

***SERICOCARPUS ASTEROIDES* (ASTERACEAE: ASTEREAE),
RHIZOMATOUS AND COLONIAL,
AND *SERICOCARPUS CAESPITOSUS*, SP. NOV.**

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ABSTRACT

Allopatric population systems of two growth forms comprise the eastern USA species traditionally identified as *Sericocarpus asteroides*. The typical form (the type collected by Peter Kalm in New Jersey), which produces slender, stoloniform rhizomes, occurs along the Atlantic coast from southern Maine into South Carolina. ***Sericocarpus caespitosus* Nesom, sp. nov.**, without stoloniform rhizomes, occurs inland from western New York to coastal counties of Alabama and Florida. An epitype is designated for *Conyza asteroides* L., clearly showing the rhizomes; neotypes are designated for *Aster leucanthemus* Raf. and *Aster conyzoides* var. *plantaginifolius* Nutt. (both are synonyms of *S. asteroides* sensu stricto). *Sericocarpus oregonensis* (with stoloniform rhizomes) and *S. californicus* (without stoloniform rhizomes) are similar in morphological distinction and have geographically separate distributions — a similar rationale (morphology and geography) justifies their treatment as separate species.

Sericocarpus asteroides (L.) B.S.P. occurs widely through the eastern USA (Fig. 1). Over much of its range, plants produce a relatively short, thick, fibrous-rooted rhizome with short basal offsets arising from a short caudex. Short, thick, caudex branches may arise from growth of these offsets. Along the Atlantic seaboard, however, from southern Maine to South Carolina, in addition to the larger perennating rhizome, plants produce slender, scale-leaved, stoloniform rhizomes that may elongate laterally up to 15 centimeters — a rooting plantlet is produced at the tip of these rhizomes (these features are shown in type collections—Figs. 9-13 and representative collections—Figs. 17-29).

Two taxa of *Sericocarpus* of the western USA and British Columbia, *S. rigidus* and *S. oregonensis* sensu stricto (Figs. 3, 4), also produce stoloniform rhizomes, while *S. oregonensis* var. *californicus* does not (Figs. 5-7). This difference has not figured in decisions regarding the taxonomy of *S. oregonensis* sensu lato (Nesom 1993; Leonard et al. 2005; Semple & Leonard 2006). Neither has this growth habit previously been observed (or at least it has not been noted) in *Sericocarpus* of the eastern USA by recent or earlier eastern USA floristicians (e.g.: Fernald; Gleason & Cronquist; Radford, Ahles, & Bell; Cronquist).

The morphology, ontogeny, and behavior of the stoloniform rhizomes is complex, and the biological difference results in clonal populations of closely adjacent plants in rhizomatous forms versus more scattered plants in caespitose forms (Figs. 14-16). In addition to this conspicuous difference, the two eastern USA entities are closely contiguous in geography (Fig. 2). Each is recognized here at specific rank (as below), reflecting these discontinuities.

Treatment of *Sericocarpus oregonensis* sensu lato as two separate species is supported by the same morphological distinction — *S. oregonensis* Nutt. with stoloniform rhizomes, *S. californicus* Durand without. These two entities also are allopatric, with a geographic hiatus of about 75 miles at their closest point of approach. It is not clear even that they are sister taxa — *S. californicus* has been treated as conspecific with *S. oregonensis* and also with *S. rigidus*. Most recently it has been regarded as conspecific with *S. oregonensis* (Nesom 1993; Leonard et al. 2005; Semple & Leonard 2006), but Nesom provided no rationale for his assessment. The two were combined by Leonard et al. (2005) based on a multivariate study showing *S. oregonensis* and *S. californicus* completely intermixed in the

UPGMA analysis, but one of *S. oregonensis* branches is more similar to *S. rigidus* than to the other *S. oregonensis* branch. Further, neither the presence/absence of rhizomes nor the allopatric geography was considered in their decision regarding *S. californicus*. They noted (pp. 1484–1485) that the close similarity of *S. asteroides*, *S. oregonensis*, and *S. rigidus* "is reflected in the inclusion of a few of the *S. oregonensis* specimens within the *S. asteroides* and *S. rigidus* branches in the cluster analysis, even if such confusion of identity is unlikely due to very different general appearances and provenances."

If production of stoloniform rhizomes is a specialized feature in *Sericocarpus*, as seems likely, it is not clear whether there have been several origins in parallel or a single origin with evolutionary losses, although parsimony argues for the latter (e.g., Fig. 1). Molecular data have not resolved the pattern of relationships among *Sericocarpus* species (e.g., Brouillet et al. 2009), but a sister relationship between the two eastern entities appears to be a reasonable hypothesis, based on their mutual production and retention of basally disposed leaves, leaves with toothed margins (otherwise not seen in the genus), and their close parapatry. Loss of rhizome production might result from repression of genes impacting axillary meristem growth, with the essentially non-overlapping geographic distribution perhaps reflecting dominance of rhizome production in hybrids (or vice versa).

