PHYTOLOGIA

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

Vol. 76 May 1994 No. 5

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

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PHYTOLOGIA (ISSN 00319430) is published monthly with two volumes per year by Michael J. Warnock, 185 Westridge Drive, Huntsville, TX 77340. Second Class postage paid at Huntsville, TX. Annual domestic individual subscription (12 issues): $40.00. Annual domestic institutional subscription (12 issues): $44.00. Foreign and/or airmail postage extra. Single copy sales: Current issue and back issues volume 72 to present, $400; Back issues (previous to volume 72), $3.00 (add $.75 per copy postage and handling US [$1.50 per copy foreign]). Back issue sales by volume: $17.00 per volume 42-71 (not all available as complete volumes); $21.00 per volume 72-present; add $3.00 per volume postage US ($6.00 per volume foreign). POSTMASTER: Send address changes to Phytologia, 185 Westridge Drive, Huntsville, TX 77340.-8916.

Phytologia (May 1994) 76(5):345-382.

A TAXONOMIC OVERVIEW OF *SCUTELLARIA*, SECTION *RESINOSA* (LAMIACEAE)

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ABSTRACT

A taxonomic study of the *Scutellaria* section *Resinosa* sensu Epling (1942) is rendered. Twenty-six morphogeographical taxa are recognized including nineteen species and nine varieties as follows: *S. anomala*; **S. aramberrana** B.L. Turner, *sp. nov.*; **S. bartlettii** B.L. Turner, *sp. nov.*; *S. carmenensis*; **S. chiangii** B.L. Turner, *sp. nov.*; *S. drummondii* (with three infraspecific categories: var. *drummondii*; var. **edwardsiana** B.L. Turner, *var. nov.*; and var. **runyonii** B.L. Turner, *var. nov.*); **S. durangensis** B.L. Turner, *sp. nov.*; *S. fruticetorum* (previously placed in sect. *Galericularia*); *S. hispidula* (including *S. horridula*); *S. laevis*; **S. monterreyana** B.L. Turner, *sp. nov.*; **S. mulleri** B.L. Turner, *sp. nov.*; *S. muriculata*; **S. muzquiziana** B.L. Turner, *sp. nov.*; *S. potosina* [with six infraspecific categories: var. **davisiana** B.L. Turner, *var. nov.*; var. **grahamiana** B.L. Turner, *var. nov.*; var. **novoleonensis** B.L. Turner, *var. nov.*; var. **platyphylla** (Epling) B.L. Turner, *comb. et stat. nov.*; var. *potosina*; var. **tessellata** (Epling) B.L. Turner, *comb. et stat. nov.*; var. **zacatecensis** B.L. Turner, *var. nov.*]; *S. resinosa*, **S. stewartii** B.L. Turner, *sp. nov.*; **S. texana** B.L. Turner, *sp. nov.*; and *S. wrightii*. Keys for identification purposes are provided for all of these, along with maps showing their distribution. A brief introduction to the characters utilized in the delineation of sect. *Resinosa* is given and, when deemed necessary, appropriate comments upon their interspecific relationships are provided.

KEY WORDS: Lamiaceae, *Scutellaria*, sect. *Resinosa*, México, Texas, U.S.A.

Scutellaria is a large difficult genus of 200 or more species occurring worldwide. It is a very natural group and readily recognized by its 2-lobed calyx

having a distinctive transverse crest (the scutellum, hence its name). The only closely related genus is the monotypic North American *Zalazaria*, and even that very distinctive element of the desert southwest (northern México and U.S.A.) has recently been subsumed into *Scutellaria* (Patton 1990. Notes Roy. Bot. Gard. Edinburgh 46:147). Barkley (1975; *cf.* Sanders & Cantino 1984), however, recognized *Zalazaria* as the only member of the family Zalazariaceae. Regardless, both *Zalazaria* and *Scutellaria*, as noted by Olmstead (1990), have been treated as the only members of the subfamily Scutellarioideae by Briquet (1895) and there is little question as to their close relationship.

Bentham (1830) was the first worker to provide a comprehensive worldwide treatment of the genus and this was built upon by Briquet (1895). Since the latter publication, most treatments of *Scutellaria* have been regional in nature. Epling (1942) provided an inclusive treatment of *Scutellaria* for North and South America, but before him, Penland (1924) and Leonard (1927) provided partial coverage of the North American species. Epling's (1942) opus, however, was by far the most ambitious study. In this he distributed 113 species of *Scutellaria* among eighteen sections. He recognized that the sections were to some considerable extent arbitrary, or at least not clear cut, for he states (p. 3) that his treatment should "be recognized as exploratory and suggestive, and by no means definitive. I shall be amply rewarded if it serves as a basis for a more comprehensive and intensive attack." And that it has, especially as to the recognition of sectional groupings.

The section *Resinosa* was largely defined by Epling as a group of xeric or subxeric mostly tap-rooted species of México and closely adjacent U.S.A. having mostly small, shortly petiolate, entire to subentire leaves, the flowers axillary and arranged two to a node along the upper stems, the corollas blue to purple. He recognized eleven species in his concept of sect. *Resinosa*, one of these (*Scutellaria potosina* Brandegee) comprised by three subspecific categories. Since his 1942 treatment, and prior to the present, only four additional species have been proposed for the section: *S. laevis* Shinners, *S. carmenensis* Henrickson, *S. thieretii* Shinners, and *S. melanquitensis* P.H. Valencia. I recognized the first two as belonging to the sect. *Resinosa* but would include the latter in the sect. *Spinosa*. *Scutellaria thieretii* is treated as synonymous with *S. drummondii* Benth.

The present study resulted from efforts to identify miscellaneous collections from northern México. In this process it became clear that numerous collections from that region assembled since Epling's 1942 treatment represented undescribed taxa. To provide names for these novelties it became necessary to borrow material of the sect. *Resinosa* from most of the larger American herbaria (*cf.* Acknowledgments), including types. I had not supposed that this task would become so arduous and time consuming or I might have simply provided a provisional identification of the plants concerned and let it go at that. But the challenge prevailed and as a result I have recognized 26 taxa

as belonging to the sect. *Resinosa*, these distributed among nineteen species and nine varieties; this includes nine new species and seven new varieties. Subspecific taxa are not recognized.

CHARACTER CONSIDERATIONS

HABIT – in the sect. *Resinosa* most taxa are perennial or annual herbs, the former predominating. Three annuals are recognized: *Scutellaria drummondii*, *S. texana* B.L. Turner, and *S. bartlettii* B.L. Turner. The latter three species possess relatively small, shallow, tap roots but occasional late-persisting plants may appear perennial. In northcentral Texas, *S. drummondii* appears to hybridize (either past, or present) with *S. wrightii* A. Gray. The resultant hybrids, or their hypothetical backcross derivatives in the direction of *S. drummondii*, apparently produce short-lived perennials reminiscent of the latter.

Perennial species may produce stems from lignescent, often branched tap roots, or else produce offshoots via rhizomes. I suspect that most of the perennial species will produce at least short rhizomes, but some of them produce very elongate slender rhizomes. Needless to say, when the perennials flower the first growing season they will appear to be annual.

VESTITURE – Epling (1942) placed much emphasis upon vestiture in his recognition of taxa, and I too have found this to be one of the more useful characters for taxonomic purposes. Several species are characterized by the direction along the stems in which the hairs are bent, be these downwards (retrorse) or upwards (antrorse). Apparently, relatively few genes control such orientation since upon rare occasions specimens with antrorse vestiture will occur in a population having only retrorse vestiture. For example, among several hundred or more collections of *Scutellaria drummondii* (which has nearly always spreading or downcurved hairs) only two specimens were found with upswept hairs, both occurring on sheets having specimens with downcurved hairs (Brazos Co., Texas, *Curry 113* [UC]; Navarro Co., Texas, *Joor s.n.* [MO]).

LEAVES – Epling distinguished sect. *Resinosa* largely by leaf characters: relatively small leaves with mostly short petioles and entire margins. Nevertheless occasional species will display crenate or serrulate leaves, often markedly so (e.g., *Scutellaria fruticetorum* Epling). Indeed, both entire and crenulodentate leaf margins may occur among populations within a single species (e.g., *S. muzquiziana* B.L. Turner). A tendency for leaf reduction at the apices of stems occurs in some taxa (e.g., *S. stewartii* B.L. Turner and *S. fruticetorum*), suggesting that the taxonomic distinctions between sections within *Scutellaria* are not especially strong, since leaf reduction along with crenulate leaves with well developed petioles were characters used by Epling to distinguish between sections *Galericularia* and *Lateriflorae*. That the American sections of *Scutellaria* are to some extent artificially delimited is implicit in the many hypothetical

diagrams provided by Epling purporting to show specific relationships *within* the various sections recognized by him.

CALYCES AND COROLLAS – Characters of the calyces and corollas are difficult to assess in *Scutellaria* when working with herbarium material because of their change during development, contortion upon drying, and general fragility. Corolla size is especially variable, both among and within species as noted by Epling. I agree, in general, with his assessments and have used corolla shape and size to only a limited extent in my treatment.

NUTLETS – While largely ignored by Epling, nutlet size, color, shape, and especially ornamentation has proven to be perhaps the best set of characters by which to discriminate among closely related species, as first emphasized by Penland (1924) who constructed an analytical key to 21 species of American *Scutellaria* using only characters of the nutlet. Strangely, Epling (1942) largely ignored Penland's treatment but subsequent workers using Scanning Electron Microscopy (SEM) have reaffirmed the value of nutlet characters for taxonomic purposes in *Scutellaria* (e.g., Lane 1983; Olmstead 1990). Nutlet characters have proven very useful in my own specific evaluations, and these will be discussed in more detail in a further SEM study of nutlets within section *Resinosa* and related cohorts (Turner & Delprete, in prep.).

SCUTELLARIA, SECTION *RESINOSA*

Scutellaria sect. *Resinosa* C. Epling, Univ. Calif. Publ. Bot. 20:57. 1942.

Annual or perennial herbs. Stems mostly simple, when perennial arising from ligneous often branched tap roots, or less often from elongate slender rhizomes. Leaves opposite throughout, those along the upper portions only rarely reduced to bracts, subsessile to shortly petiolate, the blades mostly entire or nearly so, rarely crenulodentate. Flowers axillary, mostly arranged opposite and two to a node along the upper 1/2 of the stem. Scutellum broader than high. Corollas blue to lavender, purplish white, bilabiate, the tube usually broad, the upper lip strongly galeate, patchily pilose within, usually below the stamens, rarely broadly annulate. Nutlets with surfaces variously ornate (granulose, tessellate, paxillate, papillose, or with erect or subimbricate lamellae).

Type species: *Scutellaria resinosa* Torrey.

ARTIFICIAL KEY TO SPECIES

1. Plants of U.S.A. ..... (2)

1. Plants of México. ..... (9)

2. Plants annual. ....(3)

2. Plants perennial. ....(4)

3. Nutlets ornamented with flattened overlapping enations (lamellate). ....*S. drummondii*

3. Nutlets ornamented with conical or domed enations (papillate). *S. texana*

4. Plants glabrous or nearly so. ....(5)

4. Plants markedly pubescent. ....(6)

5. Nutlets tessellate; Arizona. ....*S. potosina*

5. Nutlets papillate; trans-Pecos Texas. ....*S. laevis*

6. Vestiture of stem 0.05-0.10 mm high or less, the hairs closely appressed-arcuate. ....*S. wrightii*

6. Vestiture of stems 0.1-0.3 mm high, the hairs spreading, either stiffly erect or bent downwards but not clearly arcuate. ....(7)

7. Nutlets papillate; southernmost Texas. ....*S. muriculata*

7. Nutlets tessellate or merely rugose. ....(8)

8. Vestiture of stem densely short-pubescent with mostly stiffly erect or slightly deflexed eglandular hairs ca. 0.15 mm high; northwestern Texas, Oklahoma, and Kansas. ....*S. resinosa*

8. Vestiture of stem 0.2-0.6 mm high, variously pubescent with mostly down-turned eglandular hairs, or the latter variously interspersed with longer glandular hairs, the latter mostly 0.2-0.6 mm high; not in northcentral Texas. ....(9)

9(1). Plants annual (late-persisting plants may appear perennial with thickened tap roots). ....(10)

9. Plants perennial (first year growth appearing annual), tap roots woody and lignescent or else rhizomatous. ....(12)

10. Nutlets with mostly lamellate overlapping enations. *S. drummondii*

10. Nutlets tessellate, papillate, rugose, or with variously rounded enations. ....(11)

11. Midstem leaves with petioles mostly 1-2 cm long; blades mostly broadly elliptical to rounded; nutlets rugose to tessellate; Tamaulipas. ....*S. bartlettii*

11. Midstem leaves with petioles mostly 0.5-1.0 cm long; blades mostly ovate; nutlets papillate; Coahuila, Nuevo León. ..... *S. texana*

    12. Vestiture of stem densely and uniformly pubescent with arcuate-strigose eglandular hairs ca. 0.1 mm high, the hairs not ascending or erect; N. Coahuila. ..... *S. wrightii*

    12. Vestiture various, but not as described in the above. ..... (13)

13. Stem hairs, many or most of them, clearly appressed upwards, or bending upwards. ..... (14)

13. Stem hairs spreading at right angles or appressed downwards, or bending downwards. ..... (19)

    14. Stems and leaves densely pilose-pubescent, giving a loose-velvety appearance to the foliage under magnification; Nuevo León. .... *S. anomala*

    14. Stems and leaves not as described in the above. ..... (15)

15. Midstem leaves, some or most of them, subdeltoid to subcordate, the margins crenate, their petioles mostly 6-10 mm long; Chihuahua. *S. alata*

15. Midstem leaves not as described in the above. ..... (16)

    16. Midstem leaves broadly ovate to oval, mostly 1.0-1.2 times as long as wide, sessile or nearly so; stems sparsely and unevenly pubescent throughout with minute hairs; corollas 20-25 mm long; Durango. ..... *S. durangensis*

    16. Midstem leaves ovate to elliptic, mostly 1.5-2.0 times as long as wide, usually distinctly petiolate; stems densely and evenly pubescent with very short upturned hairs or very unevenly pubescent with multiseptate trichomes 0.2-1.0 mm long; corollas 10-18 mm long; widespread. ..... (17)

17. Vestiture of stems and leaves uniformly pubescent with densely packed up-curved hairs ca. 0.1 mm high; Coahuila (near Saltillo). ..*S. chiangii*

17. Vestiture of stems and leaves not as described in the above; widespread. ..... (18)

    18. Midstem leaves with petioles mostly 3-8 mm long; stems moderately pubescent with widely spreading hairs, the latter 0.5-1.0 mm long; nutlets rugose, the enations rounded apically; arid habitats in Coahuila. ..... *S. stewartii*

18. Midstem leaves with petioles nearly 1-3 mm long; stems sparsely pubescent with mostly appressed upturned hairs, the latter 0.2-0.5 mm high; nutlets ± tessellate, the enations flattened apically; widespread in mesic habitats but not in Coahuila. ..... *S. hispidula*

19(13). Vestiture of stems minutely and densely beset with microscopic spreading hairs 0.05 mm high or less, the foliage appearing glabrous to the unaided eye; nutlets papillose; Mpio. Aramberra, Nuevo León. . . .. *S. aramberrana*

19. Vestiture of stems and foliage not as described in the above; nutlets tessellate to variously rugose. .....(20)

20. Midstem leaves mostly sessile or subsessile, the margins entire; Mpio. Muzquiz, Coahuila. ..... *S. mulleri*

20. Midstem leaves with petioles mostly 2-10 mm long, the margins to some extent crenulate. .....(21)

21. Stems arising from ligneous tap roots. .....(22)

21. Stems arising from slender rhizomes. .....(24)

22. Midstem leaves mostly 1.5-4.0 cm long, the blades subdeltoid to broadly ovate with often crenulate margins; nutlets mostly rugose. . .....(23)

22. Midstem leaves various but not as described in the above; nutlets tessellate. ..... *S. potosina*

23. Vestiture of stems with an upper layer of long glandular trichomes and below these a layer of very short eglandular trichomes; nutlets rugose; N. Coahuila. ..... *S. muzquiziana*

23. Vestiture of stems with glandular trichomes only; nutlets tessellate; Nuevo León, about Monterrey. ..... *S. monterreyana*

24. Vestiture of stems with mostly strongly down curved fine hairs 0.2-0.4 mm high; NE Coahuila. ..... *S. carmenensis*

24. Vestiture of stem with mostly widely spreading coarse trichomes 1.0-1.8 mm high; San Luis Potosí (near Cd. Maiz). *S. fruticetorum*

SCUTELLARIA ALATA M.E. Jones, Map, Figure 2.

Scutellaria alata M.E. Jones, Contr. West. Bot. 12:70. 1908. TYPE: MEXICO. Chihuahua: Sierra Madre Mts., Guayanopa Canyon, 6000 ft, 24 Sep 1903, *M.E. Jones s.n.* (HOLOTYPE: POM; Isotypes: CAS-DS!,UC!,US!).

This taxon superficially resembles *Scutellaria potosina* var. *tessellata* (Epling) B.L. Turner, both in habit and type of vestiture, but is readily distinguished from the latter by its upturned stem hairs and rugose ornamented nutlets (vs. hairs downturned and nutlets tessellate).

Only a single collection has been assembled since Epling's (1942) treatment, who knew it only from type material: MEXICO. Chihuahua: Cerro del Nido complex, 7.5 road mi from W Bella Vista on Mesa La Boquilla (29°04′30″ N - 106°29′20″ W), base of cliff, 2020 m, 15 Jul 1981, *Worthington 7318* (ARIZ,UTEP).

SCUTELLARIA ANOMALA Epling, Map, Figure 2.

Scutellaria anomala Epling, Univ. Calif. Publ. Bot. 20:66. 1942. TYPE: MEXICO. Nuevo León: Mpio. Villa Santiago, Puerto on Sierra de la Cebolla between Protrero Redondo and Casillas, 7 Jul 1935, *C.H. Mueller 2154* (HOLOTYPE: UC; Isotypes: F!,GH!,MEXU!,MICH!,MO!,TEX!).

This taxon is distinguished by its densely puberulent vestiture, most of the hairs curving upwards, long-petiolate leaves, and large nutlets (ca. 1.5 mm long) with papillate ornamentation. It is apparently most closely related to *Scutellaria stewartii*, largely by habit, leaf shape, upturned vestiture, and nutlet ornamentation.

Since Epling's (1942) treatment (in which *Scutellaria anomala* was known only by type material), a single additional collection has come to the fore: MEXICO. Nuevo León: Mpio. Galeana, Galeana Canyon, 6 mi below Iturbide, 3650 ft, 30 Aug 1940, *Shreve & Tinkham 9779* (GH).

SCUTELLARIA ARAMBERRANA B.L. Turner, Map, Figure 2.

Scutellaria aramberrana B.L. Turner, *sp. nov.* TYPE: MEXICO. Nue-vo León: Mpio. Aramberri, Cerro Grande, rocky hillside in pine-oak forest, 2100 m, 10 Jul 1986, *G.B. Hinton et al. 18999* (HOLOTYPE: TEX!).

Scutellariae potosinae Brandegee var. *potosinae* similis sed vestimento caulium minute hispidulo ca. 0.05 mm alto et pagina nucularum papillosa (vs. tessellata) differt.

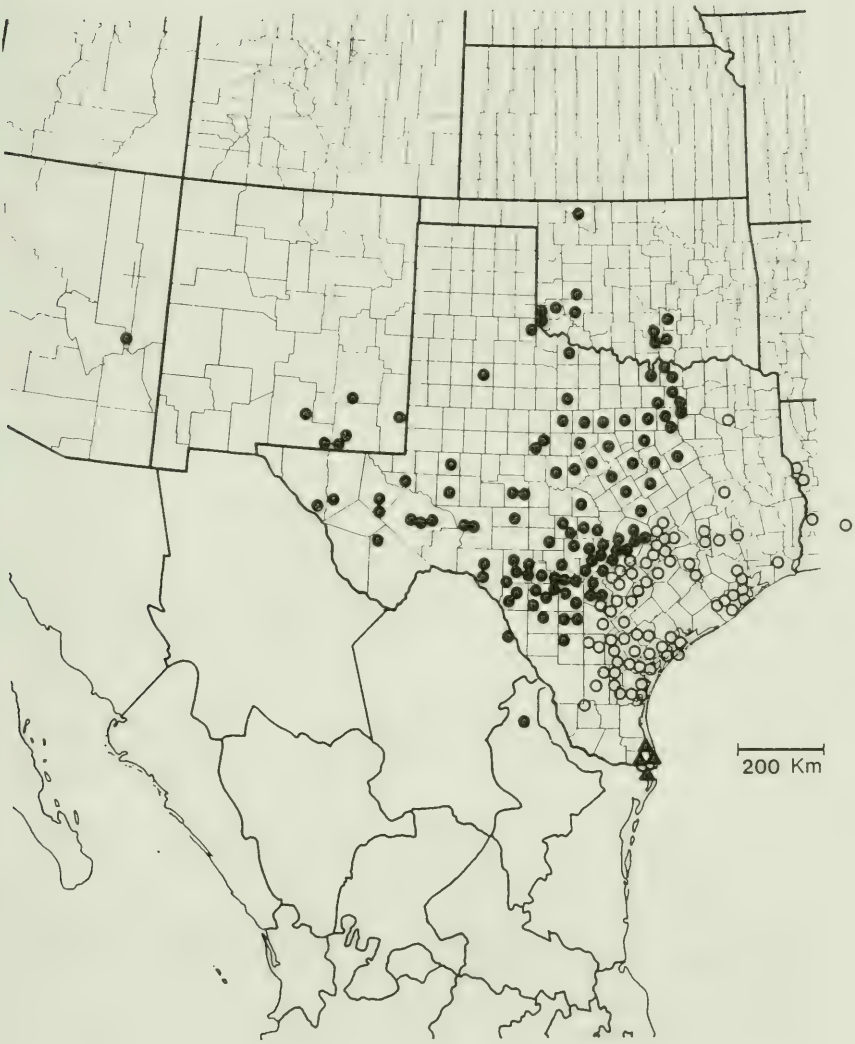

Figure 1. Distribution of *Scutellaria drummondii*: var. *drummondii* (open circles); var. *edwardsiana* (closed circles); var. *runyonii* (closed triangles).

Figure 2. Distribution of *Scutellaria* spp.: *S. alata* (open triangles); *S. anomala* (closed triangles); *S. aramberrana* (open circles); *S. stewartii* (closed circles).

