A synopsis of the genus *Sanicula* (Apiaceae) in eastern Canada

KATHLEEN M. PRYER
Botany Division, National Museum of Natural Sciences, P.O. Box 3443, Station D, Ottawa, Ont., Canada K1P 6P4

AND

LOY R. PHILLIPPE
Illinois Natural History Survey, 607 East Peabody Drive, Champaign, IL 61820, U.S.A.

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A synopsis of the genus *Sanicula* in eastern Canada is presented. Four species and two varieties of these native woodland umbellifers are recognized. A key to the taxa, pertinent synonymy, comparative descriptions of diagnostic characters, and notes on the taxonomy, distribution, habitat, and rare status are provided. Illustrations of umbellet and fruit morphology, eastern Canadian dot maps, and North American range maps are also included for each taxon. The name *S. canadensis* L. var. *grandis* Fern. is revived, but it now represents a differently circumscribed taxon from that described by Fernald. *Sanicula odorata* (Raf.) Pryer & Phillipe, which is neotypified here, must replace the long-accepted name *S. gregaria* E. P. Bicknell.

PRYER, K. M., et PHILLIPPE, L. R. 1989. A synopsis of the genus *Sanicula* (Apiaceae) in eastern Canada. Can. J. Bot. **67** : 694–707.

Un synopsis du genre *Sanicula* dans l'est du Canada est présenté. Quatre espèces et deux variétés de ces ombellifères des bois sont reconnues. Une clef d'identification des taxons, la synonymie pertinente, des descriptions comparatives des caractères diagnostiques et des notes sur la taxonomie, la distribution, l'habitat et le statut rare sont fournies. Des illustrations des ombelles et de la morphologie du fruit, des cartes d'aires canadiennes et des cartes de portée de distribution nord-américaine sont aussi incluses pour chaque taxon. Le nom *S. canadensis* L. var. *grandis* Fern. est repris mais représente maintenant un taxon de circonscription différente de celle du taxon décrit par Fernald. Le *Sanicula odorata* (Raf.) Pryer & Phillippe, qui est néotypifié ici, doit remplacer le nom accepté depuis très longtemps de *S. gregaria* E. P. Bicknell.
[Traduit par la revue]

Introduction

Sanicula (Apiaceae: Saniculoideae), commonly known as black snakeroot or sanicle, is a distinctive genus of perennial woodland herbs with representatives in the north temperate zone of both the Old and New World. Plants of *Sanicula* flower in late spring and early summer and set fruit by midsummer. Armed with hooked bristles, a rather prominent and persistent calyx, and two persistent styles, the fruits (schizocarps) are the most characteristic feature of *Sanicula* and readily distinguish it from other genera in the Apiaceae.

Shan and Constance (1951) recognized five more or less natural groups or sections within the genus *Sanicula*, each with its own morphological characteristics and distinctive geographical range. Only *Sanicula* section *Sanicula* is represented in eastern Canada. In most monographs and floras, only four taxa have been recognized in eastern Canada: *S. canadensis* L., *S. gregaria* E. P. Bicknell, *S. marilandica* L., and *S. trifoliata* E. P. Bicknell (Shan and Constance 1951; Gleason and Cronquist 1963; Scoggan 1979). In his doctoral dissertation, Phillippe (1978*a*) distinguished seven New World taxa within section *Sanicula*. Six of these occur in eastern North America and one is known from the mountains of Mexico and Central and South America. Of the six eastern North American taxa, Phillippe (1978*a*) determined that five are found in eastern Canada. The exception, *S. smallii* E. P. Bicknell, occurs primarily in the southeastern United States, and is not known to occur farther north than southern Ohio.

During the course of Phillippe's (1978*a*) investigation of *Sanicula* it became apparent that *S. canadensis* var. *grandis* Fern., placed in synonymy with *S. canadensis* by Mathias and Constance (1944) and Shan and Constance (1951), did merit recognition at varietal level. In addition, through a careful examination of publications by Bicknell (1895, 1897), Rafinesque (1817), and Robin (1807), it was determined that at the time of publication of the name *S. gregaria* (Bicknell 1895), there already existed an earlier name for this same taxon. Questions that arose from an initial study done in 1985 of *S. canadensis* in Ontario, a taxon then under consideration for inclusion in Part 4 of the *Atlas of the Rare Vascular Plants of Ontario* (Pryer and Argus 1987), prompted an investigation of the genus in eastern Canada. A survey of herbarium specimens,[1] floras, and checklists indicated that none of the eastern Canadian taxa was well understood and also reconfirmed Phillippe's (1978*a*) findings. The intent of this paper is to bring these new observations to light and to present a synopsis of the genus as represented in eastern Canada.