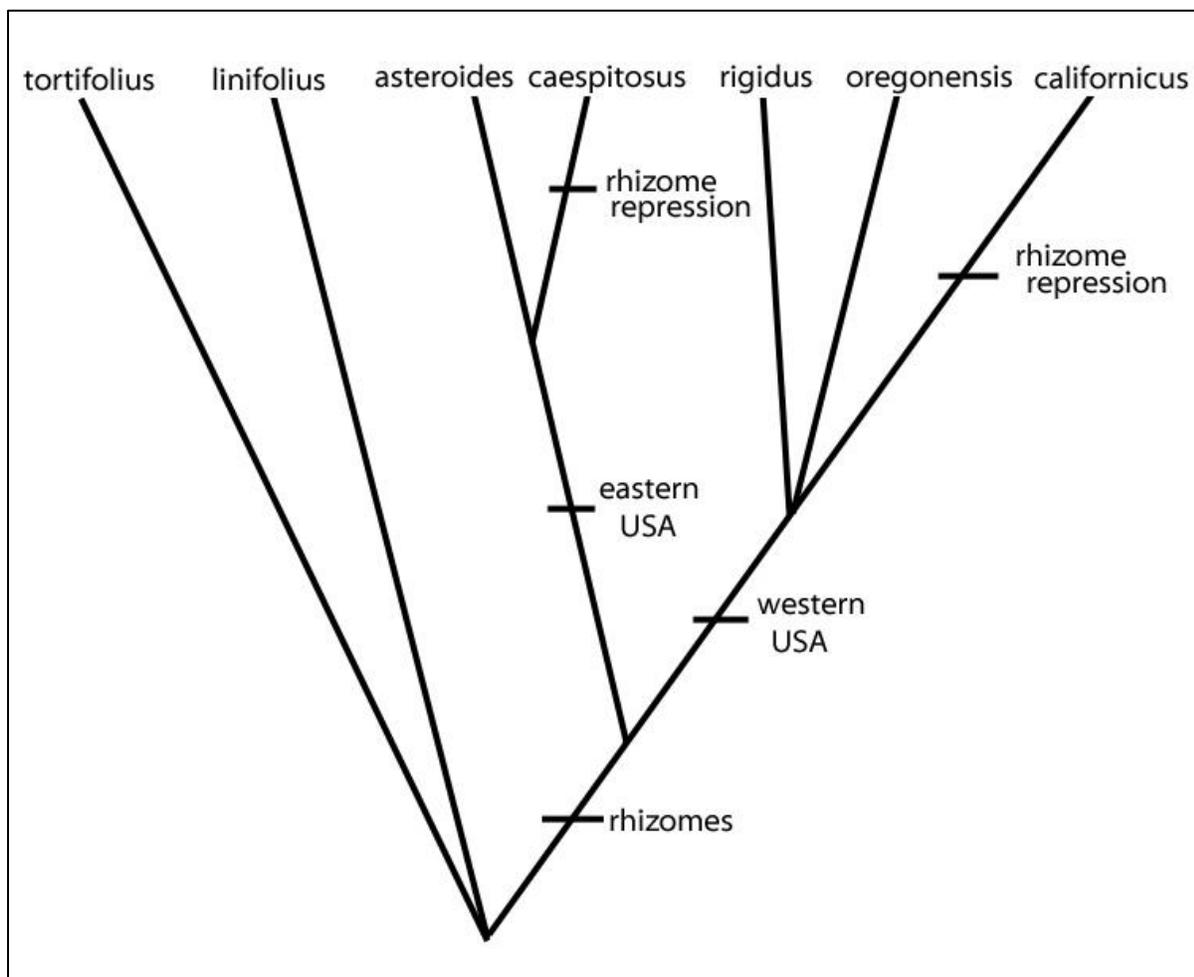


Figure 1. Hypothetical phylogeny of *Sericocarpus* species, showing possible pattern of rhizome origin and expression. *Sericocarpus tortifolius* and *S. linifolius* are species of the eastern USA — neither produces rhizomes. Assumptions here are that *S. asteroides* and *S. caespitosa* are evolutionary sisters and that *S. oregonensis* and *S. californicus* are sisters. An equally parsimonious pattern would have independent appearance of rhizomes in *S. asteroides* and in the ancestor of sister-paired *S. rigidus/oregonensis*.

The slender rhizomes in *Sericocarpus asteroides* are produced from the caudex and spread laterally through the duff or upper soil; a plantlet is produced at the rhizome apex. Rhizome production begins in mid to late June or early July, soon after the species begins to flower. They perhaps are broken off during some collections and don't show on specimens, but the consistency mapped in Figure 2 indicates that the pattern is real.

There is no strong correlation of habitat and presence/absence of rhizomes — *Sericocarpus asteroides* is primarily a coastal plain species and extends into similar habitats in New England. *Sericocarpus caespitosus* is widespread on the Appalachian Plateau but extends southward onto the coastal plain in South Carolina, Georgia, Alabama, and Mississippi. Repression of rhizome production (as hypothesized here) is more likely correlated with historical factors before these two entities reached their current geographies.

Formal taxonomic summaries of *Sericocarpus asteroides* and the newly described *S. caespitosus* are presented below, with distribution maps and photos of representative specimens. Distribution maps and representative specimens are shown for *S. rigidus*, *S. oregonensis*, and *S. californicus*.

SERICOCARPUS ASTEROIDES (L.) B.S.P., Prelim. Cat. New York Pl. 26. 1888 (non *Sericocarpus* "asterodes" [sic] Kuntze, Rev. Gen. Pl. 1: 364. 1891). *Conyza asteroides* L., Sp. Pl. 2: 861. 1753. *Aster marilandicus* Michx., Fl. Bor. Amer. 2: 108. 1803 [nom. nov. illeg., based on *Conyza asteroides* L.]. *Aster conyzoides* Willd., Sp. Pl. 3: 2043. 1803 [nom. nov. illeg., based on *Conyza asteroides* L.]. *Sericocarpus conyzoides* (Willd.) Nees, Gen. Sp. Aster. 150. 1832 [nom. nov. illeg., based on *Aster conyzoides* Willd.]. *Aster asteroides* (L.) MacMillan, Metasperm. Minn. Valley 524. 1892 [non *Aster* (*Heterochaeta*) *asteroides* (DC.) Kuntze 1891; non *Aster* (*Baccharis*) *asteroides* (Colla) Rusby 1893]. *Aster paternus* Cronq., Bull. Torrey Bot. Club 74: 149. 1947 [nom. nov., based on *Conyza asteroides* L.]. **LECTOTYPE** (Reveal et al. 1987, p. 214): without locality or date, *P. Kalm s.n.* (LINN 993.10, the two branches on the left, Fig. 8). **EPITYPE** (designated here): **New Jersey**. Gloucester Co.: Almonesson [Deptford Twp.], 28 Jun 1902, *L. Sowden s.n.* (PH, Fig. 9).

It is assumed here that Kalm made the type collection in 1748 in the vicinity of Swedesboro, Gloucester Co., New Jersey, where his activities were centered during his relatively brief time in North America (see Reveal 1983 and Wikipedia entry on Kalm). He also traveled farther into the northeastern USA, into New York and Connecticut, where typical *Sericocarpus asteroides* occurs and as far west as Niagara Falls, passing through a region of New York where the caespitose form occurs. The epitype unambiguously establishes the identity of the name.