Perennial erect rhizomatous herbs 10-20 cm high. Stems minutely hispidulous, the hairs scarcely 0.05 mm long, mostly erect or slightly downcurved, the surfaces abundantly arrayed with globular atomiferous glands. Midstem leaves mostly 12-20 mm long, 5-8 mm wide; petioles 1-2 mm long; blades ovate to ovate-lanceolate, very sparsely pubescent with minute recurved hairs, the margins entire. Flowers arranged in pairs in the upper leaf axils, the corollas mauve to purple, 15-17 mm long. Calyces sparsely pubescent like the leaves, moderately covered with atomiferous glands. Nutlets (immature) papillate.

ADDITIONAL SPECIMEN EXAMINED: MEXICO. Nuevo León: Mpio. Aramberri, W of La Escondida, 2200 m, oak woods, 3 Aug 1993, *G.B. Hinton et al. 23169* (TEX!).

This taxon is immediately recognized by its seemingly glabrous condition, but examination at magnification (× 40) readily reveals a minutely hispidulous vestiture ca. 0.05 mm high. In habit it is superficially similar to *Scutellaria potosina* but has quite different nutlets, the surface ornamentation being minutely papillate (vs. tessellate).

SCUTELLARIA BARTLETTII B.L. Turner, Map, Figure 3.

Scutellaria bartlettii B.L. Turner, *sp. nov.* TYPE: MEXICO. Tamaulipas: Sierra de San Carlos, vicinity of San Carlos, Cerro de los Armadillos, 9 Jul 1930, *H.H. Bartlett 10199* (HOLOTYPE: MICH!; Isotypes: CAS-DS!,F!,US!).

Scutellarine monterreyanae B.L. Turner similis sed duratione plantarum annua (vs. perenni) et vestimento caulium ca. 0.4-0.5 mm alto (vs. 0.6-1.3 mm) differt.

Annual erect herbs mostly 15-40 cm high, the stems arising from slender tap roots (larger when over-wintering) and branched from the base. Stems densely glandular-pubescent, the vestiture mostly 0.4-0.5 mm high. Midstem leaves mostly 1.5-3.0 cm long; petioles mostly 1-2 cm long; blades broadly ovate to oval, weakly crenulate to entire, pubescent like the stems. Flowers paired and axillary along the upper 1/2 of the stems. Flowering calyces ca. 3 mm long. Corollas lavender to purple, mostly 8-12 mm long. Nutlets black, 1.0-1.5 mm long, rugose (appearing tessellate with age), the apical enations rounded, but the lateral enations often reflexed and somewhat laminate as in *Scutellaria drummondii.*

ADDITIONAL SPECIMENS EXAMINED: MEXICO. Tamaulipas: Sierra San Carlos, vicinity of El Milagro, 5 Aug 1930, *Bartlett 11118* (MICH); 13 mi SW of Cd. Victoria, ca. 1000 m, 13 May 1949, *McVaugh 10518* (MICH); ca. 5 mi S of San Carlos, N side of Bufo El Diente, steep slopes among scattered

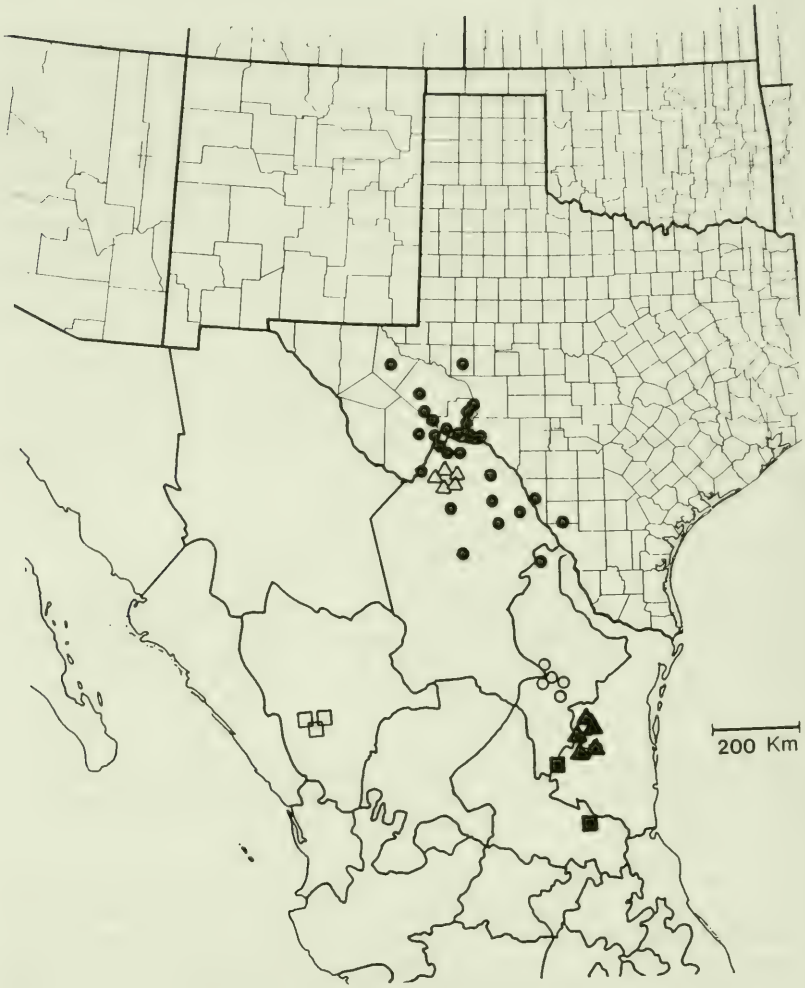

Figure 3. Distribution of *Scutellaria* spp.: *S. bartlettii* (closed triangles); *S. carmenensis* (open triangles); *S. durangensis* (open squares); *S. fruticetorum* (closed squares); *S. monterreyana* (open circles); *S. texana* (closed circles).

Figure 4. Distribution of *Scutellaria* spp.: *S. chiangii* (closed triangles); *S. hispidula* (closed circles); *S. mulleri* (open triangles); *S. muzquiziana* (open circles).

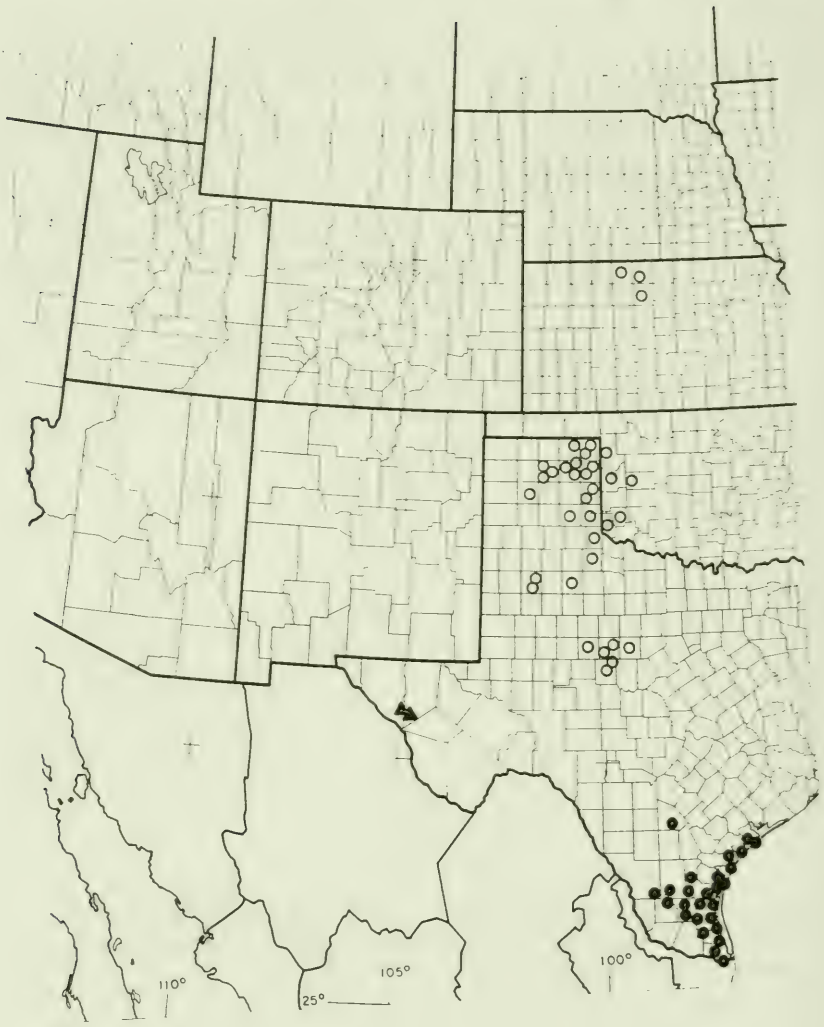

Figure 5. Distribution of *Scutellaria* spp.: *S. laevis* (closed triangles); *S. muriculata* (closed circles); *S. resinosa* (open circles).

Figure 6. Distribution of *Scutellaria potosina*: var. *davisiana* (open triangles); var. *grahamiana* (closed squares) var. *novoleonensis* (open circles); var. *platyphylla* (open circles); var. *potosina* (closed circles); var. *tessellata* (closed triangles); var. *zacatecensis* (bulls eye).

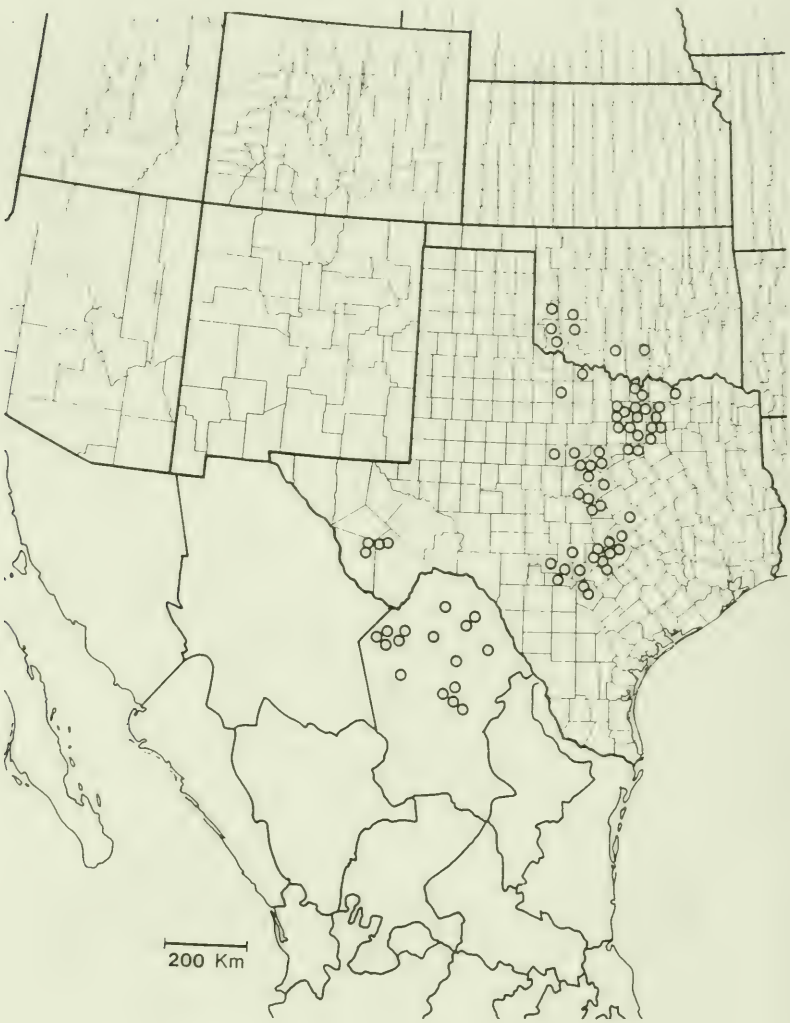

Figure 7. Distribution of *Scutellaria wrightii*.

oaks in rich soils, 770 m, 17 Jun 1987, *Nesom 6061* (TEX); mountain sides S of Cd. Victoria, 1000 m, 9 Apr 1926, *Runyon 891* (TEX,US); Cd. Victoria, Mar 1930, *Viereck 169* (US); Jaumave, Jul 1930, *Viereck 614* (US); San Vicente-Jaumave, Mar 1921, *von Rozynski 267* (ARIZ); Jaumave, 1932, *von Rozynski 419, 431, 544* (F).

This annual taxon occurs along the front range of the Sierra Madre Oriental from about Cd. Victoria, Tamaulipas northwards to the Sierra de San Carlos. Epling (1942), by annotation, apparently included this species in his concept of *Scutellaria microphylla* Benth., but he also annotated at least one sheet (*Viereck 614* [US]) as *S. potosina* var. *potosina*.

Scutellaria bartlettii combines characters of *S. texana* and *S. monterreyana* B.L. Turner, having the shorter vestiture and annual condition of the former, but the general habit, leaf shape, and nutlet ornamentation of the latter. All of these taxa, with additional field work, might be reduced to varietal rank, but present morphogeographical evidence suggests specific status.

SCUTELLARIA CARMENENSIS Henrickson, Map, Figure 3.

Scutellaria carmenensis Henrickson, Aliso 12:521. 1989. TYPE: MEXICO. Coahuila: Sierra Maderas del Carmen, upper slope and ridge of peak in upper portion of Oso Canyon, 26 May 1975, *D.A. Riskind & T.F. Patterson 1783* (HOLOTYPE: LL!).

This taxon is apparently restricted to the Sierra del Carmen of northwestern Coahuila. It is seemingly closest to *Scutellaria muzquiziana*, possessing the corollas and nutlet ornamentation of that species, but readily distinguished from it by habit and vestiture.

SCUTELLARIA CHIANGII B.L. Turner, Map, Figure 4.

Scutellaria chiangii B.L. Turner, *sp. nov.* TYPE: MEXICO. Coahuila: Las Playas, ca. 50 km S of Saltillo along highway 50 (25°15′ N, 100°48′ W), pinyon-pine woodlands, limestone slopes in calcareous gravelly soils, 2050-2100 m, 24 May 1973, *M.C. Johnston, T.L. Wendt, & F. Chiang 11212B* (HOLOTYPE: TEX!).

Scutellariae potosinae Brandegee var. *potosinae* sed differet trichomatibus caulium antrorsis (vs. retrorsis) et caulibus rhizomatibus brevibus validis (vs. radice palari lignescenti) exorientibus.

Suffruticose multistemmed perennial herbs from short thick rhizomes. Stems recumbent below, forming rounded bushes, densely and evenly hispidulous

with *upturned* eglandular hairs ca. 0.1 mm high. Midstem leaves mostly 4-6 mm long, 2-3 mm wide; petioles 0.5-1.0 mm long; blades narrowly ovate, densely pubescent throughout like the stems, faintly 3-nervate, the margins entire. Flowers mostly 10-15, arranged in axillary pairs along most of the stem length, their pedicels 1.0-1.5 mm long. Flowering calyces 3-4 mm long, in fruit 5-6 mm long, the scutellum pronounced, ca. 3 mm high, ca. 5 mm across. Corollas bluish-purple, ca. 15 mm long. Nutlets ca. 1.3 mm long, black, tessellate.

This is a weird plant known only from the type. It is remarkable in habit and vestiture, the stems densely and minutely hispidulous with upturned hairs arising from short thick rhizomes. In addition, the leaves are uniformly small from the base of stems to near the apices. It superficially resembles *Scutellaria hispidula* B.L. Robins. but on nutlet characters appears to be closest to *S. potosina*, differing from that species in leaf shape and size, and upturned vestiture.

I have named the species for Fernando Chiang, a Mexican citizen who obtained his doctorate degree at the University of Texas, Austin, working on the difficult genus *Lycium* (Solanaceae). Fernando is a trim man about 5 ft 10 inches wearing an intellectual smile and an easy grin. I never met a person who didn't enjoy his company, mainly because his generosity and kindness extended to most everyone. He even made allowances for my faults, which takes much latitude. The world needs more such Chiangs, both as friends and for eponyms.

SCUTELLARIA DRUMMONDII Benth.

I recognize three weakly differentiated morphogeographical varieties of this complex as outlined below. Collections of these abound in herbaria, especially from Texas where the species is largely centered. Exceptions to the key characters utilized for their recognition occasionally occur, but I estimate that approximately 95% of the collections can be assigned to one or the other taxon by the characters chosen, which is a significant figure as judged by scientists generally, hence my decision to bestow the names concerned.

KEY TO VARIETIES

1. Pubescence of mid and lower stems mostly with eglandular hairs (intergrades with var. *edwardsiana* occur along the eastern edge of the Edwards Plateau); eglandular stems also abound in northcentral Texas where putative hybrids and their derivatives between var. *edwardsiana* and *S. wrightii* are thought to occur. ..... var. *edwardsiana*

1. Pubescence of mid and lower stems to some considerable extent glandular-pubescent. the longer-spreading trichomes bearing minute capitate glands at their apices; Edwards Plateau of Texas and westwards, and southernmost Texas (Cameron Co. and adjacent México). .....(2)

    2. Plants mostly much-branched from the very base, the lower stems on older plants recumbent; nutlets mostly 0.9-1.1 mm across, the lamellar ornamentation mostly erect, scarcely overlapping; Cameron and Willacy counties, Texas (and adjacent México?). var. *runyonii*

    2. Plants not usually as described in the above; nutlets mostly 1.1-1.5 mm across, the lamellar ornamentations mostly to some extent overlapping or imbricate; widespread from central Texas westwards but not in Cameron Co. .....var. *drummondii*

Scutellaria drummondii Benth. var. *drummondii*, *Lab. Gen. & Sp.* 441. 1834. Map, Figure 1. TYPE: U.S.A. Texas: Austin Co., along the Rio Brazos, 1833, *T. Drummond s.n.* (HOLOTYPE: K; Photoholotype: US!).

Scutellaria helleri Small, *Man. Fl. SE. US.* 1024. 1903. TYPE: U.S.A. Texas: Nueces Co., Corpus Christi, sea level to 40 ft., 28-30 Mar 1894, *A.A. Heller 1503* (HOLOTYPE: NY; Photoholotypes: F!,US!; Isotypes: F!,GH!,MICH!,MO!,UC!,US!).

Scutellaria thieretii Shinners, Sida 1:251. 1964. TYPE: U.S.A. Louisiana: Vermilion Parish, Pecan Island, roadside in shell sand, 13 Jul 1963, *J.W. Theiret 16162* (HOLOTYPE: SMU-BRIT!; Isotype: USL).

Epling (1948) recognized a single widespread highly variable *Scutellaria drummondii* without infraspecific categories. He did, however, refer to localized pockets of variation in the species, especially calling attention to variation in corolla size, which appears not to be correlated with the morphogeographic variants recognized in the present treatment.

The considerable intergradation between var. *drummondii* and var. *edwardsiana* is discussed in more detail under the latter. Populations with glandular pubescence, bushy habits and smaller, atypically ornamented, nutlets occur in southernmost Texas and I have dubbed these var. *runyonii*. Collections referred to as *Scutellaria helleri* are habitally like var. *runyonii* but have the general vestiture and seed ornamentation of var. *drummondii*.

I am unable to recognize the recently described *Scutellaria thieretii*. Characters used by Shinners to distinguish this from *S. drummondii* are mostly illusionary: larger, thicker, less petiolate, less reduced, upper leaves. In short, *S. thieretii* falls well within the variation of *S. d.* var. *drummondii*, as suspected by MacRoberts (1984).

Scutellaria drummondii Benth. var. **edwardsiana** B.L. Turner, *var. nov.* Map, Figure 1. TYPE: U.S.A. Texas: Val Verde Co., rocky limestone hills above dam at foot of Devils Lake, ca. 20 m NNW of Del Rio, 31 Mar 1947, *R.M. McVaugh 7724* (HOLOTYPE: TEX!; Isotypes: CAS-DS!,F!,GH!,MICH!).

Scutellariae drummondii Benth. var. *drummondii* similis sed vestimento plerumque biaequato aequore supero trichomatibus reflexis eglandulosisque ac aequore infero trichomatibus majoribus glandulosis (vs. vestimentum uniformiter eglandulosum) differt.

This taxon is related to the closely allopatric var. *drummondii* but is usually readily distinguished by its glandular vestiture and longer capitate-glandular hairs mostly spreading at right angles to the stem.

Occasional individuals and/or possibly localized populations of var. *edwardsiana* in central Texas on granitic soils may possess eglandular hairs (*e.g.*, Gillespie Co., *Correll 21122, 27186* LL, *Crutchfield 1281* LL; etc.), but these few exceptional plants hardly vitiate recognition of var. *edwardsiana* as a widespread calcareous taxon of more western regions easily recognized by its mostly glandular vestiture or intermixed glandular and eglandular hairs. Indeed, the longest eglandular hairs of var. *edwardsiana* tend to be shorter than the longest eglandular hairs of var. *drummondii* (0.5-1.0 mm long vs. 1.0-2.0 mm long, respectively). Likewise, the existence of occasional plants with glandular hairs within the otherwise eglandular populations occurring in the sandy or sandy-loam soils of eastern Texas hardly vitiates the reality of that taxon.

Intergradation between var. *edwardsiana* and var. *drummondii* occurs primarily along the eastern most front of the Edwards Plateau (e.g., *Correll 29176* US; etc.), especially in sandy alluvial soils along the Colorado River drainage system as it passes through the large outcrop of granitic rock of the Central Mineral Region, most of which weathers to sandy soils. This perhaps accounts for the occurrence of localized populations of plants (cited above) with glandular hairs in the latter region: sandy river banks should provide for the intrusion of genes upstream through the distribution of var. *edwardsiana*, with or without gene flow (assuming some peripheral hybridization in regions of contact).

Finally it should be noted that in Collin, Dallas, and Grayson counties of northcentral Texas and adjacent Oklahoma there exists a large set of collection (50 plus sheets) which have very short downcurved hairs and only a smattering of glandular hairs, if that. I take these to be hybrid derivatives of ancestral crosses (if not recent) between *Scutellaria drummondii* and *S. resinosa* Torrey, as noted under the latter. Such plants possess calyces and nutlets of *S. drummondii*, but a vestiture and habit intermediate between the two taxa. So far as

known, most of these collections occur in predominately calcareous soils; Lane (by annotation) also noted that plants from this region strongly approached *S. resinosa* (including *S. wrightii* in his concept; cf. Lane 1983).