Morphology

Habit and leaves

Members of *Sanicula* in eastern Canada are perennial, glabrous herbs with stems 1–14 dm tall. Plants of each species have 1–14 basal leaves with petioles much longer than the blades; the leaf blades are palmately compound with 3-5 variously lobed leaflets. The cauline leaves are like the basal, but with shorter petioles, and are reduced in size upward, with blades progressively less lobed. The vegetative morphology

[1]A complete list of herbarium specimens examined in this study has been placed in the CISTI Depository of Unpublished Data. Copies may be purchased from CISTI, National Research Council of Canada, Ottawa, Ont., Canada K1A 0S2.

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(leaf size, shape, degree of lobing) is extremely variable and for that reason is of limited use in species delimitation.

Inflorescence

The inflorescence comprises 1–3 simple or compound dichasia of umbels. The involucral bracts are 1–3, sessile or short petiolulate, subfoliaceous, and reduced upward; involucel bracteoles are small and inconspicuous. Plants of *Sanicula* are andromonoecious; i.e., their inflorescences contain both hermaphrodite and staminate flowers. The flowers are grouped in few to numerous umbellets. All plants possess umbellets bearing a mixture of hermaphrodite and staminate flowers (referred to as polygamous umbellets). Some taxa are dimorphic and possess both polygamous umbellets and umbellets bearing only staminate flowers (referred to as staminate umbellets) (Fig. 1). Depending on the species, the polygamous umbellets can have as many as 120 flowers, though typically they have 4–30 flowers. Staminate flowers can vary greatly in number, from only 1 up to 117 per umbellet, but they usually fall in the range of 1–27; hermaphrodite flowers are typically 3 per polygamous umbellet, though occasionally at maturity fewer are visible due to fruit abortion. Pedicel length for both kinds of flowers varies from species to species.

Flowers and fruits

Floral and especially fruit morphology provides very reliable and useful diagnostic characters and its use is stressed in this paper. *Sanicula* flowers are gamosepalous. The free portion of the sepals may be deltoid or narrowly trianglular to subulate, supple or rigid, and 0.4–2.0 mm long. The corolla is polypetalous with 5 white, greenish white, or yellowish green petals that are apically inflexed. There are 5 stamens per flower and these can either be included within the calyx or exserted. The hermaphrodite flowers have 2 persistent styles whose length is exceptionally consistent within taxa and varies only from one taxon to another. Style length (Fig. 1) is an excellent diagnostic character, reliable, and easily observed. Each fruit is a brownish green schizocarp, armed with hooked bristles (Fig. 1) over its entire outer surface. The inner seed face, where the two mericarps meet, is plane or wrinkled with a commissural scar (Fig. 1) that can vary from narrowly elliptical to broadly oval.

Key to eastern Canadian *Sanicula*

1. Styles shorter than or rarely equal to the calyx; umbellets polygamous only
   2. Sepals on mature fruit convergent, forming a prominent beak-like projection equalling or exceeding the uppermost fruit bristles; fruits 4–7 mm long, ellipsoidal, sessile; umbellets polygamous with 4–11 flowers, usually 3 of these hermaphrodite and 1–8 staminate; pedicels of staminate flowers 3–6 mm long; sepal tips subulate, incurved ..... *Sanicula trifoliata*
   2. Sepals on mature fruit somewhat spreading, inconspicuous among the uppermost fruit bristles; fruits 3–5 mm long, globose to ovoid, with short but distinct pedicels 0.5–1.0 mm long; umbellets polygamous with 4–6 flowers, usually 3 of these hermaphrodite and 1–3 staminate; pedicels of staminate flowers ≤2 mm long; sepal tips acute or sharp-pointed, straight ..... *Sanicula canadensis* var. *canadensis*
1. Styles 1½ times to more than twice as long as the calyx; umbellets dimorphic: some polygamous and some staminate only (the latter are rare in *S. canadensis* var. *grandis*)
   3. Calyx lobes 0.7–2.0 mm long, rigid, narrowly triangular to subulate, the apices sharp-pointed, less than the lower ¼ of calyx connate; petals white or greenish white, equal to or slightly longer than calyx
      4. Styles about 1½ times as long as calyx, inconspicuously exserted from between calyx lobes and recurved; umbellets usually polygamous, rarely some staminate only; polygamous umbellets with 6–18 flowers, usually 3 of these hermaphrodite and 3–15 staminate; fruits with short but distinct pedicels 0.5–1.0 mm long; bases of fruit bristles dilated, but never bulbous, often minutely papillose ..... *Sanicula canadensis* var. *grandis*
      4. Styles more than twice as long as calyx, conspicuously exserted from calyx and recurved; umbellets dimorphic, some polygamous and others staminate only; polygamous umbellets with 12–120 flowers, usually 3–4 of these hermaphrodite and 9–117 staminate; fruits sessile to subsessile; bases of fruit bristles prominently bulbous, with a minutely warty-reticulate surface pattern ..... *Sanicula marilandica*.
   3. Calyx lobes 0.4–0.7 mm long, supple, deltoid, the apices obtuse or acute (not sharp-pointed), the lower ¼–½ of calyx connate; petals yellowish green, much longer than calyx ..... *Sanicula odorata*