Aster leucanthemus Raf., Med. Reposit. 2, 5: 359. 1808; reprinted in J. Bot. (Desvaux) 1(4): 226. 1809. **TYPE**: "Virginia" fide protologue. Presumably collected by Rafinesque in July or August 1804. Non *Aster leucanthemus* Desf. 1829. **Protologue**: "14. Aster leucanthemus, white star, star wort; leaves semi-cuneiform, incised-serrated, flowers terminal, crown semi 10 flosculous. Grows in Virginia." Not in Herbarium Horti Botanici Pisani (PI), fide Dr. Lucia Amadei, pers. comm, 2001; not in Herbarium Universitatis Florentinae (FI), fide Dr. Piero Cuccuini, 2000; not located elsewhere. House (1921) placed *Aster leucanthemus* as a synonym of *Sericocarpus asteroides*, otherwise the name apparently has not appeared elsewhere in literature; Rafinesque's description fits the species. **NEOTYPE** (designated here): **Virginia**. Arlington Co.: Hills near New Alexandria, bank by roadside, 10 Aug 1919, *E.C. Leonard* 748 (US, Fig. 10).

During Rafinesque's first trip to the USA, from April 1802 through December 1804, he lived in Philadelphia and several nearby towns (Rafinesque 1836) and made excursions to the countryside of Pennsylvania, New Jersey, Delaware, and Maryland, collecting plants and other organisms from a variety of habitats. "When the flora of Michaux was published in 1803, it became my manual and I

labored to write a Supplement to it" (1836, p. 18). His only excursion into Virginia was in July or August of 1804, where essentially he reached no farther southeast than the region of Washington, visiting the Falls of the Potomac and the Alexandria vicinity. Presumably his "Virginia" collection of *Sericocarpus* was made in this area, where the typical (rhizomatous) form occurs, and the neotype is from there.

Rafinesque returned to Europe in January 1805, carrying his plant collection: "My herbal contained nearly 2400 species and 10,000 specimens. I sent many to the Professors Savi of Pisa and Radi of Florence who gave me Italian plants in exchange" (1836, p. 26). He lived for about 10 years in Palermo, Sicily, from where he submitted his paper to the The Medical Repository (1808). "Having been prevented in 1807 by the want of communication, to send to Paris my supplement to the Flora of North America of Michaux, which my friend Turpin had induced the publisher Levrault to publish: I sent an abridgement of it, or the N.G. and new species to Dr. Mitchill of New York, who published them in his medical repository, and this paper was afterwards translated in French by Desvaux (1809) for his Journal of Botany" (1836, p. 33).

Aster conyzoides Willd. var. *plantaginifolius* Nutt., Gen. N. Amer. Pl. 2: 158. 1818. *Aster plantaginifolius* (Nutt.) Nutt. ex Nees, Gen. Sp. Aster. 299. 1832. **TYPE: New Jersey.** Protologue: "In the forests of New Jersey. A plant every way smaller than the preceding [typical *Aster conyzoides*], and much fewer flowered. Seeds of both villous. Probably a distinct species?" No type cited, no original material located. **NEOTYPE** (designated here): **New Jersey.** Gloucester Co.: 1/2 mi S of Plainsville, roadside, 3 Jul 1938, *F.R. Fosberg 15627* (PH, Fig. 11).

Sericocarpus asteroides (L.) B.S.P. forma *roseus* Svenson, Rhodora 30: 136. 1928. **TYPE: Massachusetts.** Barnstable Co.: Falmouth, 1 Sep 1926, *H.K. Svenson s.n.* (holotype: GH, Fig. 12; isotype: LL).

SERICOCARPUS CAESPITOSUS Nesom, **sp. nov.** **TYPE: Pennsylvania.** Westmoreland Co.: Stewart's Station, swamp at Trafford, 15 Aug 1900, *J.A. Shafer s.n.* (holotype: PH, Fig. 13).

Similar to typical *Sericocarpus asteroides* in vestiture, leaf disposition and morphology, and inflorescence and floral morphology, but different in its strictly caespitose growth habit, without slender, scale-leaved rhizomes.

Sericocarpus asteroides (L.) B.S.P. forma *albopapposus* Farw., Pap. Michigan Acad. Sci. 1: 100. 1923. **TYPE: Michigan.** Kalamazoo Co.: Galesburg, dry grounds, 31 Aug 1918, *O.A. Farwell 5097a* (holotype: MICH not seen; isotype: GH!). According to Voss (1996), this is the only known collection of the species from Michigan and it is of "dubious status."

