflorescence 5-16 cm long, more or less an open panicle; primary branches 0.5-5.0 cm long, these alternate or approximate and then appearing to be in 1 or more verticels. Spikelets gray, gray or black-tinged when mostly pale; pedicels 1-4 mm long (mostly shorter than 4 mm); florets shorter than or equal to glumes; glumes persistent, the 1st 0-1 veined, 1.5-4.1(-4.5) mm long, subulate beyond an expanded base, scabrous on margins and distal portion of keel; the 2nd acuminate, 3.1-4.8(-6.0) mm long, rounded on back, often 3 veins visible (formed from the prominent midrib vein and 2 faint veins); lemmas 2.8-3.5 (-4.0) mm long, acute, 1-veined; paleas usually slightly longer than lemmas, 2-veined with a thin fragile groove between the veins, the mature caryopsis separating the palea into 2 halves down the groove; caryopsis globose, to 2 mm long and wide, the style base remaining as an apiculus, the embryo obscure. Chromosome number, $2n = 72$.

Distribution. A species of the prairie states and on soils of an alkaline nature east of the prairies. Reported from the following states: NY, PA, MD, OH, IN, MI, IL, MN, IA, MO, AR, OK, KS, NC, GA, NE, SD, ND, WY, and CO. Also present in southern Canada from Quebec west to Saskatchewan.

In the U.S. very rare east of IL and isolated in the southern Appalachians in Clay Co., NC and Catoosa Co., GA. The two collections in the southern Appalachians are similar to those of the prairie states. It was recently found on serpentine soils in Cecil Co., MD (Tyndall & Farr 1990).

Specimens examined: UNITED STATES. Arkansas: Sebastian Co.: Massard prairie, 25 Aug 1940, *Armstrong 223* (TEX). Colorado: El Paso Co.: on prairies, Black Forest, 6 Aug 1937, *Silveus 2036* (BRIT/SMU,TEX); low places, Black Forest, 25 Aug 1935, *Silveus A-14* (TAES). Jefferson Co.: gravelly soil of hwy right-of-way in Rocky Flats between Marshall & Coal Creek, 19 Sep 1979, *Weber 15537* (NLU,TEX). Georgia: Catoosa Co.: in thin soil over limestone rock, near intermittent stream, Chickamauga & Chattanooga National Military Park, 10 mi W of Ringgold, 9 Aug 1948, *Cronquist 5621* (BRIT/SMU). Illinois: Coles Co.: prairie area at edge of RR, 3 mi W of Mattoon, 26 Sep 1974, *Ebinger 15165* (NLU). Lake Co.: marshy flat W of dunes, Dune State Park N of Waukegan, 3 Oct 1945, *Steyermark & Barkley 15327* (TEX). Winnebago Co.: gravel prairie, N of sanitary district and S of Rockford, 8 Sep 1956, *Fell 56-363* (TAES). Indiana: Benton Co.: in prairie soil along the Big Four RR, 1.5 mi NW of Fowler, 26 Sep 1945, *Kriebel 10682* (BRIT/SMU). Newton Co.: along the Pennsylvania RR, 0.5 mi W of Goodland, 5 Sep 1938, *Kriebel 5758* (NLU). Iowa: Boone Co.: edge of U.S. 30 next to C & NW RR, Des Moines Twp, SE 1/4 sect. 25, 5 Oct 1953, *Elder 473* (BRIT/SMU, OKLA). Dickinson Co.: gravel knob, NE 1/4 sect. 13, Diamond Lake Twp. (T100N, R37W), 15 Aug 1953, *Thorne 13415* (BRIT/SMU). Story Co.: prairie at Ames High School in Ames, 2 Oct 1965, *Weyland 1008* (ASTC,NLU). O'Brien Co.: prairie covered hills along Henrly Creek, sect. 24, Waterman Twp., *Hayden 8112*, 14 Sep 1940 (TEX). Minnesota: Morrison Co.: growing in prairie strip 3 mi S of Little Falls, 2 Aug 1946, *Huff 18917* (BRIT/SMU). Norman Co.: in prairie remnant near Minn. Rte. 113, 3.5 mi E, 0.3 mi N of Syre, 27 July 1977, *Ownbey 5722* (NCU). Missouri: Greene Co.: dry rocky ground, border of woods, 6 mi S of Brighton, 18 Sep 1957, *Palmer 66656* (BRIT/SMU). Polk Co.: rocky open ground along Pomme de Terre River, 5 mi SW of Huron, 21 Aug 1956, *Palmer 63826* (NLU). Nebraska: Lancaster Co.: mowed prairie, 3.5 mi N of Lincoln, 17 Aug 1949, *Dale 1699* (TEX). North Carolina: Clay Co.: open pitch pine woods on west slope of Buck Creek, serpentinized-olivine barrens, 1 km N of U.S. 64 on Buck Creek Rd, elevation 1000 m, 11 Oct 1975, *Pittillo 6262* (OKLA,NCU). Oklahoma: Delaware Co.: prairie area, 3 mi E & 3 N of Grove on State 10, *Wallis 5942* (BRIT/SMU,OKL,OKLA). Osage Co.: 15 mi NE of Pawhuska, 7 Sep 1937, *Engleman 314* (OKL); 15 mi NE of Pawhuska, 11 Sep 1937, *Engleman 321* (OKL); Barnsdall, 14 Oct 1925, *Featherly s.n.* (BRIT/SMU,OKL,OKLA). Wisconsin: Chippewa Co.: C. St. P.M. & O RR right-of-way along hwy 12, SW corner of county, 14 Oct 1939, *Fassett & Shinners 20311* (BRIT/SMU). Dane Co.: dry sandy ground, Wisconsin River 5 mi NE of Mazomanie, 29 Sep 1940,

Greene & Shinners 3465 (BRIT/SMU); La Crosse Co.: steep, south-facing prairie on top of Grandad Bluff, 18 Aug 1956, *Hartley 2425* (BRIT/SMU). Walworth Co.: along right-of-way of Milwaukee Rd W of Delavan, 1 Aug 1936, *Wadmond 722* (TEX).

CANADA. Manitoba: in gravel till of cleared area, indian cemetery, N side of Clear Lake off of Lake Audy Road in Riding Mountain National Park, 13 Aug 1979, *Cody 24634* (OKLA). Saskatchewan: dry prairie near base of hill, McKague, 23 July 1939, *Breitung 318* (TEX); several tufts on dry sandy prairie, McKague, 8 Aug 1943, *Breitung 1717* (BRIT/SMU).

ACKNOWLEDGMENTS

Appreciation is extended to the curators and staff of the following herbaria for the loan of specimens: ASTC, BRIT/SMU, LAF, LSU, NCU, NLU, OKL, OKLA, SBSC, US, and to TAES and TEX-LL for permitting access to their collections. Thanks are also extended to Carol Todzia (TEX) for the photocopy of a label, to K.N. Gandhi (NCU) for assistance with some bibliographic details, to Robert Burckhalter (LSU) and Robert Haynes (UNA) for a base map, to Marcia Braun (Houston Community College librarian) who conducted a computer search for literature, and to K.N. Gandhi and Stanley D. Jones (TAES) for their review of the paper.

LITERATURE CITED

Allen, C.M. 1992. *Grasses of Louisiana*, 2nd ed. Cajun Prairie Habitat Preservation Society, Eunice, Louisiana.

Clayton, W.D. & S.A. Renvoize. 1986. *Genera Graminum: Grasses of the World.* Kew, London: Royal Botanical Gardens, Great Britain.

Great Plains Flora Association. 1977. *Atlas of the Flora of the Great Plains.* Iowa State University Press, Ames, Iowa.

Hatch, S.L., K.N. Gandhi, & L.E. Brown. 1990. *Checklist of the Vascular Plants of Texas.* Texas Agric. Exp. Sta. Bull., MP-1655. College Station, Texas.

Hitchcock, A.S. 1935. *Manual of the Grasses of the United States.* U.S.D.A., MP-200.

———. 1951. *Manual of the Grasses of the United States*, ed. 2, revision by A. Chase. U.S.D.A., MP-200.

Holmgren, P.K., N.H. Holmgren, & L.C. Barnett. 1990. *Index Herbariorum*, 8th edition. New York Botanical Gardens, New York, New York.

Kartesz, J.T. & R. Kartesz. 1980. *A Synonymized Checklist of the Vascular Flora of the United States, Canada, and Greenland.* The University of North Carolina Press, Chapel Hill, North Carolina.

Reeder, C.G. 1975. *Sporobolus* in F.W. Gould, *The Grasses of Texas.* Texas A & M University Press, College Station, Texas.

Riskind, D.H. 1978. Noteworthy vascular plant records from Texas. Sida 7:394-396.

Smith, E.B. 1988. *An Atlas and Annotated List of the Vascular Plants of Arkansas*, 2nd ed. Published by the Author, Fayetteville, Arkansas.

Thieret, J.W. 1969. Twenty-five species of vascular plants new to Louisiana. Proc. Louisiana Acad. Sci. 32:78-82.

Tyndall, R.W. & P.M. Farr. 1990. Vegetation and flora of the Pilot serpentine area in Maryland. Castanea 55:259-265.

Phytologia (May 1993) 74(5):382-384.

TWO NEW SPECIES OF *SENECIO* (ASTERACEAE) FROM SONORA, MEXICO

B.L. Turner

Department of Botany, University of Texas, Austin, Texas 78713 U.S.A.

ABSTRACT

Two new species of *Senecio* are described from Sonora, México: **S. riomayensis** B.L. Turner, an annual belonging to the series *Senecio* sect. *Annui*; and **S. tepopanus** B.L. Turner, a shrub belonging to the series *Palmatinervii* (= *Roldana*). The former is related to *S. mohavensis*, the latter to *S. angulifolius*.

KEY WORDS: Asteraceae, Senecioneae, *Senecio, Roldana*

Routine identification of Mexican Asteraceae has revealed the following novelties.

Senecio riomayensis B.L. Turner, *sp. nov.* TYPE: MEXICO. Sonora: Río Mayo Region, "Canyon de Lopez, west of Mesa de Abajo, 28°09′40″N, 109°02′10″W", 1350 m, 17 Mar 1988, *P.S. Martin, G. Ferguson, K. Moore s.n.* (HOLOTYPE: ARIZ!).

Senecioni mohavensi A. Gray similis sed foliis plerumque basalibus, caulibus ac foliis initio arachnoidei-tomentosis (vs. glabris), et acheniis moderate pubescentibus trichomatibus brevibus papilliformibus (vs. dense strigosis) differt.

Delicate annual 10-15 cm high. Stems arachnoid-tomentose at first, mostly glabrescent with age. Lower leaves mostly 2-4 cm long, 1.0-1.6 cm wide; petioles 1-2 cm long; purplish beneath, at least the lower portions persistently arachnoid, the margins irregularly serrate. Upper stems with leaves much-reduced, ovate, sessile, clasping. Heads 1-4 to a stem, the ultimate peduncles mostly glabrescent, 2-4 cm long. Involucres campanulate, ca. 5 mm high, 4 mm wide (pressed), the bracts ca. 13, somewhat carinate, linear-lanceolate, the apices green. Ray florets 1 or more, much-reduced, the tubes ca. 4 mm

long, the ligules ca. 0.5 mm long. Disk florets ca. 35 (estimated from 1 head), the corollas yellow, ca. 3.5 mm long, glabrous, the tube grading into the throat, the lobes ca. 0.25 mm long. Achenes (immature) ca. 1.5 mm long, moderately papillose-pubescent throughout with short stubby hairs, not at all strigose.

This delicate annual superficially resembles *Senecio mohavensis* A. Gray, both belonging to the sect. *Annui* of *Senecio* (Barkley 1985). It differs from the latter in having leaves mostly basal (vs. rather evenly dispersed along the stem), an arachnoid-tomentose vestiture (vs. glabrous) and achenes moderately pubescent with very short papillose hairs (vs. densely strigose-pilose).

It is possible that the present novelty is a recent or ancient introduction from some extra continental xeric region, much as postulated for *Senecio mohavensis*, which has been convincingly shown to have an African-Asian desert origin (Liston *et al.* 1989). Regardless, the taxon is not clearly associated with any of the Mexican species of the section *Annui* (Barkley, in prep.), nor can I relate this to yet other taxa elsewhere.

Dr. Theodore Barkley (pers. comm.), after reviewing this paper, suggested that I compare the present novelty with the African *Senecio abysinnicus* Sch.-Bip., an annual species with a chromosome number of $2n = 10$ (Turner & Lewis 1965). After examining material of the latter from MO I conclude that any close similarity is largely superficial, mainly habit. *Senecio riomayensis* differs from *S. abysinnicus* in having more numerous involucral bracts (ca. 13 vs. ca. 8), calyculate heads and arachnoid-tomentose vestiture (vs. sparsely pilose to glabrous).

Senecio tepopanus B.L. Turner, *sp. nov.* TYPE: MEXICO. Sonora: Tepopa, Río Mayo drainage, "Upper Sonoran; dark canyon", 9 Mar 1935, *Howard S. Gentry 1411* (HOLOTYPE: ARIZ!).

Senecioni angulifolio DC., similis sed foliis 5-lobatis (vs. 7-11-lobatis), capitulis capitulescentia nuda stricta cymosa atque 15-30 cm lata dispositis, pedunculis ultimis plerumque 2-3 cm longis (vs. 0.5-1.5 cm longis), involucris ecalyculatis, et corollis radii ligulis 12-14 mm longis (vs. 1-5 mm longis) differt.

Shrub or shrublet 1-2 m high. Stems reddish-brown, densely glandular-pubescent with minute hairs. Midstem leaves mostly 10-25 cm long, 6-16 cm wide; petioles 3-15 cm long, pubescent like the stems; blades palmately 5-7 nervate, broadly ovate to orbicular in outline, glandular-puberulent beneath along the veins, 5-lobed, the lobes ca. as wide as long; the margins entire, ciliate with glandular-puberulent hairs. Capitulescence a broad stiffly-branching naked terminal open cyme 15-25 cm across, the ultimate peduncles mostly 2-3 cm long, pubescent like the stems. Involucres campanulate to hemispheric,

9-10 mm high, the bracts ca. 13, lance-elliptic, glandular-pubescent dorsally, the margins broadly scarious. Ray florets mostly 8, the ligules yellow, 10-12 mm long, 2-3 mm wide. Disk florets 20-30 per head, the corollas ca. 10 mm long, yellow, glabrous, the tube ca. 4 mm long, the lobes ca. 1 mm long. Achenes fusiform, 9-10 ribbed, glabrous, the pappus of ca. 50 white fragile slender bristles 5-7 mm long.

