

SPECIES OF *PHILADELPHUS* (HYDRANGEACEAE) FROM TRANS-PECOS TEXAS

Billie Lee Turner

Plant Resources Center, The University of Texas Austin, Texas, 78712, USA

Abstract: Three species of *Philadelphus* are accepted as occurring in Trans-Pecos, Texas: *P. mearnsii*, *P. microphyllus*, and *P. serpyllifolius*. *Philadelphus mearnsii* is known only from Culberson and El Paso counties; *P. microphyllus* and *P. serpyllifolius* are more widespread. *Philadelphus microphyllus* is treated as having three intergrading varieties: *Philadelphus microphyllus* var. *argenteus*, *P. m.* var. **crinitus** (C. L. Hitchc.) B. L. Turner, and *P. m.* var. *microphyllus*. *Philadelphus serpyllifolius* is treated as having two intergrading varieties: *Philadelphus serpyllifolius* var. **intermedius** B. L. Turner, and *P. s.* var. *serpyllifolius*. Maps showing their distributions in the area concerned are provided.

Keywords: *Philadelphus*, Hydrangeaceae, Trans-Pecos, Texas.

The taxonomic history of the Trans-Pecos species of *Philadelphus* is checkered, to say the least. Rydberg (1905) provided the first comprehensive treatment of the genus for the region positioning it in the family Hydrangeaceae; this recently confirmed by DNA data (Soltis and Soltis, 1997). Yet, in spite of his splintering proclivities, he recognized only a single species for Trans-Pecos, Texas, *P. serpyllifolius*.

Correll and Johnston (1970) and Johnston (1988), accepting Hu's (1954–1956) highly abiological treatment of the group, recognized nine species for Trans-Pecos, Texas: *Philadelphus argenteus* Rydb., *P. argyrocalyx* Wooton, *P. crinitus* (C. L. Hitchc.) S. Y. Hu, *P. hitchcockianus* S.Y. Hu, *P. mearnsii* W. H. Evans ex Small & Rydb., *P. microphyllus* A. Gray, *P. occidentalis* A. Nelson, *P. palmeri* Rydb., and *P. serpyllifolius* A. Gray. Hu's treatment was also accepted by Powell (1998), but with the admonition that "The Trans-Pecos species of *Philadelphus* require further study in support of the work by Hu (1954–56)."

For the *Atlas of the Vascular Plants of Texas* (Turner et al., 2003) I had to review anew the status of *Philadelphus* in Texas. Unfortunately, the present study was incomplete at the time of the Atlas' preparation and I had to incorporate into it a ten-

tative treatment compiled from the work of yet others. Were I to re-map the treatment based upon my own studies, I would recognize but three species in the Trans-Pecos region as follows:

KEY TO THE TRANS-PECOS SPECIES OF *PHILADELPHUS*

1. Lower surfaces of leaves without a vestiture of minute frizzy or pannose hairs.
 2. Stamens 15–20; petals acute to broadly obtuse at the apex 1. *P. mearnsii*
 2. Stamens 25–60; petals rounded at the apex 2. *P. microphyllus*
1. Lower surfaces of leaves with appressed straight stiff hairs, these underlain by a vestiture of minute frizzy or pannose hairs 3. *P. serpyllifolius*

1. *PHILADELPHUS MEARNsii* W.H. Evans ex Small & Rydb., N. Amer. fl. 22: 174. 1905.