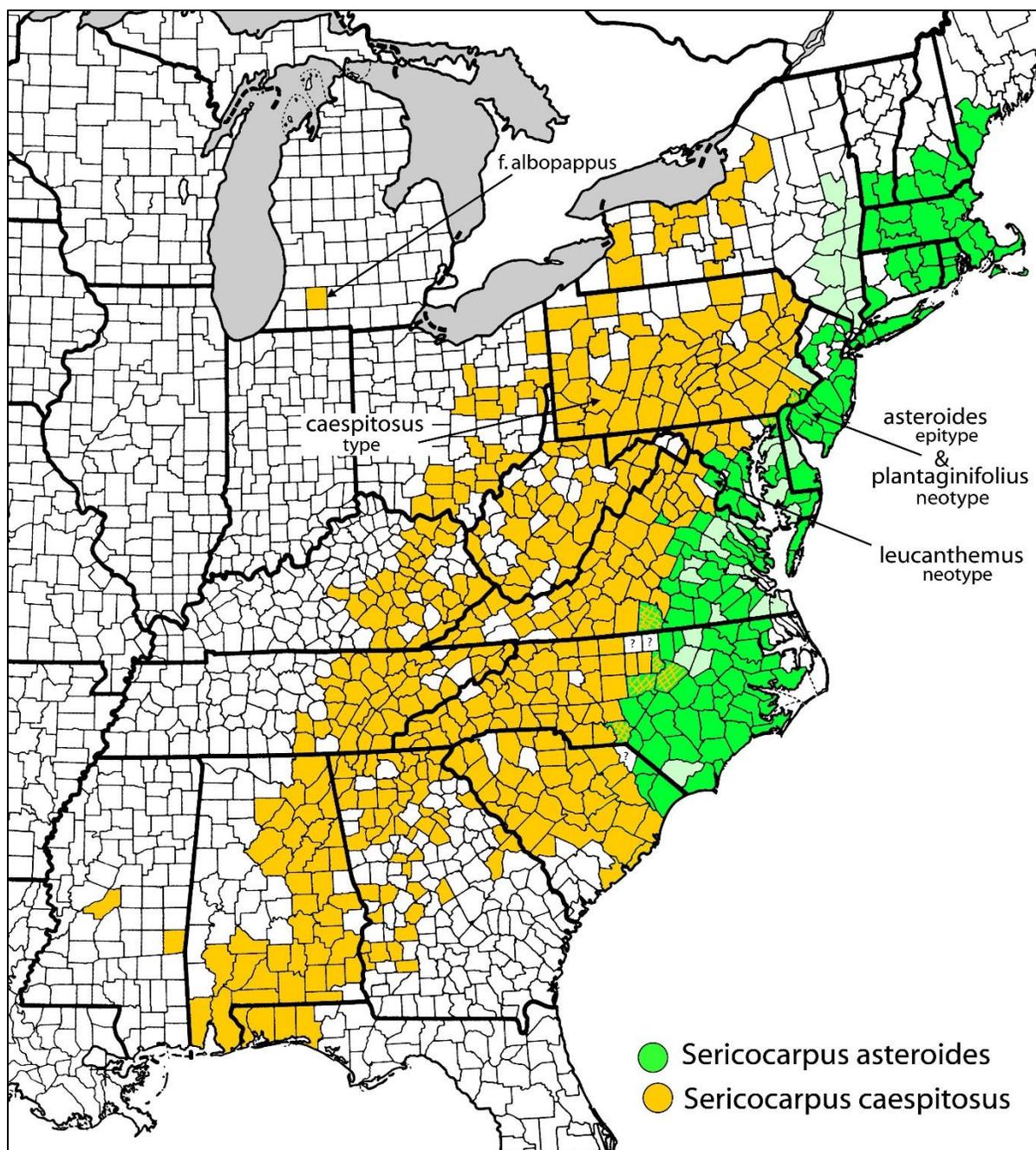


Figure 2. Distribution of *Sericocarpus asteroides* sensu stricto and *S. caespitosus*. Reports from Indiana and Wisconsin apparently are based on cultivated plants. Light green shading represents counties with collections without basal parts (or with vouchers not seen in southeastern New York) but that probably are *S. asteroides*. Question marks represent counties with vouchers without diagnostic basal parts. Counties with hatching have both entities.

The Mississippi records are these: Clarke Co.: ca. 20 mi NE of Quitman, dry, rocky ridge of Burstone Cuesta, sandy soil, scrub oak and longleaf pine, 12 Jun 1969, *Jones 16326* (FSU); Madison Co. — Lowe (1921) noted specifically that a collection was made in August at Canton in Madison Co. and deposited at "Geol. Surv. Herb." but I have not found the voucher. Other Mississippi reports are based on misidentifications.