Sanicula trifoliata E. P. Bicknell, Bull. Torrey Bot. Club 22: 359. 1895. Figs. 2, 3A, 3B

TYPE: CANADA. ONTARIO: dry rich woods, Amherstburg, 10 Oct. 1882, *Macoun s.n.* (LECTOTYPE, NY! [designated by Mathias and Constance, North Amer. Fl. 28B: 67. 1944]; photo, TENN!).

Diagnostic characters

Umbellets polygamous with 4–11 flowers, usually 3 of these hermaphrodite and 1–8 staminate. Pedicels of staminate flowers 3–6 mm long. Hermaphrodite flowers sessile. Calyx lobes 0.8–1.8 mm long, rigid, narrowly triangular, with subulate, incurved tips; less than the lower ¼ of calyx connate. Sepals on mature fruit convergent, forming a prominent beak-like projection equalling or usually exceeding the uppermost fruit bristles. Petals white, shorter than or equalling calyx. Stamens usually included in calyx. Styles shorter than or rarely equal to calyx. Fruits 4–7 mm long, 5–8 mm wide, ellipsoidal, sessile. Bases of fruit bristles dilated and minutely white-patchy, rarely minutely papillose. Commissural scar broadly oval.

Habitat, distribution, and rare status

Sanicula trifoliata is often a good indicator of rich, mature hardwoods. In Canada, it occurs in New Brunswick, Quebec, and southern Ontario (Fig. 3A). It is rare only in New Brunswick (Hinds 1983). In the United States the range of *S. trifoliata* extends from New Hampshire westward to southeastern