Occasional putative hybrids between *Scutellaria drummondii* and *S. wrightii* apparently grow intermixed (e.g., *Metz 592* [UC], from Bexar Co., Texas, the sheet containing mixed collections of both taxa plus putative hybrids and or derivatives therefrom).

Scutellaria drummondii Benth. var. **runyonii** B.L. Turner, *var. nov.* Map, Figure 1. TYPE: U.S.A. Texas: Cameron Co., "Erect diffuse herb, soon branching and becoming diffuse. Barreda Station in woodlands.", 11 Apr 1941, *R. Runyon 2525* (HOLOTYPE: TEX!; Isotype: TEX!).

Scutellariae drummondii Benth. var. *edwardsianae* B.L. Turner similis sed plantis multo ramosis ad basim et pagina nucularum lamellis erectis (vs. lateralibus imbricatisque) differt.

ADDITIONAL REPRESENTATIVE SPECIMENS: U.S.A. Texas: Cameron Co.: *Correll 28988* (LL); *Cottrell s.n.* (TEX); *Lundell 14837* (LL,TEX,UC); *Lundell & Lundell 10691* (MICH); *Lundell & Lundell 10763* (LL,MICH,UC); *Runyon 1458, 2063, 2524* (all TEX). Willacy Co.: Raymondville, 3 Mar 1925, *Runyon 703* (TEX,UC).

This taxon has the vestiture of var. *edwardsiana*, but has a bushier habit and smaller, less ornate, nutlets, as discussed under the latter. It intergrades northwards along the sandy coastal soils into var. *drummondii*, but appears to be well-separated geographically from var. *edwardsiana*, as indicated in Figure 1.

The variety is named for its earliest collector, Mr. Robert Runyon, well known amateur botanist from Brownsville, Texas, having once served as the mayor of that city. He first collected the plant in Willacy County, and subsequently numerous times in Cameron County. The taxon probably occurs in adjacent México, but I have not examined such collections.

The var. *runyonii* occurs with or near the endemic perennial, *Scutellaria muriculata*, and occasional plants of the former have been cited as the latter (e.g., *Cottrell s.n.*, so cited by Epling [1942]).

SCUTELLARIA DURANGENSIS B.L. Turner, Map, Figure 3.

Scutellaria durangensis B.L. Turner, *sp. nov.* TYPE: MEXICO. Durango: E slopes of Cerro Prieto (ca. 20 airline mi. W of Otinapa), dry, open, rocky woodlands of oak, pine, and *Arbutus*, "Plants seen occasionally in rather large patches," 3000-3100 m, 10 Jul 1950, *James H. Maysilles 7352* (HOLOTYPE: MICH!; Isotype: CAS!).

Scutellariae hispidulae B.L. Robins. similis sed differt foliis plerumque majoribus ovalibus (vs. ovatis), caulibus minute pubescentibus vestimento ca. 0.1 mm alto vel minus (vs. 0.2-1.0 mm), et corollis majoribus (20-25 mm longis vs. 10-16 mm).

Erect rhizomatous perennial herbs 10-20 cm high. Stems minutely scabridulous with arcuate upturned hairs 0.1 mm high or less. Leaves sessile or subsessile throughout, scarcely reduced upwards, those at midstem mostly 12-18 mm long, 7-18 mm wide, broadly ovate to, less often, obovate, glabrous or nearly so on the faces, the margins hispidulous like the stems. Flowers 2-6 axillary pairs arranged along the upper 1/4-1/3 of the stems. Calyces 5-6 mm long, sparsely hispidulous. Corollas purple, 20-25 mm long. Nutlets immature.

ADDITIONAL SPECIMEN EXAMINED: MEXICO. Durango: Coyotes Hacienda, 63 road mi. WSW of Cd. Durango, 2400-2500 m, 16 Jul 1955, *Maysilles 7855* (MICH).

This taxon is clearly closely related to *Scutellaria hispidula* but is readily distinguished from that species by its relatively broader, more oval leaves, minutely hispidulous vestiture and larger corollas (mostly 20-25 mm long vs. 10-16 mm). According to label data, *S. durangensis* occurs in open meadows of pine-oak forests from 2500-3100 m while *S. hispidula* reportedly occurs at lower elevations (1500-2400 m) in oak woods and grasslands.

SCUTELLARIA FRUTICETORUM Epling, Map, Figure 3.

Scutellaria fruticetorum Epling, Brittonia 7:129. 1951. TYPE: MEXICO. Nuevo León: Dulces Nombres (and just E into Tamaulipas), oak-pine forests, 1700 m, 14 Jul 1948, *F.G. Meyer & D.J. Rogers 2779* (HOLOTYPE: UC-UCLA!).

This taxon is apparently confined to middle and lower montane pine-oak forests along the Gulf slopes of the Sierra Madre Oriental in southern Nuevo León, adjacent Tamaulipas and eastern San Luis Potosí.

It is likely that *Scutellaria fruticetorum* does not belong to the sect. *Resinosa*. In having markedly toothed, clearly petiolate leaves it would key to the sect. *Mixtae* in Epling's (1942) treatment, the species of which mostly occur in the southeastern U.S.A. In several other characters, however, it appears to belong to the sect. *Resinosa*, where it forms a "bridge" to sect. *Mixtae*. In their original description, however, the authors positioned the species in the sect. *Galericulatae*, although it was not accepted into this largely western U.S.A. assemblage by Olmstead (1990). Both morphologically and geographically, *S. fruticetorum* (along with *S. fraxinea* Epling) appears closely related to the sections *Mixtae* and *Lateriflorae* of the southeastern U.S.A.

Scutellaria fruticetorum was known to its authors by type material only. More recent collections have been obtained as follows: MEXICO. San Luis Potosí: 17 airline km NE of Cd. del Maiz, 16.2 road mi. E of El Naranjo, 1.5 mi. (by road) E of El Platanito, lower oak forest on limestone bedrock with *Quercus* spp., *Trichilia*, *Litsea*, etc., 980 m, 22 Mar 1976, *Hansen et al. 3818* (LL,MICH,US); 19 mi E of Cd. del Maiz, open oak forests, "common in area", ca. 3800 ft, 16 Jul 1963, *McGregor et al. 777* (LL).

SCUTELLARIA HISPIDULA B.L. Robins., Map, Figure 4.

Scutellaria hispidula B.L. Robins., Proc. Amer. Acad. Arts 26:174. 1891. TYPE: MEXICO. México: Meadows, Flor de María, 31 Aug 1890, *C.G. Pringle 3233* (HOLOTYPE: GH!; Isotypes: F!,MEXU!,MO!,UC!,US!).

Scutellaria horridula Epling, Univ. Calif. Publ. Bot. 20:67. 1942. TYPE: MEXICO. Chihuahua: Loreto, Río Mayo, "by margins of little streams", pine-oak woodlands, 3 Sep 1936, *Gentry 2570* (HOLOTYPE: UC-UCLA!; Isotypes: ARIZ!,F!,GH!,MO!).

Epling's (1942) concept of this widely distributed highly variable species included material from xeric regions of Coahuila that I assign to *Scutellaria stewartii*. Typical plants of *S. hispidula*, obtained from mesic meadows in the state of México, are characteristically small perennial herbs with ovate subsessile leaves, the pubescence being typically sparse and composed of mostly upturned multiseptate trichomes. As I interpret the species, it is mostly confined to the southern Central Plateau regions of México, extending westwards along the Sierra Madre Occidental to Sonora. Considering its range, relatively few collections have been made since Epling's treatment and these are cited below:

MEXICO. Sonora: Cerro Saguarivo, E of San Bernardo, along stream, 1500 m, 78 Aug 1935, *Pennell 19590* (GH). San Luis Potosí: 33 km E of San Luis Potosí, ca. 2000 m, 10 Jul 1965, *Roe 122* (LL); 20 km SE of Zaragoza, 2050 m, *Rzedowski 526* (US). Jalisco: S of Sayula, Aug 1961, *Faberge s.n.* (TEX).

Scutellaria durangensis is clearly closely related to *S. hispidula*, but the former is readily distinguished by its minute vestiture and large corollas.

SCUTELLARIA LAEVIS Shinners, Map, Figure 5.

Scutellaria laevis Shinners, Sida 1:107. 1962. TYPE: U.S.A. Texas: Culberson Co., 10 mi N of Van Horn, N slope of Beach Mt., 19 Aug 1946, *D.S. Correll 13973* (HOLOTYPE: LL!).

Several collections of this relatively rare species have been made since its original description. It appears to be largely centered in the Sierra Diablo Mts. of trans-Pecos Texas. The Sierra Diablo is a relatively small mountainous mass which parallels the Hudspeth-Culberson County border for about 100 km from near Van Horn northwards. Shinners and others described the corollas of *Scutellaria laevis* as mostly white or "white with purple lips" (*Sikes & Smith 518* [LL]) but at least some of the corollas dry to a pale bluish color (e.g., *Waterfall 5087* [GH]).

Because of its glabrous condition, this taxon superficially resembles *Scutellaria potosina* var. *grahamiana* B.L. Turner of Arizona, but the latter taxon is readily distinguished from *S. laevis* by its minutely pubescent stems, purple corollas, and tessellate nutlets (vs. papillate).

SCUTELLARIA MONTERREYANA B.L. Turner, Map, Figure 3.

Scutellaria monterreyana B.L. Turner, *sp. nov.* TYPE: MEXICO. Nuevo León: Mpio. Villa Santiago, Las Ajuntas, 24 Aug 1939, *C.H. Muller 2996* (HOLOTYPE: LL!; Isotypes: F!,MICH!).

Scutellariae texana B.L. Turner similis differt duratione perenni, habitu laxe ramoso, trichomatibus glandulosis multo longioribus (0.6-1.2 mm longis vs. 0.1-0.4 mm), et pagina nucularum tessellata (vs. rugosa vel verrucata).

Perennial erect herbs mostly 15-40 cm high, the stems arising from ligneous tap roots (first years growth appearing annual). Stems loosely branched, moderately to densely pubescent with glandular spreading trichomes 0.6-1.2 mm long, mostly without an understory of shorter eglandular hairs. Midstem leaves mostly 1-3 cm long, 0.8-2.0 cm wide; petioles 4-10 mm long; blades broadly ovate to oval, entire to crenulate. Flowering calyces 2.5-3.0 cm long. Flowers paired and axillary, mostly confined to the upper 1/2-1/4 of the stems. Corollas blue, mostly 10-15 mm long. Nutlets black, tessellate, ca. 1.2 mm long.

REPRESENTATIVE SPECIMENS. MEXICO. Nuevo León: Chipinque Park, near Motel, North facing slopes, pine-oak forests, *Poole 1361* (TEX); El Diente Canyon, S of Monterrey, streambed, 600-650 m, 19 Jun 1934, *Pennell 16874* (GH,US); hills near Monterrey, 18 Jun 1889, *Pringle 2712* (F).

Scutellaria monterreyana is represented by about 30 collections, all from the vicinity of Monterrey where it occurs in pine oak forests along the upper midslopes of the surrounding mountains and in the streambeds at lower elevations which drain them. Epling (1942) included material of this taxon (and *S. texana*) in his broad concept of *S. microphylla*. *Scutellaria monterreyana* has the general habit of *S. texana* but is readily distinguished from the latter

by its perennial, less compact, habit, much longer glandular trichomes (0.6-1.2 mm long vs. 0.1-0.4 mm), and tessellate nutlets (vs. rugose or warty).

SCUTELLARIA MULLERI B.L. Turner, Map, Figure 4.

Scutellaria mulleri B.L. Turner, *sp. nov.* TYPE: MEXICO. Coahuila: Mpio. Muzquiz, lower slopes of the Sierra de San Manuel, 27 Jun 1936, *F.L. Wynd & C.H. Mueller 323* (HOLOTYPE: GH!; Isotypes: ARIZ!, MICH!,MO!).

Scutellariae muzquizianae B.L. Turner similis sed foliis sessilibus integrisque et vestimento caulium trichomatibus plerumque patentibus vel retrorsis (vs. antrorsis) differt.

Wiry perennial herbs 30-40 cm high. Stems erect, branched from the base, moderately pubescent with slender, spreading or downcurved, glandular or eglandular multiseptate trichomes mostly 0.5-1.0 mm long. Leaves ovate-lanceolate, sessile, gradually and markedly reduced upwards, those at midstem mostly 14-18 mm long, 5-7 mm wide, 2.0-2.8 times as long as wide, moderately pubescent like the stems. Fruiting calyces ca. 6 mm long. Corollas absent. Nutlets black, ca. 1.3 mm long, rugose-tessellate.

ADDITIONAL SPECIMEN EXAMINED: MEXICO. Coahuila: Muzquiz, Spring 1935, *Marsh 158* (TEX); Muzquiz, Palm Canyon, 9 Jul 1936, *Marsh 304* (TEX,UC-UCLA).

In habit this taxon resembles *Scutellaria muzquiziana* but differs in having sessile entire, ovate-lanceolate leaves and a vestiture of mostly spreading or downcurved trichomes 0.5-1.0 mm long. Epling (1942) annotated one of the above cited isotypes (ARIZ) as *Scutellaria ? microphylla*, but did not cite this in his study. The Marsh collection *158* (cited above) bore the name "*Scutellaria lythroides* Standl.", an apt name, for vegetatively the species resembles the genus *Lythrum*. Epling (1942, p. 59) also makes an offhand reference to the Marsh collections but failed to give them a name.

It is a pleasure to name this species for Prof. Emeritus, Cornelius H. Muller (nee Mueller) of the University of California, Santa Barbara, well known ecologist, expert on oaks and an early collector in northeastern México.

SCUTELLARIA MURICULATA Epling, Map, Figure 5.

Scutellaria muriculata Epling, Univ. Calif. Publ. Bot. 20:69. 1942. TYPE: U.S.A. Texas: Cameron Co., Resaca Park, "Brownsville near south bridge, W side", 10 m, 7 Mar 1939, *R. Runyon 2044* (LECTOTYPE [selected here]: UC-UCLA!; Isolectotypes: TEX!,UC-UCLA [2 sheets]).

This species superficially resembles *Scutellaria drummondii* var. *drummondii* but is readily distinguished from the latter by its perennial recumbent habit, vestiture of uniformly short recurved hairs and very distinctive muriculate nutlets. Indeed, on an isotype sheet (TEX) the provisional name, *S. incertis* sp. nov., was proposed by some early worker, probably in reference to the muriculate nutlets.

Epling (1942) knew the species by only four collections. Since his treatment, 40 or more collections (all assembled at LL,TEX) have been made from throughout its distribution (Figure 5) where it seems confined to sandy or sandy-loam soils derived from ancestral dune sands. Collections, as yet, are not known from México.

Epling (1942) cited a single collection from Atascosa Co., Texas (*Palmer 9780* [US!]) as *Scutellaria potosina* subsp. *platyphylla* (Epling) B.L. Turner, but examination of its nutlets reveal the plants concerned to be rather typical *S. muriculata*. Isolation of this collection from its center of distribution probably misled Epling in his identification, for the taxa concerned are superficially quite similar.

SCUTELLARIA MUZQUIZIANA B.L. Turner, Map, Figure 4.

Scutellaria muzquiziana B.L. Turner, *sp. nov.* TYPE: MEXICO. Coahuila: Mpio. Muzquiz, Muzquiz, 12 Apr 1936, *E.M. Marsh 2116* (HOLOTYPE: TEX!; Isotype: GH!).

> *Scutellariae potosinae* Brandegee var. *platyphyllae* Epling sed foliis plerumque crenulatis (vs. integris) et pagina nucularum tuberculata (vs. tessellate).

Erect perennial herbs 25-40 cm high. Stems densely pilose with spreading delicate glandular-capitate trichomes 0.5-1.0 mm long, beneath these a layer of minute delicate straight eglandular hairs 0.1 mm long or less. Midstem leaves mostly 2-4 cm long, 1.0-2.5 cm wide; petioles mostly 6-20 mm long; blades broadly ovate to subtriangular, sometimes subcordate, glandular-punctate beneath, glandular-pubescent along the veins, the margins decidedly crenulate, glandular-pubescent. Flowering calyx ca. 5 mm long, the upper lip with glandular trichomes like the stems. Corollas 15-20 mm long, the tubes broadly flaring upwards. Nutlets black, ca. 1.2 mm long, 1.0 mm wide, ornamented with somewhat downcurved rounded or obtuse tubercles.

ADDITIONAL COLLECTIONS EXAMINED: MEXICO. Coahuila: 35 air mi. S of Monclova, N side of Sierra de la Gavia, lower limestone canyon, with *Quercus*, *Cercis*, *Juglans* ...etc., 4700 ft, 2 Aug 1973, *Henrickson 11728* (LL); Muzquiz, Spring 1935, *Marsh 154* (F,TEX); 20 km ESE of Cuatro Cienegas, large limestone canyon, 24 Apr 1941, *Schroeder 151* (GH); same locality

Schroeder 93 (GH); Rincón de María, ca. 70 mi by road NW of Muzquiz, 27 Apr 1975, *Wendt & Riskind 941* (LL); Rancho Agua Dulce, wooded canyon on eastern slopes of Sierra de San Manual, 30 Jun 1936, *Wynd & Mueller 373* (GH).

This species is superficially similar to *Scutellaria potosina* var. *platyphylla* but is readily distinguished by its crenulate, relatively long-petiolate leaves and markedly ornate nutlets, the surface ± tuberculate (vs. tessellate).

Epling (1942, p. 59) first called attention to what I have named *Scutellaria muzquiziana* in stating, "Two collections made at Muzquiz, Coahuila, by March [*sic*] (Herb. Univ. Texas) represent two probable species in addition to those described below." He was presumably referring to *Marsh 159* (fruiting specimens cited above) and *Marsh 2116* (the type), neither of which Epling annotated.

SCUTELLARIA POTOSINA Brandegee, Map, Figure 6.

Scutellaria potosina Brandegee, Univ. Calif. Publ. Bot. 4:187. 1911. TYPE: MEXICO. San Luis Potosí: Minas de San Rafael, Nov 1910, *C.A. Purpus 4875* HOLOTYPE: UC!; Isotypes: F!,G!,MO!).

This is the most common widespread species of *Scutellaria* in northern México. It is exceedingly variable, but for the most part this variability can be partitioned into meaningful morphogeographical units. Epling (1942) recognized three infraspecific taxa in the complex, calling these subspecies.

I recognize two subspecies (Figure 6), subsp. *potosina* with three intergrading regional varieties; and subsp. *platyphylla*, which is monotypic and confined to central Arizona. The following key will help to distinguish among these.

ARTIFICIAL KEY TO VARIETIES

1. Plants of Arizona. ..... (2)

1. Plants of México, New Mexico, and Texas. ..... (4)

2. Stems uniformly pubescent with spreading glandular trichomes, eglandular hairs absent or nearly so; southcentral Arizona. ..... var. *platyphylla*

2. Stems variously pubescent with eglandular trichomes, or else glabrous or nearly so; southern Arizona. ..... (3)

3. Stems uniformly pubescent with a dense vestiture of short eglandular hairs; Cochise, Santa Cruz, and Pima counties. ..... var. *tessellata*

3. Stems glabrous or nearly so (only a few scattered hairs occurring); Graham Co. ..... var. *grahamiana*

4. Midstem leaves mostly 6-10 mm long, their petioles 1-2 mm long; nonglandular indument, or lowest level of vestiture, mostly 0.1-0.2 mm high; Zacatecas, San Luis Potosí, Guanajuato, Hidalgo, and Puebla. ..... (5)

4. Midstem leaves mostly 10-35 mm long, their petioles mostly 2-10 mm long; nonglandular vestiture mostly 0.2-0.5 mm high, or vestiture absent; N San Luis Potosí northwards. ..... (6)

5. Stems and leaves uniformly strigose with closely appressed eglandular arcuate hairs 0.5-0.15 mm high; Zacatecas. ..... var. *zacatecensis*

5. Stems and leaves hispidulous with merely downcurved eglandular hairs, or with a layer of both eglandular and glandular hairs, the latter 0.2-0.5 mm high; San Luis Potosí, Guanajuato, Hidalgo, and Puebla. var. *potosina*

6. Stems with vestiture mostly uniform, eglandular and somewhat reflexed; western Coahuila, Chihuahua, Sonora, and closely adjacent U.S.A. (Arizona, New Mexico, Texas). ..... var. *tessellata*

6. Stems with vestiture decidedly glandular throughout, or glandular hairs variously intermixed with short reflexed or nearly straight eglandular hairs. ..... (7)

7. Stems variously sprawling or recumbent; leaves broadly ovate, mostly 1.5-2.0 times as long as wide; México. ..... var. *novoleonensis*

7. Stems erect or ascending, leaves ovate, mostly 2-3 times as long as wide; U.S.A. (Davis Mts. of trans-Pecos Texas). ..... var. *davisiana*

Scutellaria potosina Brandegee subsp. *potosina* var. *potosina*, Map, Figure 6. Univ. Calif. Publ. Bot. 4:187. 1911. TYPE: MEXICO. San Luis Potosí: Minas de San Rafael, Nov 1910, *C.A. Purpus 4879* (HOLOTYPE: UC!; Isotypes: F!,G!,MO!).

Perennial herbs 10-30 cm high. Stems mostly erect or ascending, rather uniformly pubescent with a layer of mostly downturned eglandular hairs 0.1-0.2 mm high, above these often occur a layer of straight glandular hairs 0.2-0.5 mm high. Leaves mostly 6-10 mm long, 3-8 mm wide, broadly ovate to broadly elliptical, 1-2 times as long as wide. Corollas mostly 8-12 mm long. Nutlets black, tessellate.

REPRESENTATIVE SPECIMENS: MEXICO. Guanajuato: Mpio. San Luis de la Paz, Cañada de Pozos, 2100 m, 18 Jul 1990, *Ventura 8310* (F). Hidalgo: Mpio. Jacala, "International Highway", 4500 ft, 24 Jun 1939, *Chase 7109* (F,GH,MICH); "Mountain roadside", 4500 ft, 6 Jul 1939, *Chase 7328* (F); Jacala, 15 Aug 1937, *Edwards 896* (F); 5 mi N of Jacala, 5300 ft, 17 Apr 1946, *Johnston s.n.* (TEX); Mpio. Zimapan, on trail from Zimapan to mines of El Norte, N of Zimapan 7500-7800 ft, 11 Aug 1948, *Moore 4458* (GH). Puebla: 1 mi S of Tejupan, 28 Mar 1955, *Wiggins 13258* (CAS-DS). San Luis Potosí: Mpio. Guadalcazar, 8 mi E of highway 57 along road to Guadalcazar, 1770 m, 28 Aug 1986, *Breedlove 63272* (CAS); Minas de San Rafael, Jul 1911, *Purpus 5294* (F,GH,US); Mpio. Ciudad del Maiz, 4 km from Ciudad del Maiz, 1300 m, 26 Mar 1959, *Rzedowski 10232* (MICH); 13.2 mi W of Cerritos, 7 Aug 1983, *Starr 655* (ARIZ).