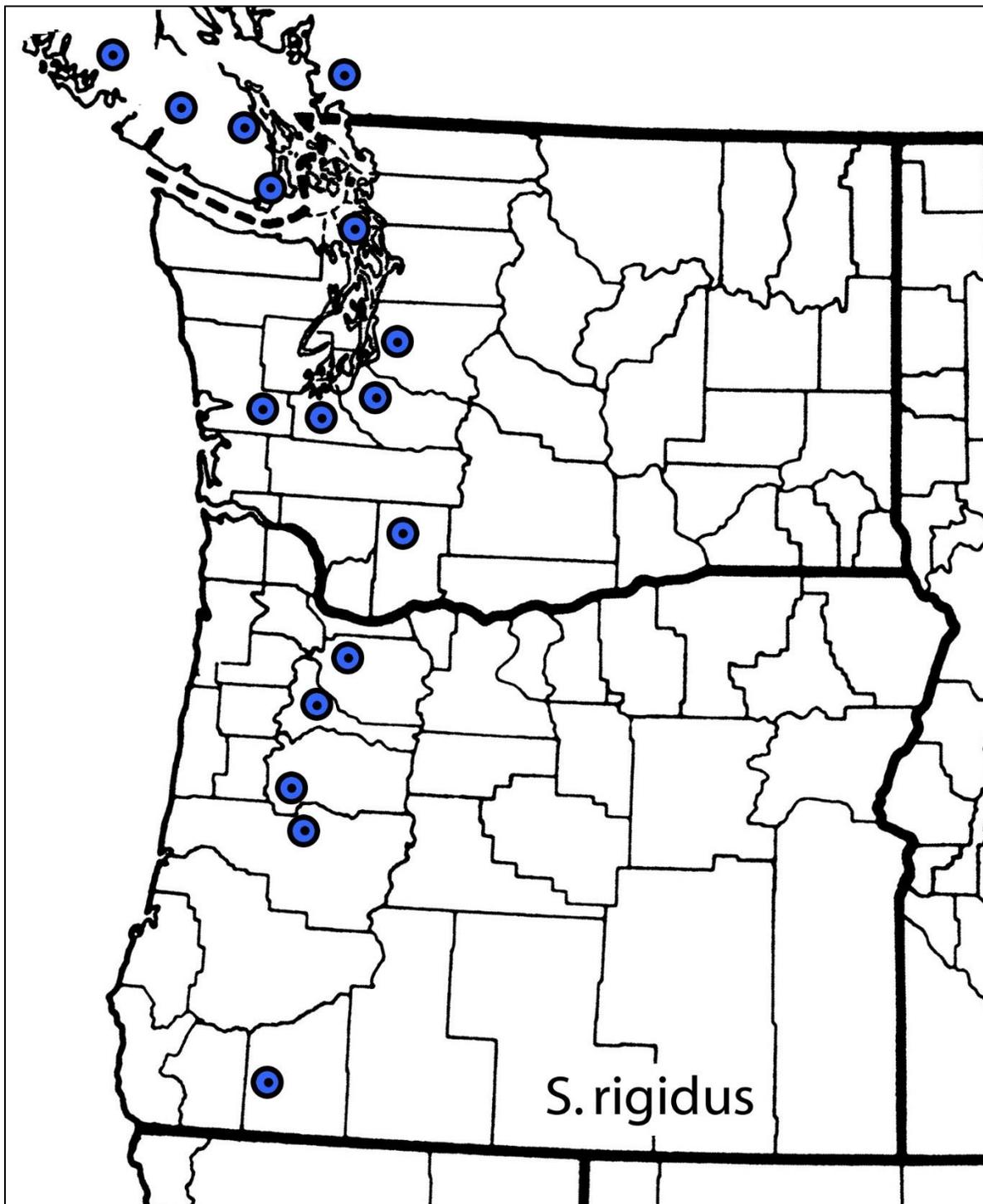


Figure 3. Distribution of *Sericocarpus rigidus*. Plants of *S. rigidus* produce stoloniform rhizomes.

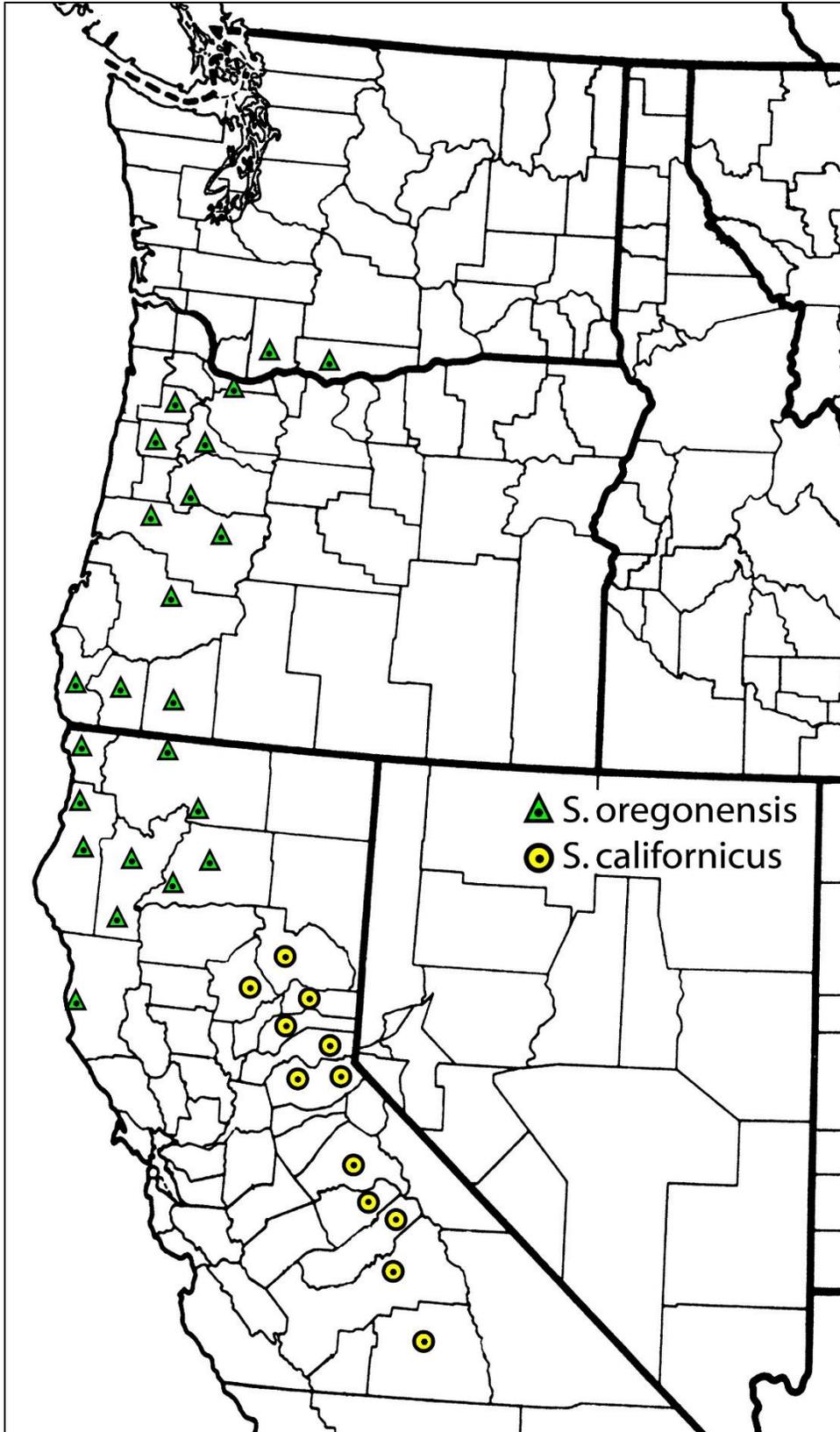


Figure 4. Distribution of *Sericocarpus oregonensis* and *S. californicus*. Plants of *S. oregonensis* produce stoloniform rhizomes; those of *S. californicus* do not.