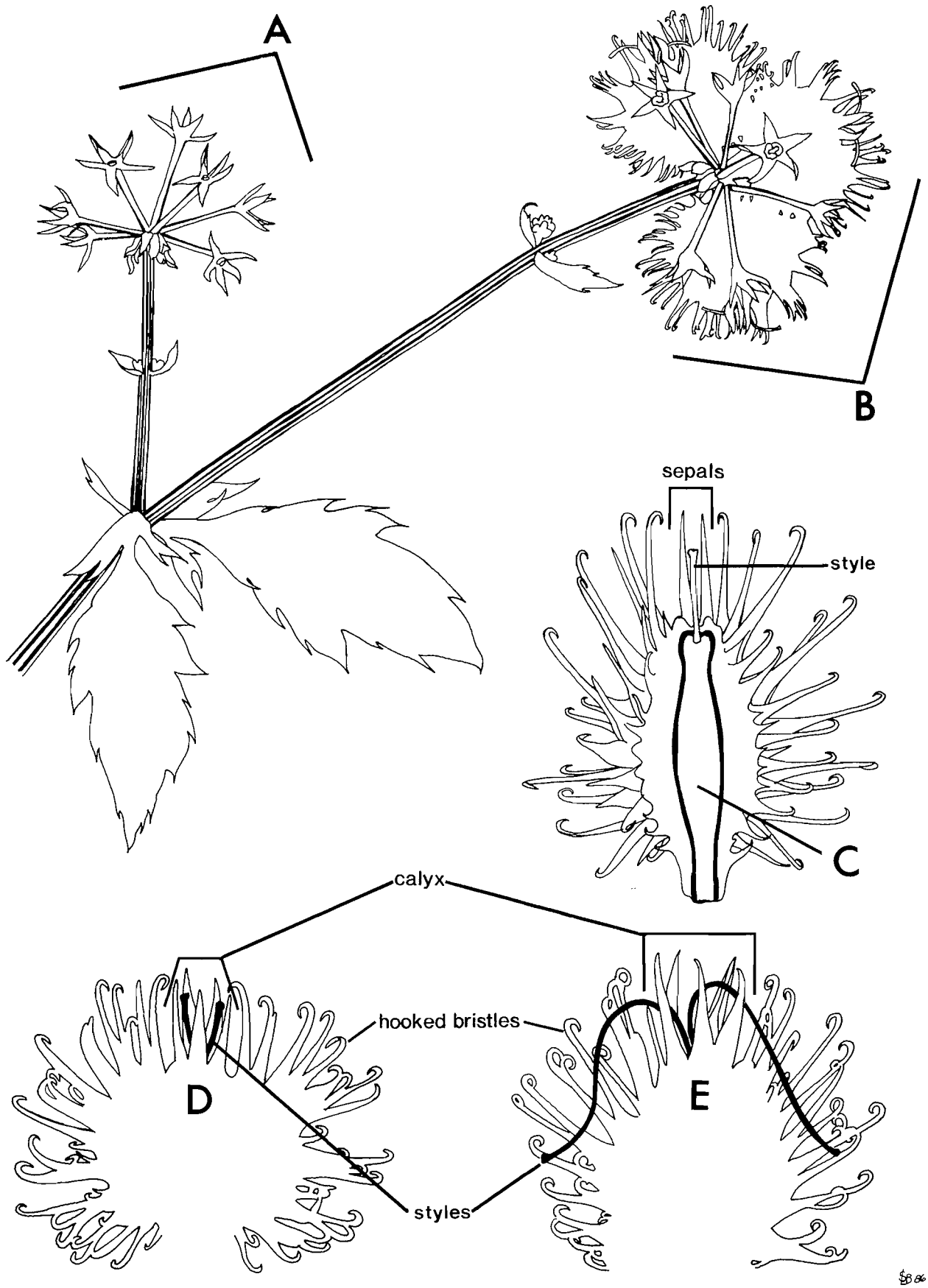

FIG. 1. Diagrammatical sketches illustrating inflorescence and fruit features of *Sanicula*. (A) Staminate umbellet: staminate flowers only. (B) Polygamous umbellet: mixture of hermaphrodite and staminate flowers. (C) Commissural scar on inner seed face of mericarp. (D) Styles shorter than calyx. (E) Styles conspicuously exserted from calyx and recurved.