Epling (1942) included in his concept of subspecies *potosina*, material which I include in var. *novoleonensis*, the latter mostly distinguished from var. *potosina* by its larger leaves, longer vestiture, and recumbent habit. In spite of the half century since Epling's treatment, relatively few collections of var. *potosina* have come to the fore; indeed all of these are cited in the above.

The var. *potosina* apparently intergrades northwards into var. *novoleonensis*, to judge from the large number of variable collections of the latter in the southern part of its distribution.

Scutellaria potosina Brandegee subsp. **potosina** var. **davisiana** B.L. Turner, *var. nov.* Map, Figure 6. TYPE: U.S.A. Texas: Jeff Davis Co., Davis Mountains, 24 Apr 1902, *S.N. Tracy & F.S. Earle 340* (HOLOTYPE: TEX!; Isotypes: F!,GH!,MICH!,MO!,US!).

Scutellariae potosinae Brandegee var. *tessellatae* (Epling) B.L. Turner similis sed caulibus dense ubique glandulosi-pubescentibus trichomatibus patentibus (vs. trichomatibus eglandulosis retrorsis) differt.

ADDITIONAL SPECIMENS EXAMINED: U.S.A. Texas: Jeff Davis Co., highway 118, 1.8 mi SE of intersection with highway 166, 24 May 1991, *Bierner 91-29* (TEX); Valentine road, 29 Jun 1928, *Cory 2340* (GH); N of Marfa, 18 Apr 1929, *Ingram 2714* (US); Madera Spring, 4 May 1913, *M.E. Jones 18540* (CAS,CAS-DS), pine woods, ridge between Bob Manning and Little Aguja Canyons, 1600 m, 17 Jun 1931, *Moore 3139* (GH,MICH); Davis Mountains, 15 Jun 1926, *Palmer 30899* (GH, TEX); 5 mi NW McDonald Observatory, 14 Jun 1941, *Rose-Innes 1144* (TEX); Madera Spring, 9 May 1937, *Warnock T84* (ARIZ,GH,TEX,US); Limpia Creek, 13 May 1914, *Young 254* (TEX).

This weakly differentiated variety appears to be confined to pine woodlands in the higher portions of the Davis Mountains, in or along streams leading from

such areas. It has the habit of var. *tessellata* but the glandular vestiture of var. *novoleonensis*. Epling (1942) treated var. *davisiana* as part of his concept of *Scutellaria potosina* subsp. *platyphylla*, but the latter, while superficially similar, has quite different vestiture, as indicated in the above key, and is restricted to southcentral Arizona.

Occasional specimens of var. *tessellata* from the lower *Juniperus* woodlands of adjacent Brewster and Presidio counties may have sparsely glandular stems (e.g., *Butterwick B-1008* [TEX]) and I take these to be partial intergrades between the two varieties, but overall closer to *tessellata*. Indeed, Epling's *Scutellaria potosina* subsp. *parviflora* appears to be based upon specimens showing gene flow from *S. potosina* var. *davisiana*, most of the specimens cited by him showing at least a few glandular trichomes scattered amongst an otherwise downturned eglandular vestiture. Var. *davisiana* is named for the Davis Mountains, to which it seems confined.

Scutellaria potosina Brandegee subsp. **potosina** var. **grahamiana** B.L. Turner, *var. nov.* Map, Figure 6. TYPE: U.S.A. Arizona: Graham Co., Galiuro Mts., Redfield Canyon near junction with Sycamore Canyon, 3950 ft, 5 Aug 1981, *T.R. Van Devender & F.W. Reichenbacher 744* (ARIZ!).

Scutellariae potosinae Brandegee var. *tessellatae* (Epling) B.L. Turner similis sed caulibus ac foliis glabris vel paene glabris.

ADDITIONAL SPECIMEN EXAMINED: U.S.A. Arizona: Graham Co., Galiuro Mts., Redfield Canyon, just above Sycamore Canyon, 21 May 1980, *Van Devender & Reichenbacher s.n.* (ARIZ).

This taxon is distinguished by its nearly glabrous condition, the stems being only very sparsely pubescent with scabridulous downcurved hairs, or rarely very short glandular hairs. The leaves are mostly glabrous except for short incurved hairs along the major veins and upon the margins. Mature nutlets are absent, but the plant seems in all other ways comparable to var. *tessellata*, except for its occasional short glandular hairs. It is possible that var. *grahamiana* is only a nearly glabrous form of var. *tessellata* but it apparently does not occur within the geographical distribution of the latter, and it is known by at least two collections, both from the same general area. Because of this, and the absence of near-glabrous forms across the entire gamut of *Scutellaria potosina*, I feel that formal recognition at the varietal level for this population is justified.

Scutellaria potosina Brandegee subsp. **potosina** var. **novoleonensis** B.L. Turner, *var. nov.* Map, Figure 6. TYPE: MEXICO. Nuevo León:

Mpio. Galeana, San Francisco Canyon, ca. 15 mi SW of Pueblo Galeana, scattered in open woods about the mouth of the canyon, 7500-8500 m, 9 May 1934, *C.H. & M.T. Mueller* (HOLOTYPE: GH!; Isotypes: F!,GH!,MICH!,TEX!).

Scutellariae potosinae Brandegee var. *potosinae* sed caulibus plerumque reclinatis vel procumbentibusque vestimento numero magniore trichomatium glandulosorum et foliis majoribus (plerumque 12-20 mm longis vs. 8-12 mm).

REPRESENTATIVE SPECIMENS: MEXICO. Coahuila: Mpio. Arteaga, Sierra Zapaliname, 2370 m, 25 Mar 1990, *Hinton et al. 20236* (TEX). Nuevo León: Mpio. Galeana, S.J. Las Joyas, 2530 m, 27 Jul 1983, *G.B. Hinton 18507* (GH,TEX,US); Cerro Potosí, ca. 8000 ft, 16 Aug 1938, *Schneider 1004* (ARIZ,F,GH,MICH). San Luis Potosí: Mpio. Charcas, Charcas on hillsides, 29 Jun 1934, *C.L. Lundell 5050* (LL,MICH). Tamaulipas: 3 mi N of Miquihuana, in pine forest, 12 Jul 1949, *Stanford 2405* (CAS,CAS-DS,GH,US).

This taxon was included by Epling (1942) in his broad concept *Scutellaria potosina* subsp. *potosina*. Material which I recognize as var. *novoleonensis* is abundant in the pine-oak forests of Nuevo León, usually occurring from 1500-2500 m. It is readily distinguished from var. *potosina* by its procumbent habit, larger leaves, higher, usually more glandular vestiture, and generally larger corollas (mostly 12-20 mm long vs. 8-10 mm). Nevertheless, occasional plants approach var. *potosina* near regions of peripheral contact (e.g., *Lundell 5050*, cited above).

In the vicinity of Saltillo, Coahuila, and Monterrey, Nuevo León, collections are found which vary in the direction of var. *tessellata* (mostly in vestiture characters, e.g., *Villareal 1699* [TEX]). Collections from central Coahuila (Sierra San Marcos [TEX]) also approach var. *tessellata*, both in leaf shape and vestiture.

Material of var. *novoleonensis* is especially abundant in herbaria. For example, collections by *Hinton et al.* (*19904, 20527, 20964, 22024, 22091, 22620*, all on deposit at TEX) have been obtained over a wide area (from Cerro El Viejo in southernmost Nuevo León, to near Saltillo, Coahuila) at varying elevations (920 m to 2700 m) but the specimens are surprising uniform as regards habit, leaf shape and vestiture.

Scutellaria potosina Brandegee subsp. **potosina** var. **tessellata** (Epling) B.L. Turner, *comb. nov.* Map, Figure 6. BASIONYM: *Scutellaria tessellata* Epling *ex* Kearney & Peebles, J. Wash. Acad. Sci. 29:488. TYPE: U.S.A. Arizona: Cochise Co., Huachuca Mountains, 3 Sep 1903, 7000 ft., *M.E. Jones s.n.* (HOLOTYPE: US!). Epling cites the collection date as Mar 1902, but the date on the label is as given here.

Scutellaria potosina Brandegee subsp. *parviflora* Epling, Univ. Calif. Publ. Bot. 20:65. 1942. TYPE: U.S.A. Texas: Brewster Co., Chisos Mts., upper Blue Creek, 1520 m, 25 Jun 1931, *J.A. Moore & J.A. Steyermark 9231* (HOLOTYPE: UC!; Isotypes: CAS-DS!,GH!, MICH!,MO!).

Epling (1942) restricted his concept of this taxon to southern Arizona, New Mexico, and adjacent Sonora and Chihuahua, México. He contended that "It is readily distinguished from *S. potosina* by the small decurved hairs." In reality, vestiture in *Scutellaria potosina* is remarkably variable and I cannot distinguish *S. tessellata* sensu Epling from collections obtained in northern Coahuila and adjacent trans-Pecos Texas that Epling assigned to *S. potosina*. As shown in Figure 6, the var. *tessellata* is replaced by var. *novoleonensis* in southern Nuevo León, México, the latter in turn replaced by var. *potosina* in San Luis Potosí and southwards, there being intergradation between these taxa in the area of geographical replacement.

As noted under var. *platyphylla*, which is restricted to Arizona, the var. *tessellata* does not appear to intergrade strongly with that glandular-pubescent taxon, hence its retention under the monotypic subspecies *platyphylla*. A possible intermediate between var. *platyphylla* and var. *tessellata* was examined: *Harrison 1949* (ARIZ) from hills above Verde River above Ft. McDowell in Maricopa County; the specimen has short glandular hairs dispersed among mostly eglandular hairs. In short, the plant is closest in its vestiture to var. *tessellata*, but has a smattering of short glandular hairs that suggest gene flow from var. *platyphylla*. Perhaps both taxa occur near or at this locality but, so far as known, typical elements of var. *tessellata* have not been collected from the area concerned.

In Texas, the var. *tessellata* grades into the glandular-pubescent var. *davisiana*, hence retention of the latter in the subspecies *potosina*.

Scutellaria potosina Brandegee subsp. **potosina** var. **zacatecensis** B.L. Turner, *var. nov.* Map, Figure 6. TYPE: MEXICO. Zacatecas: 9 mi NW of Sombrerete on eastern bajado of Sierra Papantón, 2400-2500 m, 26 Sep 1948, *Howard S. Gentry 8467* (HOLOTYPE: ARIZ!; Isotypes: GH!,MICH!,US!).

Scutellariae potosinae Brandegee var. *potosinae* sed vestimento ca. 0.05 mm alto trichomatum uniformiter appressorum, *S. wrightii* A. Gray reminescens.

This taxon is known only by type material. It has the habit and leaves of var. *potosina* but differs markedly in having a uniformly appressed pubescence

reminiscent of *Scutellaria wrightii*. More detailed study with additional collections might suggest specific status. Epling (1951) examined type material and considered it to be *Scutellaria tessellata* without comment.

Scutellaria potosina Brandegee subsp. **platyphylla** Epling var. **platyphylla** (Epling) B.L. Turner, *comb. & stat. nov.* Map, Figure 6. BASIONYM: *Scutellaria potosina* Brandegee subsp. *platyphylla* Epling, Univ. Calif. Publ. Bot. 20:64. 1942. TYPE: U.S.A. Arizona: Maricopa Co., Fish Creek Canyon, Apache Trail, 4 May 1931, *G.J. Harrison 7778* (HOLOTYPE: US; Isotype: ARIZ!).

This taxon is quite distinct and readily distinguished from Arizona plants of var. *tessellata* by its widely spreading glandular trichomes and distribution. Indeed, I saw only a single hypothetical intermediate (*cf.* discussion under var. *tessellata*) between the two taxa.

Epling (1942), positioned in his concept of subsp. *platyphylla*, plants from the Davis Mountains of trans-Pecos Texas which I place in subsp. *potosina* var. *davisiana*, the latter readily distinguished from var. *platyphylla* by its shorter glandular vestiture, the glandular trichomes usually intermixed with reflexed eglandular hairs of the type found in var. *tessellata* and var. *potosina*.

SCUTELLARIA RESINOSA Torr., Map, Figure 5.

Scutellaria resinosa Torr., Ann. Lyc. N.Y. 2:232. 1828. TYPE: U.S.A. Oklahoma: along the Canadian River, *James s.n.* (HOLOTYPE: NY).

My circumscription of this taxon is the same as that of Epling (1947). As indicated by him "the pubescence is constant and distinctive", as exemplified in his plate 2. Habitally it resembles *Scutellaria wrightii*, the latter readily distinguished by its appressed pubescence (vs. spreading) and more eastern distribution. The two taxa are largely allopatric and so far as known do not grow together at a given site, nor have I seen intermediates.

SCUTELLARIA STEWARTII B.L. Turner, Map, Figure 2.

Scutellaria stewartii B.L. Turner, *sp. nov.* TYPE: MEXICO. Coahuila: Cañon de Milagro, a deep narrow box-canyon in limestone, eastern side of the Sierra de los Guajes, ca. 12 km W of Hacienda de la Encantada, 10-16 Sep 1941, *Robert M. Stewart 1518* (HOLOTYPE: LL!; Isotypes: F!,GH!).

Scutellariae hispidulae B.L. Robins. similis sed foliis valde petiolatis (vs. subsessilibus) et paginis nucularum tessellata (vs. rugosa) differt.

Perennial herbs 20-40 cm high, arising from elongate slender rhizomes. Stems moderately to sparsely pubescent with short or elongate mostly upturned hairs, these very variable in length, ranging from arcuate and 0.1-0.2 mm high (as on the type) to widely spreading and 0.5-1.5 mm high. Midstem leaves mostly 1.5-3.0 cm long, 1.0-2.5 cm wide; petioles mostly 3-8 mm long; blades broadly ovate to subdeltoid, sparsely pilose, the margins more or less crenulodentate. Flowers numerous, mostly arranged terminally on the stems among usually much-reduced leaves. Flowering calyces ca. 5 mm long. Corollas mostly 11-18 mm long. Nutlets ca. 1.5 mm long, buff-colored to dark brown, markedly mammilate.

ADDITIONAL SPECIMENS EXAMINED: MEXICO. Coahuila: Sierra Madera Mts., 4 mi. W and 10 mi. S of Ocampo, 16 Jun 1956, *Graber 169* (TEX); ca. 29 airline mi. WNW of Cuatro Cienegas, 2000-2300 m, 10 Aug 1976, *Henrickson 15263a* (TEX); Sierra Madera Mts., ca. 2 km E of Picacho de Zozaya, 8600-8800 ft., 13 Sep 1941, *I.M. Johnston 9027* (GH); Sierra Hermosa, ca. 100 mi. NW of Muzquiz, 4800 ft, 13 May 1968, *La Torre s.n.* (TEX); Mina El Aquirreño, N side of Sierra de la Paila, *M.C. Johnston 11686* (LL); Sierra de la Gloria, SE of Monclova, Jul 1939, *Marsh 1891* (F,GH,TEX); Mpio. de Castanos, Sierra de San Lazaro, Puerta de San Lazaro, 31 Aug 1939, *Mueller 3081* (GH,LL,MICH,UC); Sierra de la Paila, El Cedral, 20 Aug 1987, *Villareal 3877* (TEX); Sierra de la Gloria, Cañon El Cono, 6 Sep 1976, *Wendt 1643* (LL).

Most workers have treated *Scutellaria stewartii*, largely because of its upturned pubescence, as part of a widely distributed highly variable *S. hispidula*. The latter is markedly distinct from the present taxon, having nearly sessile leaves and nutlets with tessellate ornamentation.

Additionally, *Scutellaria stewartii* appears largely confined to dry calcareous slopes of northcentral México mostly from 1500-2200 m, while *S. hispidula* occurs in igneous soils of central and southcentral México, southwards along the Pacific Coastal Mountains to Durango, mostly from 2000-3000 m.

Actually, *Scutellaria stewartii* appears to be relatively closely related to *S. fraxinea* Epling from southern Nuevo León, both having similar habits, vestiture, leaves, and nutlets. Epling positioned the latter in the sect. *Galericularia* but it would appear equally close, if not closer, to the sect. *Lateriflorae*. In short, the positioning of *S. stewartii* in the sect. *Resinosa* is moot. More detailed analysis may show that it belongs to the sect. *Lateriflorae*.

SCUTELLARIA TEXANA B.L. Turner, Map, Figure 3.

Scutellaria texana B.L. Turner, *sp. nov.* TYPE: U.S.A. Texas: Terrell Co., low hills in upper Big Canyon, ca. 30 mi. N of Sanderson towards Sheffield, abundant in limestone soils, 2800 ft, 1 Jun 1957, *Barton H. Warnock 14727* (HOLOTYPE: LL!; Isotypes: SRSC!,TEX!).

Scutellariae drummondii Benth. var. *edwardsianae* B.L. Turner similis sed vestimento glanduloso plerumque breviore (0.1-0.4 mm alto vs. plerumque 0.4-1.0 mm) trichomatibus multo brevioribus eglandulosis intercalaribus carentibusque, et paginis nucularum tuberculata vel verrucata (vs. lamellosa) differt.

Annual much-branched low herbs mostly 10-30 cm high. Stems erect or ascending, branched from the very base, uniformly densely glandular-pubescent with spreading hairs 0.1-0.4 mm long. Midstem leaves mostly 1.0-1.5 cm long, 0.5-1.0 cm wide; petioles 3-9 mm long; blades ovate to obovate to entire to weakly crenulate. Flowers paired at the nodes throughout most of the stem. Corollas white, blue or purple, mostly 5-8 mm long. Nutlets black, 0.6-0.8 mm long, rugose.

ADDITIONAL REPRESENTATIVE SPECIMENS: U.S.A. Texas: Brewster Co., Maravillas Canyon, ca. 7 mi. E of Black Gap Wildlife Preserve, 22 Apr 1961, *Correll 23725* (LL). Pecos Co.: ca. 20 mi. W of Sanderson, 2900 ft, 1 Jun 1923, *Warnock 14923* (LL,TEX). Reeves Co.: Pecos, 14 Jan 1931, *Tharp s.n.* (TEX). Terrell Co.: 15 mi. S of Sheffield, Blackstone Ranch, 8 Jun 1949, *Webster 167* (MICH,TEX). Upton Co.: 10 mi. E of McCamey, amongst rock on brows of limestone hills, 30 Apr 1944, *Muller 5185* (LL). Val Verde Co.: rocky hills at bridge over Pecos River along highway 90, 7 Jul 1958, *Correll 19420* (LL).

MEXICO. Coahuila: 15 mi. W of Allende, 1 May 1959, *Correll 21275* (CAS,LL); Muzquiz, Apr 1938, *Marsh 1141* (F,TEX); Muzquiz, Apr 1938, *Marsh 1198* (F,GH,TEX); Hacienda La Rosita, 26 Jun 1936, *Wynd 293* (ARIZ, GH,US). Nuevo León: Lampazos, Rancho Rosendez, 24 Jun 1937, *Edwards* (ARIZ,CAS-DS,F,TEX).

This is apparently a fairly common species in the trans-Pecos region of Texas and northern Coahuila. It was first collected by Charles Wright in 1851

in the "valley of the Pecos" (*C. Wright 1540* [GH!]). Asa Gray thought the plant similar or close to *Scutellaria drummondii*, but was aware that it did not match well, having scribbled on one sheet "*Scutellaria* n. sp., cf. *drummondii*."

Epling (1942) included the taxon in his broad concept of *Scutellaria microphylla* Benth. without having seen type material of the latter. As noted under Excluded Taxa in the present paper, *S. microphylla* probably does not belong to the sect. *Resinosa* (sensu Epling).

Scutellaria texana, while having the annual habit and vestiture of *S. drummondii*, differs radically from the latter in its nutlet ornamentation (possessing rugose or rounded enations; versus flattened or lamellar enations). In addition, plants of *S. texana* appear much more floriferous with smaller corollas. The single collections from northern Nuevo León, cited above, differs in having larger leaves and longer hairs than typical, approaching that of *S. monterreyana*.

SCUTELLARIA WRIGHTII A. Gray, Map, Figure 7.

Scutellaria wrightii A. Gray, Proc. Amer. Acad. Arts 8:370. 1872. TYPE: U.S.A. Texas: Uvalde Co., prairies near the Sabinal River, 13 May 1851, *C. Wright* exsic. no. *1539* (LECTOTYPE [indirectly selected by Epling 1942, and accepted here]: GH!; Isolectotype: US!). The date given for the lectotype was taken from Johnston (1940).

Scutellaria integrifolia L. var. *brevifolia* A. Gray, *in* Hall, *Pl. Tex.* 1873. *Scutellaria brevifolia* (A. Gray) A. Gray, *Syn. Fl.* 2:380. 1878. *Scutellaria resinosa* Torr. var. *brevifolia* (A. Gray) Penland, Rhodora 26:72. 1924. TYPE: U.S.A. Texas: Dallas Co., near Dallas, w/o date, *E. Hall 458* (HOLOTYPE: GH; Probable isotype: F!). The original publication of this name was without description (*nomen nudum*) but a specimen (*Hall 458*) from Dallas Co., Texas was cited and I take this to be sufficient for publication and typification purposes. If one views the original place of publication as the *Synoptical Flora* (1878) then selection of a lectotype might be in order since Gray cited the afore mentioned Hall collection and additional collections by Reverchon. If needed, I would lectotypify *Scutellaria integrifolia* var. *breviflora* by *Hall 458*.

My concept of this species is essentially that of Epling (1942). It is clearly closely related to *Scutellaria resinosa* but I do not find intergrades between these, and prefer to retain them as "clean species", as noted under *S. resinosa*. If treated as a variety of *S. resinosa* the correct name would be var. *brevifolia*. Type material of *S. integrifolia* var. *brevifolia* (and additional collections from Dallas County, e.g., *C.L. Lundell & A.A. Lundell 9233, 9526, 11996, 14018* [LL]) has quite large corollas (up to 35 mm long) but otherwise differs but

little from typical forms of *S. wrightii*. Penland's (1924) concept of *S. resinosa* var. *resinosa* included *S. wrightii*, but Epling and I both disagree with his assessment in this instance.