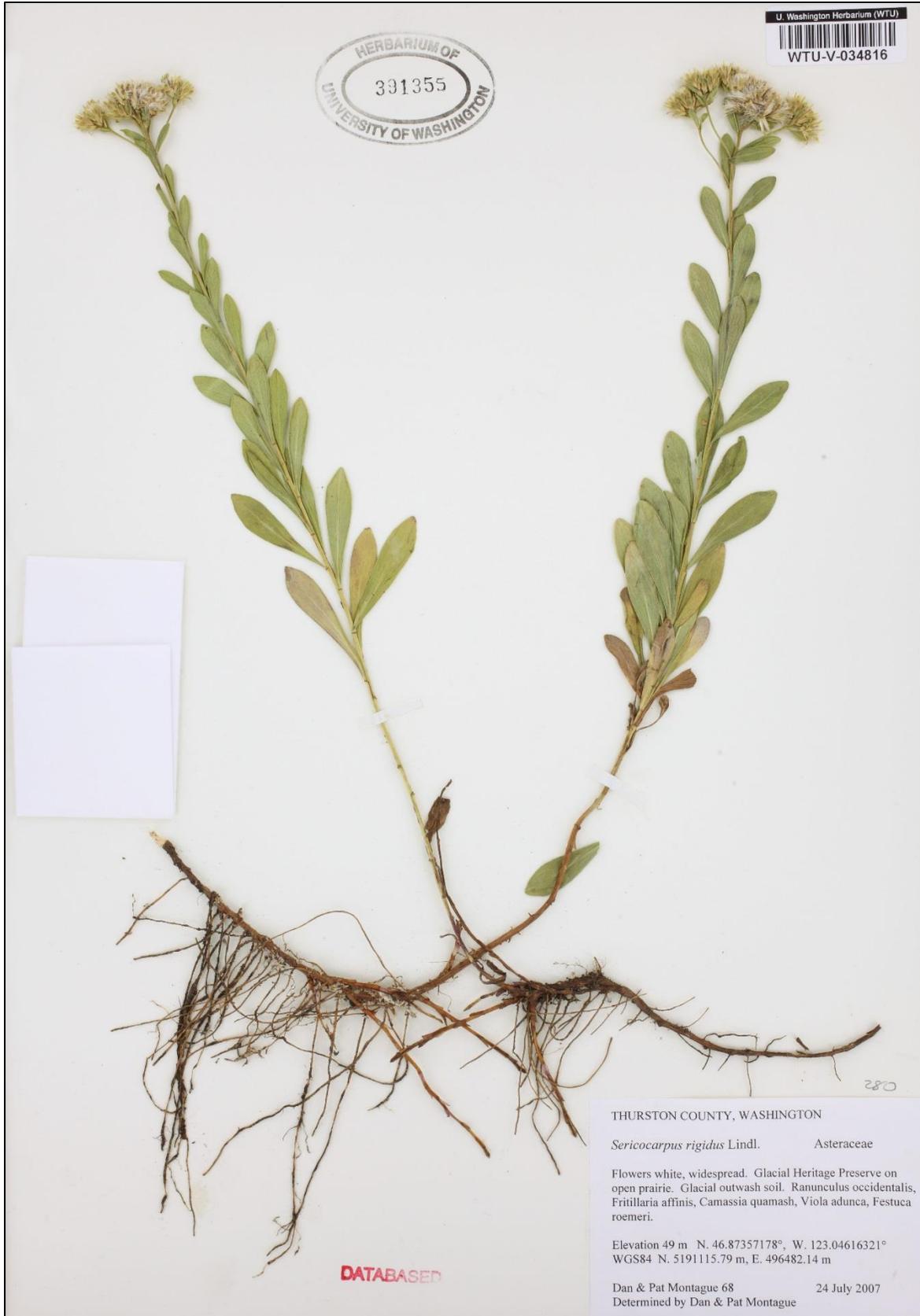


Figure 5. *Sericocarpus rigidus*. Thurston Co., Washington, Montague 68 (WTU).



Figure 6. *Sericocarpus oregonensis*. Benton Co., Oregon, Baker 356 (ID).



Figure 7. *Sericocarpus californicus*. Nevada Co., California, Williams 77-106-1 (RENO).



Figure 8. *Sericocarpus asteroides*. Lectotype, LINN 993.10, collected by Peter Kalm, presumably from New Jersey (see text).



Figure 9. *Sericocarpus asteroides*. Epitype, Gloucester Co., New Jersey, Sowden s.n. (PH). Plants arising from stoloniform rhizomes (arrows).



Figure 10. Neotype of *Aster leucanthemus* Raf. Arlington Co., Virginia, Leonard 748 (US).



Figure 11. Neotype of *Aster conyzoides* var. *plantaginifolius* Nutt. Gloucester Co., New Jersey, Fosberg 15627 (PH).



Figure 12. *Sericocarpus asteroides* forma *roseus*. Basal portion of holotype (GH), Barnstable Co., Massachusetts. Slender, scale-leaved, stoloniform rhizomes arising from the caudex.



Figure 13. *Sericocarpus caespitosus*. Holotype, Westmoreland Co., Pennsylvania, Shafer s.n. (PH). Plant with a branching caudex, without stoloniform rhizomes.



Figure 14. *Sericocarpus asteroides*. Bigelow Hollow State Park, Tolland Co., Connecticut. Photo by Sean Blaney, 22 August 2016, iNaturalist. Colonial population resulting from spread by rhizomes.



Figure 15. *Sericocarpus asteroides*. Raleigh, Wake Co., North Carolina. Photo by "paupau," 10 June 2019, iNaturalist. Colonial population resulting from spread by rhizomes.



Figure 16. *Sericocarpus asteroides*. Wissahickon Valley Park, Philadelphia Co., Pennsylvania. Photos by Janet Novak, 29 July 2020, iNaturalist. Colonial population resulting from spread by rhizomes.

Nesom: *Sericocarpus caespitosus*, sp. nov.



Figure 17. *Sericocarpus asteroides*. Fairfield Co., Connecticut, Kennedy s.n. (GH).



Sericocarpus asteroides (L.) B.S.P.
 (Syn: *Aster paternus* Cronq.)
 Det: MR Blondin & JC Sempile June 2002
 WAT University of Waterloo

S. asteroides (L.) B.S.P.
 #345 FLORA OF CONNECTICUT.
 C. H. BISSELL, Collector.
 Southington, Conn.
Sericocarpus conyzoides,
 Woods' commun. Nesom.
 Southington Hartford Co 1/24/98

Figure 18. *Sericocarpus asteroides*. Hartford Co., Connecticut, Bissell 345 (NEBC).



Figure 19. *Sericocarpus asteroides*. Cumberland Co., North Carolina, Ahles 26587 (VSC).