ADDITIONAL SPECIMEN EXAMINED: MEXICO. Sonora: Tepopa (27°19.3′N, 108°44′W), 1250 m, "springs and waterfall at upper edge of short tree forest mixing with oaks", *Martin et al. s.n.* (ARIZ,TEX).

When originally examined I tentatively positioned this taxon within the widespread highly variable *Senecio angulifolius* (series *Palmatinervii*, Barkley 1985), largely because they share similar foliage and vestiture. *Senecio tepopanus* is readily distinguished from the latter by its large stiffly-branching "cymose" capitulescence, ecalyculate heads and well-developed ray florets; additionally, it is known only from the area of Tepopa, Sonora, whereas *S. angulifolius* has a more southern distribution, occurring from Jalisco to San Luis Potosí and southwards to Chiapas.

The type sheet bears the following interesting observations: "Shrub one to two meters high. Has an odor like some exotic perfume I have noticed in feminine company."

ACKNOWLEDGMENTS

I am grateful to Guy Nesom for the Latin diagnoses, and to him and Ted Barkley for reviewing the manuscript and providing helpful comments.

LITERATURE CITED

Barkley, T. 1985. Infrageneric groups in *Senecio*, s.l., and *Cacalia*, s.l. (Asteraceae: Senecioneae) in Mexico and Central America. Brittonia 37:211-218.

Liston, A., L. Rieseberg, & T. Elias. 1989. Genetic similarity is high between intercontinental disjunct species of *Senecio* (Asteraceae). Amer. J. Bot. 76:383-388.

Turner, B.L. & W.H. Lewis. 1965. Chromosome numbers in the Compositae IX. African species. J. South Afr. Bot. 31:207-217.

Phytologia (May 1993) 74(5):385-413.

NEW TAXA, NEW COMBINATIONS, AND NOMENCLATURAL COMMENTS ON THE GENUS *ACOURTIA* (ASTERACEAE, MUTISIEAE)

Billie L. Turner

Department of Botany, University of Texas, Austin, Texas 78713 U.S.A.

ABSTRACT

Eleven new species of *Acourtia* are described from México and Guatemala: **A. caltepecana** B.L. Turner from southern Puebla, México; **A. durangensis** B.L. Turner from central Durango, México; **A. guatemalensis** B.L. Turner from Guatemala; **A. hidalgoana** B.L. Turner from Nuevo León, Querétaro, Hidalgo, and closely adjacent Veracruz, México; **A. macvaughii** B.L. Turner from Michoacán, México; **A. queretarana** B.L. Turner from Querétaro, México; **A. rzedowskii** B.L. Turner from Puebla, México; **A. sinaloana** B.L. Turner from northern Sinaloa, México; **A. souleana** B.L. Turner from southern Puebla and closely adjacent Oaxaca, México; **A. veracruzana** B.L. Turner from northern and central Veracruz and closely adjacent Puebla, Hidalgo, and Querétaro, México; and **A. zacatecana** B.L. Turner from Zacatecas, México. Two new Mexican varieties are proposed: **Acourtia reticulata** (Lag. *ex* D. Don) Reveal & King var. **maculata** B.L. Turner from Michoacán and Guanajuato, and **A. wislizeni** (A. Gray) Reveal & King var. **subscaposa** B.L. Turner from southern Durango; in addition *A. dugesii* (A. Gray) Reveal & King var. *pilulosa* (Bacig.) Reveal & King is raised to specific rank as **A. pilulosa** (Bacig.) B.L. Turner, *comb. & stat. nov.* Several early specific names were found to predate those used by Bacigalupi in his monograph of 1931, and new nomenclatural combinations consequently proved necessary: **Acourtia cordata** (Cerv. *in* La Llave & Lex.) B.L. Turner, *comb. nov.*, an earlier name for *Acourtia hebeclada* DC.; **A. humboldtii** (Less.) B.L. Turner, *comb. nov.*, an earlier name for both *A. alamanii* (DC.) Reveal & King and *A. mexicana* (Lag. *ex* D. Don) H. Rob., the latter not synonymous with *A. thurberi* (A. Gray) Reveal & King as proposed by H. Robinson; *A. moschata* (La Llave & Lex.) DC., an earlier name for *A. thyrsoidea* A. Gray; **A. fruticosa** (La Llave & Lex.) B.L. Turner, an earlier name for *A. ridiga* DC.; and *A. patens* (A. Gray) Reveal & King, an earlier name

for *A. montana* (Rose) Reveal & King. In addition, when necessary, typifications for sundry species of *Acourtia* are established, including *A. carpholepis* (Sch.-Bip. *ex* A. Gray) Reveal & King, *A. dugesii*, *A. macrocephala* Sch.-Bip. *ex* Seemann, and *A. reticulata*.

KEY WORDS: Asteraceae, Mutisieae, *Perezia*, *Acourtia*, México, Guatemala

Preparation of a treatment of *Acourtia* for the Asteraceae of México has necessitated description of the following novelties, new combinations, and nomenclatural comments. The study is based upon the examination of approximately 2,900 specimens on loan from 18 institutions (cf. Acknowledgments). This material was borrowed initially for study by Dr. R.L. Cabrera (1992), but she opted to study for her doctoral work only the scapose taxa of *Acourtia* (ca. 15 species) which she segregated as a distinct genus, leaving the remaining 50 or more species essentially unexamined. In returning the latter loans, I took it upon myself to complete the task initially set before Ms. Cabrera, examining in detail all of the sheets concerned, working out matters of typification and priority, composing a key, and preparing a detailed distributional map for all of the Mexican taxa. The complete synopsis (Turner & Nesom, in prep.) should be forthcoming shortly.

Acourtia caltepecana B.L. Turner, *sp. nov.* TYPE: MEXICO. Puebla: Mpio. Caltepec, Cerro El Tambor, al NE de Caltepec, 1960-2300 m, 10 Oct 1984, *P. Tenorio L. 7634*, with C. Romero de T. (HOLOTYPE: TEX!; Isotype: MEXU).

Acourtiae carpholepi (Sch.-Bip. *ex* A. Gray) Reveal & King similis sed involucris minoribus (6-7 mm altis vs. 9-11 mm), bracteis exterioribus ac mediis plerumque scariosis apicibus acutis reflexisque (vs. aliquantum crassis apicibus late obtusis vel rotundatis erectisque) differt.

Perennial sprawling suffruticose herbs 1.0-1.5 m high. Stems puberulent to glabrescent, purple to green. Midstem leaves sessile, 5-7 cm long, 2.0-2.5 cm wide, ovate to trullate in outline, gradually reduced upwards, minutely glandular-pubescent beneath to nearly glabrous, rarely somewhat viscid, the major veins sparsely puberulent, the margins denticulate, entire or clearly lobate, sometimes throughout. Heads sessile or nearly so, numerous in terminal or lateral congested cymules, the ultimate peduncles mostly 1-2 mm long. Involucres narrowly campanulate, 6-7 mm high, the bracts 3-5 seriate, graduate, erect to markedly reflexed, glabrate dorsally, the margins ciliate with soft

hairs, the mid-bracts decidedly obtuse, mostly mucronate. Receptacle somewhat convex, glabrous. Florets 9-10 per head, the corollas reportedly white or rose-colored, bilabiate, glabrous, 5-6 mm long, both the anterior and posterior lips or limbs longer than the tube. Achenes (immature) fusiform, ca. 2 mm long, densely glandular-pubescent, 8-9 costate; pappus of numerous tawny to tawny-white, barbellate bristles 5-6 mm long.

ADDITIONAL SPECIMENS EXAMINED: MEXICO. Puebla: Rincón de la Hierba, la Mesa Chica al W de Caltepec, ca. 2120 m, 17 Oct 1983, *Tenorio L. 4706* (MEXU,TEX); 5 km al NO de Caltepec, por el camino a Los Reyes Metzontla, ca. 3 km al SE de los Reyes Metzontla, 10 Nov 1983, *Villaseñor & Tenorio 588* (MEXU,TEX); Cerro El Gavilan, ca. 4 km al SE de Caltepec, por el camino a San Luis Atolotitlán, 12 Nov 1983, *Villaseñor & Tenorio 623* (MEXU,TEX).

According to label data on type material and *Tenorio L. 4706*, the species is said to be locally abundant, occurring with *Beaucarnea* and other xerophilics. The leaves on the holotype are lacking lobes; *Villaseñor 623* has a few lobed leaves; those of *Villaseñor 588* are markedly lobed throughout. The extremes among the four sheets might be considered two species, but taken together and considering their close proximity, these all appear to belong to a single variable species.

Acourtia caltepecana is clearly related to *A. carpholepis*, *A. lobulata* (Bacig.) Reveal & King, and *A. souleana* B.L. Turner, but is readily distinguished from all of these by its smaller, tightly congested, fewer-flowered heads (9-10 florets vs. 11 or more) and usually reflexed, markedly scarious outer involucral bracts. The species was apparently first collected by Sessé and Moçiño between 1787-1804 (no. *3089*, fragment F!) and given the unpublished name "*Perdicium scariosum*", presumably by Cervantes at Madrid.

Acourtia carpholepis (Sch.-Bip. *ex* A. Gray) Reveal & King, Phytologia 27:229. 1973. BASIONYM: *Perezia carpholepis* Sch.-Bip. *ex* A. Gray, Proc. Amer. Acad. Arts 19:60. 1883. TYPE: MEXICO. Puebla: "Chapulco", Dec 1841, *Liebmann 351* (LECTOTYPE [selected here]: GH!; Fragment of lectotype and sketch of lectotype: GH!; Isolectotypes: G!,US!). As noted by Bacigalupi (1931), Gray adopted the name *P. carpholepis* from an unpublished annotation on a Liebmann sheet by Schultz-Bipontinus which had been sent to him from Europe. Gray based his description upon several sheets (*Liebmann 351*, from Puebla; *Ghiesbreght 525*, from Chiapas; *Linden 439*, also from Chiapas. Specimens from Puebla and closely adjacent states tend to have fewer, less graduate, and more narrowly obtuse involucral bracts than those from Chiapas, which are more numerous and rounded apically. The Liebmann specimen fits well the description concerned, Gray specifically noting the heads to be ca. 10-

flowered and the bracts with obtuse apices.

So far as known *Acourtia carpholepis* occurs in Puebla, Veracruz, and again in Chiapas. Material from Guatemala heretofore referred to as *A. carpholepis* is described below as *A. guatemalensis* B.L. Turner. Material of the former from Chiapas approaches the latter in having mostly rounded involucral bracts, but otherwise is closer to what I call *A. carpholepis*. *Acourtia lobulata* is closely related to *A. carpholepis*, the former distinguished by its acute involucral bracts, lobed leaves, and more numerous florets per head (18-20 vs. 9-11).

Acourtia cordata (Cerv. *in* La Llave & Lex.) B.L. Turner, *comb. nov.* BASIONYM: *Perdicium cordatum* Cerv. *in* La Llave & Lex., *Nov. Veg. Descr.* 1:27. 1824. TYPE: MEXICO. D.F.(?) "montibus del Desierto Mexico vicinis", 1787-1804, *Sessé & Moçiño 3736* (LECTOTYPE [selected here]: M; Probable fragment of lectotype: F!; Isolectotypes: G-BOISS!). De Candolle, in his description of *Acourtia hebeclada* DC., cited *Perdicium cordatum* as a questionable synonym. The lectotype fragment examined here differs not at all from the lectotype fragment of *Acourtia hebeclada* at GH.

Acourtia hebeclada DC., *Delessert Icon. Select.* 4:41. 1838. *Perezia hebeclada* (DC.) A. Gray, *Pl. Wright.* 1:127. 1852. TYPE: MEXICO. w/o specific locality, 1831, *Alaman s.n.* (LECTOTYPE [selected here]: G-DC; Xerolectotype: TEX!; Fragment of lectotype: GH!). In his protologue, De Candolle also cited a specimen collected by Mairet.

Perezia hebeclada (DC.) A. Gray var. *urolepis* B.L. Rob., Proc. Amer. Acad. Arts 44:625. 1909. TYPE: MEXICO. Hidalgo: Sierra de Pachuca, 2900 m, *C.G. Pringle 13975* (HOLOTYPE: GH!).

Acourtia matudae Rzed., Bol. Soc. Bot. Mex. 45:107. 1983. TYPE: MEXICO. D.F.: Sierra de Guadalupe, 2450-2750 m, 1 Nov 1953, *E. Matuda 29536* (HOLOTYPE: MEXU!).

Acourtia cordata is apparently a relatively common species in southcentral México, especially in the vicinity of México City. The earliest name for the taxon is clearly *Perdicium cordatum*, to judge from both the description and fragment of the lectotype. Bacigalupi (1931) listed this name among his "Doubtful or Uncertain Species", not having access to type material, which was apparently collected by Sessé & Moçiño in the mountainous areas about or near México City.

Acourtia matudae appears to be a form of *A. cordata* with peculiar involucral bracts, appropriately described as "cochleate-fimbriate" by Rzedowski.

This plant is known only by a single collection from Sierra de Guadalupe, a relatively small mountainous area just north of México City. Upon this same sierra, numerous collections of *A. cordata* have been made, nearly all of which show a range of involucral types. While none of these is as bizarre as "*A. matudae*," *Rzedowski 37117* (IPN) clearly possesses semi-cochleate inner bracts, some of which are lacerate. More or less similar variation in involucral bracts can be found elsewhere in the range of the taxon (e.g., *Pringle 13975*, Sierra de Pachuca, Hidalgo, the type of var. *urolepis*), but on the localized Sierra de Guadalupe all of the 15 or more specimens examined have very elongated inner involucral bracts with apices tortuous or variously reflexed to cochleate. The involucral bracts found in *A. cordata* over most of its distribution are like those found in type material: linear-lanceolate, glandular, with inner bracts appressed, the latter mostly 14-20 mm long. Regardless, I can find no other character other than bract shape to distinguish *A. matudae* from *A. cordata* and reluctantly relegate the name to synonymy here.