Philadelphus hitchcockianus S.Y. Hu, J. Arnold Arbor. 37: 51. 1956. Fig. 1

This species is known to Texas only from the Franklin Mts. (El Paso Co.: *Worthington* 24987, SRSC, UTEP) and Guadalupe Mts. (Culberson Co.: numerous collections, SRSC, TEX). The single collection from the Franklin Mts. is sterile, but ap-

pears to have the vegetative characters of *Philadelphus mearnsii*, and is said to occur at an elevation of 5900 ft. The only other collection of *Philadelphus* known to me from the Franklin Mts. is *Worthington 25113* (SRSC), collected at the "base of cliffs on the NE side and immediately below Anthony's Nose," 6000–6300 ft. I take this specimen, because of its densely tomentose hypanthium, to be *P. microphyllus* var. *argenteus*. In the Trans-Pecos at least, *P. mearnsii* apparently occurs at somewhat lower elevations than *P. microphyllus* (5900–6500 ft. vs. 6400–6800 ft., as determined from label data) with which it is sympatric, at least in the Guadalupe of Culberson Co., Texas. No intergradation between the two species has been noted from this locality among the 30 or more specimens examined by me (LL, SRSC, TEX). Indeed, the late Barton Warnock (22805, 22806, SRSC) collected typical elements of both species in "South McKittrick Canyon" on 28 May 1968. In short, the two taxa appear to be non-interbreeding species in nature.

Philadelphus hitchcockianus is typified (in part) by a collection from Culberson Co., Texas (Guadalupe Mts., above McKittrick Canyon, *Moore & Steyermark 3477* [LECTOTYPE: A; ISOLECTOTYPES: GH, MO]) that Hitchcock considered to be typical *P. mearnsii*, as do I. Hu complicated the typification of *P. hitchcockianus* by citing as "types" two elements (a fruiting element, *Moore & Steyermark 3477*) and a flowering element (New Mexico. Eddy Co.: Carlsbad Cave, 5 May 1924, *Bailey s. n.* US). Such typification is contrary to the present *International Code of Botanical Nomenclature* and I propose here to lectotypify the name *P. hitchcockianus* with the aforementioned Moore and Steyermark collection 3477. Hu also cited one additional collection in her concept of *P. hitchcockianus*, this being a collection from Coahuila, Mexico (*Steward 1728*), which is probably also *P. mearnsii*, sensu Hitchcock and the present worker.

2. PHILADELPHUS MICROPHYLLUS A. Gray, Pl. wright. 1: 54. 1852. Fig. 2

Hitchcock (1943) recognized eight subspecies under the fabric of *P. microphyllus*, three of these are accepted as occurring in the Trans-Pecos, albeit recognized as varieties, as follows:

1. Hypanthium densely white tomentose; Franklin Mts . . . 2a. *P. m.* var. *argenteus*
1. Hypanthium sparsely appressed-ciliate to glabrous.
 2. Undersurfaces of the leaves densely pubescent with appressed, often matted hairs, the dermal layer scarcely visible; known only from the uppermost slopes of Mount Livermore (7200–8000 ft), Jeff Davis Co
 2b. *P. m.* var. *crinitus*
 2. Undersurfaces of leaves sparsely to moderately pubescent with appressed non-matted hairs, the dermal layer clearly visible: widespread at mid elevations of Chisos, Davis, Del Norte, and Guadalupe Mts
 2c. *P. m.* var. *microphyllus*

2a. PHILADELPHUS MICROPHYLLUS var. ARGENTEUS (Rydb.) Kearney & Peebles, J. Washington Acad. Sci. 29: 480. 1939.

Philadelphus microphyllus subsp. *argenteus* (Rydb.) C. L. Hitchc., Madroño 7: 42. 1943.

According to Frazier (pers. comm., email, 1995), "This is the common *Philadelphus* of southern New Mexico and adjacent southwest Arizona and north-central Mexico." It is known to me by only a single collection from the Franklin Mts. of El Paso Co., as follows: "at base of cliffs on the NE side and immediately below Anthony's Nose, 6000–6300 ft. . . limestone cliffs and talus, shaded much of the day and some areas completely." 19 Jul 1995, *Worthington 25113* (SRSC, UTEP).

2b. PHILADELPHUS MICROPHYLLUS var. **CRINITUS** (C. L. Hitchc.) B. L. Turner, stat. nov.

Based upon *P. microphyllus* subsp. *crinitus* C. L. Hitchc., *Madroño* 7: 45. 1943.