Nesom: *Sericocarpus caespitosus*, sp. nov.



Figure 20. *Sericocarpus asteroides*. Granville Co., North Carolina, Batson 1210 (DUKE).



Figure 21. *Sericocarpus asteroides*. Moore Co., North Carolina, Bowers 45566 (TENN).

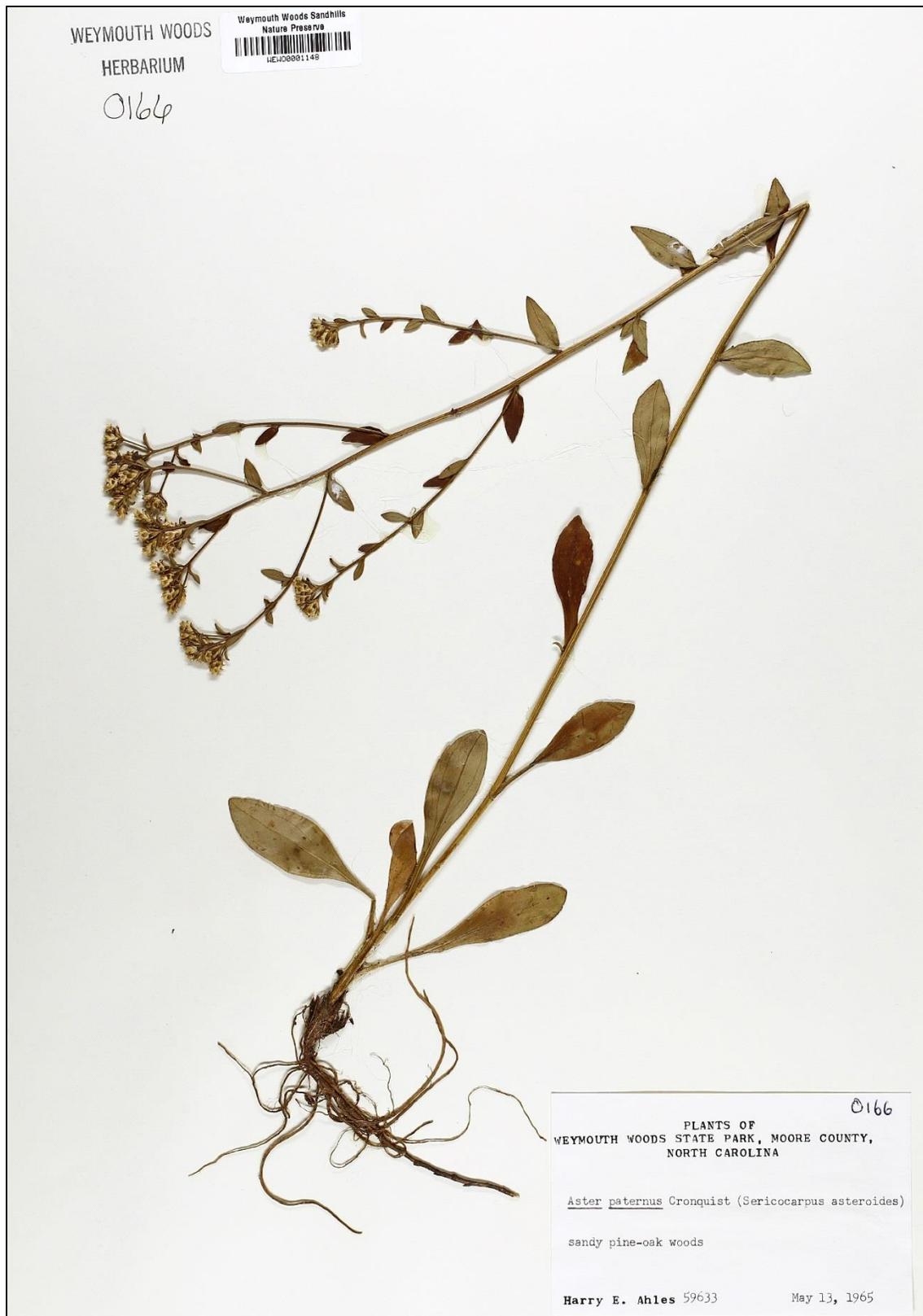


Figure 22. *Sericocarpus asteroides*. Moore Co., North Carolina, Ahles 59633 (WEW). Lignescent rhizome, compare Figures 20 and 22.



Figure 23. *Sericocarpus asteroides*. Marion Co., South Carolina, Bell 13628 (NCU). Arrow points to lignescent rhizome, presumably developed from a thinner, stoloniform rhizome. See Figs. 18, 21.