Acourtia dugesii (A. Gray) Reveal & King, Phytologia 27:229. 1973. BASIONYM: *Perezia dugesii* A. Gray, Proc. Amer. Acad. Arts 19:60. 1883. TYPE: MEXICO. Guanajuato: "Guanaxuato", w/o date *A. Duges s.n.* (HOLOTYPE: GH!). In his protologue Gray noted the species to be known by "A flowering branch only." and has annotated the sheet concerned as "Perezia Dugesii n. sp." Apparently, at the time of his description he did not have available another sheet with 2 sprigs from this locality (*Duges 430*, collected in 1883, GH!), which matches closely that of the holotype. Duges also collected the species again at the same locality in 1905 (*Duges 20*, NY).

Acourtia dugesii is a sprawling suffruticose shrub or shrublet 2-5 m high. As treated by previous workers (*e.g.*, McVaugh 1984) it was a very heterogeneous assemblage. I have restricted the name to plants of the above habit from western México having sessile heads, each containing 5 or 6 florets, the latter producing mostly glandular-pubescent achenes. From out of this complex several taxa have been described herein, including *A. macvaughii*, *A. queretarana*, and *A. veracruzana*.

Bacigalupi (1931) recognized two varieties under *Acourtia dugesii* (s.l.): a widespread var. *dugesii* and var. *pilulosa* Bacig. from Oaxaca. The latter is treated as a species in the present account.

Acourtia durangensis B.L. Turner, *sp. nov.* TYPE: MEXICO. Durango: Cienega bottomland near small lake 40 mi N of Cd. Durango in scattered colonies on open bottomland, ca. 2000 m, 3 Oct 1948, *Howard S. Gentry 8594* (HOLOTYPE: MICH!; Isotypes: ARIZ!,GH!,US!).

Acourtiae dieringeri Cabrera R. similis sed foliis ellipticis (vs. obovatis) valde glanduliferis in paginis inferioribus (vs. sparsim glandi-punctatis) et acheniis dense pubescentibus trichomatibus hispidulis ac glandulosis (vs. sparsim hispidulis eglandulosis) differt.

Stiffly erect unbranched suffruticose herbs to 1 m high. Stems moderately puberulent to glabrescent. Midstem leaves sessile, clasping, ovate-elliptic to elliptic, mostly 12-20 cm long, 5-8 cm wide, the undersurfaces both atomiferous-glandular and eglandular-puberulent, the latter mainly along the veins, the margins irregularly serrate-prickly. Heads sessile or nearly so, arranged in terminal congested cymules of 5-(8)-15, the entire collection of 100 or more heads forming a rather tightly congested pyramidal capitulescence. Involucres turbocylindric, 6-8 mm high, the bracts 3-4 seriate, eglandular, the margins pilose-ciliate, the apices obtuse to rounded, usually minutely apiculate. Florets 5 per head. Achenes 4.5-5.5 mm long, pubescent with an even mixture of both hispid and minute glandular hairs, the pappus of numerous tawny bristles ca. 9 mm long, their apices somewhat expanded.

ADDITIONAL SPECIMENS EXAMINED: MEXICO. Durango: 19 mi W of Cd. Durango, canyon slope with pine and oak, 8000 ft., 28 Sep 1943, *Gentry 6905* (ARIZ,GH,MICH,NY); Santiago Papasquiaro, Apr-Aug 1896, *Palmer 611*, in part (US).

Acourtia durangensis is apparently closely related to the recently described *A. dieringeri* from west-central Chihuahua, having most of the vegetative features of that taxon but the leaves more nearly elliptical (vs. obovate) with markedly glandular-pubescent undersurfaces, the heads subsessile, arranged in congested glomerules, the capitulescence more nearly tightly pyramidal (vs. arranged in rather openly branched rounded paniculate cymes), and achenes both densely hispidulous and glandular-pubescent (vs. sparsely hispidulous).

The species apparently occurs with or near *Acourtia fruticosa* (La Llave & Lex.) B.L. Turner in the vicinity of Cd. Durango since *Palmer 611* is a mixture of both of these taxa. Thus a sheet of *A. fruticosa* (*Palmer 611*, F) has the flowering stalk of the latter, but a large packet attached to this contains late-flowering heads of *A. durangensis*, upon which some unknown worker has perceptively written, "this material does not belong to the pressed specimen."

Acourtia fruticosa (La Llave & Lex.) B.L. Turner, *comb. nov.* BASIONYM: *Perezia fruticosa* La Llave & Lex., *Nov. Veg. Descr.* 1:24. 1824. TYPE: MEXICO. Michoacán: Mountains about Morelia, w/o date, *Lexarza s.n.* (HOLOTYPE: G-DEL, not located; NEOTYPE [selected here]: MEXICO. Michoacán: "Hills, Jesus del Monte near Morelia, 6500 ft.", 29 Nov

1907, *C.G. Pringle 10410* (NEOTYPE: LL!; Isoneotypes: ENCB!,G!, GH!,LL! [3 sheets],MICH!,US!). For additional discussion see below.

Trixis latifolia Hook. & Arn., *Bot. Beech. Voy.* 300. 1838. TYPE: MEXICO. Nayarit: "Tepic", Dec 1837, *A. Sinclair s.n.* (HOLOTYPE: K!; Fragment of holotype: GH!).

Acourtia formosa D. Don, Trans. Linn. Soc. 16:204. 1830. *Perezia formosa* (D. Don) A. Gray, Proc. Amer. Acad. Arts 19:58. 1883. TYPE: MEXICO. w/o specific locality, 1788-1804, *Sessé & Moçiño s.n.* (HOLOTYPE: G!; Isotype: G-BOISS!; Photoisotype: F!).

Acourtia formosa Hook. & Arn., *Bot. Beech. Voy.* 437. 1838. Not *Acourtia formosa* DC. or *Acourtia formosa* D. Don. TYPE: MEXICO. Nayarit: Tepic, Dec-Jan 1837-38, *Sinclair s.n.* (HOLOTYPE: K!).

Acourtia rigida DC., *Prodr.* 7:66. 1838. *Perezia rigida* (DC.) A. Gray, *Pl. Wright.* 1:127. 1852. TYPE: MEXICO. Guanajuato: León, 1829, *Mendez s.n.* (HOLOTYPE: G-DC microfiche!; Fragment holotype: GH!; Photoholotypes: F!,MICH!,TEX!; Photoisotypes: F!,MICH!).

Perezia seemannii A. Gray, *Pl. Wright.* 1:127. 1852. *Trixis seemannii* (A. Gray) Sch.-Bip. *ex* Seem., *Bot. Voy. Herald* 315. 1856. *Acourtia seemannii* Sch.-Bip. *in* Seem., *Bot. Voy. Herald* 315. 1856. (Cited in synonymy but illustrated as t. 54). TYPE: MEXICO. Durango(?): w/o specific locality, Dec-Jan 1839-40, *Seemann 2033* (HOLOTYPE: GH!; Isotype: K!; Photoisotype: MICH!). Seemann's collection data is taken from the isotype label at K.

Perezia rigida (DC.) A. Gray var. *acuminata* Bacig., Contr. Gray Herb. 97:46-1931. *Acourtia rigida* DC. var. *acuminata* (Bacig.) Reveal & King, Phytologia 27:231. 1973. TYPE: MEXICO. Jalisco: barranca near Guadalajara, 1525 m, 9 Dec 1902, *C.G. Pringle 9950* (HOLOTYPE: GH!; Isotypes: F!,GH!,NY!,US!).

Perezia rigida (DC.) A. Gray var. *linearifolia* Bacig., Contr. Gray Herb. 97:46. 1931. *Acourtia rigida* DC. var. *linearifolia* (Bacig.) Reveal & King, Phytologia 27:231. 1973. TYPE: MEXICO. Guanajuato: hillsides near Guanajuato, Nov 1988, *C.G. Pringle 1860* (HOLOTYPE: GH!; Isotypes: BM!,F!,MEXU!,NY!,US!).

Perezia kuhnioides M.E. Jones, Contr. West. Bot. 118:73. 1933. TYPE: MEXICO. Jalisco: La Barranca, Guadalajara, 25 Nov 1930, *M.E. Jones 27693* (HOLOTYPE: POM; Photoholotype: US!; Isotype: BM!).

Acourtia fruticosa was relegated to the "Doubtful or Uncertain Species" in the treatment of Bacigalupi (1931), but a careful reading of the original description and geographical considerations show this to be an earlier name for what has been called *A. rigida*. Unfortunately most authors have followed Bacigalupi's treatment; which was presumably based upon Gray's (1883) synopsis of *Perezia*.

Lexarza, as reported by La Llave & Lexarza (1824), collected three of the five species of what is now regarded as *Acourtia* that are known to occur in the immediate vicinity of Morelia, Michoacán: *Perezia fruticosa*, *P. moschata* La Llave & Lex., and *P. turbinata* La Llave & Lex. He apparently did not collect *Acourtia humboldtii* (Less.) B.L. Turner or *A. pringlei* (B.L. Robins. & Greenm.) Reveal & King, both of which are relatively rare in the region concerned, the former three being much more common to judge from the number of collections available in the herbaria consulted for the present study.

Bacigalupi (1931) not having examined type material, rejected all of the names of La Llave & Lexarza except that of *Perezia turbinata*, largely because of rather technical misdescriptions of corolla shape in the taxa concerned, otherwise the descriptions are surprisingly detailed and unquestionably refer to species of what is today recognized as *Acourtia*. Further, all of these by their descriptions alone can be referred to species of *Acourtia*, which are relatively common in the area of Morelia, even today. These are: *Acourtia fruticosa*, *A. moschata* (La Llave & Lex). DC. and *A. turbinata* (La Llave & Lex.) Reveal & King, as noted in the above. The latter taxon is readily characterized by its turbinate involucres with lanceolate involucral bracts, as described by La Llave & Lexarza (vs. cylindric with ovate bracts in *A. fruticosa*, not to mention the glabrous lustrous or shiny leaves of the latter, also mentioned in the original description). Bacigalupi (1931) retained *Acourtia turbinata* (as *Perezia*) with reservation, although he misapplied the name as to species. His concept of *A. turbinata* applies to what I call *A. cordata*; type material of the latter hails from the vicinity of México City, as indicated elsewhere in the present paper. The characters which distinguish *A. moschata* are discussed under *A. cordata*, and this latter name hardly qualifies as a competitor for either *A. fruticosa* or *A. turbinata*. Comparisons of the original descriptions of these several taxa clearly indicate that these cannot be confused with either *A. humboldtii* or *A. pringlei*.

Unfortunately, I have not been able to locate type material of any of Lexarza's collections. These were not located in the various herbaria housed at G, where his collections would normally be found. Regardless, I have no hesitation, from the descriptions rendered by La Llave & Lexarza, and from what is known of the distributions of *Acourtia* species, in taking up these early names. Thus *Acourtia fruticosa* must replace Bacigalupi's *A. hebeclada*; *A. moschata* must replace his use of *A. thyrsoidea*, and *A. turbinata* his use of *A. formosa*. Material which Bacigalupi assigned to his *A. turbinata*, actually

belong to *A. cordata*, as noted in the above.

To legitimize these new nomenclatural applications I have established neotypes for these three names so as to provide adequate typification for each, as necessitated by the current *International Code of Botanical Nomenclature.*

McVaugh (1984) aptly noted that *Acourtia fruticosa* is a widespread highly variable species but easily recognized by its coriaceous, glabrous leaves and small involucres, the bracts to some extent glandular. He also noted, correctly I think, that the name var. *acuminata* has been applied to forms from near Guadalajara with rather narrowly acute involucral bracts, and the name var. *linearifolia* to forms with somewhat narrow leaves. It is likely that some of this variation is due to occasional hybridization with associated taxa. McVaugh (1984) noted that *Perezia rigida* (=*A. fruticosa*) is largely allopatric with *A. platyphylla* (A. Gray) Reveal & King, which has a more northern distribution; the latter has somewhat larger involucres (mostly 8-11 mm high vs. 6-8 mm), broader, somewhat orbicular leaves, and nearly always a mixture of both hispidulous and glandular hairs on its achenes (vs. eglandular or nearly so).

Acourtia guatemalensis B.L. Turner, *sp. nov.* TYPE: GUATEMALA. Dept. Solola: Mountain slopes above Lake Atitlán, ca. 3-5 km W of Panojachel, 2100 m, 6-7 Dec 1963, *L.O. Williams, A. Molina R., & T.P. Williams 75318* (HOLOTYPE: F!; Isotypes: GH!,NY!,US!,WIS!).

Acourtiae carpholepi (Sch.-Bip. *ex* A. Gray) Reveal & King similis sed capitulis cylindricis (vs. turbocampanulatis) flosculis paucioribus (5-7 vs. 10-18), bracteis involucri paucioribus apicibus plerumque late rotundatis (vs. plerumque anguste obtusis vel acutis), et acheniis glanduliferis et hispidulis (vs. minute penitusque glanduliferis) differt.

Trailing or reclining shrublets, or clambering vines 1-2 m high. Stems straw-colored, sparsely puberulent to glabrous, the terminal portions somewhat fractiflex. Midstem leaves sessile, clasping, thin, ovate-elliptic to elliptic-obovate, sparsely and minutely glandular-pubescent on the undersurfaces, the major veins sparsely puberulous, the margins denticulate. Heads both terminal and axillary, arranged mostly 5-10 in corymbose clusters, the ultimate peduncles mostly 1-5 mm long. Involucres cylindric, 8-9 mm high, ca. 4 mm wide, the bracts ca. 12, 3-4 seriate, graduate, the middle bracts glabrous dorsally, the margins scarious and sparsely ciliate, the apices mostly obtuse or rounded. Florets 5-7 per head, the corollas bilabiate, lilac. Achenes fusiform, 5-6 mm long, densely and minutely glandular-pubescent, but scattered, much longer, hispidulous hairs also occur; pappus of numerous tawny weakly barbellate bristles ca. 9 mm long.

ADDITIONAL SPECIMENS EXAMINED: GUATEMALA. Dept. Jalapa: La Laguna, Volcán Jumay, 1 mi N of Jalapa, 1400-1600 m, 30 Nov 1939, *Steyermark 32301* (F). Dept. Sacatepequez: Finca El Hato, NE of Antigua, 1950-2040 m, 28 Dec 1938, *Standley 61149* (F); near Antigua, 1500-1600 m, Nov 1938-Feb 1939, *Standley 61746* (F).