Philadelphus crinitus (C. L. Hitchc.) S. Y. Hu, *J. Arnold Arb.* 37: 60. 1956.

This variety is known in its typical form only from specimens obtained from the upper slopes of Mt. Livermore. Hitchcock (1943) proposed the taxon with the following comment: "The status of this entity is puzzling." He further noted that it was likely closely related to *Philadelphus argyrocalyx* and/or *P. argenteus*, "but the pubescence of the calyx and leaves is so unique that it cannot be combined with either."

I accept the taxon concerned as a weakly delimited high elevational varietal element of *Philadelphus microphyllus*, this grading at lower elevations into the typical *P. m. var. microphyllus*, as attested to by the following intermediates: Jeff Davis Co.: Northeastern Davis Mts., 11 mi W of highway 17 on Farm Road 1832, Nations Ranch, hillside W of Bear Cave Mt., 26 Aug 1985, *Larke & Poole* 275 (SRSC); rocky ledge on NW slope of Sawtooth Mt., 29 Jun 1948, *Turner s.n.* (SRSC). These two localities are well separated from Mt. Livermore (Fig. 2) and are at lower elevations than found for typical *P. m. var. crinitus*; still the leaf vestiture of both specimens appears to approach that of the latter. Typical forms of *P. m. var. crinitus* also occur on Sawtooth Mt. (W side of Sawtooth, 4 Oct 1926, *Palm-er* 31950, TEX).

Hitchcock (1943) based his original description of *Philadelphus microphyllus* subsp. *crinitus* upon only three collections. Since that time numerous collections of the taxon have been assembled (LL, SRSC, TEX), all from the upper slopes of Mount Livermore. Hu (1954–56) elevated the taxon to specific rank but confounded its descriptive parameters and geographic boundaries with the addition of three problematic collections from the Santa Catalina Mts. of southeastern Arizona, one of these (*Hinckley* 50) is a citation error. The Hinckley specimen is actually from Mt. Livermore,

Texas, as cited by Hitchcock (1943). I take the two Arizona specimens (the Hinckley collections excluded) to be atypical forms of *P. microphyllus* var. *microphyllus*.

Whether *Philadelphus crinitus* is deserving of formal nomenclatural recognition is moot. It is superficially similar to *P. serpyllifolius* in that the dense, often tangled vestiture of the undersurfaces of its leaves suggest the latter, as noted by Hitchcock; he also noted that "Since the flowers are so alike those of the other subspecies of *P. microphyllus* [namely *P. m. subsp. argenteus* and *P. m. subsp. argyrocalyx*] there is not an adequate basis for according the plant specific recognition." I have not maintained its specific or subspecific status because of the variability of its leaf vestiture, as noted above.

2c. PHILADELPHUS MICROPHYLLUS var. MICROPHYLLUS

This is the most widespread, commonly encountered variety of *Philadelphus microphyllus* occurring in the Trans-Pecos (Fig. 2). As noted in the above, Hitchcock (1943) recognized nine infraspecific categories within *P. microphyllus*, the oldest name within the complex concerned, the type collected by Fendler near Santa Fe, New Mexico in 1847. Hitchcock also provided a relatively crude map showing the distribution of these taxa in the southwestern U.S.A. and Mexico. With the exception of several dubious mostly Mexican taxa, it is likely that some of these are worthy of varietal recognition in that they appear to have some degree of morpho-geographical differentiation, and from his account and that of Hu, tend to intergrade with contiguous infraspecific elements. Holmgren and Holmgren (1997), however, recognized *P. microphyllus* "as one variable complex ranging from the southern Rocky Mountains to northern Mexico and west to California," noting that "The differences [among the infraspecific categories] are not at all constant and bear no correlation with geographical distribu-