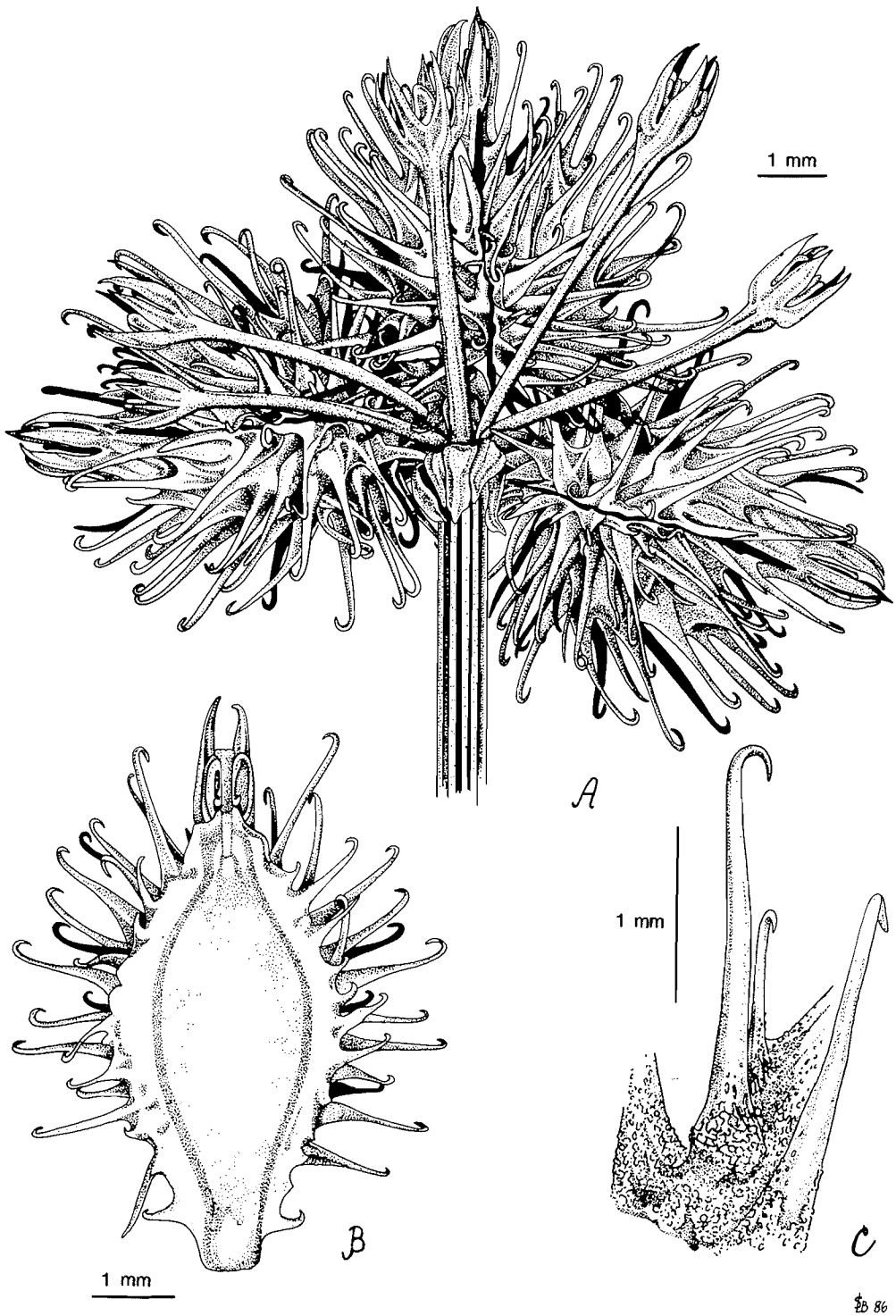

FIG. 2. Umbellet and fruit features of *Sanicula trifoliata*. (A) Polygamous umbellet with sessile mature fruits and pedicellate staminate flowers. (B) Inner seed face of mericarp showing broadly oval commissural scar; style shorter than sepals; included stamens; and sepals with subulate, incurved tips exceeding the uppermost bristles. (C) Bases of fruit bristles dilated and minutely white-patchy.

Minnesota and northeastern Iowa, and southward to northern Alabama and northern Georgia (Fig. 3B). It is threatened in South Carolina (Rayner 1985) and New Hampshire (New Hampshire Natural Heritage Inventory 1985), and rare in Iowa (Kartesz and Kartesz 1977) and Minnesota (Minnesota State Register 1983).

Rousseau (1974) suspected that J. Macoun's specimen at CAN of *S. trifoliata* from the Gaspé Basin, collected on 17 August 1907, may have been incorrectly labelled since it is somewhat disjunct from the species main range (Figs. 3A, 3B). An itinerary of Macoun's activities (Lamb 1968) and the computerized databases at CAN indicate that other Macoun collections were made from the Gaspé Basin area between 10 and 27 August 1907. There is currently little reason to doubt that the origin of the specimen was the Gaspé Basin, other than the scarcity of seemingly suitable habitat.