Acourtia guatemalensis is obviously related to *A. carpholepis* of México, and was so treated as a synonym of the latter by Nash (1976) in her account for the Flora of Guatemala. It is readily distinguished from the *A. carpholepis* in having more numerous cylindric heads (vs. turbocampanulate), the nearly glabrous involucral bracts having rounded apices; in addition the heads have only 5-7 florets (vs. 10-18), and the achenes possess both minute, glandular hairs and much longer, scabrid hairs (vs. predominately glandular). *Acourtia guatemalensis* is probably more closely related to *A. dugesii* than to *A. carpholepis*, having the habit, and floret number of the latter, but possessing less congested corymbs, somewhat smaller involucres with rounded involucral bracts and achenes equally pubescent with both glandular and hispid hairs.

Acourtia hidalgoana B.L. Turner, *sp. nov.* TYPE: MEXICO. Hidalgo: 7 km al NE de Mesquititlán, sobre la carreterra a Zacualtipan, "ladera de roca ignea con vegetacion de matorral xerofilo," 1750 m, 17 Nov 1974, *Rzedowski 32510* (HOLOTYPE: MEXU!; Isotypes: ENCB!,MEXU!).

Acourtiae humboldtii (Less.) B.L. Turner similis sed foliis midcaulinis eglandulosis amplis ellipticis abrupte redactisque versus apicem caulis (vs. plerumque glandulosis minoribus ovatis gradatim redactisque) et bracteis involucri aliquantum glandulosis (vs. puberulis vel fere glabris sed eglandulosis) differt.

Stiffly erect suffruticose herbs 0.8-1.5 m high. Stems puberulent to glabrescent. Midstem leaves sessile, clasping, mostly 6-14 cm long, 4-9 cm wide, ovate-elliptic to elliptic-obovate, eglandular-puberulent beneath along the major veins, otherwise glabrous, the margins spinulose-dentate. Heads arranged 3-10 in terminal mostly erect glomerules, 2-10 glomerules to a capitulescence, the ultimate peduncles 1-10 mm long. Involucres turbocampanulate, 8-11 mm high, the bracts 4-7 seriate, the inner bracts linear-lanceolate, to some extent glandular-pubescent, at least along the margins, rarely markedly brown-tomentose along margins, their apices acute, usually apiculate. Florets mostly 11-20 per head. Achenes 4.5-5.5 mm long, minutely glandular-granuliferous throughout, the pappus of numerous white bristles 9-11 mm long in 2-3 series, their apices somewhat expanded.

ADDITIONAL SPECIMENS EXAMINED: MEXICO. Hidalgo: 2 km N of San Miguel Regla, 2100 m, 18 Nov 1977, *Medrano et al. 10727* (MEX).

Nuevo León: Mpio. Zaragoza, Cerro El Viejo, 1850 m, 16 Oct 1992, *Hinton et al. 22530* (TEX). Querétaro: Mpio. Cadereyta, ca. El Doctor, 2600 m, 11 Oct 1988, *Rzedowski 45063* (TEX); Mpio. San Joaquin, 2 km N de San Joaquin, 2300 m, *Fernández 3618* (NY,TEX). Veracruz: Huayacocotla, 2100 m, 21 Dec 1970, *Hernández M. & Yolando de Hernández 961* (GH,MEX,US).

Acourtia hidalgoana superficially resembles *A. platyphylla*, type material having been identified as such by the original collector. The new species appears closest, however, to *A. humboldtii*, from which it differs in having elliptical much larger midstem leaves which are eglandular. As conceived here, *A. hidalgoana* has either glandular or eglandular involucral bracts and rather well-extended terminal cymes, the ultimate peduncles mostly 2-10 mm long (vs. sessile heads in terminal rounded glomerules mostly overlapped by the leaves in *A. humboldtii*).

Occasional plants of *Acourtia humboldtii* from Guanajuato superficially resemble *A. hidalgoana* (e.g., *Ventura 7683*, TEX; from Mpio. Victoria), but the former are readily distinguished by their glandular-pubescent leaf surfaces (vs. eglandular). It is possible, however, that more extended study will show the Guanajuato material to be a distinct taxon. Collections from Querétaro and Nuevo León differ in having more numerous florets per head (14-20 vs. 11-12) and involucral bracts with margins densely brown-tomentose, otherwise these look very much like typical *A. hidalgoana*.

Acourtia humboldtii (Less.) B.L. Turner, *comb. nov.* BASIONYM: *Dumerilia humboldtii* Less., Linnaea 5:13. 1830 [Jan]. *Perezia humboldtii* (Less.) A. Gray, *Pl. Wright.* 1:128. 1852. TYPE: MEXICO. w/o specific locality or date, *Humboldt s.n.* (HOLOTYPE: Willdenow Herbarium *16095*, microfiche!).

Proustia mexicana Lag. *ex* D. Don., Trans. Linn. Soc. 16:203. 1830 [May]. *Acourtia mexicana* (Lag. *ex* D. Don) H. Rob., Phytologia 69:106. 1990. TYPE: MEXICO. w/o specific locality or date, *Sessé & Moçiño s.n.* (HOLOTYPE: G-DC, microfiche!; Isotype: G-BOISS!).

Dumerilia alamanii DC., *Prodr.* 7:67. 1838. *Perezia alamanii* (DC.) Hemsl., *Biol. Centr. Amer. Bot.* 2:255. 1881. *Acourtia alamanii* (DC.) Reveal & King, Phytologia 27:229. 1973. TYPE: MEXICO. w/o specific locality or date, *L. Alaman s.n.* (HOLOTYPE: G-DC, microfiche!; Fragment of holotype: GH!; Photoholotypes: F!,MICH!,US!).

Perezia adnata A. Gray, *Pl. Wright.* 1:127. 1852. *Perezia alamanii* (DC.) Hemsl. var. *adnata* (A. Gray) Bacig., Contr. Gray Herb. 97:

64. 1931. TYPE: MEXICO. Michoacán: Morelia, pine forests, Sep 1844, *Ghiesbreght 378* (HOLOTYPE: GH!).

Perezia adnata A. Gray var. *oolepis* Bartlett, Proc. Amer. Acad. Arts 44:637. 1909. *Perezia alamanii* (DC.) Hemsl. var. *oolepis* (Bartlett) Bacig., Contr. Gray Herb. 97:65. 1931. TYPE: MEXICO. México: rocky hills, Tultenango, 2500 m, 3 Sep 1890, *C.G. Pringle 3244* (LECTOTYPE [selected here]: GH!; Isolectotypes: BM!,F!,G!,GH!, MEXU!,MU!,NY!,US!). In his protologue Bartlett cited two specimens of *Pringle* (*3244* and *9945*), both from the same locality. I follow Cabrera R. (by annotation) in selecting as lectotype the sheet concerned.

Bacigalupi (1931), not having examined type material of *Dumerilia humboldtii*, referred this to his list of "Doubtful or Uncertain Species". In its place he took up the name *Perezia alamanii*, largely following the precepts of Gray (1883). Harold Robinson (1991) further complicated the nomenclature of this group by taking up the name *Acourtia mexicana*, asserting this to be the earliest available name for what Bacigalupi called *A. alamanii*. At the same time he proclaimed the long-accepted species *A. thurberi* (A. Gray) Reveal & King, which is restricted to northern México and adjacent U.S.A., to be synonymous with his concept *A. mexicana*.

Dumerilia humboldtii has a well-preserved type in the Willdenow herbarium (microfiche TEX!) and its publication has priority over that of *Proustia mexicana*. Examination of types for the two names leaves little doubt that both of these belong to the same taxon. I cannot, however, agree that *Acourtia humboldtii* should encompass *A. thurberi*, the latter being quite distant from the range of *A. humboldtii* and readily distinguished from the latter by its smaller involucres and hispidulous achenes (vs. glandular), and yet other characters.

As I understand *Acourtia humboldtii*, it is a widespread, variable species occurring in San Luis Potosí, Guanajuato, Hidalgo, Jalisco, Michoacán, México, Morelos, Puebla, and Veracruz. Bacigalupi (1931) recognized three varieties under his concept of *Perezia alamanii* (= *Acourtia humboldtii*): 1) var. *alamanii* with involucres 12-14 mm high, their bracts glabrous or merely "sericeo-ciliate" along the margins; 2) var. *adnata* with involucres 9-10 mm high, their bracts glandular and midstem leaves ovate- to lance-oblong; and 3) var. *oolepis* with glandular involucres 9-10 mm high, and midstem leaves broadly oval to ovate-spatulate, and yet further distinguished by its more exserted capitulescence.

These several varieties may or may not deserve recognition. In general, plants referable to the first named variety are largely centered in the state of México and westwards; the second named variety is largely confined to Michoacán; and the last named variety appears to be merely a form with large

leaves. But exceptions to the several characters by which Bacigalupi identified the taxa are found here and there throughout the range of *Acourtia humboldtii*, and with the information and data before me at the present time it would seem best to recognize but a single variable species.

Acourtia macrocephala Sch.-Bip. *ex* Seemann, *Bot. Voy. Herald* 315, t. 55. 1856. TYPE: MEXICO. Durango(?): ("Sierra Madre", probably collected between Cd. Durango and northern Nayarit), Dec-Feb 1838-39, *Seemann s.n.* (HOLOTYPE: K!; Photoholotype: MICH!; Isotype: GH!). For an account of Seemann's travels in the region concerned see Turner (1992). Stafleu & Cowan (1979) contend that Seemann's types are located at BM, but careful search by myself for his types during the summer of 1992 at that institution proved futile.

Acourtia acevedoi M. González E., Phytologia 61:117. 1986. TYPE: MEXICO. Durango: Rincón de Las Mulas, a 3 km al SW de San Isidro, Mpio. Vicente Guerrero, 2180 m, 16 Feb 1985, *S. Acevedo 1926* (HOLOTYPE: CIIDIR; Isotype: TEX!).

Bacigalupi (1931) inexplicably positioned this species as a synonym of his concept of *Perezia formosa*, the latter typified by a Sessé & Moçiño collection, probably from Michoacán. Sessé & Moçiño presumably did not collect in the range of *Acourtia macrocephala*. Regardless, it is clear that Schultz-Bipontinus recognized both *A. formosa* and *A. macrocephala*, providing strikingly different illustrations for both of these. In addition, with his original description Schultz-Bipontinus established *A. macrocephala* as the probable type of his proposed subgenus *Macrocephalae* Sch.-Bip., which was presumably meant to include most of the large-headed taxa of *Acourtia*, including *A. turbinata*; and those subsequently described.

González, in her original description of *Acourtia acevedoi*, has provided an excellent account of *A. macrocephala* and its relationship to *A. longifolia* (S.F. Blake) Reveal & King. Unfortunately she had no help from Bacigalupi's confused treatment of the group and did not have access to the type of *A. macrocephala*, although it is nicely illustrated in Seemann's account of the species.

Part of the confusion with respect to the validity of *Acourtia macrocephala* rests with the interpretation by some authors (presumably Seemann himself, and perhaps followed by Bacigalupi) that *A. turbinata* and *A. macrocephala* are synonymous. But apparently Schultz-Bipontinus did not think them so when he provided the treatment of *Acourtia* for Seemann's account, hence the two appropriately labeled illustrations and the brief Latin description of *A. macrocephala* Sch.-Bip., presumably provided by Schultz-Bipontinus himself.

Acourtia macvaughii B.L. Turner, *sp. nov.* TYPE: MEXICO. Michoacán: steep limestone slopes near summits, 8-12 km SW of Aserradero Dos Aguas and nearly W of Aguililla, fir-forest zone, 2250-2400 m, 5-6 Mar 1965, *Rogers McVaugh 22789* (HOLOTYPE: LL!; Isotypes: MICH!,NY!).

Acourtiae dugesii (A. Gray) Reveal & King similis sed habitu erecto 1.0-1.5 m elato, capitulis majoribus plus laxe fasciculatis in pedunculis ultimis 1-5 mm long (vs. sessilibus), et capitulis flosculis plerumque 8-10 (vs. 5-6) differt.

Erect suffruticose herbs 1.0-1.5 m high. Stems sparsely puberulent, green at first but purple and glabrescent with age. Midstem leaves mostly 10-18 cm long, 4-9 cm wide, sessile, clasping, gradually reduced upwards, elliptic to ovate-elliptic, sparsely pubescent beneath, especially along the major veins, the margins finely and rather evenly spinulose-dentate. Heads arranged 5-15 in both terminal and axillary cymules, the ultimate peduncles mostly 1-5 mm long. Involucres subcylindric, mostly 9-11 mm high, the bracts 4-5 seriate, glabrous dorsally, the margins sparsely pubescent, the midbracts mostly abruptly obtuse or broadly acute at their apices. Florets (7-)8-9(-10) per head. Achenes (immature) 3-4 mm long, densely short-glandular throughout, the pappus of ca. 40 slender white bristles ca. 10 mm long in a single series.

ADDITIONAL SPECIMENS EXAMINED: MEXICO. Michoacán: steep mountain-sides NW of Aguililla, ca. 6-7 km S of Aserradero Dos Aguas, cut-over slopes in pine-forest zone, on sharply eroded and tumbled limestone rocks, 2000 m, 3 Mar 1965, *McVaugh 22711* (ENCB,MICH).

This species is clearly closely related to *Acourtia dugesii* and both of the above cited collections were included by McVaugh (1984) in his concept of that taxon. In label data of type material he notes the plant to be a "Harsh herb 1.5 m high; flowers purple, spicily fragrant." *Acourtia dugesii*, as I understand the species, is a sprawling shrub or shrublet 2-5 m high having sessile heads, each with only 5 or 6 florets. *Acourtia macvaughii* is apparently confined to the area cited and does not appear to intergrade with *A. dugesii* from closely adjacent Coalcoman, Michoacán, plants of the latter having sessile smaller heads with only 5-6 florets. The geographical distribution of *A. dugesii* and closely related taxa are shown in Fig. 1.

Acourtia moschata (La Llave & Lex.) DC., *Prodr.* 7:66. 1838. BASIONYM: *Perezia moschata* La Llave & Lex., *Nov. Veg. Descr.* 1:26. 1824. TYPE: MEXICO. Michoacán: "montibus Vallisoletanis" [near the present city of Morelia], w/o date, *La Llave s.n.* (not located). (NEOTYPE [selected here]: MEXICO. Michoacán: 24 mi W of Morelia, 29 Nov 1907, *H.D. Ripley & R.C. Barneby 14849*, NY!).

Fig. 1. Distribution of *A. dugesii* and closely related taxa.

Fig. 2. Distribution of selected *Acourtia* species.