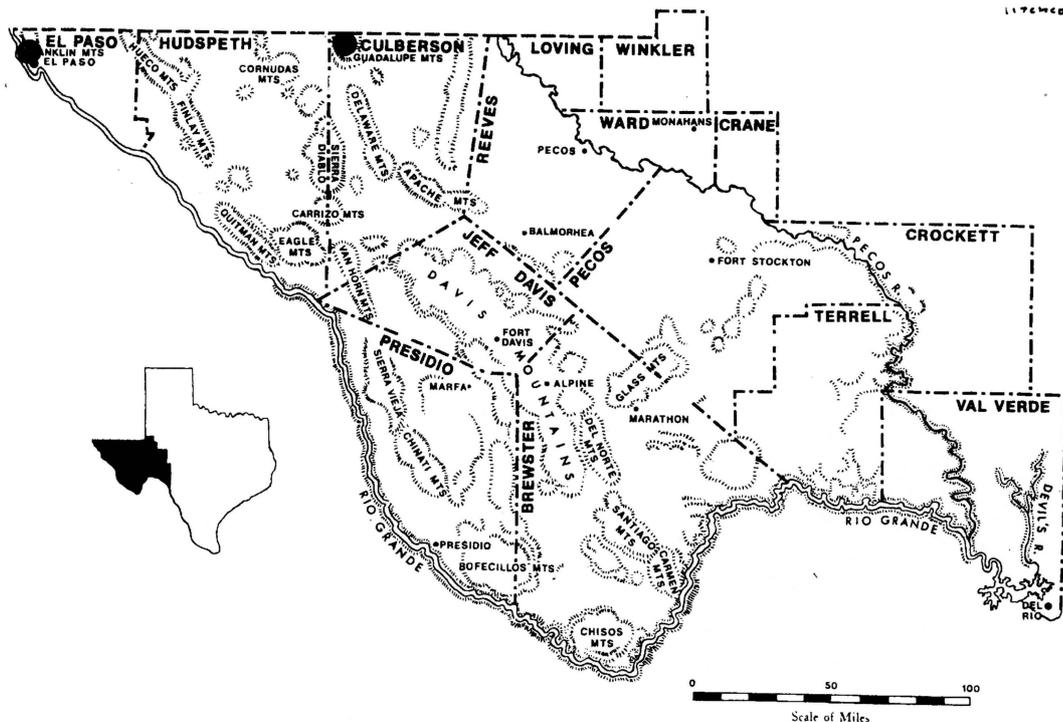


FIG. 1. Distribution of *Philadelphus mearnsii* in Texas.

tion.” I think this observation an overstatement. Probably, biological reality lies somewhere between the latter study and that of Hitchcock. Most of the observations of Hu, however, can be ignored as not having much biological or populational validity.

3. PHILADELPHUS SERPYLLIFOLIUS A. Gray, Pl. wright. 1: 77. 1852. Fig. 3.

Two varieties of this species are recognized for the Trans-Pecos, as follows:

1. Upper surfaces of leaves with strictly appressed hairs; limestone soils of eastern Brewster Co. and eastward 3a. *P. s.* var. *intermedius*
1. Upper surfaces of leaves with erect hairs, the latter few or numerous; igneous soils, Davis Mts. and westward 3b. *P. s.* var. *serpyllifolius*

3a. PHILADELPHUS SERPYLLIFOLIUS var. **intermedius** B. L. Turner, var. nov.

TYPE: TEXAS. Brewster Co.: “Infrequent on lower limestone slopes of Old

Blue, Glass Mts.” 2 Jun 1941, B. H. Warnock W559 (HOLOTYPE: SRSC; ISOTYPES: SRSC, TEX).

The holotype bears an additional notation by its collector, “Maple odor when dry.”

Similis *P. s.* var. *serpyllifoliae* A. Gray, sed superficies foliorum pubescentiam opressam habent, et plantae in solis calcareis (non igneis) adsunt.

Low divaricately branched SHRUBS to 1 m high. LEAVES ovate, 3-nervate, bicolored, 10–15 mm long, 5–8 mm wide, the upper surfaces with appressed pubescence. CALYX ca. 7 mm long; lobes ca. 3 mm long. PETALS broadly oval, 7–9 mm long, 6–8 mm wide. STAMENS 18–20.