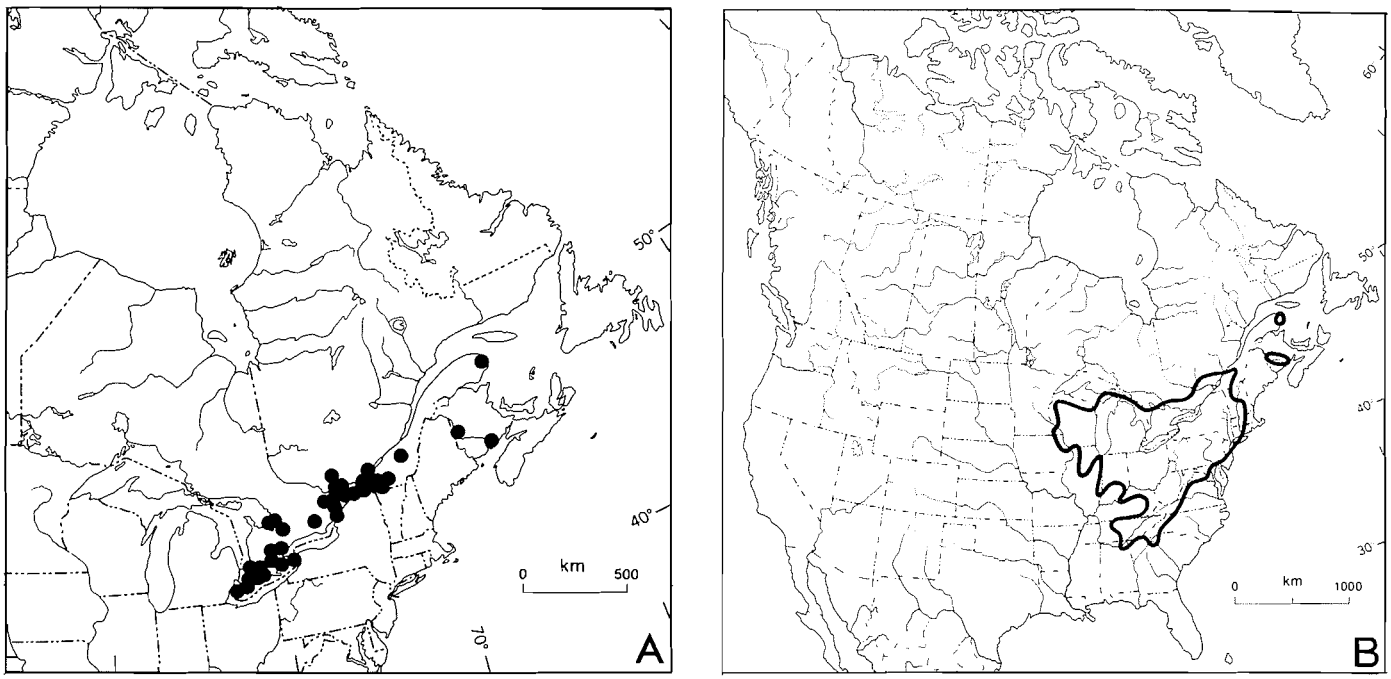

FIG. 3. Distribution of *Sanicula trifoliata*. (A) Canadian distribution based on verified specimens at AAR, ACAD, CAN, DAO, GH, HAM, ILL, LKHD, MSC, MT, MTMG, NBM, NY, QUE, TRT, TRTE, UNB, UWO, WS. (B) North American range based on Phillippe (1978*a*), Voss (1985), and herbarium specimens.

COMMON NAMES: Large-fruited sanicle, trefoil snakeroot.

Sanicula canadensis L., Sp. Pl. 235. 1753.

TYPE: UNITED STATES. VIRGINIA: "Sanicula canadensis amplissimo folio. Tourn. Inst. R. h. p. 326" *Clayton s.n.* (lectotype, BM [designated by Reveal, Bot. J. Linn. Soc. 92: 170–171. 1986: "the unnumbered, fertile Clayton specimen, . . . , annotated by Gronovius with the Tournefort name and described by him"]).

Sanicula marilandica L. var. *canadensis* (L.) Torrey, Fl. N. Middle U.S. 302. 1824. ('β').

Diagnostic characters

Umbellets polygamous; in var. *grandis* rarely some umbellets staminate only. Polygamous umbellets with 4–18 flowers, usually 3 of these hermaphrodite and 1–15 staminate. Pedicels of staminate flowers ≤3 mm long. Hermaphrodite flowers with short but distinct pedicels 0.5–1.0 mm long. Calyx lobes 0.6–1.5 mm long, rigid, narrowly triangular to subulate with acute or sharp-pointed tips, somewhat spreading, straight; less than the lower ¼ of calyx connate. Sepals on mature fruit inconspicuous among the uppermost bristles. Petals white or greenish white, usually included in calyx. Stamens usually shorter than or equalling calyx. Styles dimorphic, shorter than (rarely equal to) calyx in var. *canadensis*, and about 1½ times as long as calyx in var. *grandis*. Fruits 3–5 mm long, 3–7 mm wide, globose to ovoid, with short but distinct pedicels 0.5–1.0 mm long. Bases of fruit bristles dilated, ridged, and often minutely papillose. Commissural scar narrowly linear-elliptical.

Sanicula canadensis L. var. *canadensis*. Figs. 4, 5A, 5B

Diagnostic characters

Umbellets polygamous with 4–6 flowers, usually 3 of these hermaphrodite and 1–3 staminate. Pedicels of staminate flowers ≤2 mm long. Styles shorter than or rarely equal to calyx.

Habitat, distribution, and rare status

Plants of *S. canadensis* var. *canadensis* occur in such varied habitats as rich, dry upland woods, mesic deciduous–coniferous woods, overgrown alvars, wet lowland woods, wooded sand dunes, and thickets. In Canada, it occurs in southern Ontario and Quebec (Fig. 5A). Although once considered a rare taxon in Ontario (Argus and White 1977), further study has shown it to be too widespread in the province to retain that status (Pryer and Argus 1987). *Sanicula canadensis* var. *canadensis* is reported here for the first time in Quebec on the basis of the following herbarium specimens: Huntingdon Co., Cazaville. 25 Aug. 1984. *J. Brisson & M. Portier 10Q6* (MT); and Ile-de-Montréal, Sainte-Geneviève. 6 Aug. 1931. *S.M.-Victoria 74* (MT). Although not listed by Bouchard *et al.* (1983), this taxon should be considered rare in Quebec and looked for in the southwestern counties. In the United States its range extends from Vermont and Massachusetts southward to central Florida and westward to South Dakota and central Texas (Fig. 5B). The species is listed as threatened in Vermont (Vermont Endangered Species Committee 1985) and rare in Minnesota (Minnesota State Register 1983).

COMMON NAME: Short-styled Canadian sanicle.