Perezia thyrsoidea A. Gray *in* Torrey, *Bot. Mex. Bound.* 104. 1859. *Acourtia thyrsoidea* (A. Gray) Reveal & King, Phytologia 27:231. 1973. TYPE: MEXICO. Guanajuato: Guanajuato, 1827, *Berlandier 1329* (HOLOTYPE: GH!).

Bacigalupi (1931) relegated *Perezia moschata* to his list of "Doubtful or Excluded" species. He did this in spite of the fact that the original authors provided an excellent Latin description of the taxon, which was translated into English by Bacigalupi. In this, the latter worker described *Perezia moschata* as having "a simple, erect stem 3-4 feet high, the upper leaves and flowers forming a very long thyrse" with an additional note that the whole plant exudes a strong odor of musk, whence the name". Nevertheless, Bacigalupi contended that the "description would seem to fit *P. hebeclada* [*Acourtia cordata* of the present treatment] more closely then any other Mexican *Perezia*."

De Candolle (1838; *Prodr.* 7:66) accepted *Acourtia moschata* with a query, noting that it was perhaps the same as *Perezia moschata*. A type sheet of the latter was not located, either at G where such might be expected, or elsewhere. But in my opinion the description of *Perezia moschata* can only apply to what has been long called *P. thyrsoidea*. Indeed, this is the only species in the genus that can be said to have simple stems, "the upper leaves and flowers forming a very long thyrse" to say nothing of its highly aromatic foliage, no other species even approaching its odoriferous condition. Gray noted that his *Perezia thyrsoidea* could "hardly be the *Perezia moschata* of Lallav. and Lex, or any other described species", probably because the original authors described the head as having 18 outer radiate corollas in addition to inner bilabiate corollas. In my opinion this latter observation is a technical descriptive flaw by its original authors: the radiate corollas may be bilabiate like those of the inner; regardless, all else in the description is exactly that of *A. moschata* as conceived here. *Acourtia moschata* was originally collected near Morelia, Michoacán, where it still occurs. Since *Acourtia cordata* (= *Perezia hebeclada* sensu Bacigalupi), is not known from Michoacán, it is not likely that *Acourtia moschata* might apply to that name, as suggested by Bacigalupi.

Finally, it should be noted that *Acourtia moschata*, when originally described, was said to have the vernacular name "Cola de Zorra", apparently because the dense elongated capitulescence superficially resembles the tail of a fox, which it does, this attributed to Lexarza who first collected the plant near Morelia, Michoacán. Subsequent collections of this plant from near Morelia were still given the common name "Cola de Zorra" (e.g., *Urbinaz s.n.*, in the year 1877, MEXU); this name is also applied to the same plant in other areas as well (*e.g.*, near Cd. Guanajuato, Guanajuato, Oct 1894, *Duges s.n.*, GH). I emphasize here: so far as known no other *Acourtia* has received this vernacular name nor does any other species possess such a capitulescence.

Acourtia patens (A. Gray) Reveal & King, Phytologia 27:230. 1973. BASIONYM: *Perezia patens* A. Gray, *Pl. Wright.* 1:127. 1852. *Trixis patens* (A. Gray) Sch.-Bip. *in* Seemann, *Bot. Voy. Herald* 315, t. 56. 1856. TYPE: MEXICO. Durango (?): (probably at or near the Sinaloa-Durango border along the present day highway 40), 1839-40, *Seemann s.n.* (LECTOTYPE [selected here]: GH!; Isolectotype: K!, this sheet bears Seemann's collection no. *2032*, as noted by McVaugh 1984). Seemann's number *2032* is also cited by Schultz-Bipontinus in his transfer of the species to *Trixis*. In the protologue Gray recognized two unnamed varieties, these based upon at least three separate collections belonging to yet other species. The typical element of Gray's *Perezia patens*, however, was based upon Seemann's collection, hence its designation as lectotype. The type locality is not known for certain but subsequent collections of the taxon have been made only near the site indicated in the above (*e.g.*, along hwy 40, 1 mi E of Palmito, Sinaloa, *Breedlove 4250* [MICH]; ca. 9 mi W of Espinosa del Diablo, Durango, along hwy 40, *Scott 1018* [TEX]). Seemann traveled along this very route in his traverse of the Sierra Madre (cf. Turner 1992).

Perezia montana Rose, Contr. U.S. Nat. Herb. 1:105. t. 8. 1891. *Acourtia montana* (Rose) Reveal & King, Phytologia 27:230. 1973. TYPE: MEXICO. Sonora: Sierra de los Alamos, 25 Mar-8 Apr 1890, *E. Palmer 285* (*385?*) (HOLOTYPE: US!; Isotypes: GH!, MICH!). The holotype label gives the date of collection as 16-30 Sep 1890 and the number as *385*, although Rose gave a spring date, as indicated in the above; the latter date also occurs on the isotype label, but this is numbered *285*. Palmer apparently mixed some of his preprinted labels, which perhaps accounts for the citation error. The number *385* is more likely the correct collection number judging from Palmer's account of his collection.

Perezia montana Rose var. *intermedia* Bacig., Contr. Gray Herb. 97:19. 1931. *Acourtia montana* (Rose) Reveal & King var. *intermedia* (Bacig.) Reveal & King, Phytologia 27:230. 1973. TYPE: MEXICO. Durango: Santiago Papasquiaro, Apr-Aug 1896, *E. Palmer 59* (HOLOTYPE: GH!; Isotype: US!).

I am unable to distinguish *Acourtia patens* from *A. montana*; the types of both were collected along the Pacific slopes of Sonora and Durango, and both possess very similar habits, glabrous foliage, similar eglandular involucres, and sparsely to moderately hispidulous achenes. Bacigalupi (1931) retained both taxa, distinguishing between these by the purportedly obtuse involucral bracts in *A. patens* vs. acute bracts in *A. montana*. His concept of *A. patens* also included material of what I refer to *A. mexiae* R.L. Cabrera (1992); McVaugh

(1984) also shared or followed the concept of Bacigalupi. He, however, noted that material referable to *A. mexiae*, while similar to *A. patens*, differs in having fewer obtuse involucral bracts, and fewer florets (9-11 vs. 17+). He commented, wisely I think, that "when more specimens become available the extent of the variation [in the taxa concerned] may be better understood." I think this is now the case.

Acourtia pilulosa (Bacig.) B.L. Turner, *comb. et stat. nov.* BASIONYM: *Perezia dugesii* A. Gray var. *pilulosa* Bacig., Contr. Gray Herb. 97:19. 1931. TYPE: MEXICO. Oaxaca: below Jayacatlin, 1067 m, 9 Feb 1895, *L.C. Smith 373* (GH!).

Acourtia pilulosa appears to be largely confined to southern Puebla and closely adjacent Oaxaca. It is readily distinguished from *A. dugesii* by its erect, nonclambering habit, often lobulate leaves, and densely appressed-hirsute achenes. *Acourtia pilulosa* may possess either lobed or unlobed leaves and is consistently described as a herb 60-100 cm high.

In his description of this taxon, Bacigalupi cited only two collections, the type and a specimen from Veracruz (*Muller s.n.*, NY; Orizaba, collected in 1855). My examination of the latter shows it to be *Acourtia carpholepis*, the plant concerned having 10 or more florets with glandular-pubescent achenes. Nevertheless, numerous collections of *A. pilulosa* have come to the fore since its original description. Those examined in the present study follow:

Oaxaca: Jayacatlin along road to Nacaltepec, 1600 m, 4 Nov 1973, *Breedlove 35949* (MICH); Tomallin Cañon, 30 Nov 1895, *Pringle s.n.* (US); 6 km NE of Chilapa de Diaz, 1800 m, 2 Nov 1976, *Rzedowski 34495* (ARIZ,IPN,MEXU). Pueblo: km 259 between Puebla and Tehuacan, 18 Oct 1963, *Niles 250* (ARIZ); 10 km NW of Caltepec, 2120 m, 16 Oct 1984, *Tenorio L. 7714* (MEXU,TEX); W of Caltepec, 2120 m, 6 Nov 1984, *Tenorio L. 7986* (MEXU,TEX); SE of Caltepec, 2000-2200 m, 16 Nov 1984, *Tenorio L. 8022* (MEXU,TEX); 3.5 km E of Zonatitlanapa, ca. 2320 m, 19 Oct 1988, *Tenorio L. 15291* (MEXU,TEX). A Pringle collection (w/o number) dated 29 Oct 1902 said to be from Yautepec, Morelos is probably in error as to locality.

Acourtia queretarana B.L. Turner, *sp. nov.* TYPE: MEXICO. Querétaro: Mpio. Pinal de Amoles, 13 km al NE de Pinal de Amoles, sobre la carretera a Jalpan, 1700 m, 15 Jan 1989, *J. Rzedowski 48108* (HOLOTYPE: TEX!).

Acourtiae veracruzanae B.L. Turner similis sed capitulis valde campanulatis flosculis 18-20 (vs. cylindricis flosculis 5-6) differt.

Suffruticose sprawling or clambering herbs to 2 m high. Stems green, somewhat fractiflex, moderately puberulent to glabrate. Midstem leaves ovate to ovate-elliptic, sessile, clasping, mostly 10-15 cm long, 4-8 cm wide, the undersurfaces nearly glabrous to minutely glandular-pubescent but always sparsely puberulent along the major veins, the margins irregularly serrulate, the apices gradually attenuate. Heads 4-5, broadly campanulate, loosely arranged in terminal cymes, the ultimate peduncles moderately to densely puberulent, mostly 5-20 mm long. Involucres broadly campanulate, 3-4 seriate, unevenly graduate, 6-8(-9) mm high, 9-12 mm wide (pressed), the middle bracts mostly scarious and ciliate along the margins, the dorsal surfaces glabrous, the apices rounded to acute, sometimes shortly reflexed. Florets ca. 20 per head, the corollas bilabiate, whitish. Achenes (immature) 3-4 mm long, fusiform, densely and minutely glandular-pubescent throughout, the pappus of numerous tawny barbellate bristles 7-8 mm long.

ADDITIONAL SPECIMENS EXAMINED: MEXICO. Guanajuato: El Alamo, 12 km SE of Xichu, 1500 m, 10 Dec 1989, *Ventura & Lopez 7729* (TEX). Querétaro: Mpio. Pinal de Amoles, 4 km al SE de Santa Agueda, 1100 m, 20 Dec 1989, *E. Carranza 2268* (TEX); 13 km al NE de Pinal de Amoles, 1300 m, 12 Mar 1989, *Rzedowski 48416* (TEX).

Acourtia queretarana superficially resembles *A. carpholepis* and was so identified by its original collector. It differs from the latter in having fewer and campanulate to hemispheric heads (vs. turbocampanulate) with more numerous florets (8-10 vs. ca. 20) on longer ultimate peduncles (1-3 cm long vs. 0.5-1.0 cm).

Acourtia reticulata (Lag. *ex* D. Don) Reveal & King, Phytologia 27:231. 1973. BASIONYM: *Proustia reticulata* Lag. *ex* D. Don, Trans. Linn. Soc. London 16:200. 1830. *Perezia reticulata* (Lag. *ex* D. Don) A. Gray, *Pl. Wright.* 1:128. 1852. TYPE: MEXICO: w/o specific locality, 1787-1804, *Sessé & Moçiño 3082* (LECTOTYPE [selected here]: M; Fragment lectotype: F!). McVaugh (1984) thought the type to be from Guerrero, but with equal reason it could have been from México City or its environs, where typical forms of the species abound.

Perdicium mexicanum Sessé & Moç., *Pl. Nov. Hisp.* 139. 1890. TYPE: MEXICO. w/o specific locality, 1787-1804, *Sessé & Moçiño 3082* (LECTOTYPE [selected here]: M, fragment of lectotype: F!). Heads in packet material on the F specimen almost exactly match those of *Acourtia reticulata.* McVaugh (1984) also lists *Perdicium mexicanum* as a synonym of the present species, although Bacigalupi (1931), without having access to type material, placed this name among his doubtful or uncertain species.

I recognize two morphogeographic varieties within this widespread species, as follows (Fig. 2):

1. Middle and inner involucral bracts with punctate, reddish spots on their dorsal surfaces (readily visible at 10×); achenes minutely glandular-pubescent throughout, hispidulous, eglandular hairs lacking; Michoacán, Guanajuato. ..... var. *maculata*

1. Middle and inner involucral bracts without punctate spots; achenes to some extent with both glandular and hispid hairs, rarely glandular throughout or nearly so; eastern Michoacán and elsewhere but not within the above range. ..... var. *reticulata*

Acourtia reticulata (Lag. *ex* D. Don) Reveal & King var. **maculata** B.L. Turner, *var. nov.* TYPE: MEXICO. Michoacán: Swales in pastured thorn-savanna in subtropical deciduous forest zone, 27 mi E of Jiquilpan and 10 mi W of Zamora, 5600 ft, 8 Oct 1965, *A. Cronquist 10295* (HOLOTYPE: NY!; Isotypes: GH!,IPN [2 sheets]!, MEXU [2 sheets]!,NY!).

Varietati typicae similis sed involucri bracteis interioribus maculas punctatos rubentes efferentibus (vs. maculae absentes) et acheniis omnino glandiferis (vs. glandiferis ac aliquantum hispidulis) differt.

ADDITIONAL SPECIMENS EXAMINED: MEXICO. Guanajuato: 1 km S of Uriangato, 1650 m, *Diaz L. 8983* (IPN,MICH); 9 km S of Acambaro, 1500-2000 m, 3 Dec 1971, *Iltis & Cochrane 264* (IPN,WIS); ca. 8 km NNE Uriangato, 1900-2100 m, 17 Sep 1977, *Iltis & Doebley* nos. (US,WIS); hills near Acambaro, 18 Oct 1892, *Pringle* no. (BM,F,GH,MICH,MU,NY,US); 1.5 km NW of Comonfort, 2000 m, 21 Sep 1987, *Zamudio 5676* (TEX). Michoacán: vicinity of Morelia, 1950 m, 18 Oct 1909, *Arsene 9155* (F,GH,NY,US); 44.6 km along road from Patzcuaro to Uruapan, 1750 m, 5 Nov 1973, *Banda s.n.* (MEXU); 5 km W of Huandacareo, 2000 m, 15 Oct 1986, *Barrie 1546* (TEX); 5 km NE of Quitupan; ca. 2000 m, 5-7 Aug 1959, *Feddema 107* (IPN,MICH,TEX); Aguatiaba, Puruandiro, ca. 1850 m, 12 Oct 1970, *Hernández M. 751* (MEXU); summit of slopes W of Jiquilpan, ca. 1800 m, 23 Sep 1952, *McVaugh 13211* (BM,MEXU,MICH,NY); between Zinapecuaro and Acambero, 27 Sep 1975, *Mendoza s.n.* (IPN); El Sabino, Sep 1975, *Mendoza s.n.* (IPN); Crucero a Curimeo, 1750 m, *Perez & Garcia 1830* (TEX); vicinity of Cotija, 13 Oct 1976, *Stuessy & Gardner 4170* (IPN,US,WIS). San Luis Potosí: near Peñasco, Sep 1876, *Schaffner 374* (GH).