While intergrades between *Scutellaria wrightii* and *S. resinosa* were not found in the present study, occasional plants of *S. wrightii* somewhat intermediate or approaching *S. drummondii* were noted (*e.g.*, Collin Co., *Correll 29912* LL; Travis Co., *Waddle 276* TEX). Such plants appear to be biennial or weakly perennial and possess an indument of raised recurved hairs reminiscent of *S. potosina*. I believe such plants to be hybrids or hybrid derivatives of *S. wrightii* × *S. drummondii* var. *edwardsiana*, the two taxa being broadly sympatric and frequently occur together or near each other, hence the occasional hybrid is not unexpected.

EXCLUDED TAXA

Scutellaria molanquitensis P.H. Valencia, Bol. Soc. Bot. Mex. 46:43. 1984.

While positioned in the sect. *Resinosa* by its author, based upon its red corollas, suffruticose habit, and nutlet ornamentation, I would position this taxon in the sect. *Spinosae*.

Scutellaria microphylla Moç. & Sessé *ex* Benth., *in* Lindl., Bot. Reg. 18. 1832.

Epling positioned this taxon in sect. *Resinosa*. Unfortunately, he did not examine type material of this name, nor have I been able to locate any. Epling (1942, p. 67) cites plate 1493 in the original publication as picturing the taxon concerned, but the said plate is labeled *Scutellaria alpina* and does not relate to the *Resinosa* complex. The very brief description rendered by Bentham does not permit one to know for certain what the name might apply to, but I doubt that it applies to any taxon of the sect. *Resinosa*, at least as used by Epling, since Sessé, who collected the type material, did not collect in northern México (where Epling applied the name to what I recognize as *S. texana*).

ACKNOWLEDGMENTS

This study is based upon the examination of approximately 1,705 specimens from the following institutions, as follows (numbers of loans shown in parenthesis): CAS (78), F (118), GH (204), LL (300), MO (151), TEX (500), UC (123), US (198).

Dr. Guy Nesom provided the Latin diagnoses, and he and T.P. Ramamoorthy kindly reviewed the manuscript.

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Phytologia (May 1994) 76(5):383-384.

NEW COMBINATIONS IN *THERMOPSIS* AND *BAPTISIA* (FABACEAE)

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ABSTRACT

Three new combinations are proposed to accommodate conceptual shifts in the systematics of *Baptisia* and *Thermopsis*: **Baptisia australis** var. **aberrans**, **Thermopsis gracilis** var. **ovata**, and **Thermopsis montana** var. **hitchcockii**.

KEY WORDS: Fabaceae, *Thermopsis*, *Baptisia*, taxonomy

In anticipation of publication of new DNA sequence data (Mendenhall 1994) and a discussion of its taxonomic implications, the following new combinations are proposed:

Baptisia australis (L.) R. Br. var. **aberrans** (Larisey) M. Mendenhall, *comb. nov.* BASIONYM: *Baptisia minor* Lehm. var. *aberrans* Larisey, Ann. Missouri Bot. Gard. 27:206. 1940. TYPE: U.S.A. Georgia: Walker Co., sandy roadside 8.5 mi. south of Chickamauga, 24 Apr 1938, *Pyron & McVaugh 2690* (HOLOTYPE: MO).

Thermopsis gracilis Howell var. **ovata** (B.L. Robins. *ex* Piper) M. Mendenhall, *comb. nov.* BASIONYM: *Thermopsis montana* Nutt. subsp. *ovata* B.L. Robins. *ex* Piper, Contr. U.S. Natl. Herb. 23:49. 1906. *Thermopsis ovata* (B.L. Robins. *ex* Piper) Rydberg, Bull. Torrey Bot. Club 40:43. 1913. *Thermopsis montana* Nutt. var. *ovata* (B.L. Robins. *ex* Piper) St. John, Torreya 41:112. 1941. *Thermopsis rhombifolia* (Nutt. *ex* Pursh) Nutt. *ex* Richardson var. *ovata* (B.L. Robins. *ex* Piper) Isely, Brittonia 30:470. 1978. TYPE: U.S.A. Idaho: Latah Co., "Cedar Mountain," 4 Jul 1893, *C.V. Piper 1489* (LECTOTYPE: WS!; Isolectotypes: GH!,US!,WS!).

Thermopsis montana Nutt. var. **hitchcockii** (Isely) M. Mendenhall, *comb nov.* BASIONYM: *Thermopsis macrophylla* Hook. & Arn. var. *hitchcockii* Isely, Brittonia 30:469. 1978. TYPE: U.S.A. Washington: Grays Harbor Co., roadside near Humptulips, 10 Jul 1931, *J.W. Thompson 7342* (HOLOTYPE: WTU; Isotypes: GH!,OSC,PH,POM,UC).

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Phytologia (May 1994) 76(5):385-388.

A NEW GYPSOPHILIC SPECIES OF *SOPHORA* (FABACEAE) FROM NUEVO LEON, MEXICO

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ABSTRACT

A new species of *Sophora*, **S. juanhintoniana** B.L. Turner, is described from a single gypseous outcrop in Mpio. Aramberri, Nuevo León. It is closely related to the relatively rare endemics, *S. purpusii* T.S. Brandegee of southern Coahuila and closely adjacent Zacatecas, and to *S. gypsophila* B.L. Turner & A. Powell of northeastern Chihuahua and western Texas, U.S.A.

KEY WORDS: Fabaceae, *Sophora*, gypsum, edaphic endemism, México

Sophora (sensu lato) is a cosmopolitan, relatively primitive, genus notorious for its wide array of morphological groupings, many of which have been elevated to generic status (*cf.* Polhill 1981, for review). The species described here belongs to the *Calia* grouping, which includes *S. arizonica* S. Wats., *S. formosa* Kearney & Peebles, *S. gypsophila* B.L. Turner & A. Powell, and *S. purpusii* T.S. Brandegee. Turner & Powell (1972), Northington (1976),and Van Devender & Northington (1977) have reviewed the taxonomy and distribution of most of these taxa, including rat-midden fossils of *S. gypsophila*.

Sophora juanhintoniana B.L. Turner, *sp. nov.* TYPE: MEXICO. Nuevo León: Mpio. Aramberri, La Soledad, base of gypsum mounds, 1680 m, 26 Mar 1994, *Hinton et al. 24053* (HOLOTYPE: TEX!).

Sophorae purpusii T.S. Brandegee similis sed floribus lavandulis (vs. albis), vexillis minoribus (ca. 14 mm longis vs. ca. 20 mm), foliis majoribus (4-6 cm longis vs. 3-4 cm), et habitatione gypsea (vs. calcarea) differt.

Low shrubs 0.4-1.2 m high. Stems (lower) 5-7 mm across, the bark grey and fissured. Leaves (larger) odd-pinnate with 11-19 leaflets; petioles mostly 0.5-0.8 cm long; rachises 4-6 cm long; leaflets broadly ovate to elliptic, the lowest pairs mostly 6-9 mm long, 3-5 mm wide, rounded at the apices, densely silvery-strigose beneath, less so above and soon glabrescent. Racemes short, the flowering axis ca. 6 mm long, the flowers 3-6 arranged in subverticillate terminal clusters on pedicels 2-6 mm long. Calyx 9-11 mm long, moderately short-strigose, bracteolate at the base, the hypanthium 3-4 mm long, the lower 3 lobes ca. 1 mm long, their apices rounded, the upper 2 lobes fused forming a single broad arcuate lobe ca. 1 mm high and 4 mm across. Petals lavender; banner bilobed, ca. 14 mm long, the claw ca. 4 mm long, the blade ca. 10 mm long and 6 mm wide; wing petals with claw ca. 4 mm long, the blade ca. 7 mm long, 2.5 mm wide; keel petals ± similar to the wings. Ovary densely silvery-strigose, mostly containing 6-8 ovules. Legumes weakly arcuate, 6-8 cm long, ca. 1 cm wide, persistently moderately appressed-pubescent. Seeds red, reniform, glabrous, ca. 8 mm long, 5 mm wide, the hilum ca. 2.5 mm below the broadest end.

Sophora juanhintoniana was first collected in sterile condition by the Hintons on 14 Jul 1993 (*Hinton et al. 23025* [TEX]). The same site was subsequently revisited in 1994, when type material was obtained along with a series of color photographs showing its habitat, habit, and flower details (on file with the holotype).

George Hinton, who revisited the type locality to collect flowers and fruit, noted the following (pers. comm., letter dated 30 Mar 1994):

> "Last Saturday I went back to the little gypsum area near La Soledad, Aramberri, to see if the *Sophora hintoniorum* [=*S. juanhintoniana*] was in flower. I was very pleased to find it in full bloom, and to be able to collect a few red beans so that the description can be complete. I figure that it grows in an area of three acres at the base of a gypsum mound, together with *Leucophyllum hintoniorum*, which is the dominant species. The whole gypsum area is about ten acres, but the *Sophora* grows only on the flat, and as soon as you leave the gypsum it disappears. We looked for some seedlings to bring back to the ranch but couldn't find any. The plant grows up to about 1.2 m., and usually has an old gnarled trunk from which sprout the branches."

Sophora juanhintoniana is clearly closely related to *S. gypsophila* of northeastern Chihuahua and the poorly known *S. purpusii* of northern Coahuila and closely adjacent Zacatecas (Northington 1976); the former is gypsophilic but, so far as known, the latter is calciphilic. These several taxa may be contrasted as follows (data for *Sophora purpusii* from the type description).

	S. juanhintoniana	*S. purpusii*	*S. gypsophila*
leaves	4-6 cm long	3-4 cm long	6-12 cm long
petioles	4-8 mm long	5-7 mm long	8-12 mm long
leaflets no.	11-19	13-19	13-19
lflt. size	5-12 mm long	6-8 mm long	10-16 mm long
Corollas:			
color	lavender	white	lavender
banner	ca. 14 mm long	ca. 20 mm long	25 mm long

The above comparisons are admittedly poorly contrasting, but it appears that *Sophora juanhintoniana* can be distinguished from *S. purpusii* by its lavender flowers (vs. white), with smaller banners (ca. 14 mm long vs. ca. 20 mm long), and larger leaves (4-6 cm long vs. 3-4 cm long). From *S. gypsophila* it differs markedly in its foreshortened racemes, and smaller leaves and flowers, as noted in the above comparisons.

The species name honors John Hinton (23 Dec 1951-1 Oct 1970), son of Jaime Hinton, whose early death precluded an extended experience with the Hinton family's botanical field excursions, but it is my understanding that he helped maintain the Hinton's personal herbarium and participated in numerous sorties with his father. For all of this, the present eponym is bestowed.

ACKNOWLEDGMENTS

I am grateful to Guy Nesom for the Latin diagnosis and to him and Alan Prather for reviewing the manuscript. Special thanks to George Hinton for gathering adequate type material and for providing detailed notes and photographs of the species and its habitat.

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Polhill, R.M. 1981. Sophoreae, *in* Advances in Legume Systematics 1:213-232 [Polhill & Raven, eds], Roy. Bot. Gardens, Kew, Great Britain.

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Phytologia (May 1994) 76(5):389-390.

TAXONOMIC STATUS OF *BRICKELLIASTRUM VILLARREALII* R.M. KING & H. ROBINS. (ASTERACEAE, EUPATORIEAE)

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ABSTRACT

The recently described *Brickelliastrum villarrealii* R.M. King & H. Robins. is a synonym of *Steviopsis nesomii* B.L. Turner. *Brickelliastrum fendleri* (A. Gray) R.M. King & H. Robins. (= *Eupatorium fendleri*: [A. Gray] A. Gray) is transferred to *Steviopsis* as **S. fendleri** (A. Gray) B.L. Turner, *comb. nov.*

KEY WORDS: Asteraceae, Eupatorieae, *Eupatorium*, *Brickelliastrum*, *Steviopsis*, México

King & Robinson (1987) recognized *Brickelliastrum* as having but a single species, *B. fendleri* (A. Gray) King & Robinson. King & Robinson (1994) added a second species, *B. villarrealii* R.M. King & H. Robins., to the genus.

Examination of type material of the latter shows this to be the same as *Steviopsis nesomii* B.L. Turner, a localized endemic of southern Nuevo León (Turner 1990). The description of *Brickelliastrum villarrealii* led me to re-examine *B. fendleri* and as a consequence I conclude that it fits comfortably into an expanded concept of *Steviopsis*, sensu Turner 1988 (including *Asanthus* R.M. King & H. Robins., and *Dyscritogyne* R.M. King & H. Robins.).

Steviopsis nesomii B.L. Turner, Phytologia 68:410. 1990. TYPE: MEXICO. Nuevo León: Mpio. Doctor Arroyo, ca. 35 km NE of Doctor Arroyo, 15 Oct 1988, *Nesom 6782* (HOLOTYPE: TEX).

Brickelliastrum villarrealii R.M. King & H. Rob., Phytologia 76:17. 1994. TYPE: MEXICO. Nuevo León: 9 km S of Zaragoza, 15 Nov 1991, *Estrada 2223A* (HOLOTYPE: US!).

Since its initial description, *Steviopsis nesomii* has been collected from four additional localities (not counting the above cited type of *Estrada*), as follows: MEXICO. Nuevo León: Mpio. Aramberri, between La Escondida and Josecito, *Hinton et al. 23947* (TEX); Cerro Viejo, *Hinton et al. 23959, 24031* (TEX); Mpio. Zaragoza, Cerro El Viejo, *Hinton 22447* (TEX).

In spite of King & Robinson's hunch that "The collection locality of the new species *Brickelliastrum villarrealii*] may actually not be far from the Warnock locality [Maderas del Carmen, northern Coahuila]"., it is clear from the above citations that the plant concerned came from the region in which it was said to have been collected.

Steviopsis fendleri (A. Gray) B.L. Turner, *comb. nov.* BASIONYM: *Brickellia fendleri* A. Gray, Mem. Amer. Acad. Arts 4:62. 1849. ≡ *Eupatorium fendleri* (A. Gray) A. Gray, Proc. Amer. Acad. Arts 17:205. 1882. *Brickelliastrum fendleri* (A. Gray) R.M. King & H. Robins., Phytologia 24:64. 1972.

This taxon has all of the attributes of *Steviopsis* (sensu Turner 1988) except that the anther appendages are somewhat better developed than might be expected.

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Phytologia (May 1994) 76(5):391-401.

TAXONOMIC STUDY OF THE *STACHYS COCCINEA* (LAMIACEAE) COMPLEX

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ABSTRACT

A taxonomic study of the *Stachys coccinea* complex, a mostly Mexican group with large orange-red to red annulate corollas, is rendered. Six species are recognized in the complex: *S. coccinea*, widespread from the southwestern U.S.A. (Arizona) to Nicaragua; **S. jaimehintonii** B.L. Turner, *sp. nov.*, from eastern Michoacán; *S. lindenii*, from southern México and Guatemala; *S. albotomentosa* (with two varieties: var. *albotomentosa* from northern Hidalgo, and var. **potosina** B.L. Turner, *var. nov.* from San Luis Potosí); **S. pacifica** B.L. Turner, *sp. nov.*, from the western slopes of the Sierra Madre Occidental (Sonora to Michoacán); and **S. torresii** B.L. Turner, *sp. nov.*, from Oaxaca. A key to the taxa is provided and distribution maps for each are presented.

KEY WORDS: Lamiaceae, *Stachys*, México, taxonomy

Epling (1934) provided a treatment of the North American elements of *Stachys*. In this he recognized eight species as belonging to a "Species Group VII", in part characterized by their relatively long, nonsaccate, deep purple or red corollas, the latter internally transversely or obliquely annulate near the base of the tube. Epling listed as first among this group the orange- or red-flowered *S. coccinea* Jacq., a widespread quite variable taxon occurring from the southwestern U.S.A. (westernmost Texas, southern New Mexico, and Arizona) to Guatemala.

The only other taxon having red or orange corollas in his group VII is *Stachys lindenii* Benth.; the remaining species are variously described as having pink to lavender or purple corollas. With study of numerous collections assembled since his publication, I have discerned several new taxa from among this complex which are described below.

This study is based upon 200 or more collections of the complex at LL, TEX and 85 sheets on loan from F and selected types from GH. The distributional maps (Figs. 1-4) are based upon these specimens.

KEY TO SPECIES OF THE *STACHYS COCCINEA* COMPLEX

(Taxa having large orange or red corollas, belong to species group VII of Epling 1934)

1. Leaves densely white-velvety beneath; calyces 11-15 mm long; San Luis Potosí, N Hidalgo. ..... *S. albotomentosa*

1. Leaves variously pubescent beneath, but not velvety; calyces 5-10(-13) mm long. ..... (2)

2. Angles of stems beset with stiff, retrorse, broad-based prickles. ... . *S. lindenii*

2. Angles of stems variously pubescent but prickles absent. .....(3)

3. Bracts of inflorescence thin, broad and leafy, about as wide as long, mostly 15-25 mm wide; calyx lobes markedly ciliate with stiff hairs 0.5-1.0 mm long; Michoacán (vicinity of Zitácuaro). ..... *S. jaimehintonii*

3. Bracts of inflorescence not as described in the above; widespread. ... (4)

4. Midstem leaves large and thin, mostly 8-15 cm long, their petioles mostly (3-)4-10 cm long; calyces with tubes mostly 3-4(-5) mm long; westernmost Pacific slopes. ..... *S. pacifica*

4. Midstem leaves smaller and thicker, mostly 6-10(-12) cm long, their petioles mostly 2-3(-4) cm long; calyces with tubes mostly (5-)6-10 mm long. .....(5)

5. Calyx lobes 6-7 mm long, as long as or longer than the campanulate tube; stems with a mixture of long, broad-based trichomes and short glandular hairs; Oaxaca. ..... *S. torresii*

5. Calyx lobes 2-5 mm long, shorter than the cylindrical tube; stems variously pubescent but broad-based hairs absent; widespread from U.S.A. to Nicaragua. ..... *S. coccinea*

1a. *STACHYS ALBOTOMENTOSA* Ramamoorthy var. *ALBOTOMENTOSA*, An. Inst. Biol. Univ. Nac. Auton. Mex. Bot. 34:158. 1987. TYPE: MEXICO. Hidalgo: Jacala, 9 Sep 1940, *Moore 12* (HOLOTYPE: MEXU).

Suffruticose herbs 30-50 cm high. Midstems 2-4 mm across, densely tomentose. Midstem leaves thick, mostly 4-8 cm long, 1.5-3.5 cm wide; petioles 1-3 cm long; blades ovate to deltoid, bicolored, densely velvety-tomentose beneath, the margins finely crenulate. Flowers axillary, sessile or nearly so, 4-6 to a node, arranged along the upper portions of the stem, the subtending leaves much-reduced, thick, lanceolate, 2-3 times as long as wide. Calyces mostly 12-14 mm long, tubular or only slightly flaring; tubes (7-)10-12 mm long, evenly silky-pilose throughout with short hairs; lobes 2.5-3.5 mm long, their apices narrowly acuminate. Corollas "salmon-colored" to red; tubes 14-20 mm long, annulate within ca. 4 mm above the base; lower lip ca. 9 mm long; upper lip ca. 6 mm long. Anthers exserted ca. 4 mm beyond the tube. Nutlets ca. 2.2 mm long, 1.8 mm wide, the surfaces minutely rugulose (×40).

ADDITIONAL SPECIMENS EXAMINED: MEXICO. Hidalgo: Jacala, 13 Nov 1937, *Kenoyer 639* (F); 10 mi SW of Jacala, on moist cliffs, ca. 9000 ft., 23 Jul 1940, *Hitchcock & Stanford 72678* (F); 6.5 air km ENE of Jacala between Cuesta Colorado and El Pinalito along México hwy 85, "limestone boulders covered with cacti and many ferns in woodland of pine and oaks", 1700 m, 13 Jul 1991, *Mayfield et al. 815* (TEX); near Jacala, 8 Apr 1939, *Perkins & Hall 3329* (F); 10 km by road NE of Jacala along hwy 85, pine-oak woodlands, ca. 1030 m, 12 Jul 1965, *Roe et al. 234* (LL).

Two morphogeographical varieties are recognized for this recently described species, which was known to its original author by only the holotype. The numerous collections assembled since that time speaks to its biological reality; the plants concerned, all from the vicinity of Jacala, are remarkably uniform. The description of var. *albotomentosa* (above) includes only those collections from Hidalgo, México.

1. Midstem leaves mostly 8-12 cm long; stems silky-pilose, scarcely tomentose; San Luis Potosí. ..... var. *potosina*

1. Midstem leaves mostly 3-5 cm long; stems densely tomentose; N Hidalgo. ..... var. *albotomentosa*

1b. **STACHYS ALBOTOMENTOSA** Ramamoorthy var. **POTOSINA** B.L. Turner, *var. nov.* TYPE: MEXICO. San Luis Potosí: 30 mi E of San Luis Potosí along hwy 86 to Río Verde, rocky open oak-wooded hillside, 13 Jul 1963, *R.L. McGregor 631*, with L.J. Harms, A.J. Robinson, R. del Rosario, and R. Segal (HOLOTYPE: LL!).

Stachydi albotomentosa Ramamoorthy var. *albotomentosa* similis sed foliis midcaulinis majoribus (plerumque 8-12 cm longis vs.

3-8 cm longis) et caulibus laxe sericei-pilosis (vs. dense tomentosis) differt.

Resembling var. *albotomentosa* but the midstem leaves larger (mostly 8-12 cm long vs. 3-8 cm) and the stems loosely silky-pilose (vs. densely tomentose).

ADDITIONAL SPECIMENS EXAMINED: MEXICO. San Luis Potosí: ca. 21 m E of San Luis Potosí along hwy 70 to Río Verde, 23 Jul 1981, *Poole 2375* (TEX); ca. 40 km E of San Luis Potosí along hwy 70, then along side road to microwave tower, near crest, oak woodlands, 2700 m, 30 May 1974, *Sanders 74036* (TEX).

This taxon is clearly related to var. *albotomentosa* but differs in several characters, as noted in the key. It appears to be more variable than var. *albotomentosa*, the leaves on their undersurfaces varying from merely loosely silky-pilose beneath (*Poole 2375*) to densely tomentose (*Sanders 74036*); the former collection also has glandular-pilose stems, suggesting possible contamination with genes from *Stachys coccinea* but, so far as known, elements of the latter have not been collected in San Luis Potosí.