NOTES: Two additional specimens of *S. canadensis* var. *canadensis* pertinent to Quebec require discussion: Quebec Co., Cap-Rouge. July 1884. *D. N. Saint-Cyr 1769* (QUE); and Saguenay Co., Ile Anticosti, Baie Gamache. Aug. 1882. *D. N. Saint-Cyr 1768* (QUE). These specimens were not mapped in Fig. 5A because the localities given are most likely due to labelling errors. Information regarding Saint-Cyr and his herbarium was provided by Richard Cayouette (a letter) and indicated that Saint-Cyr's specimens should be cited with caution, especially when referring to possible range extensions. Therefore, these Saint-Cyr specimens must be discounted as notable range extensions for *S. canadensis* var. *canadensis* in Quebec, since the locality data are too unreliable and the plants may in fact have originated from Ontario.

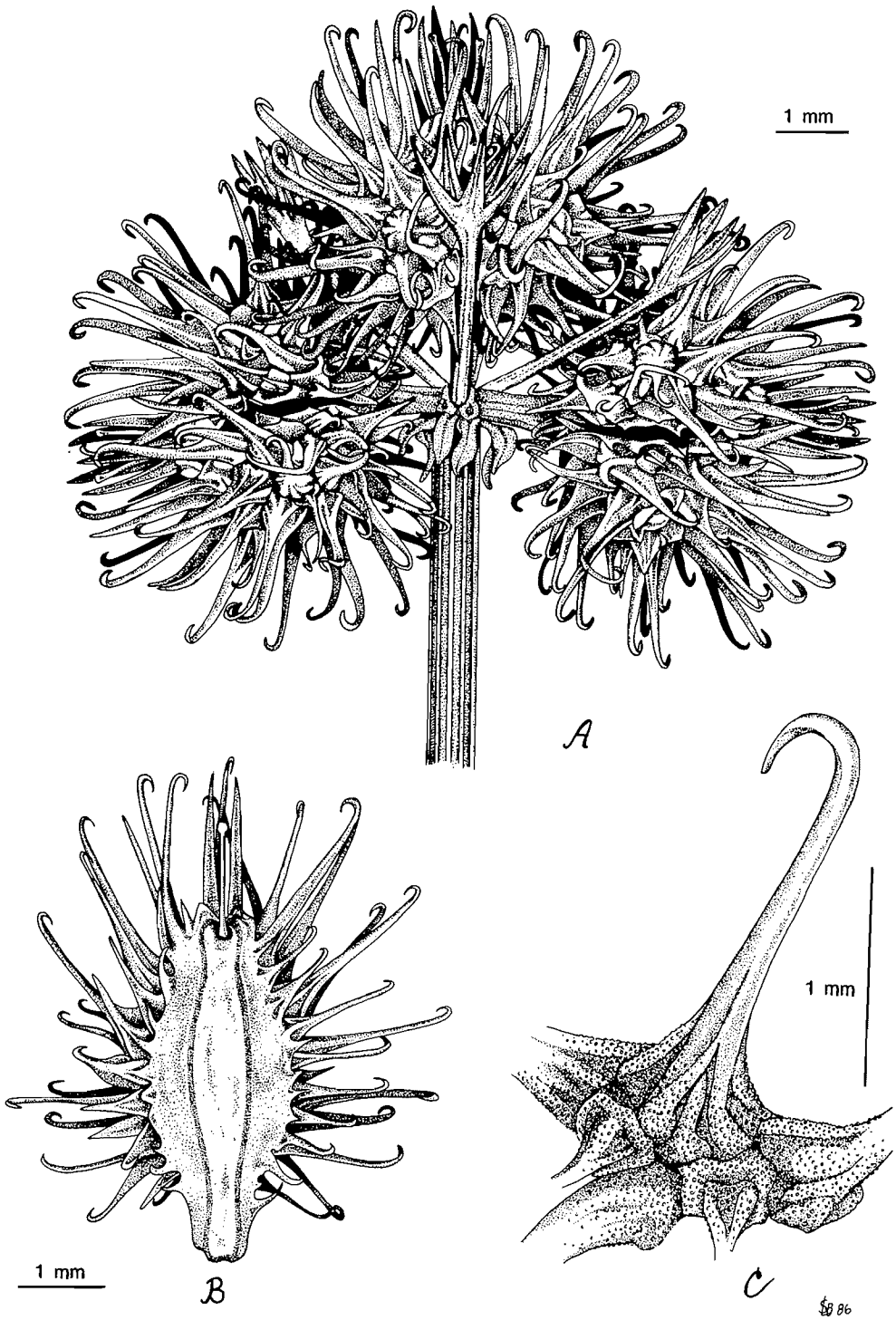

FIG. 4. Umbellet and fruit features of *Sanicula canadensis* var. *canadensis*. (A) Polygamous umbellet with pedicellate mature fruits and staminate flowers. (B) Inner seed face of mericarp showing narrowly elliptical commissural scar; style shorter than sepals; and inconspicuous sepals straight and about equalling uppermost bristles. (C) Bases of fruit bristles dilated, ridged, and often minutely papillose.