ADDITIONAL SPECIMENS EXAMINED: TEXAS. Brewster Co.: Glass Mts., limestone rocks of Gilliland Canyon, Old Blue Ranch, 15 Jun 1987, Maddux 124 (SRSC); Old Blue Mt., 25 Jun 1945, Muller 8149

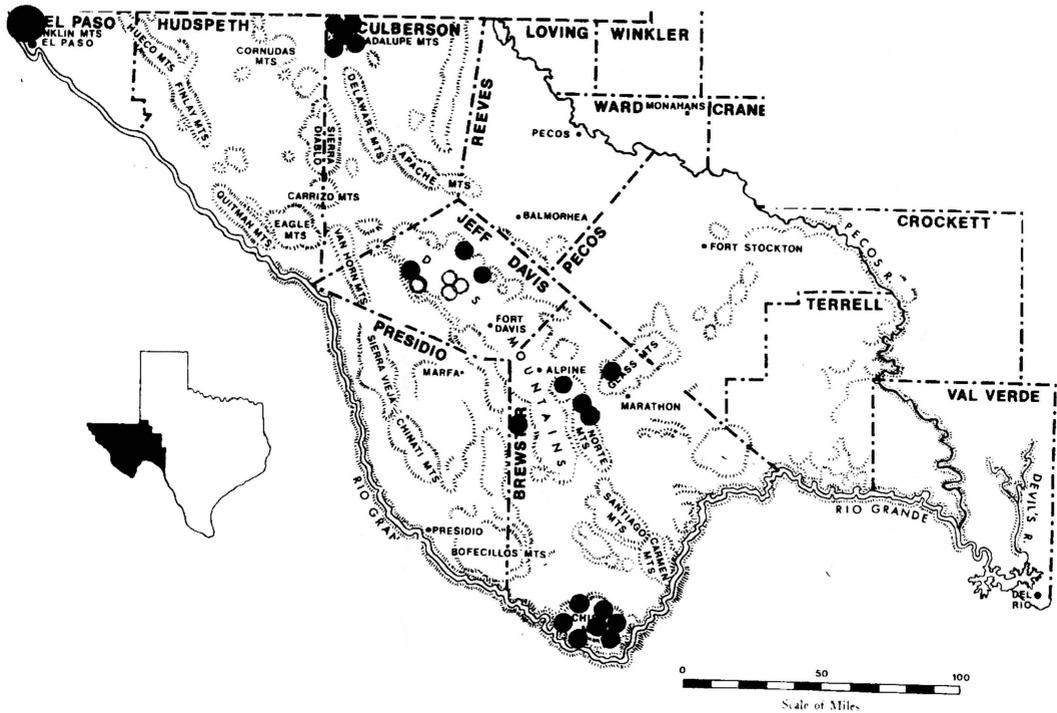


FIG. 2. Distribution of *Philadelphus microphyllus* in Texas: var. *argenteus* (large dot); var. *crinitus* (circles); var. *microphyllus* (small dots).

(TEX); W of Old Blue, limestone canyons and bluffs, 20 Jun 1978, *Powell 3289* (TEX); limestone hills, S of Old Blue Mt., "pine-juniper assoc." 20 Aug 1979, *Powell 3480* (SRSC); "Limestone hills on John Pate Ranch, ca. 12 mi SE of Alpine, near Bird Mt.; *Pinus remota* dominant." 19 Jul 1986, *Powell et al. 5245* (SRSC); "Infrequent shrub in Mc Rae Canyon on C. F. Cox Ranch in limestone soil." 31 Jul 1953, *Warnock 11414* (SRSC); slopes of Old Blue, rocky limestone slopes, 18 Jun 1941, *Rose-Innes & Moon 1231* (TEX). **Pecos Co.:** limestone slopes of Sierra Madera, 22 mi S of Ft. Stockton, 26 May 1949, *Warnock & McVaugh 8699* (SRSC).