2. *STACHYS COCCINEA* Ort., *Nov. Pl. Descr.* Dec. 20, 1797. TYPE: CUBA(?). Grown in Spain from seed reportedly collected in Cuba by Sessé (HOLOTYPE: MA; Probable isotype: F! [Ex antiguo herbaria generali, Hort Madrid ex "Nova Hispania"]). Epling (1935) listed *S. coccinea* Jacq., *Hort. Schoenb.* 3:18, t. 284. 1798, as the preferred citation for this name, apparently not certain of the typification of Ortega's earlier name. Seed was apparently collected in México by Sessé, presumably in the vicinity of what is now México City, and shipped secondarily from Cuba.

?*Stachys cardinalis* Kunze, Bot. Zeit. 2:645. 1844. TYPE: MEXICO(?). Grown in garden at Leipzig. Not examined, but from the description probably *S. coccinea.*

Stachys oaxacana Fernald, Proc. Amer. Acad. Arts 35:564. 1900. TYPE: MEXICO. Oaxaca: Papico, Cuicatlán, 5400 ft, 9 Dec 1895, *Gonzáles 47* (LECTOTYPE: GH! [designated by Epling 1934]).

Stachys limitanea A. Nels., Amer. J. Bot. 25:115. 1938. U.S.A. Arizona: Massacre Camp, between Ruby and Tucson, *Nelson & Nelson 1471* (HOLOTYPE: RM, not examined).

Perennial erect herbs 0.4-1.5 m high. Roots forming short rhizomes. Midstems 2.0-4.8 mm across, variously pubescent, but most often pilose with spreading hairs. Midstem (primary) leaves mostly 6-10(-12) cm long, 3-4(-5) cm wide; petioles mostly 1-3 cm long, much shorter than the blades; blades

thick, ovate to ovate-cordate, 3-5 nervate from the base, variously pilose beneath, but usually moderately so, the margins crenulate. Flowers mostly 4-6 to a node, forming a lax terminal bracteate inflorescence. Calyces mostly tubular, (6-)7-12 mm long, minutely glandular-pubescent to pilose, the lobes 2-4(-5) mm long, apiculate. Corollas orange to red, mostly 15-25 cm long, the upper lips 4-6 mm long, the lower lips 6-9 mm long, annulate within 3-4 mm above the base. Stamens exserted for 4-6 mm, the anthers ca. 1 mm long. Nutlets brown, ovoid, ca. 2.5 mm long, 2 mm wide, the surfaces minutely rugulose (×40).

The type material of *Stachys oaxacana* (5 sheets, GH!) differs somewhat from most specimens of *S. coccinea* in having shorter calyces (mostly 5-6 mm long vs. 6-12 mm long) and longer thinner leaves, approaching those of *S. pacifica* B.L. Turner, otherwise it seems to match well material of *S. coccinea.* Additional study, however, may show that populations from the region concerned (northcentral Oaxaca) are worthy of formal recognition.

3. **STACHYS JAIMEHINTONII** B.L. Turner, *sp. nov.* TYPE: MEXICO. Michoacán: Zitácuaro, Salto de Nandio, bushy bank by orchard, 1500 m, 26 Dec 1938, *Jaime Hinton 13489* (HOLOTYPE: LL!; Isotypes: TEX! [2]).

Label data indicate that the type material was collected by "J.H.", in reference to Jaime Hinton, the son of G.B. Hinton. Jaime collected with his father over an extended period during the 1930's (*cf.*, Hinton & Rzedowski 1972).

Stachydi coccineae Jacq. similis sed floribus in spica congesta foliacea terminalique dispositis, bracteis tenuibus plerumque 15-25 mm latis, et calycibus ad maturitatum late sursum factis lobis sigillatum ciliatis differt.

Clambering succulent herbs (according to label data) to 50 cm high (the lower portions absent on most sheets examined). Midstems 2-4 mm across, minutely pubescent with a vestiture of glandular hairs ca. 0.1 mm high, scattered among these an array of stiffly erect multiseptate trichomes 0.5-2.0 mm long. Midstem leaves large and thin, 8-15 cm long, 4-7 cm wide; petioles mostly 2.5-5.0 cm long, pubescent like the stem; blades cordate, sparsely pubescent above and below with appressed hairs, mostly along the major veins, the margins crenulodentate. Inflorescence a congested terminal bracteate columnar spike 8-15 cm long, 3.0-4.5 cm across, the bracts markedly thin and leafy, mostly 15-25 mm long and about as wide, their margins ciliate with stiff hairs. Flowers mostly 6 to a node, their pedicels 2-3 mm long. Calyces 12-14 mm long, broadly flaring upwards at maturity; tubes 8-10 mm long, pubescent

throughout with stiff multiseptate trichomes 0.5-2.5 mm long; lobes ca. 4 mm long, 2-3 mm wide at base, their apices apiculate. Corollas orange; tubes 15-18 mm long, annulate within ca. 4 mm above the base; lower lip ca. 8 mm long; upper lip ca. 7 mm long. Anthers exserted ca. 4 mm beyond the tube. Nutlets ca. 2 mm long, 1.9 mm wide, smooth, their surfaces minutely rugulose (×40).

This species is remarkable for its congested leafy-bracteate terminal spikes and flaring calyces with markedly ciliate lobes.

4. *STACHYS LINDENII* Benth. *in* DC., *Prodr.* 12:467. 1848.

My circumscription of this taxon is the same as Epling's. *Stachys lindenii* is readily distinguished by its sprawling vine-like habit and stems which are beset with very broad-based recurved prickles. It is adequately described by both Epling (1935) and Standley & Williams (1973).

5. **STACHYS PACIFICA** B.L. Turner, *sp. nov.* TYPE: MEXICO. Michoacán: Distr. Apatzingan, Aguililla, on cliffs, 12 Oct 1939, *Hinton et al. 15319* (HOLOTYPE: LL!; Isotype: F!).

Stachydi coccineae Ort. similis sed foliis plerumque tenioribus majoribusque (8-15 cm longis vs. 6-10 cm longis) petiolis longioribus (3-6 cm longis vs. 1-3 cm longis), calycibus minoribus (plerumque 4-7 mm longis vs. 7-12 mm longis), et corollarum labio supero longiore (7-10 mm longis vs. 4-6 mm longis) differt.

Perennial erect brittle-stemmed herbs 0.4-1.5 m high. Roots at first forming a slender tap root, but soon developing slender rhizomes. Midstems 1.5-3.0 mm across, sparsely to moderately pilose with spreading hairs 0.7-1.5 mm long, these often somewhat broad-based, below these a shorter vestiture of shorter glandular hairs 0.1-0.3 mm, or else an underlayer of hairs absent. Midstem (primary) leaves mostly 7-11 cm long, 3-5 cm wide; petioles (3-)4-5(-6) cm long; blades thin, cordate, sparsely pilose beneath, especially along the veins, the margins crenulodentate. Flowers (2-)4-6 to a node, arranged in a lax terminal interrupted inflorescence. Calyces mostly 4-6(-7) mm long, the lobes linear-lanceolate to narrowly triangular, mostly 2-4 mm long, the tube minutely glandular-pubescent. Corollas red, mostly 2.5-3.5 cm long, the tube relatively narrow, 20-25 mm long, 2.0-3.5 mm wide at mid-portion, the lower lip 4-5 mm long, the upper lip 7-10 mm long, annulate within ca. 2 mm above the base. Stamens 4, subequal, extending from the throat for 7-10 mm; filaments pilose; anthers ca. 0.7 mm long. Nutlets brown, obovoid to ovoid, ca. 1-3 mm long, 2 mm wide, the surfaces minutely "pitted" or rugulose (×40), often secondarily encrusted with scablike wellings.

ADDITIONAL SPECIMENS EXAMINED: MEXICO. Jalisco: Mpio. Talpa, entre Cumbre del Tejamani y Cuale, pine-oak woodlands on side of hill, 1660 m, 8 Mar 1971, *Gonzáles T. 132* (TEX); Hacienda del Ototal, W of San Sebastián, Arroyo de los Palos Blancos, slope in densely wooded canyon, 1500 m, 9 Mar 1927, *Mexia 1844* (TEX); Trail from San Sebastián to Las Mesitas, 1500 m, 10 Mar 1927, *Mexia 1855-a* (TEX); Mpio. Zapotitlán, ca. 22 km NNW of Colima, N of Cerro El Campanario along Arroyo Cordoban, ca. 1375 m, 1 Nov 1990, *Phillips 1043* (TEX). Nayarit: Mpio. Tepic, 5 km NE of Cuarenteno, 15 Sep 1990, *Flores F. 2344* (TEX). Sinaloa: w/o locality, 1933, *Ortega 7105* (F). Sonora: Río Mayo watershed, San Bernardo and vicinity, Chorijoa, short-tree forest, 400-1000 m, Sep 1961, *Arguelles 135* (LL).

This taxon is readily distinguished from *Stachys coccinea* by its very thin leaves with relatively long petioles; additionally, it has smaller calyces and mostly narrower corolla tubes.

Stachys pacifica is a relatively widespread taxon occurring from southern Sonora to Michoacán (Figure 2) along the Pacific slopes, hence its name.

6. **STACHYS TORRESII** B.L. Turner, *sp. nov.* TYPE: MEXICO. Oaxaca: Distr. Mixe, "En los primeros 5 km de el camino a Villa Alta, entrado por la desviación que esta aprox. a 10 km de Totontepec ... Veg. Ruderal de bosque mesófilo con neblina"., 13 Dec 1985. *R. Torres C. 7925* (HOLOTYPE: F!; Isotype: MEXU).

> *Stachydi coccineae* Ort. similis sed differt calycis lobis tubum longitudine aequantibus vel superantibus (vs. lobis 2-plo vel plus brevioribus) et caulibus pubescentibus trichomatibus longi-patentibus basis latae ac trichomatibus brevioribus glandulosis (vs. trichomatibus basis latae carentibus).

Perennial herbs ca. 40 cm high. Midstems ca. 3 mm across, sparsely pubescent with spreading, somewhat broad-based, trichomes 1.0-1.5 mm long, below these a moderately dense vestiture of glandular hairs ca. 0.25 mm high. Midstem leaves ca. 10 cm long, 5 cm wide; petioles ca. 3.5 cm long; blades relatively thin, cordate, 3-5 nervate, sparsely pilose beneath, especially along the veins, the margins crenulate. Flowers 4-6 to a node, arranged in a lax terminal interrupted leafy inflorescence. Calyces 13-14 mm long, the tube crenulate, 6-7 mm long, glandular-pubescent with hairs ca. 0.5 mm long, the lobes linear-lanceolate, 6-7 mm long, pubescent with glandular hairs ca. 0.5 mm long. Corollas orange-red, 3.0-3.5 cm long, the upper lip ca. 9 mm long, the lower lip ca. 12 mm long, the inner portion annulate ca. 3 mm from the base. Nutlets ovoid, ca. 2.5 mm long, 2 mm wide, the surfaces minutely rugulose (×40).

Figure 1. Distribution of *Stachys coccinea*.

Figure 2. Distribution of *Stachys lindenii*.

Figure 3. Distribution of *Stachys* species: *S. jaimehintonii* (open circle); *S. albotomentosa* (open triangles var. *albotomentosa*; closed triangles var. *potosina*); *S. pacifica* (closed circles); and *S. torresii* (open squares).

This taxon combines characters of *Stachys lindenii* (at least some of the stem-hairs broad-based, leaves cordate and thin, and the corollas with exceptionally well-developed lips) and *S. coccinea* (erect herbs with large well-developed calyces). *Stachys torresii* differs from both in having very large calyces, the lobes as long as or longer than the tubes.

ACKNOWLEDGMENTS

I am grateful to Guy Nesom for the Latin diagnoses, and to him and T.P. Ramamoorthy for reviewing the manuscript.

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Phytologia (May 1994) 76(5):402-405.

MISCELLANEOUS NOTES ON NEOTROPICAL FLORA XXII. IDENTIFICATION OF THE GENUS *PHYLLOSTELIDIUM* AND A FEW NEW COMBINATIONS IN THE COMPOSITAE

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ABSTRACT

The status of the Beauverd genus *Phyllostelidium* is clarified and it's synonymy is presented. New combinations are provided for a few Senecioideae, six species of *Pentacalia* subgenus *Microchaetae*, and one *Lasiocephalus*. *Scrobicaria* Cassini is reduced to synonymy under *Pentacalia*.

KEY WORDS: Compositae, Inuleae, *Phyllostelidium*, Senecioneae, *Lasiocephalus*, *Pentacalia*, *Scrobicaria*

Identification of genus *Phyllostelidium* Beauverd.

In a 1915 meeting of the Soc. Botanique de Genéve, G. Beauverd presented a note announcing a forthcoming publication of a new genus of the Compositae, Gnaphaliinae: *Phyllostelidium* represented by two peruvian species: *P. aretioides* and *P. pavonianum*.

The promised description was never published, but the characters given and its type species fixed in the short note presented by Beauverd in 1915 were sufficient enough to accept the generic name as a nomenclaturally valid publication:

> "*Phyllostelidium*, a l'aspect de petites colonnettes feuillées que présentent les ramifications de cette *plante a coussinet* des hautes régions des Andes. Ce nouveau genre est caractérisé par la dioïcie absolue et la forme particuliére du stigmate de ses fleurs femelles; il comprend jusqu'á présent deux espèces bien distinctes, le *Phyllostelidium aretioideum* (Sch. Bip.) Beauverd, comb. nov., ancien

Baccharis aretioides Sch. Bip. figuré sous le nom de *Merope aretioides* Wedd. dans le "Chloris Andina: page 164 tab. 25A, puis le *P. pavonianum* Beauverd spece nouvelle des Andes de Pérou." (Bull. Soc. Bot. Genéve, ser. 2, 7:185. 1916)."

The *Index Kewensis* listed the names of the genus and the two species. Willis (1973) also lists it as a proper genus; Grau (1977), in his systematic review of the Astereae, lists the genus as a synonym of *Baccharis*; Mabberley (1989), in the Plant Book, mentions *Phyllostelidium* as a synonym of *Baccharis*; Merxmuller *et al.* (1977), in their review of the Inuleae do not mention it at all; and neither do Dillon & Sagástegui (1991), in Flora of Perú.

Having had the opportunity myself to examine the collections cited by Beauverd and his annotations in the 'G' Herbarium, I obtained the evidence that *Phyllostelidium* Beauverd is a synonym of *Mniodes* A. Gray. Its type species is *Baccharis aretioides* Schultz Bip. which was already transferred to *Mniodes* by myself in 1954. But since *Baccharis aretioides* Schultz Bip. (1856) is an illegitimate homonym of *Baccharis aretioides* Turcz. (1851), a different species, according to the International Rules (Codex, Art. 81) the specific binomen *Mniodes aretioides* Cuatrec. must be considered a new name, instead of a new combination.

Mniodes A. Gray *ex* Bentham & Hooker, *Gen. Pl.* 2:301. 1876. Type species: *Antennaria andina* A. Gray = *Mniodes andina* (A. Gray) A. Gray.

Phyllostelidium Beauverd, Bull. Soc. Bot. Genéve, Ser. 2, 7:185 (1915) 1916. Type species: *Baccharis aretioides* Sch. Bip. = *Merope aretioides* (Sch. Bip.) Weddell, = *Mniodes aretioides* Cuatrec.

Mniodes aretioides Cuatrec., *Folia Biol. And.* 1:3. 1954. *Baccharis aretioides* Schultz Bipontinus, 1856 (not Turczaninow 1851). *Phyllostelidium aretioideum* (Schultz Bipontinus) Beauverd, Bull. Soc. Bot. Genéve 7:185 (1916).

Mniodes pulvinulata Cuatrec., *Folia Biol. And.* 1:5. 1954. Synonym: *Phyllostelidium pavonianum* Beauverd, *nomen nudum* "coll. Pavon" (Ruiz & Pavón) Perú.

New combinations in the Senecioneae

Lasiocephalus stylotrichus (Cabrera) Cuatrec., *comb. nov.* BASIONYM: *Senecio stylotrichus* Cabrera. Notas Mus. La Plata 15:107, fig. 15. 1950. TYPE: *Steinbach 3363*, cerro Hosana Sta. Cruz, BOLIVIA (LIL).

Pentacalia pleniaurita (Cuatrec.) Cuatrec., *comb. nov.* BASIONYM: *Senecio pleniauritus* Cuatrec., Proc. Biol. Soc. Wash. 77:154-155. 1964. TYPE: PERU. Chachapoyas: cerro Yama-uma, above Taulia, 3200-3450 m, *Wurdack 1669*; HOLOTYPE: US.

Pentacalia miniaurita (Sagást. & Dillon) Cuatrec., *comb. nov.* BASIONYM: *Senecio miniauritus* Sagástegui & Dillon, Brittonia 37:11-13, fig. 4. 1985. TYPE: PERU. Chachapoyas: Leimabamba-Balsas, 3400 m., *Dillon & Turner 1732*; HOLOTYPE: F.

Pentacalia pavonii (Weddell) Cuatrec., *comb. nov.* BASIONYM: *Culcitium pavonii* Weddell, *Chl. And.* 1:141. 1856. TYPE: PERU. *Pavón s.n.* (sine loc.); LECTOTYPE: G.

Pentacalia curvidens (Sch. Bip. *ex* Klatt) Cuatrec., *comb. nov.* BASIONYM: *Senecio curvidens* Schultz Bip. *ex* Klatt, Lepoldina 24:127. 1888. TYPE: PERU. Tatamara, *Lechler 2658*; HOLOTYPE: B.

Pentacalia aquifolia (Cuatrec.) Cuatrec. & H. Robinson, *comb. nov.* BASIONYM: *Gynoxys aquifolia* Cuatrec., Fieldiana 27(1):12-13. 1950. TYPE: VENEZUELA. Parámo de Tamá, *Steyermark 57381*; HOLOTYPE: F. *Scrobicaria aquifolia* (Cuatrec.) B. Nord. Opera Bot. 44:64. 1978.

Pentacalia ilicifolia (L.*f.*) Cuatrec. & H. Robins., *comb. nov.* BASIONYM: *Staehelina ilicifolia* L.*f.*, *Sp. Pl. Suppl.* 358. 1781. *Cacalia ilicifolia* (L.*f.*) Kunth *in* H.B.K., *Nov. Gen. Sp. Pl.*, ed. fol. 4:163 (1818). *Senecio scrobicaria* DC., *Prodr.* 6:422. 1838. *Gynoxys ilicifolia* (L.*f.*) Weddell, *Chlor. And.* 1:80. 1856. *Scrobicaria ilicifolia* (L.*f.*) Nord., Opera Bot. 44:64. 1978.

The latter two combinations reflect the reduction of the genus *Scrobicaria* Cassini to synonymy under *Pentacalia*. The relationship between the species of *Scrobicaria* is very close to species already placed in *Pentacalia* subg. *Microchaete* (Benth.) Cuatrec., *e.g.*, *P. guadalupe* Cuatrec., *P. andicola* (Turcz.) Cuatrec. The opposite leaves used to distinguish *Scrobicaria* cannot not be considered a reliable basis for separation at the generic level.

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Phytologia (May 1994) 76(5):406-409.

A NEW SPECIES OF *CASTILLEJA* (SCROPHULARIACEAE) FROM CHIHUAHUA, MEXICO

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ABSTRACT

A new species from west-central Chihuahua is described: **Castilleja lebgueana** Nesom. It is the third known species of the "Ortegae group," which is formally recognized here as **Castilleja** sect. **Ortegae** Nesom (*sect. nov.*). The three species of sect. *Ortegae* occur in the sierras of western and southwestern México, mostly on the Pacific slope.

KEY WORDS: *Castilleja*, Scrophulariaceae, Chihuahua, México

Recent intensive collecting within Parque Nacional "Cascada de Basaseachi" has brought to light an undescribed species of *Castilleja*. To provide a valid name for citation in a checklist of vascular plants of the park (R. Spellenberg, T. Lebgue, and R. Corral D. in prep.), the species is formally described here.

Castilleja lebgueana Nesom, *sp. nov.* TYPE: MEXICO. Chihuahua, Mpio. Ocampo, Parque Nacional "Cascada de Basaseachi, along the Río Candamena ca. 1/2 km downstream from the base of the cascada, just above the bend in the river; 108° 12′30″W, 28° 11′N; shaded cleft in large boulder receiving afternoon sun, only one plant seen, elev. 1600 m, 24 May 1994, *R. Spellenberg 12034* with R. Miller (HOLOTYPE: NMC!).

Castilleja ortegae Standley maxime affinis sed duratione annua, calyce dentati-lobato, et floribus sigillatim angustioribus corollis brevioribus differt.

Annuals (evidently) from a short slender taproot. Stems 24-36 cm tall, herbaceous from base to apex, very distinctly green-ribbed, the ribs apparently

originating as decurrent leaf bases, short-pilose with a mixture of stipitate-glandular hairs and non-glandular hairs 0.2-0.5 mm long. Leaves spreading to slightly deflexed, on internodes 5-15 mm long, narrowly oblong-lanceolate, entire, 3-veined (outer pair near the margins), 12-30 mm long, 3.0-3.5(-4.0) mm wide, sessile, barely but perceptibly decurrent, not at all clasping, mostly strigose-hispid above and beneath with loosely appressed to arching, non-glandular, sharp-pointed hairs, sometimes slightly stipitate-glandular near the base. Floral bracts spreading-ascending, green, the lower identical to the uppermost leaves, very slightly reduced in size upwards. Inflorescence a distinctly secund raceme 7-12 cm long, the flowers spreading to slightly ascending, separated by internodes 3-5 mm long; rachis and pedicels stipitate-glandular; pedicels 1-4 mm long. Calyx densely stipitate-glandular, greenish-pink or more strongly reddened distally, thin-hyaline at the base, slightly curved, not at all medially constricted, 17-20 mm long, the lateral lobes broadly dentate with shallow (1.0-1.5 mm) attenuate teeth, the abaxial cleft 6-9 mm deep, the adaxial clefts ca. 3 mm deep. Corolla light creamy-yellow, 19-25 mm long, the galea ca. 1/3 the tube length, very sparsely bearded near the apex, exserted 5-8 mm from the calyx, the lower lip of 3, linear, thickened, green teeth; stigma abruptly clavate apically. Mature fruits not observed.

Castilleja lebgueana is named for Toutcha Lebgue of the Universidad Autónoma de Chihuahua (Cd. Chihuahua), who is collaborating with Richard Spellenberg in the production of a documented checklist of the Basaseachi flora.