As indicated in Fig. 2, var. *maculata* is confined to the states of Michoacán and Guanajuato. Only a single collection of var. *reticulata* was seen from Michoacán, this collected by King & Soderstrom (*5126* MICH) ca. 18 mi E of Morelia. The plant concerned is typical var. *reticulata*, without maculations on the bracts and achenes hispidulous throughout.

It should also be noted that occasional specimens of *Acourtia fruticosa* from San Luis Potosí with glandular involucres superficially resemble *A. reticulata* var. *maculata*, especially in foliage, but such plants can be recognized by their more numerous florets (8-11 vs. 5-7) per head. It is possible, however, that the variation concerned is occasioned by hybridization between *A. reticulata* and *A. fruticosa* in this region, at least Schaffner combined various collections from various sites at different dates under his number *374*, the plants being quite variable.

Acourtia rzedowskii B.L. Turner, *sp. nov.* TYPE: MEXICO. Puebla: 8 km al NNE de Azumbilla, sobre la carretera a Esperanza, 2350 m, 5 Jan 1981, *J. Rzedowski 37173* (HOLOTYPE: MEXU!; Isotypes: ARIZ!,GH!, ENCB!,NY!,US!,WIS!).

Acourtiae lobulatae (Bacig.) Reveal & King similis sed foliis dense glanduliferis in superficiebus ambabus, capitulis majoribus flosculis numerosioribus, et bracteis exterioribus involucri parus glanduliferis differt.

Much-branched scrambling shrublets or clambering vines 0.8-2.5 m high. Stems mostly somewhat fractiflex, both puberulous and stipitate glandular, purple and glabrescent with age. Midstem leaves sessile, clasping, at least some of the blades lobulate, mostly 3-14 cm long, 1.5-7.0 cm wide, glandular-pubescent on both surfaces, the margins spinulose, the apices acute. Heads arranged 1-3 on both terminal and axillary shoots, usually subtended by (1-) 2-3 reduced leaves, the ultimate peduncles mostly 0.5-3.0 cm long. Involucres markedly campanulate, 14-16 mm high, 10-18 mm wide (pressed), the bracts 3-4 seriate, the outermost ovate-lanceolate, to some degree glandular-pubescent, the innermost linear-lanceolate with mostly acuminate apices. Florets 18-22 per head, the corollas bilabiate, lilac or rose-colored. Achenes fusiform, ca. 6 mm long, densely pubescent with very short glandular hairs.

ADDITIONAL SPECIMENS EXAMINED: MEXICO. Puebla: Mpio. Caltepec, Cerro El Gavilan, al SE de Caltepec, 1800-2320 m, 20 Oct 1983, *Tenorio L. 4773* (MEXU,TEX); Mpio. Morelos Cañada, 10 km S of Esperanza, 2280 m, 5 Jan 1970, *Anderson 5321* (ENCB,MICH); Mpio. Tehuacan, 4 km al E de Azumbilla, 19 Sep 1990, *Sanchez-Ken 240* (TEX).

All of the above-cited sheets were identified as *Acourtia lobulata*, a markedly different species from Veracruz and Oaxaca having narrowly campanulate,

ebracteate involucres with eglandular outer bracts, fewer florets, and nearly glabrous leaves, only the major ribs bearing a crisp puberulence.

It is a pleasure to name this taxon for the doyen of Mexican synantherologists and collector of the type material, Dr. J. Rzedowski.

Acourtia sinaloana B.L. Turner, *sp. nov.* TYPE: MEXICO. Sinaloa: summit of Sierra Tacuichamona, rocky slope in oak forest, 4500 ft, 19 Feb 1940, *Howard S. Gentry 5679* (HOLOTYPE: MICH!; Isotypes: ARIZ!,F!,GH!,MEXU,NY!,US!).

Acourtiae dugesii A. Gray similis sed involucris minoribus (6-8 mm altis vs. 9-12 mm) turbinatis (vs. cylindricis) flosculos pauciores (8 vs. 5-6) efferentibusque et phyllariis externis viscidis vel glandulosis absque trichomatibus eglandulosis (vs. puberulis sed absque glandibus) differt.

Suffruticose reclining or clambering shrublets 1-2 m high. Stems glandular-pubescent, purplish, the upper portions somewhat fractiflex. Midstem leaves relatively thick, spreading, sessile, clasping, those at or near mid-stem mostly 10-20 cm long, 4-8 cm wide, ovate-elliptic to elliptic, the undersurfaces minutely glandular-pubescent to glabrate, the margins serrulate, the apices mostly broadly acute to narrowly obtuse. Heads both terminal and lateral, mostly arranged 5-10 in congested corymbs, the ultimate peduncles 1-8 mm long. Involucres campanulate, 6-8 mm high, the bracts 2-3 seriate, appressed, graduate, the outer bracts viscid or with a few glandular hairs, the apices acute, often abruptly so. Florets ca. 8 per head, the corollas zygomorphic, pink. Achenes fusiform, minutely glandular-pubescent, the pappus of numerous tawny bristles 7-8 mm long.

Acourtia sinaloana is known only by type material and appears closely related to the more southern *A. dugesii* (occurring in Jalisco and Guanajuato southwards). It is readily distinguished from the latter by its smaller involucres (6-8 mm high vs. 9-12 mm), the outer bracts being viscid or glandular, and heads with more numerous florets (ca. 8 vs. 5-6).

Acourtia souleana B.L. Turner, *sp. nov.* TYPE: MEXICO. Oaxaca: 7.5 mi NW of Huahuapan de León, 4.5 mi SE of Puebla border along route 190, "seasonally dry chaparral with *Dasylirion*, Yuccas, etc.," 1875 m, 9 Jan 1992, *J.A. Soule 3187* (with L.A. Prather) (HOLOTYPE: TEX!; Isotype: MEXU).

Acourtiae ovatifoliae R.L. Cabrera similis sed foliis ellipticis valde denticulatisque (vs. ovatis integrisque) et capitulis parum majoribus flosculis paucioribus (6-7 vs. ca. 9) differt.

Stiffly erect leafy suffruticose herbs or shrublets to 1 m high. Stems purple, densely glandular-pilose, the hairs 0.10-0.25 mm long. Midstem leaves mostly 3-4 cm long, 1.5-2.5 cm wide; petioles 1.0-1.5 mm long; blades elliptic to elliptic-ovate, widest at or near the middle, the undersurfaces rather evenly pilose-puberulous with scattered glandular hairs, the margins decidedly denticulous. Heads ca. 2.5 cm long, arranged 10-12 in terminal congested cymes, the ultimate peduncles 1-4 mm long, bracteate, pilose. Involucres ca. 1.8 cm long, cylindric, 4-5 seriate, the bracts linear-lanceolate, minutely glandular-pubescent throughout, the apices gradually acuminate. Florets 6-7 per head, the corollas reportedly white, zygomorphic. Stylar shaft and branches beige. Achenes ca. 6 mm long, 8-nervate, pubescent with both scabrid and short-glandular hairs, the pappus of numerous tawny white bristles 11-12 mm long in ca. 3 series, the apices scarcely enlarged.

ADDITIONAL SPECIMEN EXAMINED: MEXICO. Puebla: 3 mi N of Oaxaca border along route 125, ca. 2000 m, 11 Mar 1985, *Whittemore 85-013* (TEX).

Cabrera (1990) apparently included immature elements of this taxon in her concept of *Acourtia ovatifolia* R.L. Cabrera (Oaxaca: road to Nacaltepec-Jayacatitlan, 7.8 km SW of route 135, 1600 m, 20 Oct 1989, *Cabrera 779, 780*, which were not available to me in the present study, although these are cited as being at TEX).

The species is clearly related to *Acourtia ovatifolia* but is readily distinguished by its elliptical leaves with prickly margins (vs. ovate and entire) and somewhat larger heads with fewer florets per head.

It is a pleasure to name this taxon for Ms. Jacqueline A. Soule, doctoral student at the University of Texas who participated in the plant's discovery.

Acourtia turbinata (La Llave & Lex.) Reveal & King, Phytologia 27:232. 1973. BASIONYM: *Perezia turbinata* La Llave & Lex., *Nov. Veg. Descr.* 1:25. 1824. TYPE: MEXICO. Michoacán: vicinity of Morelia, Oct-Nov, w/o year *Lexarza s.n.* (HOLOTYPE: G, not located). NEOTYPE [selected here]: MEXICO. Michoacán: Mpio. Senguio, 5 km al S de Chincua, 7800 m, 15 Feb 1989, *J. Rzedowski 48261* (NEOTYPE: TEX!; Isoneotype: IGN). Reasons for neotypification for *Acourtia turbinata* are given under my discussion of *Acourtia fruticosa*.

Perezia arachnolepis B.L. Rob., Proc. Amer. Acad. Arts 43:47. 1907. *Acourtia arachnolepis* (B.L. Rob.) Reveal & King, Phytologia 27: 229. 1973. TYPE: MEXICO. Jalisco: Mountains N of Lake Chapala, S of La Capilla Station (according to McVaugh 1984), but given in the protologue as "Canons, Chapala Mountains near Guadalajara", 13 Dec 1889, *C.G. Pringle 2935* (HOLOTYPE: GH!).

Bacigalupi (1931) recognized both *Acourtia turbinata* (with misgivings) and *A. arachnolepis*, but his concept of the former is essentially the same as my concept of *A. cordata*. I can not distinguish between "true" *A. turbinata*, the type from near Morelia, Michoacán, and *A. arachnolepis*, the latter typified by material from near Guadalajara, Jalisco, as noted in the above. *Acourtia turbinata*, in my treatment of *Acourtia* for México (Turner, in prep.) is distributed from Durango, México to Morelos, México, mostly along the western sierras.

Acourtia veracruzana B.L. Turner, *sp. nov.* TYPE: MEXICO. Veracruz: Maltrata, 6 May 1937, *E. Matuda 1236* (HOLOTYPE: MEXU!; Isotypes: LL!,MICH!).

Acourtiae dugesii (A. Gray) Reveal & King similis sed capitulis in cymis flexuosis laxisque (vs. congestis) dispositis in pedunculis ultimis 1-15 mm long (vs. sessilibus vel fere sessilibus) et bracteis interioribus involucri anguste acuminatis (vs. abrupte acutis) differt.

Scrambling suffruticose herbs or clambering vines to 4 m high. Stems muchbranched and somewhat fractiflex, moderately puberulent to glabrate. Leaves ovate to ovate-lanceolate, sessile, clasping, mostly 8-20 cm long, 3-7 cm wide, the lower surfaces puberulous, especially along the veins, the apices gradually acute. Heads 3-10, arranged in open fractiflex cymes, the ultimate peduncles puberulent, mostly 2-10 mm long. Involucres cylindric, 12-14 mm long, the bracts mostly linear-lanceolate with abruptly acuminate apices, glabrous dorsally, the margins sparsely pilose. Florets 5-6 per head, the corollas zygomorphic, white to lilac. Achenes ca. 6 mm long, 5-ribbed, minutely glandular-pubescent, the pappus bristles tawny, 10-11 mm long.

ADDITIONAL SPECIMENS EXAMINED: Hidalgo: Mpio. Tianguistengo, 11 km NE of Tianguistengo, ca. 1100 m, 15 Jan 1980, *Hernández M. 4046* (GH,MEXU,WIS). México (Federal Dist.): wet meadows, Valley of México, 4 Oct 1899, *Pringle 8253* (NY) (the label bears the name *Aster pauciflorus*, perhaps a mixed label). Puebla: near Huachinango, 1300 m, 9 Dec 1932, *Asplund 742* (F,MICH,NY); Esperanza, Sep 1911, *Purpus 2977a* (MEXU). Querétaro: km 19 between Amealco and México, 2100 m, 10 Nov 1976, *Arguelles 640* (MEXU). Veracruz: Mpio. Huiloapan, Cerro de San Cristóbal, ca. 1300 m, 22 Apr 1982, *Calzada 8586* (IPN,TEX); Mpio. Tepetzintla, Sierra de San Juan Otantepec, 900 m, 13 Dec 1981, *Castillo 2426* (F,IPN); Mpio. Chiconquiaco, Rincón Grande, 5 km SE of Chiconquiaco towards Buenavista, 1950 m, 29 Dec 1989, *M. Chazaro 6151* (TEX); Huayacocotla, 2000 m, 21 Dec 1970, *Hernández 987* (GH,MEXU), ca. 5 km S of San Andreas Tejhapan, 1600 m, 11 Mar 1982, *Lorence 3902* (MEXU); Maltrata, 6 May 1977,

Matuda 1209 (MEXU,MICH,US); Mpio. Chocamán, 1350 m, 7 Dec 1981, *Nee 2387* (BM,F,IPN,TEX); hills near Japala, 4000 ft, Mar-Apr 1899, *Pringle 8131* (BM,GH,MEXU,MICH,US); Boca del Monte (30 km W of Orizaba) Mar 1908, *Purpus 2977* (BM,F,GH,NY,US); Jalapa, Feb 1894, *Smith 1671* (F,MICH,NY); Mpio. San Juan Coscomatepec, El Duranzo, 1420 m, 29 Jan 1972, *Ventura 4861* (IPN,MEXU); Mpio. Naolinco, El Naranjo, 1350 m, 3 Feb 1976, *Ventura 12396* (IPN,MEXU); La Cueva, 1500 m, 6 Mar 1978, *Ventura 15062* (IPN,MEXU).

According to label data, this taxon occurs in montane rain forests and is a clambering shrublet or shrub 2-4 m high. Most of the specimens cited in the above were identified as *Acourtia dugesii.* The type of the latter was collected in western Guanajuato and the species is readily distinguished from *A. veracruzana* by its tightly congested, sessile heads in corymbose clusters. Nevertheless the two taxa are closely related, both having sprawling or clambering habits, membranous clasping leaves, and cylindric heads with only 5 or 6 florets.