The variety is named for its intermediate stance between *Philadelphus serpyllifolius* var. *serpyllifolius* and *P. s.* var. *texensis*, both geographically and morphologically.

Hu (1954–56) placed the type (and several additional collections) of this variety within her concept of *Philadelphus serpyllifolius*. She further confounded circumscription of the latter by including in this collections from central Texas (Blanco and Kendall counties) that clearly belong to *P. texensis* S. Y. Hu. In my initial cogitation on the biological status of *P. s.* var. *intermedius*, I considered placing the present taxon under the fabric of *P. texensis*, the latter reduced to varietal status under *P. serpyllifolius*. Indeed, Hu herself noted that both *P. serpyllifolius* and *P. texensis* "are similar in appearance and their leaves are strigose and lanate beneath." The latter taxon (and *P. s.* var. *intermedius*) is readily distinguished from typical *P. s.* var. *serpyllifolius* by the vestiture on its upper leaf surfaces (consisting of appressed hairs vs. erect), and its proclivity for calcareous soils (vs. volcanic or igneous). All of the above cited spec-

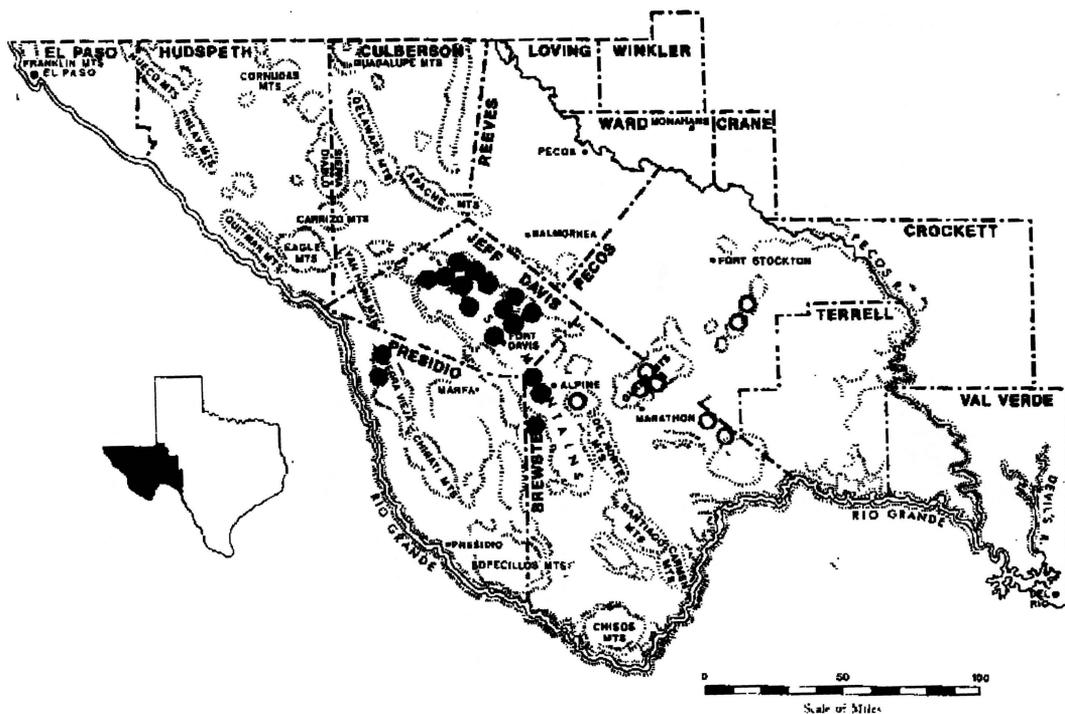


FIG. 3. Distribution of *Philadelphus serpyllifolius* in Texas: var. *intermedius*(circles); var. *serpyllifolius* (dots).

imens of *P. s.* var. *intermedius* have appressed hairs on their upper leaf surfaces except for *Warnock 11414* (SRSC) which has at least a few erect hairs, these occurring on the upper third of the blade. Were future workers to combine *P. s.* var. *intermedius* with *P. texensis*, and these treated at the varietal level, its correct epithet would be var. *texensis*, this validated by Hu's description of *P. texensis* var. *coryi* S. Y. Hu, also a taxon of central Texas (Bandera Co.), and known only by its type.