Castilleja lebgueana is most similar and presumably most closely related to *C. ortegae* Standley, and in turn, to the more recently described *C. pterocaulon* N. Holmgren (Holmgren 1976). This group (the "Ortegae group" sensu Holmgren) is characterized by narrow, entire, spreading leaves, a strongly secund inflorescence with green floral bracts, irregularly cleft calyces, and corollas with a short galea (about 1/3-1/4 the length of the corolla tube). Plants of the two earlier-named species are clearly perennial (vs. apparently annual in *C. lebgueana*). *Castilleja pterocaulon* is endemic to the Sierra de Manantlán and Sierra de Cuale of southern Jalisco. *Castilleja ortegae* has been collected a number of times from the region near its type locality in southern Sinaloa and into north-central Durango. Holmgren (1976) has noted that the species also occurs in Chihuahua and Sonora, but I have not studied specimens of it from this more northern region. These Chihuahuan and Sonoran plants may prove to be *C. lebgueana*; otherwise, the latter is known only from the type collection.

The three species of the Ortegae group are distinguished by the following contrasts.

1. Plants perennial; stems and calyces eglandular; the green cauline ribs strongly contrasting with the stramineous stem; leaves linear to filiform. . . . . *C. pterocaulon*

1. Plants perennial or annual; stems and calyces stipitate-glandular; the green cauline ribs nearly the same color as the stems; leaves narrowly elliptic to linear- or oblong-lanceolate. ..... (2)

    2. Plants apparently annual from a slender taproot and herbaceous stems; calyx relatively narrow (2-3 mm wide, pressed), the two lateral lobes secondarily lobed, broadly dentate; corollas 19-25 mm long, with galea 6-8 mm long. ..... *C. lebgueana*

    2. Plants distinctly perennial from a woody root and basally woody stems; calyx relatively broader (4-5 mm wide, pressed), the two lateral lobes entire and apically rounded; corollas (23-)27-32 mm long, with galea 9-12 mm long. ..... *C. ortegae*

The Ortegae group is most similar in features of the inflorescence and corollas to *Castilleja* sect. *Epichroma* Benth., but the latter has pectinately divided leaves with filiform segments, and four of the five species are annuals. Holmgren (1978, p. 193) observed that "the leaves of *C. tayloriorum* N. Holmgren of Costa Rica are reminiscent of the species of sect. *Epichroma* Benth.," but they are very different in floral morphology and their foliar resemblance is convergent. Holmgren (1976, p. 206-207) noted that "The nearly funnelform calyx, the longer corolla tube in proportion to the galea, and the secund inflorescence of the Ortegae species is similar to that of the *Epichroma* species, wheras the entire, sometimes reflexed, narrow leaves [of the Ortegae species] are similar to those in the members of the Tenuiflorae group [= sect. *Castilleja*] .... The floral and vegetative characteristics of the [Ortegae] species represent a transition between the typical taxa of the [sect.] *Castilleja* and the species of [sect.] *Epichroma*."

Plants of sect. *Castilleja* (*C. fissifolia* L.*f.*, the type) are characterized by deeply and irregularly cleft calyces and corollas with the galea about the same length as the tube. All Mexican species with an irregularly cleft calyx (sect. *Castilleja* — 19 species, Sect. *Epichroma* Benth. five species, and the Ortegae group) are treated in a key (Nesom 1992).

Holmgren (1976) noted that the Ortegae group is "a distinctive group worthy of sectional status, but the formal definition of such groups must await a more thorough understanding of the entire genus." A discussion of the broad structure of the genus and problems in sectional delimitation has recently been published by Chuang & Heckard (1991), who recognize three subgenera, including a broadly inclusive subg. *Castilleja*. While the rank of any infrageneric group of the genus will certainly be subject to review, I agree that the Ortegae group should be formally recognized. There are no other species that might be equivocally placed within it, and its closest relative appears to be sect. *Epichroma*, an equally distinctive group. The Ortegae group is treated here as

a section, in view of its distinctive morphology and its apparent intermediate position between sect. *Castilleja* and sect. *Epichroma*.

Castilleja sect. **Ortegae** Nesom, *sect. nov.* TYPE: *Castilleja ortegae* Standley.

> *Castillejae* sect. *Epichromae* Benth. similis inflorescentia valde secunda, calycibus irregulariter fissis, et corollae galea brevi (galea quam tubo ca. 3-4-plo breviore) sed foliis integris (vs. pectinatim divisis) differt.

Species included: *Castilleja ortegae*, *C. pterocaulon*, and *C. lebgueana*.

ACKNOWLEDGMENTS

I thank Rich Spellenberg and Billie Turner for their review of the manuscript.

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Phytologia (May 1994) 76(5):410-411.

VALIDATION OF THE COMBINATION *ELEUSINE CORACANA* SUBSPECIES *AFRICANA* (KENNEDY-O'BYRNE) HILU & DEWET

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ABSTRACT

The new combination *Eleusine coracana* (L.) Gaertn. subspecies *africana* (Kennedy-O'Byrne) Hilu & deWet was published without meeting some criteria of valid publication. The criteria are hereby met by providing direct reference for the basionym and joining the authors names by "et".

KEY WORDS: Poaceae, *Eleusine*, nomenclature

The African tetraploid *Eleusine africana* Kennedy-O'Byrne was segregated from the pantropic weedy diploid species *E. indica* (L.) Gaertn. by Kennedy-O'Byrne (1957). Recognition of the new species was based primarily on chromosome number and certain quantitative morphological characters, with emphasis on lemma length as the primary distinguishing character. Phillips (1972) recognized *E. africana* as a subspecies of *E. indica* because of overlap in various reproductive characters, including those that distinguish between the two taxa. She, however, indicated that both taxa can be distinguished on the bases of qualitative morphological characters related to ligule structure, seed shape, and seed surface ornamentation. She also (Phillips 1972) pointed out the morphological overlap and the natural hybridization between subspecies *africana* and domesticated *E. coracana*.

Cytogenetic data show *Eleusine indica* subsp. *africana* to be conspecific with *E. coracana* (Chennaveerdiah & Hiremath 1974). Based on these and morphological information, the former was placed as a subspecies in *E. coracana* (Hilu & deWet 1976). Subsequent cytogenetic, biochemical, and molecular work support this taxonomic treatment (reviewed in Hilu & Johnson 1992).

The *International Code of Botanical Nomenclature*, Article 33, Section 2, states that "A new combination, or an avowed substitute (*nomen novum*),

published on or after 1 Jan. 1953, for a previously and validly published name is not validly published unless its basionym or the replaced synonym is clearly indicated and a full and direct reference given to its author and place of valid publication with page or plate reference and date". The *Code* also requires that authors names joined by "et" or "&" but not "and" since the publication is done in Latin. Neither of these two rules were followed in the publication of Hilu & deWet (1976). The valid publication of the new combination *Eleusine coracana* subspecies *africana* is given below:

Eleusine coracana (L.) Gaertn. subspecies **africana** (Kennedy-O'Byrne) Hilu et deWet, *comb. nov.* BASIONYM: *Eleusine africana* Kennedy-O'Byrne, *In* Kew Bulletin 12:65-72. (1957). TYPE: SOUTH AFRICA. Cape Province, Kimberely District, Warrenton-on-Vaal, March 1950, *Wilman H.K.I* (HOLOTYPE: K). Synonym: *Eleusine indica* (L.) Gaertn. subspecies *africana* (Kennedy-O'Byrne) S.M. Phillips. Kew Bulletin 27:251-270. (1972).

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Phytologia (May 1994) 76(5):412-420.

TEXAS SPECIES OF *SCHRANKIA* (MIMOSACEAE) TRANSFERRED TO THE GENUS *MIMOSA*

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ABSTRACT

Following the compelling evidence presented by Barneby, the Texas species of *Schrankia* are transferred to the genus *Mimosa*. These include: **Mimosa hystricina** (Small) B.L. Turner, *comb. nov.*; **M. latidens** (Small) B.L. Turner, *comb. nov.*; **M. nuttallii** (DC.) B.L. Turner, *comb. nov.*; and **M. occidentalis** (Wooton & Standley) B.L. Turner, *comb. nov.* All of these were treated by Barneby at the varietal level within his concept of *Mimosa quadrivalvis*, a widespread variable species of the tropical and subtropical regions of the New World. The taxa of this complex, including *M. microphylla* Dryander of the southeastern U.S.A. and *M. roemeriana* Scheele, are believed to be best treated at the specific level since they are largely isolated from each other and do not intergrade to any perceptible extent and when occasionally growing together appear not to hybridize. In short, they show all the criteria of biological species: distinct integrated gene pools occupying distinct habitats, either allopatric or partially sympatric, with little proclivity for hybridization or gene flow.

KEY WORDS: Mimosaceae, *Mimosa*, *Schrankia*, Texas

Contemplation of a revised treatment of the legumes of Texas (Turner 1959) has occasioned the present paper. In my original study I recognized *Schrankia* as a genus with six specific taxa: *S. hystricina* (Britt. & Rose) Standley, *S. latidens* (Small) Schum., *S. microphylla* (Dryander) Standley, *S. occidentalis* (Wooton & Standley) Standley, *S. roemeriana* (Scheele) Blankinship, and *S. uncinata* Willd. Most of these were recognized as good taxa by Isely (1973) and Barneby (1991), except that the latter included all of these in the genus *Mimosa* as but regional varieties under his broad concept of *M. quadrivalvis* L., a wide-ranging variable species of the tropical and subtropical regions of the

New World. While I can readily accept the submergence of *Schrankia* within *Mimosa* as a monophyletic subseries (no. 24 of 25) of the series *Mimosa*, section *Mimosa*, I cannot subscribe to Barneby's wholesale reduction of the species concerned to varietal status, for reasons given in the above abstract. At least I intend to recognize five of these at the specific level in my forthcoming revised treatment of Texas legumes, albeit with different names, which is the purpose of the present paper.

In the account that follows I have changed relatively few of my earlier taxonomic concepts, mainly that of *Mimosa microphylla* Dryander, thanks to the contributions of Isely (1973). Familiarity with the complex after 35 years of field work in Texas and adjacent México has reinforced my original convictions as to their specific status, although my preliminary work was based largely upon herbarium specimens. Any inconsistencies between my earlier work and the present are discussed under the species concerned.

KEY TO TEXAS SPECIES OF *MIMOSA*, SECT. *BATOCAULON*

(Sect. *Batocaulon* ser. *Quadrivalves* Barneby = *Schrankia* Willd.)

1. Leaflets with clearly defined raised lateral venation beneath. ..... (2)

1. Leaflets smooth, without raised lateral venation beneath. ..... (3)

    2. Legumes mostly 2-4 cm long, without apical beaks; heads in bud with excurrent narrowly lanceolate bracts protruding from the capitulescence, this readily seen with the naked eye; peduncles in late flower and fruit mostly 8-20 cm long; se Texas and closely adjacent Louisiana. ..... 1. *M. hystricina*

    2. Legumes mostly 5-10 cm long, with well-defined beaks; heads in bud with abruptly acute or obtuse bracts, those not much protruding from the capitulescence, if at all; peduncles in late flower or fruit mostly 3-8 cm long; widespread from southcentral Texas northwards to Nebraska. ..... 3. *M. nuttallii*

3. Larger leaves with mostly 6-9 pairs of pinnae; legumes tetragonal at maturity, 7-16 cm long; westernmost Texas and closely adjacent New Mexico (and Chihuahua, México). ..... 4. *M. occidentalis*

3. Larger leaves with mostly 2-5 pairs of pinnae; legumes flattened at maturity or tetragonal; panhandle, central and eastern Texas. ..... (4)

    4. Mature legumes laterally compressed, 4-6 mm wide; lower stems mostly rounded or pentagonal; young stems puberulent, or less often, glabrous; mostly calcareous soils of Edwards Plateau of Central Texas. ..... 5. *M. roemeriana*

4. Mature legumes tetragonal, 2-4 mm wide; lower stems mostly tetragonal or 4-sided; young stems glabrous; mostly sandy soils of the Gulf Coastal Plain of eastern Texas. ..... 2. *M. latidens*

1. **MIMOSA HYSTRICINA** (Small *ex* Britt. & Rose) B.L. Turner, *comb. nov.* BASIONYM: *Leptoglottis hystricina* Small *ex* Britt. & Rose, *N. Amer. Fl.* 33:139. 1929. TYPE: U.S.A. Texas: Waller Co., "Hemstead" [Hempstead], 1 May 1872, *E. Hall 170* (HOLOTYPE: NY; Isotype: TEX!).

This robust briar was treated by both Isely (1973) and Barneby (1991) as only varietally distinct; the former accepted it as part of *Schrankia nuttallii* (DC.) Standley and the latter as part of *Mimosa quadrivalvis*. Field work in eastern Texas has convinced me that *Mimosa hystricina* is readily distinguished from *M. nuttallii*, both in flower, in fruit, and geographically. Isely (1973, map 45) mapped two collections of *S. hystricina* from northeast Texas, well out of the range of the species as I know it (Figure 1), but I believe both of these to be misidentified plants of *S. hystricina*. I have not seen the two taxa growing together, nor am I aware of intergrades in Texas, although Isely notes the presence of such in northcentral Louisiana where their ranges come in contact. Perhaps in this region the occasional hybrid occurs.

2. **MIMOSA LATIDENS** (Small) B.L. Turner, *comb. nov.* BASIONYM: *Morongia latidens* Small, Bull. New York Bot. Gard. 2:98. 1901.

The type of this taxon is from Karnes County in south-central Texas. My circumscription of the species is about the same as that of Barneby (1991) and Isely (1973) except that I do not include the Mexican *Schrankia potosina* (Britt. & Rose) Standl. in the complex as does Isely. The latter also treated the Mexican *Leptoglottis nelsonii* Britt. & Rose as belonging to *Schrankia latidens*, although Barneby maintained the taxon, but at the subspecific level, as noted below.

Mimosa latidens occupies a broad range of sandy soils in eastcentral and southcentral Texas (Figure 2). While quite variable in leaf and leaflet size, it is fairly constant in the ratio of petiole to rachis length. Occasional plants of *M. latidens* are found which approach those of *M. nuttallii* (DC.) B.L. Turner, and vice versa; these are possibly residual recombinants of ancestral hybrids or hybrid derivatives between the species concerned and not part of a geographical intergradation between these quite distinct taxa.

Mimosa latidens is known from México by only a few populations, mostly from sandy soils in coastal areas of northeastern Tamaulipas (*Johnston 5535* [TEX] and *Runyon 434* [TEX]).

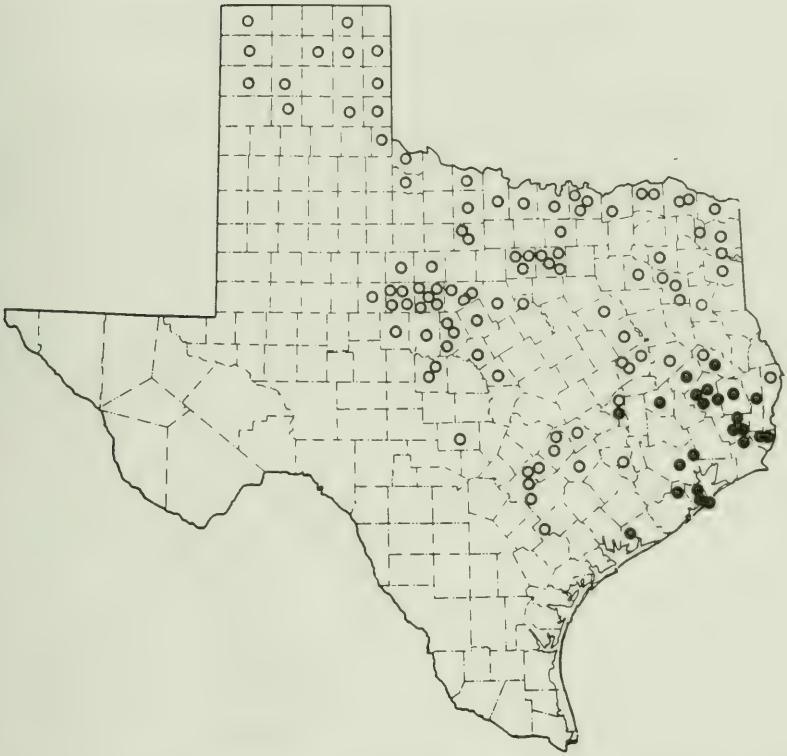

Figure 1. Texas distribution of *Mimosa hystricina* (solid circles) and *M. nuttallii* (open circles).

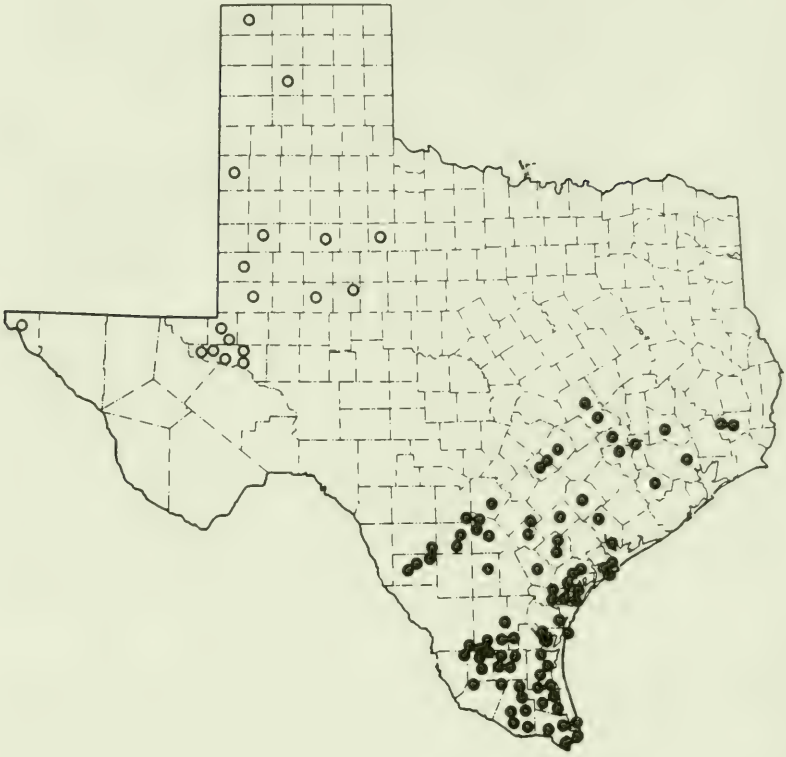

Figure 2. Texas distribution of *Mimosa latidens* (closed circles) and *M. occidentalis* (open circles).

3. **MIMOSA NUTTALLII** (DeCandolle) B.L. Turner, *comb. nov.* BASIONYM: *Leptoglottis nuttallii* DeCandolle, Mém. Légum. 8:451. 1827.

As noted by Isely (1973) this is a widespread distinctive taxon, occurring throughout the tall grass prairie regions of the U.S.A. His map showing its distribution in Texas is verified in the present study (cf. Figure 4). In Texas, *Mimosa nuttallii* mostly occurs in sandy or silty alluvial soils. It occasionally occurs with *M. latidens* (cf. discussion under the latter), but where I have observed these two taxa growing together they act like species (*i.e.*, no hybrids were observed, each retaining its identity (*e.g.*, *Turner 94-67, 94-75*; Austin Co., Texas, [TEX]).

Mimosa nuttallii superficially resembles *M. hystricina*, but the two are largely allopatric and do not intergrade in Texas to my knowledge, although Isely (1973) reported occasional intermediates between these two closely related taxa in northern Louisiana.

4. **MIMOSA OCCIDENTALIS** (Wooton & Standley) B.L. Turner, *comb. nov.* BASIONYM: *Morongia occidentalis* Wooton & Standley, Contr. U.S. Natl. Herb. 16:135. 1913.

The morphological features and distribution of this western taxon (Figure 2) are ably discussed by Isely (1973), who treated it at the specific level. Barneby (1991), however, reduced this to varietal status under his broad fabric of *Mimosa quadrivalvis*, which might make sense as a phenetic taxon but all of the ecomorphogeographical data strongly suggest that it is a biologically sound species, showing little or no intergradation with other taxa and is as biologically sound as most other closely related species of whatever genera of most families in the region concerned.

5. *MIMOSA ROEMERIANA* Scheele, Linnaea 21:456. 1848. TYPE: U.S.A. Texas: Comal Co., near New Braunfels, 1846-1847, *Roemer s.n.*

Mimosa platycarpa A. Gray.

According to Barneby (1991) no extant type is known for *Mimosa roemeriana*, and since the original description of this earliest epithet lacks an account of its fruits, one cannot be certain of the application of the name. However, its vegetative description fits fairly nicely that of many "flat-fruited" elements of *M. roemeriana* (but Barneby thinks otherwise, believing the vegetative description to fit better that of *M. latidens*). This controversy, to me, seems somewhat academic since if we can believe that Roemer did indeed collect *M. roemeriana* in the vicinity of New Braunfels, a small village on the very edge

of the calcareous Edwards Plateau, then it is highly unlikely that he collected elements of *M. latidens*, which is not now known from the vicinity of New Braunfels, or even within Comal Co., the closest collection occurring in sandy soils well to the east of New Braunfels (cf. Figure 6).

Regardless, largely because of the absence of an extant type, Barneby adopted the name *Mimosa quadrivalvis* var. *platycarpa* (A. Gray) Barneby, this originally described as *Schrankia platycarpa* A. Gray, and typified by material from calcareous soils about New Braunfels, collected by Lindheimer, presumably collected at about the same time as Roemer's collection. Indeed, Roemer and Lindheimer explored together the hills about New Braunfels (Geiser 1937) and possibly collected their specimens at about the same time and place. In short, I think the name *M. roemeriana* is properly applied to the flat-fruited prostrate briar of central Texas.

Isely (1973) also accepted *Mimosa roemeriana* at the specific level, correctly noting its allopatric distribution and superficial similarity to *M. latidens* and commenting that there might be some introgression of the former into the latter, but "little overt evidence to that effect," with which I agree.

MIMOSA MICROPHYLLA Dryander

Barneby treated this name as synonymous with his *Mimosa quadrivalvis* var. *angustata* (Torrey & A. Gray) Barneby. I find Barneby's concept of *M. quadrivalvis* too broad and agree with Isely's circumscription of *M. microphylla*, a taxon of the southeastern U.S.A., typical members of which are distinguished from Texas material in having leaves with shorter petioles and more numerous pinnae.