The specimen from the Federal District (cited above) is not mapped (Fig. 1) since it is believed to be a label mixup.

Acourtia wislizeni (A. Gray) Reveal & King var. **subscaposa** B.L. Turner, *var. nov.* TYPE: MEXICO. Durango: Mpio. Mesquital, 1.5 km S of Charcos, 2650 m, 21 Sep 1982, *R. Fernández N. 1161* (HOLOTYPE: TEX!; Isotypes: ARIZ!, CIIDIR,F!).

Varietati typicae similis sed habitu subscaposo et involucri bracteis interioribus plerumque coriaceis apicibus rotundatis (vs. membranaceis apicibus plerumque obtusis vel acutis) differt.

Erect herbs 15-40 cm high; well developed leaves mostly 5-12, these usually crowded near the lower 1/2 of the stem; heads broadly turbocampanulate, the involucral bracts mostly indurate and purple, the middle and inner series mostly broadly rounded to obtuse; achenes sparsely pubescent with hispidulous and often small glandular hairs.

ADDITIONAL SPECIMENS EXAMINED: MEXICO. Durango: Mpio. Durango, 65-75 km SW of Cd. Durango, on road to La Flor, 2620 m, 17 Sep 1979, *Breedlove 44190* (NY,TEX); Mpio. Suchil, El Temascal, 4 km SW of Piedra, 2400 m, 11 Sep 1981, *S. Gonzáles 1972* (ARIZ,F,MEXU,TEX); 5 mi E of El Salto, 7400 ft, 5 Oct 1985, *Ripley & Barneby 13999* (NY); Mpio. San Juan de Michis, Reserva de La Michilia, potrero San Juan de Michis, 2 Oct 1985, *Alvarado 144* (CIIDIR); Reserva La Michilia, El Olvido, 5 Oct 1980, *Carrillo S. 1* (MEXU).

This taxon appears to intergrade with var. *wislizeni* to the SE of Cd. Durango and with var. *megacephala* (A. Gray) Reveal & King in the areas to

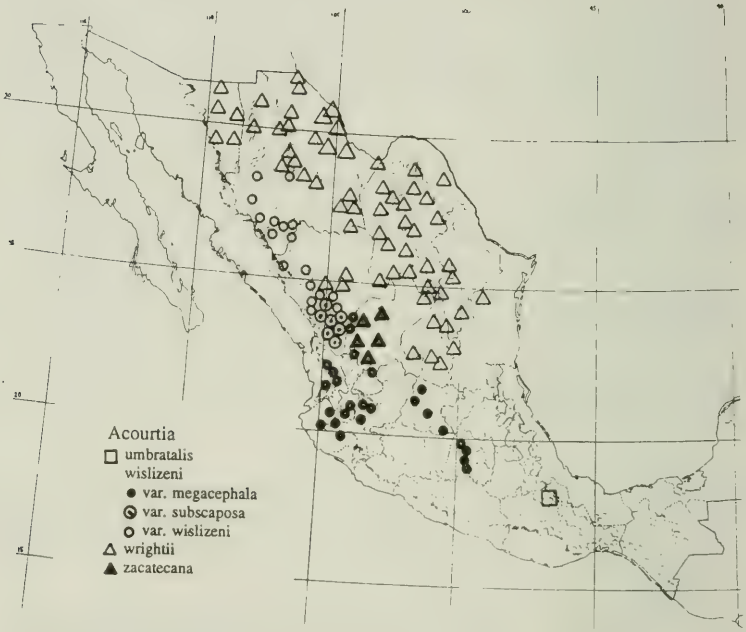

Fig. 3. Distribution of selected taxa of *Acourtia* in Mexico.

the east and southeast of Charco, Mpio. Mezquital (Fig. 3). Specimens from this area which I would assign to var. *megacephala* include *Alvarado 206, 348* (CIIDIR), both of which have very leafy stems but approach var. *subscaposa* in characters of the involucre. Occasional and seemingly intermediates between var. *subscaposa* and var. *megacephala* also occur (e.g., *Gonzáles 1696*, CIIDIR). It may be that var. *subscaposa* is a populational system of transgressive variants of recent or ancient hybridization between varieties *wislizeni* and *megacephala*; at least the involucral features of var. *subscaposa* suggest that this might be the case, but the nearly scapose condition is seemingly unknown among populations of the other varieties. Field observations among populations in this region should help resolve the problem.

Acourtia zacatecana B.L. Turner, *sp. nov.* TYPE: MEXICO. Zacatecas: 6 km antes de Monte Escobedo, a 36 km de Huejucar, sobre la brecha que va hacia Monte Escobedo, bosque de *Quercus*, ladera bastante pedregosa, 2100 m, 4 Nov 1978, *José Garcia P. & A. Delgado S. 856* (HOLOTYPE: TEX!; Isotypes: CHAPA!,F!,GH!,MEXU!,NY!,TEX!).

Acourtiae rigidae DC. similis sed foliis midcaulinis late ellipticis plerumque 1.5-2.0 plo longioribus quam latioribus (vs. lineari-oblanceolatis) in paginis inferioribus sparsim vel moderate glanduliferis (vs. glabris) differt.

Stiffly erect suffruticose herbs 0.8-1.0 high. Stems sparsely puberulent to glabrescent. Midstem leaves sessile, clasping, relatively thick, elliptic to oblong-elliptic, mostly 8-14 cm long, 4-7 cm wide, sparsely to densely glandular-atomiferous beneath, the margins serrate-spinulose. Heads 10-numerous, arranged in terminal, rather rigid open cymes, the ultimate peduncles mostly 5-10 mm long. Involucres turbocampanulate, mostly 6-8 mm high, the bracts 3-4 seriate, the middle and inner bracts minutely glandular-pubescent, especially along the margins, their apices obtuse-apiculate. Florets 8-11(-12) per head. Achenes 4-5 mm long, densely atomiferous-glandular throughout, the pappus of numerous white bristles 8-10 mm long, their apices somewhat expanded.

ADDITIONAL SPECIMENS EXAMINED: MEXICO. Jalisco: Mpio. Huejuquilla, Rancho Viejo, ladera rialítica con vegetación de encinar, 1900 m, 31 Oct 1963, *Rzedowski 17555* (ENCB,MEXU). Zacatecas ("Durango-Zacatecas border"): Pass through Sierra Papanton near highway, oak-juniper grassland, 2400-2500 m, igneous derived soils, 25-30 Oct 1948, *Gentry 8449* (ARIZ,MICH,US); Mpio. Río Grande, Rancho El Carrizal, portrero Las Remudas, 2080 m, 9 Oct 1979, *Garcia P. et al. 1191* (TEX).

Acourtia zacatecana is apparently confined to southcentral Durango and closely adjacent Zacatecas and Jalisco. It appears most closely related to *A.*

wrightii and *A. fruticosa*, standing somewhere between these taxa, perhaps of ancestral hybrid origin from them.

ACKNOWLEDGMENTS

This work is based upon the study of approximately 2,900 specimens from 18 institutions, as follows (numbers in parenthesis refer to the sheets concerned): ARIZ (95), BM (86), CIIDIR (47), ENCB (187), F (202), G (230), GH (328), K (78), LL (111), MEXU (264), MICH (220), MU (23), NY (244), TEX (250), US (394), WIS (82), and XAL (38). We are grateful for the loan of these materials. Dr. Guy Nesom provided the Latin diagnoses, and both he and Dr. T.P. Ramamoorthy reviewed the manuscript. I am especially grateful to Dr. M. Dittrich of G for his search among their collections for possible types of La Llave & Lexarza.

LITERATURE CITED

Bacigalupi, R. 1931. A monograph of the genus *Perezia* section *Acourtia*. Contr. Gray Herb. 97:1-78.

Cabrera, R.L. 1992. Systematic study of the genus *Rzedowskiela* R.L. Cabrera (Mutisieae, Compositae). Doctoral thesis, The University of Texas, Austin, Texas.

Gray, A. 1883. *Perezia*, sect. *Acourtia*. Proc. Amer. Acad. Arts 19:57-60.

McVaugh, R. 1984. *Perezia*, in Fl. Novo-Galiciana 12:683-702. University of Michigan Press, Ann Arbor, Michigan.

Nash, D. 1976. Mutisieae, in Fl. Guatemala, Fieldiana, Bot. 24:429-440.

Robinson, H. 1991. New combinations in the Asteraceae (Vernonieae, Heliantheae, Mutisieae). Phytologia 69:105-107.

Stafleu, F. & R. Cowan. 1979. *Taxonomic Literature* 2:728. Bohn, Scheltema, & Holkema, Utrecht, The Netherlands.

Turner, B.L. 1992. New species of *Wedelia* (Asteraceae, Heliantheae) from México and critical assessment of previously described taxa. Phytologia 72:115-126.

Phytologia (May 1993) 74(5):413.

NOMENCLATURAL NOTE: *JUNIPERUS COAHUILENSIS* (MARTINEZ) GAUSSEN *EX* R.P. ADAMS

Robert P. Adams

Plant Biotechnology Center, Baylor University, BU Box 97372, Waco, Texas 76798 U.S.A.

ABSTRACT

Juniperus coahuilensis is validated for use in future publications.

KEY WORDS: *Juniperus*, Cupressaceae, nomenclature

Gaussen (1968) elevated *Juniperus erythrocarpa* Cory var. *coahuilensis* Martinez to specific rank: *J. coahuilensis* (Martinez) Gaussen. Unfortunately, Gaussen (1968) failed to properly cite the basionym as required by the current *International Code of Botanical Nomenclature*, thus rendering the publication invalid. To validate the name, the following is proposed.

Juniperus coahuilensis (M. Martinez) Gaussen *ex* R.P. Adams, *comb. nov.* BASIONYM: *Juniperus erythrocarpa* Cory var. *coahuilensis* M. Martinez, Anal. Inst. Biol. Mexico 17:115-116. 1946. TYPE: MEXICO. Coahuila: Sierra de los Hechiceros, *Johnston & Muller 1290* (HOLOTYPE: MEXU; Isotypes: GH,NA,TENN,TEX).

Distribution: Chihuahuan desert from n. México into w. Texas, s. New Mexico, and s. Arizona.

LITERATURE CITED

Gaussen, H. 1968. Les gymnosperms actuelles et fossils. Les Cupressaceés. Trav. Lab. Forest. Toulouse Tome II, Sect. I, Vol. 1, partie II 2, fasc. 10:1-222.

Martinez, M. 1946. Los *Juniperus* Mexicanos. Ann. Inst. Biol. Univ. Nac. México 17:3-128.

Phytologia (May 1993) 74(5):414-418.

STUDIES ON THE GENUS *BIDENS* L. (COMPOSITAE) FROM THE EASTERN HEMISPHERE. 5. A NEW SPECIES FROM BURUNDI

T.G.J. Rayner

Department of Botany, Plant Science Laboratories, University of Reading, Whiteknights, P.O. Box 221, Reading, RG6 2AS, U.K.

ABSTRACT

Bidens ruyigiensis T.G.J. Rayner, a species known only from Ruyigi Province, southeastern Burundi, is described as new. It is shown to possess close affinity with *B. burundiensis* Mesfin, a taxon with which it shares a number of characters including the presence of blunt setae on the ventral face of the cypselas and a well developed cypselial corona. The two species are readily distinguished by their leaf and capitulum morphology.

KEY WORDS: *Bidens*, Compositae, taxonomy, Burundi

The examination of African material for an ongoing revisional study of Eastern Hemisphere *Bidens*, partly in connection with the preparation of an account of the genus for the *Flora of Tropical East Africa*, has uncovered another new species from eastern Africa.

Bidens ruyigiensis T.G.J. Rayner, *sp. nov.* TYPE: BURUNDI. Ruyigi Province, Mpinga, 3° 45′ S 30° 10′ E, 12 Jun. 1976, *M. Reekmans 5304* (HOLOTYPE: C; Isotypes: BR,MO,PRE).

Bidens praecox auct. non Sherff: Lisowski, Fragm. Florist. Geobot. 36(1), suppl. 1:169. 1991, typ. excl.

Species nova affinitatem praebens *Bidenti burundiensi* Mesfin ob setas obtusas in superficie ventrali cypselarum, sed ab ea imprimis differt plantis annuis, foliis similaribus omnibus, pro maxima parte marcidis sub anthesi, capitulis 1.5-3.9 centrimetris diametro, phyllariis exterioribus uniseriatis minus quam decem 0.5-0.7 millimetris latis, flosculis radii 2.3-5.2 millimetris latis ad apicem

regularibus integris aut 2-3-dentatis, corollis flosculorum disci 1.3-1.8 millimetris longis 0.7-0.9 millimetris latis lobis quattuor aut quinque, antheris 1.2-2.1 millimetris longis, filis staminum 0.6-1.5 millimetris longis, coronis apicalibus cypselae torum simulantibus.