Philadelphus texensis, sensu Hu (1954–56, in part), is sympatric with *P. ernestii* S.Y. Hu, the latter also confined to central Texas. The latter species is readily distinguished from the former by the vestiture on the under surfaces of its leaves, these lacking the frizzy hairs characteristic of *P. serpyllifolius*. Except for this singular feature the two species are very similar.

3b. PHILADELPHUS SERPYLLIFOLIUS var. SERPYLLIFOLIUS

The type of *Philadelphus serpyllifolius* (*C. Wright 1100*, GH) is from the upper part of Limpia Canyon, Jeff Davis Co., Texas, first collected in 1851 and lectotypified by Hu (1954–56).

The species is relatively common in volcanic soils of the Davis Mts. (Fig. 3), but is not known to occur in calcareous soils, as noted under the discussion of *Philadelphus serpyllifolius* var. *intermedius*. *Philadelphus serpyllifolius* has been said to occur in New Mexico, but such records are probably based upon type material collected by C. Wright from Trans-Pecos, Texas.

Finally, I view the term subspecies as a clustering category and/or an infraspecific category to denote degree of biological differentiation, much as the term subgenus is

used for generic classificatory purposes (cf. Turner and Nesom, 2000). Varieties are usually viewed as closely related allopatric populational categories that intergrade over a relatively short distance near or in regions of contact. Further, varieties do not normally grow together, for allopatric infraspecific intergradation is a populational phenomenon, as clearly noted by Turner (1956, 1984) and yet others.

ACKNOWLEDGEMENTS

I am grateful to my colleague Guy Nesom for the Latin diagnosis, and to Mike Powell, Martin Terry, and Jackie Poole for their reviews and helpful comments. The dot maps are based upon herbarium specimens housed at SRSC, and TEX; thanks are extended to both institutions for permission to study the same.

LITERATURE CITED

- Correll, D.S. and M.C. Johnston. 1970. *Manual of the Vascular Plants of Texas*. Renner: Texas Research Foundation.
- Hitchcock, C.L. 1943. The xerophyllus species of *Philadelphus* of southwestern North America. *Madroño* 7: 35–56.
- Holmgren, P.K. and N.H. Holmgren. 1997. *Philadelphus*, Pp. 10–12 in Cronquist et al. (eds.) *Intermountain Fl.* 3.
- Hu, S.Y. 1954–56. A monograph of the genus *Philadelphus*. *J. Arnold Arbor.* 35: 275–333; 36: 52–109; 37: 15–90.
- Johnston, M.C. 1988. *The Vascular Plants of Texas, an updating*. Austin: Published by the author.
- Powell, A.M. 1998. *Trees and Shrubs of the Trans-Pecos and Adjacent Areas*. Austin: University of Texas Press.
- Rydberg, P.A. 1905. *Philadelphus*, in *N. Amer. Fl.* 22: 162–175.
- Soltis, D.E. and P.S. Soltis. 1997. Phylogenetic relationships in Saxifragaceae sensu lato: a comparison of topologies based on 18S rDNA data and rbcL sequences. *Amer. J. Bot.* 84: 504–522.
- Turner, B.L. 1956. A cytotoxic study of the genus *Hymenopappus* (Compositae) *Rhodora* 58: 691–694.
- . 1984. Taxonomy of the genus *Aphanostephus*. *Phytologia* 56: 81–101.
- , and G.L. Nesom. 2000. Use of variety and subspecies and new varietal combinations for *Styrax platanifolius* (Styracaceae). *Sida* 19: 257–262.
- , H. Nichols, G. Denny, and O. Doron. 2003. *Atlas of the Vascular Plants of Texas*, Vols. 1 and 2, *Sida Bot. Misc.* 24.