Isely (1973) included all of the Texas material of *Mimosa microphylla* in his concept of *M. latidens*. My reexamination of the Texas material of this complex, having earlier treated some of the sheets as belonging to *Schrankia microphylla* (Dryander) Macbr. (Turner 1956), leads me to agree with Isely's assessment that "Genuine *S. microphylla* of southeastern states is disjunction from Texas populations, apparently coming no closer than eastern Louisiana." This contrasts with Barneby's view who perceives the two taxa as intergrading in easternmost Texas. As currently understood, *M. latidens* does not occur in the border counties of easternmost Texas (Figure 3), nor is it known from westernmost Louisiana.

Of course one might with some validity treat *Mimosa latidens* as but varietally distinct, as proposed by Barneby (1992), but on ecomorphogeographical grounds I would argue that its closest relationship is with the temperate species, *M. microphylla*, and that its treatment as a variety under the latter name is a more meaningful alternative to that of its treatment as a regionalized variety of the largely tropical *M. quadrivalvis* to which Barneby appended *M.*

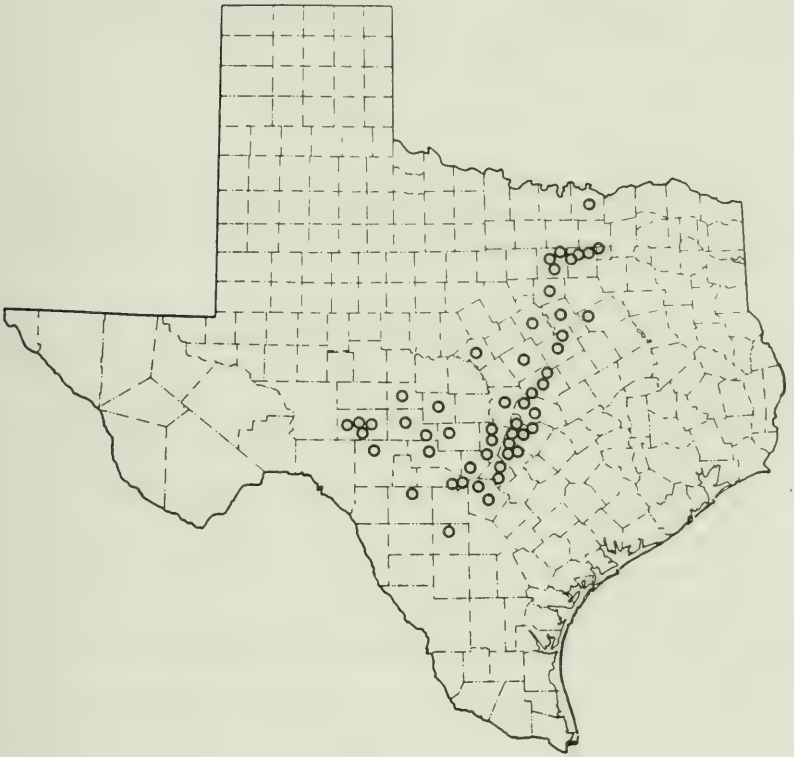

Figure 3. Texas distribution of *Mimosa roemeriana* (open circles).

latidens. At least many of Barneby's varietal taxa of *M. quadrivalvis* act like biological species in the field.

ACKNOWLEDGMENTS

I am grateful to Guy Nesom and T.P. Ramamoorthy for reviewing the manuscript and to NY for the loan of selected types. The distributional maps (Figures 1-3) are largely based upon herbarium sheets on deposit at LL, TEX.

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Phytologia (May 1994) 76(5):421-425.

NORTHERN MEXICAN SPECIES OF *SCHRANKIA* (MIMOSACEAE) TRANSFERRED TO *MIMOSA*

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ABSTRACT

Three species of *Schrankia* from north-central México are transferred to *Mimosa*, following Barneby's (1992) submergence of the former into the latter: **Mimosa potosina** (Britt. & Rose) B.L. Turner, *comb. nov.*, **M. paucijuga** (Britt. & Rose) B.L. Turner, *comb. nov.*, **M. subinermis** (S. Wats.) B.L. Turner, *comb. nov.* [including *Leptoglottis nelsonii* Britt. & Rose = *Mimosa quadrivalvis* L. var. *nelsonii* (Britt. & Rose) Barneby]. Along with the previously transferred *Mimosa occidentalis* and *M. latidens*, this brings to five the number of species recognized from northern México that were previously placed in *Leptoglottis* or *Schrankia*. All of these were treated by Barneby as varietal taxa within his highly variable concept of the widespread *M. quadrivalvis*, a species of tropical and subtropical America. The taxa concerned are briefly discussed, keyed, and distributional maps are provided.

KEY WORDS: Mimosaceae, *Mimosa*, *Schrankia*, México

In a previous paper (Turner 1994), the Texas species of *Schrankia* were treated as belonging to *Mimosa*, following Barneby's (1992) submergence of the former into the latter. Unfortunately Barneby treated all of the temperate species of this complex as belonging to the widespread tropical or subtropical species *M. quadrivalvis* L., a position which I cannot accept (cf. discussions in Isely 1971, 1973; and Turner 1994).

Only five Mexican taxa appear to belong to the more temperate elements of the "*Schrankia*-complex." Two of these, *Mimosa potosina* (Britton & Rose) B.L. Turner and *M. subinermis* (S. Wats.) B.L. Turner are endemic to north-central México, while *M. latidens* (Small) B.L. Turner and *M. occidentalis* (Wooton & Standley) B.L. Turner extend into the border regions of northern México from much wider distributions to the north.

KEY TO THE TEMPERATE *MIMOSA* ["*SCHRANKIA*-COMPLEX"] OF NORTHERN MEXICO

1. Leaflets to some extent with visible reticulate, often raised, veins. .... *M. paucijuga*

1. Leaflets with smooth surfaces, raised reticulate veins not evident. ... (2)

2. Larger leaves with mostly 4-8 pairs of pinnae; Chihuahua. .... *M. occidentalis*

2. Larger leaves with mostly (1-)2-3 pairs of pinnae. ..... (3)

3. Petiole of larger leaves 2.5-3.5 times as long as the rachis; pinnae 2 cm long or less; Gulf coastal region of northern Tamaulipas in mostly sandy or sandy-loam soils. ..... *M. latidens*

3. Petiole of larger leaves mostly 1.5-2.5 times as long as the rachis; pinnae 1 cm long or more; calcareous soils of interior regions. ..... (4)

4. Leaflets with mostly acute apices; pods mostly 6-8 cm long; leaves with mostly 3-4 pairs of pinnae. ..... *M. subinermis*

4. Leaflets with mostly obtuse or rounded apices; pods mostly 3-5 cm long; leaves with mostly 1-2(-3) pairs of pinnae. ..... *M. potosina*

MIMOSA LATIDENS (Small) B.L. Turner, Phytologia 76:414. 1994. BASIONYM: *Morongia latidens* Small. *Leptoglottis latidens* (Small) Britt. & Rose. *Mimosa quadrivalvis* L. var. *latidens* (Small) Barneby. *Schrankia latidens* (Small) K. Schumann

Turner (1994) has discussed the biological status of this mostly Texas taxon, populational dregs of which extend into the coastal regions of northeastern México (Figure 2). Barneby (1992) included the Mexican *Leptoglottis potosina* as questionably synonymous with this taxon but I treat the species as distinct.

MIMOSA OCCIDENTALIS (Wooton & Standley) B.L. Turner, Phytologia 76:417. 1994. *Leptoglottis occidentalis* (Wooton & Standley) Britton & Rose. *Morongia occidentalis* Wooton & Standley. *Schrankia occidentalis* (Wooton & Standley) Standley. *Schrankia quadrivalvis* L. var. *occidentalis* (Wooton & Standley) Barneby.

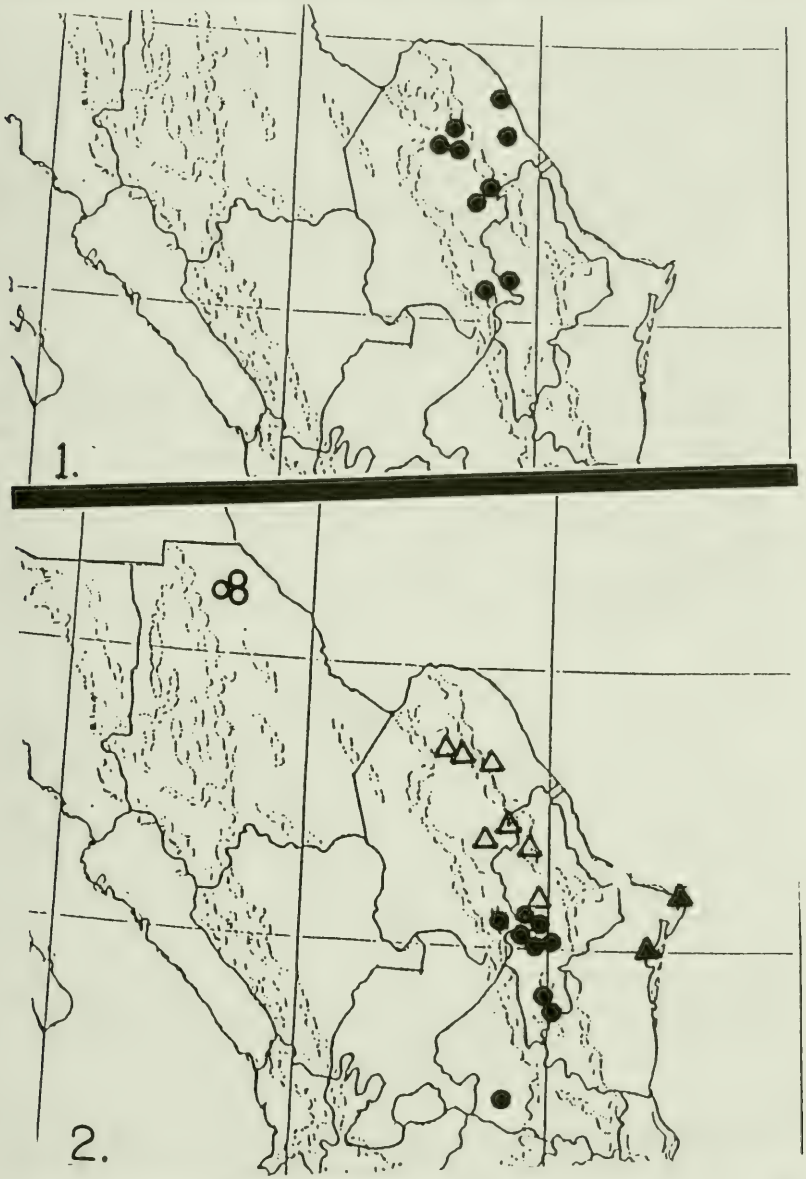

Figure 1 (above). Geographical distribution of *Mimosa paucijuga* and *M. subinermis*.

Figure 2 (below). Geographical distribution of *Mimosa latidens*, *M. occidentalis*, and *M. potosina*.

The biological status of this very distinctive widespread taxon is discussed in more detail by Turner (1994). In México the species is known only from a small region of dune sands south of Cd. Juárez, Chihuahua (Figure 2).

MIMOSA PAUCIJUGA (Britton & Rose) B.L. Turner, *comb. nov.* BASIONYM: *Leptoglottis paucijuga* Britton & Rose, *N. Amer. Fl.* 23:139. 1938. TYPE: MEXICO. Nuevo León: Monterrey, w/o date, *Eaton & Edwards s.n.* (HOLOTYPE: NY!). *Mimosa quadrivalvis* L. var. *paucijuga* (Britton & Rose) Barneby.

Leptoglottis regiomontanus Britton & Rose.

Barneby (1992) recognized the validity of this taxon, although it was never formally positioned in *Schrankia.* He felt that it "duplicates var. *latidens* in everything but prominulous dorsal venation of the leaflets." *Mimosa paucijuga* is also a taxon of calcareous soils having generally larger leaves and larger flowering heads than occurs in *M. latidens*, the latter occurring in silicaceous soils. The distribution of the two taxa are also disparate (Figures 1, 2). The relationships of *M. paucijuga* are probably closest to *M. nuttallii*, a largely calciphilic element also with prominulous dorsal venation of its leaflets occurring in the grassland regions of the southcentral U.S.A.

MIMOSA POTOSINA (Britton & Rose) B.L. Turner, *comb. nov.* BASIONYM: *Leptoglottis potosina* Britton & Rose, *N. Amer. Fl.* 23:143. 1928. TYPE: MEXICO. San Luis Potosí: Minas de San Rafael, May 1911, *Purpus 5177* (HOLOTYPE: US; Isotype: NY!).

This largely calciphilic taxon is closely related to the silicaceous *Mimosa latidens* and was treated as synonymous with the latter (as *M. quadrivalvis* var. *latidens*) by Barneby (1992). *Mimosa potosina* is fairly well-collected in north-central México where it mostly occurs in montane situations and does not appear to intergrade with the strictly low-lands *M. latidens*, nor do their distributions overlap or approach (Figure 2). Further, *M. potosina* is readily distinguished from *M. latidens* by both vegetative and fruit characters, as noted in my key to species, although the occasional fragmentary collection may superficially resemble one or the other.

MIMOSA SUBINERMIS (S. Wats.) B.L. Turner, *comb. nov.* BASIONYM: *Schrankia subinermis* S. Wats., Proc. Amer. Acad. Arts 17:350. 1882. TYPE: MEXICO. Coahuila: "Mountains 24 mi northeast by north from Monclova", Sep 1880, *E. Palmer 302* (HOLOTYPE: GH; Isotype: NY!). The quoted locality is taken from label data on the isotype (NY).

Leptoglottis nelsonii Britton & Rose. *Mimosa quadrivalvis* L. var. *nelsonii* (Britton & Rose) Barneby.

The large leaves with usually more numerous pinnae and its elongate fruits readily distinguish *Mimosa subinermis* from *M. potosina*. Barneby placed the older specific name, *Schrankia subinermis*, as questionably synonymous with his *Mimosa quadrivalvis* var. *nelsonii*, the type of the latter from Sabinas, Coahuila, only a short distance to the north of the type locality for *M. subinermis*. The isotype of *M. subinermis* is a late-fruiting fragmentary specimen with only 1 pair of pinnae on upper leaves, as noted by Barneby, otherwise all characters are similar to those of type material of *Leptoglottis nelsonii* (Isotype: NY!). At least I have but little doubt that the latter name is properly synonymized under *M. subinermis*, and I believe field studies (suggested as needed by Barneby) will bear this out.

Mimosa subinermis is essentially allopatric with the closely related *M. potosina* (Figure 2) but I find no suggestion from herbarium sheets that they might intergrade, nor does *M. subinermis* pass into the silicaceous taxa *M. latidens* and *M. occidentalis*, as might be inferred from Barneby's account. I do agree with the latter's observations that *M. subinermis* has "contributed to the amorphous ... concept of *S. latidens* proposed by Isely [1971]".

ACKNOWLEDGMENTS

I am grateful to Guy Nesom and T.P. Ramamoorthy for reviewing the manuscript. Especial thanks are due NY for the loan of specimens, including types. Distributional maps (Figures 1, 2) are based upon these and those at LL, TEX.

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Phytologia (May 1994) 76(5):426.

PAPPOCHROMA RAFIN. IS THE CORRECT GENERIC NAME FOR *ERIGERON PAPPOCHROMA* LABILL.

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ABSTRACT

A correction is made in the nomenclature for *Erigeron pappochroma.*

KEY WORDS: *Erigeron*, *Pappochroma*, *Lagenopappus*, Asteraceae, Astereae, nomenclature

As has been quickly pointed out to me by several botanists, my peculiar interpretation (Nesom 1994) of the taxonomic status of Rafinesque's genus *Pappochroma* (1836) was wrong. *Pappochroma* Rafin. is the correct name for the Australian species that I segregated from *Erigeron* L. under the name *Lagenopappus* Nesom, and *Pappochroma uniflora* Rafin. (= *Erigeron pappochroma* Labill.) is the correct name for the type of the genus.

Two further combinations are necessary:

Pappochroma gunnii (J.D. Hook.) Nesom, *comb. nov.* BASIONYM: *Haplopappus gunnii* J.D. Hook., London J. Bot. 6:111. 1847. *Lagenopappus gunnii* (J.D. Hook.) Nesom, Phytologia 76:154. 1994.

Pappochroma tasmanica (J.D. Hook.) Nesom, *comb. nov.* BASIONYM: *Haplopappus tasmanicus* J.D. Hook., London J. Bot. 6:110. 1847. *Lagenopappus tasmanicus* (J.D. Hook.) Nesom, Phytologia 76:154. 1994.

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BOOKS RECEIVED

Annual Review of Ecology and Systematics, volume 24. Daphne Gail Fautin, Douglas J. Futuyma, & Frances C. James (eds.). Annual Reviews, Inc., 4139 El Camino Way, Palo Alto, CA 94306. 1993. xii. 646 pp. $44.00 ISBN 0-8243-1424-7 (hardcover); ISSN 0066-4162.

The topics treated in the 1993 volume of this series are unusually diverse. They range from discussions of chaos in ecology and miniaturization of body size, to more typical subjects such as phenotypic plasticity, models of energy allocation, and sibling species. In addition are papers on seed longevity, origins of marine larvae, mouse evolution, comparisons of molecular and morphological phylogenies, founder effects, molecular systematics, phylogenetic constraints, phenology, reproductive traits, photosynthesis, selfing, hybrids zones, plankton, and phylogenetic comparative analyses. In total, 21 papers have been contributed by 43 authors.

Annual Review of Phytopathology, volume 31. R. James Cook, George A. Zentmyer, & Gregory Shaner (eds.). Annual Reviews, Inc., 4139 El Camino Way, Palo Alto, CA 94306. 1993. xii. 551 pp. $46.00 ISBN 0-8243-1331-3 (hardcover); ISSN 0066-4286.

Included in this volume are sections covering various types of pathogens (fungi, bacteria, nematodes), control mechanisms (biological, toxicants, cultural), interactions between host and pathogen at various levels (biochemical, molecular, genetic, physiology, anatomy), environmental influences on pathology, and other topics. An introductory section examines international cooperation in potato research, and this is followed by an historical section in which the careers of three pioneers of plant pathology are summarized. In total, 23 papers have been contributed by 47 authors.

Bacterial Plant Pathology, Cell and Molecular Aspects. David C. Sigee. Cambridge University Press, 40 West 20th Street, New York, New York 10011-4211. 1993. xii. 325 pp. $84.95 ISBN 0-521-35064-6 (hardcover).

The first four chapters of this book examine the bacteria that commonly act as plant pathogens. This section includes discussion of bacterial structure and function, taxonomy, ecology, and efficacy as pathogens. The middle three chapters examine the interactions between the pathogen and host, with the final two chapters including discussions of genetic analysis of phytopathogenic bacteria and control of diseases caused by those bacteria.

Genes, Crops and the Environment. John Holden, James Peacock, & Trevor Williams. Cambridge University Press, 40 West 20th Street, New York, New York 10011-4211. 1993. xiv. 162 pp. $17.95 ISBN 0-521-43737-7 (paper); $49.95 ISBN 0-521-43137-9 (hardcover).

This book is a compendium documenting the origins of the primary crop plants of the world. The concept of selective breeding, and consequences of loss of genetic diversity are explored. Centers of domestication are discussed, as well as mechanisms for preserving genetic resources of crop plants.

Marine Phytoplankton, A Guide to Naked Flagellates and Coccolithophorids. Carmelo R. Tomas (ed.). Academic Press, Inc., A Division of Harcourt Brace & Company, 1250 Sixth Avenue, San Diego, CA 92101-4311. 1993. xiv. 263 pp. Price unknown ISBN 0-12-693010-4 (hardcover).

The book has three chapters: an introductory chapter by Tomas, a chapter of nearly 140 pages by Jahn Throndsen, and a final chapter by Berit Heimdal. Throndsen's chapter examines the flagellates (both plant-like and animal-like groups). Included are sections on taxonomy and systematics, and laboratory handling techniques. The Heimdal chapter covers terminology, recent issues, classification and descriptions.

Photosynthesis. Molecular, Physiological and Environmental Processes, 2nd ed. David W. Lawlor. Longman Scientific & Technical, Longman Group UK Limited, Longman House, Burnt Mill, Harlow, Essex, CM20 2JE, England. 1993. Available in the U.S. from John Wiley & Son, New York. vii. 318 pp. Price unknown. ISBN 0-582-08657-4 [0-470-22077-5 in U.S.A.] (paperback).

This book updates the first edition, published in 1987. Several aspects of photosynthesis are examined, including light harvesting, electron transfer, chemical syntheses, and biophysical processes involved in the photosynthetic mechanism. Treatments of these topics stress the biochemical and cellular biological perspectives of photosynthetic mechanisms. By no means an introductory volume, the author presupposes considerable biological and chemical knowledge on the part of the reader, but provides a detailed treatment of several interesting facets of the photosynthetic process.

The Molecule and its Double. Jean Jacques. McGraw-Hill, Inc., 11 West 19th Street, New York, New York 10011. 1993. 128 pp. $10.95 ISBN 0-07-032399-2 (paper).

Published through McGraw-Hill's *Horizons of Science Series*, this book examines the concept of chirality. Some historical background on the discovery of chiral compounds is followed by discussion of effects and importance of stereochemistry on the world in which we live.

Water. Paul Caro. McGraw-Hill, Inc., 11 West 19th Street, New York, New York 10011. 1993. 155 pp. $10.95 ISBN 0-07-009990-1 (paper).

Published through McGraw-Hill's *Horizons of Science Series*, this book examines interesting aspects of the water molecule, and how the structure of this molecule profoundly influences biotic and abiotic processes on the Earth.

Water Transport in Plants Under Climatic Stress. Proceeding of an International Workshop, held in Vallombrosa, Firenze, Italy. M. Borghetti, J. Grace, & A. Raschi (eds.). Cambridge University Press, 40 West 20th Street, New York, New York 10011-4211. 1993. xvi. 300 pp. $259.95, ISBN 0-521-44219-2 (hardcover).

This book is the result of a three day workshop in 1990, in which 80 scientists participated. From that meeting, 57 authors produced 30 papers which comprise this volume. Cavitation, or failure of the xylem hydraulic pathway, was the focus of the workshop. Papers in this book examine how and why cavitation occurs, what effects it has on the plant, how the plant recovers from and responds to cavitation, experimental methods for detection of cavitation, and case studies (primarily from the southern Mediterranean region). For any researcher having an interest in water stress in general, and cavitation in particular, this would appear to be an essential book to have.

Phytologia (May 1994) 76(5):431.

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