Annual herbs, to 26-55 cm tall; stems solitary, arising from a short (to 0.4-1.5 cm long) taproot with numerous, long, slender, much-branched adventitious roots; stems inclined to suberect at base, erect above, terete especially below to rounded-tetragonal above, 1.1-2.3 mm diam. near base, not or slightly woody below, few-branched usually only in upper 2/3; stems and branches smooth or shallowly to deeply sulcate chiefly above, faintly striate, pale to dark brown, glabrous below, usually sparsely pilose above with minute (0.05-0.20 mm long), adpressed to suberect, antrorse, straight to flexuous, uniseriate, few-cellular hairs; branches erect or suberect, more or less obtuse-angled tetragonal, 1.2-2.1 mm diam. at base, 0.8-1.5 mm diam. beneath peduncles. Leaves decussate, mostly withered by anthesis below branches, petiolate; lamina (1-)2-pinnatipartite, with (3-)5-7 segments, narrowly to broadly ovate or elliptic-ovate to broadly trullate-ovate in outline, more rarely broadly transverse ovate, (1.2-)2.0-4.8 cm long × (0.7-)1.1-3.1(-3.9) cm wide; primary leaf segments opposite or more rarely subopposite, antrorsely inserted at ca. 45° to rachis, pinnatipartite, rarely undivided, narrowly trullate-ovate to narrowly oblong-ovate or sometimes more or less irregular in outline, 0.6-3.1 cm long × 0.5-1.4 cm wide; lobes opposite or alternate, generally thickened and slightly involute at margin, linear to narrowly oblong, often slightly attenuated toward apex, rarely narrowly obovate-linear, acute to subobtuse and usually somewhat callose-indurated at apex, occasionally apiculate, entire at margin, 0.5-3.3 cm long × 0.8-1.3 mm wide, papyraceous, green, glandular punctate, glabrous or sparsely to subdensely hispid on margins and nerves beneath, with minute (0.05-0.10 mm long), antrorse and more or less adpressed hairs; rachis linear to narrowly obtriangular-linear, 0.4-1.8(-2.3) mm wide, more or less canaliculate or flattened and slightly involute at margin; petioles to 1.8-21.0 mm long × 0.15-3.80 mm wide, usually somewhat canaliculate, unwinged or, especially for leaves subtending branches and peduncles, somewhat broadly winged, usually gradually dilated above and below and more or less narrowly oblong with concave margins, sometimes broadest toward apex and more or less narrowly obtriangular, glabrous or rarely sparsely pilose beneath; bases clasping and connate. Capitula radiate, heterogamous, erect, 1.5-3.9 cm diam. × 3.2-4.6(-6.5) mm high at anthesis, to 8.2 mm high in fruit, solitary at branch apices or 2-3(-5) in extremely lax cymes; receptacles flat or slightly convex at anthesis, usually becoming somewhat convex in fruit; peduncles to (2.5-)5.0-15.0 cm long, very slender, 0.3-0.6 mm diam. at anthesis, to 1.1 mm diam. in fruit, more or less obtuse-angled tetragonal, shallowly to somewhat deeply sulcate, mostly faintly striate, sparsely to subdensely pilose especially on an-

gles, rarely densely pilose chiefly toward apex; ebracteate or with 1-2(-3), alternate, usually undivided bracts, intermediate between the leaf lobes and outer phyllaries. Involucre cupuliform, 3.0-5.1 mm diam. at anthesis, becoming depressed-hemispheric and to 13 mm diam. in fruit, subsparsely to densely pilose at base; outer phyllaries uniseriate, 4-8(-9), narrowly oblong and slightly dilated at base to narrowly ovate-oblong or narrowly obspatulate-oblong, acute and shortly apiculate at apex, entire at margin, 2.3-4.9 mm long × 0.5-0.7 mm wide at anthesis, to 8.4 mm long × to 1.2 mm wide in fruit, erect to somewhat spreading in fruit, green, usually with a narrow, paler margin, with 3-7 pairs of red-brown nerves, subglabrous or sparsely to densely hispid-pilose chiefly on margin and at base of dorsal surface; inner phyllaries uniseriate, fused to 1/3 of length, (7-)8, elliptic-ovate to narrowly elliptic or narrowly to somewhat broadly oblong-obovate, gradually to subabruptly narrowed above, subacute to more or less rounded at apex, entire at margin, 3.3-4.9 mm long × 1.0-1.9 mm wide at anthesis, to 8.9(-9.2) mm long × to 2.9 mm wide in fruit, erect, membranous, basal half pale to dark stramineous or pale brown, apical half dark brown, pale stramineous at margin, with 17-numerous brown nerves, sparsely to more or less densely pilose chiefly toward base, apex puberulous. Ray florets (6-)8, neuter; ovary obovate-elliptic to narrowly oblong, 0.4-3.7 mm long × 0.3-0.7 mm wide, glabrous, minutely biaristate, style absent; corolla tube 1.3-1.8 mm long, sparsely to somewhat densely pubescent, occasionally with isolated glandular hairs; ray yellow, elliptic-oblong, 6.1-18.3 mm long × 2.8-5.2 mm wide, with 8-12 darker nerves, glabrous or sparsely pubescent beneath toward base; apex entire and acute to obtuse, or 2-3-dentate with teeth 0.3-0.6 mm long × 0.3-0.7 mm wide. Paleae narrowly elliptic-oblong or obovate-oblong to obovate, acute to broadly obtuse at apex, entire at margin, 2.8-5.3 mm long × 0.6-1.5 mm wide at anthesis, to 7.7 mm long in fruit, membranous, glabrous or minutely hispid-pilose on upper part of dorsal surface, pale yellow, often dark brown toward apex, with 4-9 pairs of red-brown nerves. Disc florets 18-31; corolla yellow, glabrous or lobes dorsally sparsely pubescent; limb campanulate, 1.3-2.0 mm long × 0.7-0.9 mm diam., not annularly thickened, apex 4-5-lobed; lobes triangular or ovate-triangular, acute to obtuse at apex, 0.4-0.5 mm long × 0.3-0.5 mm wide at base, papillate on margin; limb gradually or subabruptly attenuated below into a narrow, 0.4-0.9 mm long × 0.3-0.4 mm wide, terete tube; anthers 1.2-2.1 mm long × 0.25-0.40 mm diam., dark brown to black; endothecial tissue with polarized thickening; apical appendages ovate-triangular, subacute to obtuse at apex, 0.2-0.3 mm long × 0.25-0.30 mm wide, margins reflexed; basal appendages sagittate, just reaching or slightly exceeding base of the filament collar; collar 0.15-0.20 mm long × 0.10-0.15 mm wide; filament 0.6-1.5 mm long, flat or slightly involute; style 2.4-3.7 mm long, slightly tapered at base, with caudate, 0.5-0.7 mm long branches; stylopodium cupuliform or cylindric. Cypselas unwinged; body narrowly obovate-oblong or more or less narrowly elliptic-oblong and

TABLE 1. Morphological differences between capitula of *Bidens ruyigiensis* and *B. burundiensis*.

	B. ruyigiensis	*B. burundiensis*
Capitula		
diam. at anthesis	1.5-3.9 cm	3.2-4.9 cm
Outer phyllaries		
no. of series	1	2
no.	4-8(-9)	(6-)10
width at anthesis	0.5-0.7 mm	1.2-3.3 mm
Inner phyllaries		
width at anthesis	1.0-1.9 mm	1.6-4.1 mm
Ray florets		
width	2.8-5.2 mm	6.2-12.1 mm
no. nerves	8-12	(9-)11-18
apex shape	regular	irregular
Disc florets		
corolla size	1.3-2.0 × 0.7-0.9 mm	2.9-5.6 × 1.2-1.9 mm
no. lobes at apex	4-5	5
anther length	1.2-2.1 mm	3.4-5.8 mm
filament length	0.6-1.5 mm	1.8-3.1 mm
Cypselas		
apical corona	torus-shaped	broadly cupuliform

gradually attenuated toward base, 3.8-5.1 mm long × 0.6-0.9 mm wide, dark grey, compressed; dorsal face strongly convex, sometimes irregularly so, with a broad, cartilaginous, pale brown, apical shoulder, glabrous or rarely with a few, erect, blunt, uniseriate, few-cellular, ca. 0.1 mm long setae; ventral face flat or slightly concave, with a raised median rib, sparsely to densely setose just below apex; both faces 8-striate-sulcate; apex surmounted by a corona, glabrous, exaristate; corona torus-shaped, stramineous, cartilaginous, slightly ventrally produced, 0.5-0.6 mm diam. × 0.15-0.20 mm tall; base of cypsela with a short (ca. 0.1 mm long), cartilaginous, flap-like carpopodium.

PARATYPES: BURUNDI. Ruyigi Province, Mpinga, 30 Apr. 1972, *M. Reekmans 1851* (BR,EA,MO).

Bidens ruyigiensis is presently known only from the type locality in south-

eastern Burundi. Reekmans described it as growing at 2000 m in "steppe rocheuse" with *Exotheca*.

It is closely related to *Bidens burundiensis* Mesfin, a taxon with which it shares a character unique within the genus, namely the presence of minute, blunt setae near the apex of the ventral face (and rarely also the dorsal face) of the cypselas. Both species also possess a well developed, cartilaginous, cypselial corona. In addition the inner phyllaries of the fruiting capitula of both taxa are, at least in the apical half, dark brown or black with a much paler margin. The two species are readily distinguished, however, by their leaf morphology. In *B. ruyigiensis* the leaves are all alike, 1-2-pinnatipartite, cauline, and mostly withered by anthesis on the basal part of the stem. In *B. burundiensis* the leaves are dimorphic. The basal ones are pinnatipartite with linear segments or rarely undivided and linear, and crowded into a rosette, whereas the upper cauline leaves are undivided, narrowly ovate and often subulate toward the apex. *B. ruyigiensis* also differs from the perennial *B. burundiensis* by its annual life-form. Furthermore, the species show a number of differences in capitula characters (see Table 1).

The sheets of *Reekmans 1851* and *5304* at BR were cited for *Bidens praecox* Sherff by Lisowski (1991) in his account of *Bidens* for *La Flore d'Afrique Centrale*. This species was described by Sherff (1931) from a single specimen (*Busse 2523* at B) collected in southeastern Tanzania. Although this specimen was destroyed during World War II, a duplicate is extant at EA. A comparison of this specimen with the two collections of *B. ruyigiensis* shows them to differ in a number of significant ways. In *B. praecox* the leaf lobes are ovate or somewhat trullate and 3.4-14.2 mm wide (more or less linear and 0.8-1.3 mm wide in *B. ruyigiensis*), the outer phyllaries are dilated above (not gradually attenuated above) and the cypselas are 6.3-8.1 mm long (not 3.8-5.1 mm long) with a capitate corona (not torus-shaped corona).

Mesfin has surprisingly determined specimens of *Reekmans 1851* as *Bidens lineariloba* Oliv., a taxon which resembles *B. ruyigiensis* only superficially, primarily in habit and leaf morphology. *Bidens lineariloba*, however, is instantly and easily distinguished by its cypselas. In flowering specimens these possess two apical, more or less erect, retrorsely barbed aristae. In fruiting capitula they are rigid, shiny, 3.4-6.2 mm long and, uniquely within African species of the genus, arranged more or less perpendicularly to the axis of the fruit body.

BIBLIOGRAPHY

Lisowski, S. 1991. Les Asteraceae dans La Flore d'Afrique Centrale, 1. Fragm. Florist. Geobot. 36(1), suppl. 1:1-249.

Sherff, E.E. 1931. A new species of *Bidens* from Africa. Bot. Gaz. 92:450-451.

Phytologia (May 1993) 74(5):419-420.

BOOKS RECEIVED

Destructive and Useful Insects, Their Habits and Control. Fifth Edition. Robert L. Metcalf & Robert A. Metcalf. McGraw-Hill, Inc., 11 West 19th Street, New York, New York 10011. 1993. xviii. 1072 pp. $85.00 (hardcover). ISBN 0-07-041692-3.

This is an updated edition of a classic reference work. The primary new feature of the book is an expanded treatment of integrated pest management. The book is organized into 21 chapters with individual pagination for each chapter (*i.e.*, the first page of chapter 2 is 2.1 rather than 45. The first six chapters contain general information about insects, followed by two chapters on insect control (with insecticides or otherwise), with the bulk of the book (the remaining 13 chapters) devoted to treatments of insects infesting or causing harm to particular crops, products, or animals. Discussions in these chapters include descriptions of the insects, their life history, damages they cause, and how to control them.

Perspectives in Plant Cell Recognition. J.A. Callow & J.R. Green (eds.). Society for Experimental Biology Seminar Series 48. Cambridge University Press, 40 West 20th Street, New York, New York 10011-4211. 1992. xvi. 302 pp. $89.95 (hardcover). ISBN 0-521-40445-2.

Representing a compliation of presentations at a seminar held in April 1991, fifteen papers have been contributed by 56 authors to form this volume. Topics of the papers include gamete recognition (and other sexual signalling topics), reproductive incompatibility, defense mechanisms, and symbiotic relationships. Many of the included papers consider these processes primarily or partly as they pertain to fungi.

The Orchid Book, A Guide to the Identification of Cultivated Orchid Species. J. Cullen (ed.). Cambridge University Press, 40 West 20th Street, New York, New York 10011-4211. 1992. xxvi. 529 pp. $49.95 (hardcover). ISBN 0-521-41856-9.

This book consists primarily of descriptions of the various species of orchids that are cultivated. Each species entry contains information on vegetative and floral features of the plants, distribution, hardiness, and flowering phenology. References to illustrations are also included. Many of the species are illustrated by line drawings accompanying (in the margins) the descriptions. A few species are included in color plates. The book includes a key to genera of Orchidaceae as well as a key to species in each genus.

Information for Authors

Articles from botanical systematics and ecology, including biographical sketches, critical reviews, and summaries of literature will be considered for publication in PHYTOLOGIA. Manuscripts may be submitted either on computer diskette, or as typescript. Diskettes will be returned to authors after action has been taken on the manuscript. Diskettes may be 5.25 inches or 3.5 inches and may be written in any IBM or MacIntosh compatible format. Typescript manuscripts should be single spaced and will be read into the computer using a page scanner. The scanner will read standard typewriter fonts but will not read dot matrix print. Manuscripts submitted in dot matrix print cannot be accepted. Use underscore (not italics) for scientific names. Corrections made on typescript manuscripts must be complete and neat as the scanner will not read them otherwise. Language of manuscripts may be either English or Spanish. Figures will be reduced to fit within limits of text pages and therefore, should be submitted with an internal scale and have dimensions proportional to those for text pages. Legends for figures should be included in figures whenever possible. Each manuscript should have an abstract and key word list. Specimen citations should be consistent throughout the manuscript. Serial titles should be cited with abbreviations used in *Botanico Periodicum Huntianum*. References cited only as part of nomenclatural summaries should not appear in Literature Cited. Nomenclatural work should include one paragraph per basionym and must provide proper (as defined by the current *International Code of Botanical Nomenclature)* citation of sources of epithets and combinations.

Authors should arrange for two workers in the appropriate field to review the manuscript before submission. Copies of reviews should be forwarded to the editor with the manuscript. Manuscripts will not be published without review.

Cost of publication is currently $13.00 US per page for publication without reprints. Publication with 100 reprints is provided for $18.00 US per page, 200 reprints for $21.50 US per page. Page charges are due with manuscript and no paper will be published before payment is received in full. Reprints must be ordered and paid for in advance. Page charges will be determined on the basis of a typescript page (single spaced, 10 points, blank line between paragraphs) with all type inside a rectangle 143 mm (horizontal) by 219 mm (vertical), not including running head and page number. Title page should include title, author(s) name(s), and address(es). Two blank lines should appear above and below section headings (Abstract, Discussion, Literature Cited, etc.) in the manuscript. No extra charge is made for line drawings provided they conform to limitations of size and proportion for normal text. Halftones require an extra charge of $10.00 US per page.