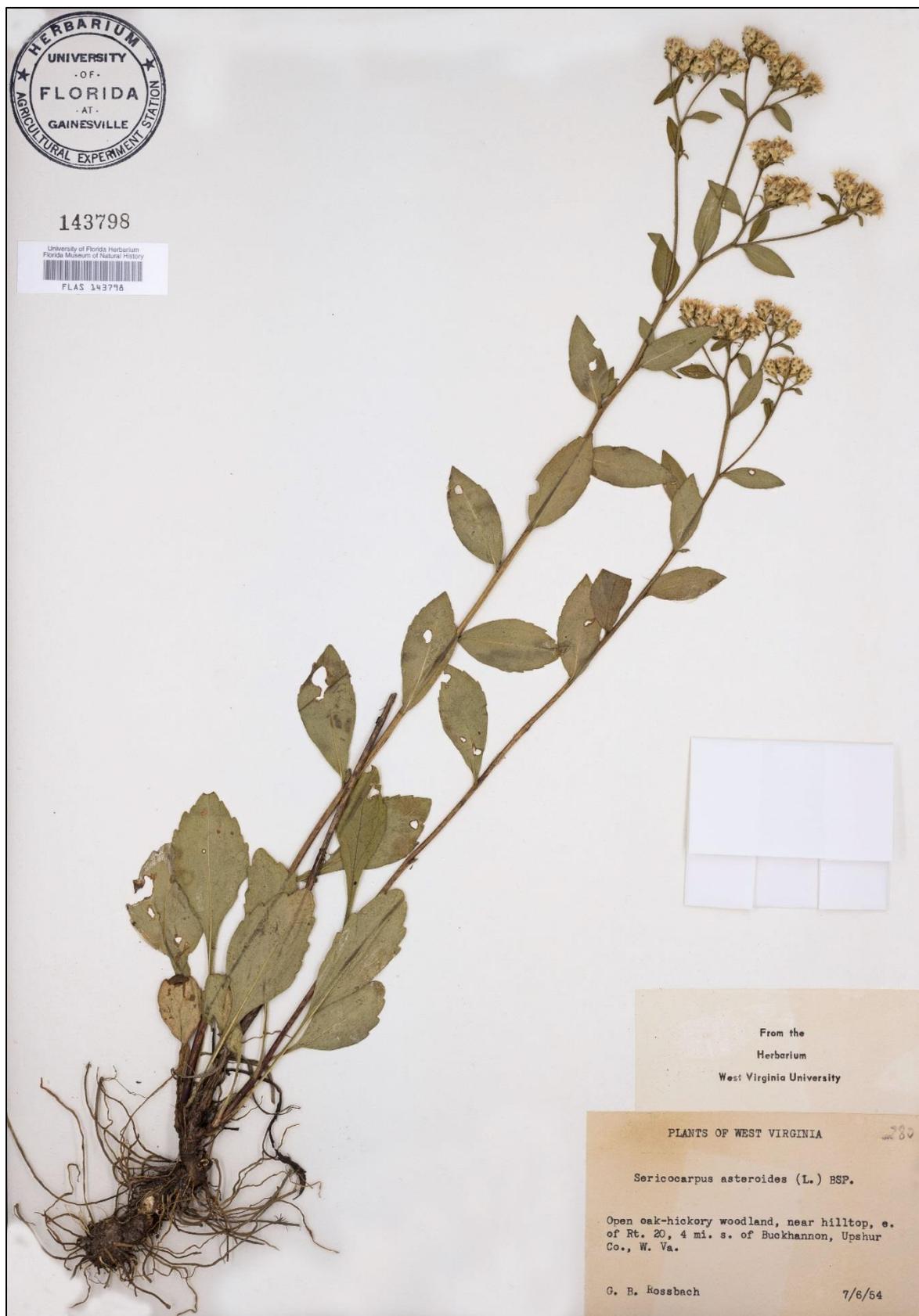


Figure 24. *Sericocarpus caespitosus*. Upshur Co., West Virginia, Rossbach s.n. (FLAS).

Nesom: *Sericocarpus caespitosus*, sp. nov.



Figure 25. *Sericocarpus caespitosus*. Beaver Co., Pennsylvania, Henrici s.n. (PH).



Figure 26. *Sericocarpus caespitosus*. Montgomery Co., Pennsylvania, Long 61570 (PH).



Figure 27. *Sericocarpus caespitosus*. Calhoun Co., Alabama, Whetstone s.n. (BRIT).



Figure 28. *Sericocarpus caespitosus*. Walton Co., Florida, Correll 52242-A (USF).



Figure 29. *Sericocarpus caespitosus*. Charleston Co., South Carolina, Hill 23819 (CLEMS).

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I am grateful to Bruce Sorrie for guiding me to *Sericocarpus asteroides* sites in Moore and Richmond counties, North Carolina, and to Dr. Piero Cuccuini (FI, Florence) and Dr. Lucia Amadei (PI, Pisa) for searching for a Rafinesque collection that might be the type of *Aster leucanthemus* (see text).

LITERATURE CITED

- Brouillet, L., T.K. Lowrey, L. Urbatsch, V. Karaman-Castro, G. Sancho, S.J. Wagstaff, and J.C. Semple. 2009. Astereae. Pp. 589–629, in V.A. Funk et al. (eds.). Systematics, Evolution, and Biogeography of Compositae. International Association for Plant Taxonomy, Vienna.
- House, H.D. 1924. Annotated List of the Ferns and Flowering Plants of New York State. New York State Mus. Bull. 254: 5–759.
- Leonard, M.R., R.E. Cook, and J.C. Semple. 2005. A multivariate morphometric study of the Aster genus *Sericocarpus* (Asteraceae: Astereae). Sida 21: 1471–1505.
- Lowe, E.N. 1921. Plants of Mississippi. Mississippi State Geological Survey Bulletin No. 17. Hedermann Bros., Jackson.
- Nesom, G.L. 1993. Taxonomy of *Sericocarpus* (Asteraceae: Astereae). Phytologia 75: 45–54.
- Rafinesque Schmaltz, C.G.[S.]. 1808. Essential generic and specific characters of some new Genusses and species of plants observed in the United States of America, in 1803 and 1804. Communication to Dr. Mitchill, 1 September 1807, from Palermo. The Medical Repository, 2, 5(4): 356–363.
- Rafinesque Schmaltz, C.G.[S.]. 1809. Description des plantes trouvees dans les Etats-Unis d'Amerique, en 1803 et 1804, Desvaux's Journal de botanique 1(4): 218–234. [Translation of the 1808 article published in Medical Repository]
- Rafinesque Schmaltz, C.G.[S.]. 1836. A Life of Travels and Researches in North America and South Europe F. Turner, Philadelphia.
- Reveal, J.L. 1983. Significance of pre-1753 botanical explorations in temperate North America on Linnaeus' first edition of Species Plantarum. Phytologia 53: 1–96.
- Reveal, J.L., C.R. Broome, M.L. Brown, and G.F. Frick. 1987. On the identities of Maryland plants mentioned in the first two editions of Linnaeus' *Species plantarum*. Huntia 7: 209–245.
- Semple, J.C. and M.R. Leonard. 2006. *Sericocarpus*. Pp. 101–105, in Flora of North America North of Mexico, Vol. 20. Oxford Univ. Press, New York and Oxford.
- Voss, E.G. 1996. Michigan Flora. Part III. Dicots (Pyrolaceae-Compositae). Cranbrook Institute of Science Bull. 61 and Univ. of Michigan Herbarium, Ann Arbor.

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