Sanicula canadensis L. var. *grandis* Fern., Rhodora 42: 467. 1940. Figs. 6, 7A 7B

TYPE: UNITED STATES. VERMONT: Bristol, 25 July 1898, *E. Brainerd s.n.* (HOLOTYPE, GH!; photo, TENN!).

Diagnostic characters

Umbellets usually polygamous, rarely some staminate only. Polygamous umbellets with 6–18 flowers, usually 3 of these hermaphrodite and 3–15 staminate. Pedicels of staminate flowers 2–3 mm long. Styles about 1½ times as long as calyx, inconspicuously exserted from between calyx lobes and recurved.

Habitat, distribution, and rare status

Sanicula canadensis var. *grandis* inhabits rich, deciduous woods. It is regarded as rare in Canada (Argus and Pryer

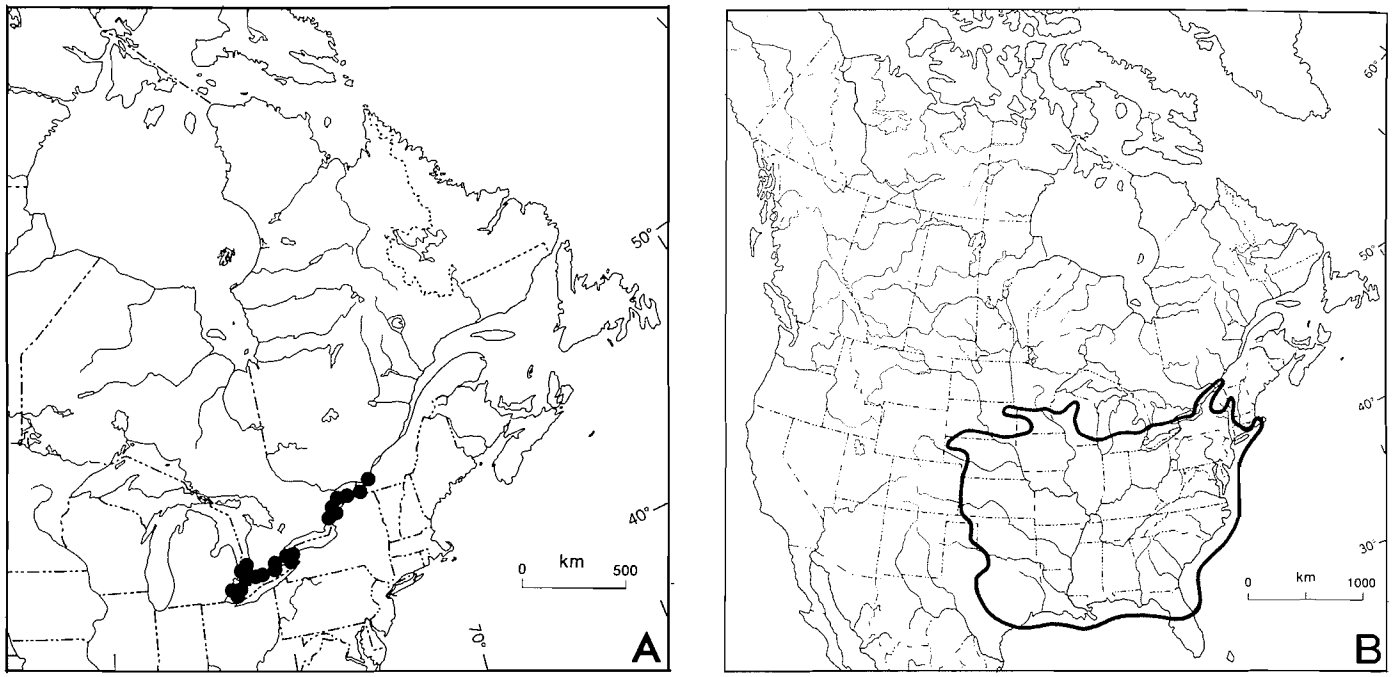

FIG. 5. Distribution of *Sanicula canadensis* var. *canadensis*. (A) Canadian distribution based on verified specimens at ACAD, CAN, DAO, DFB, ERCA, HAM, LKHD, MT, MTMG, NCU, NY, OAC, PFM, PPNP, QFA, QK, QUE, SFS, TRT, TRTE, UWO. (B) North American range based on Phillippe (1978*a*), McGregor and Barkley (1977), Voss (1985), and herbarium specimens.

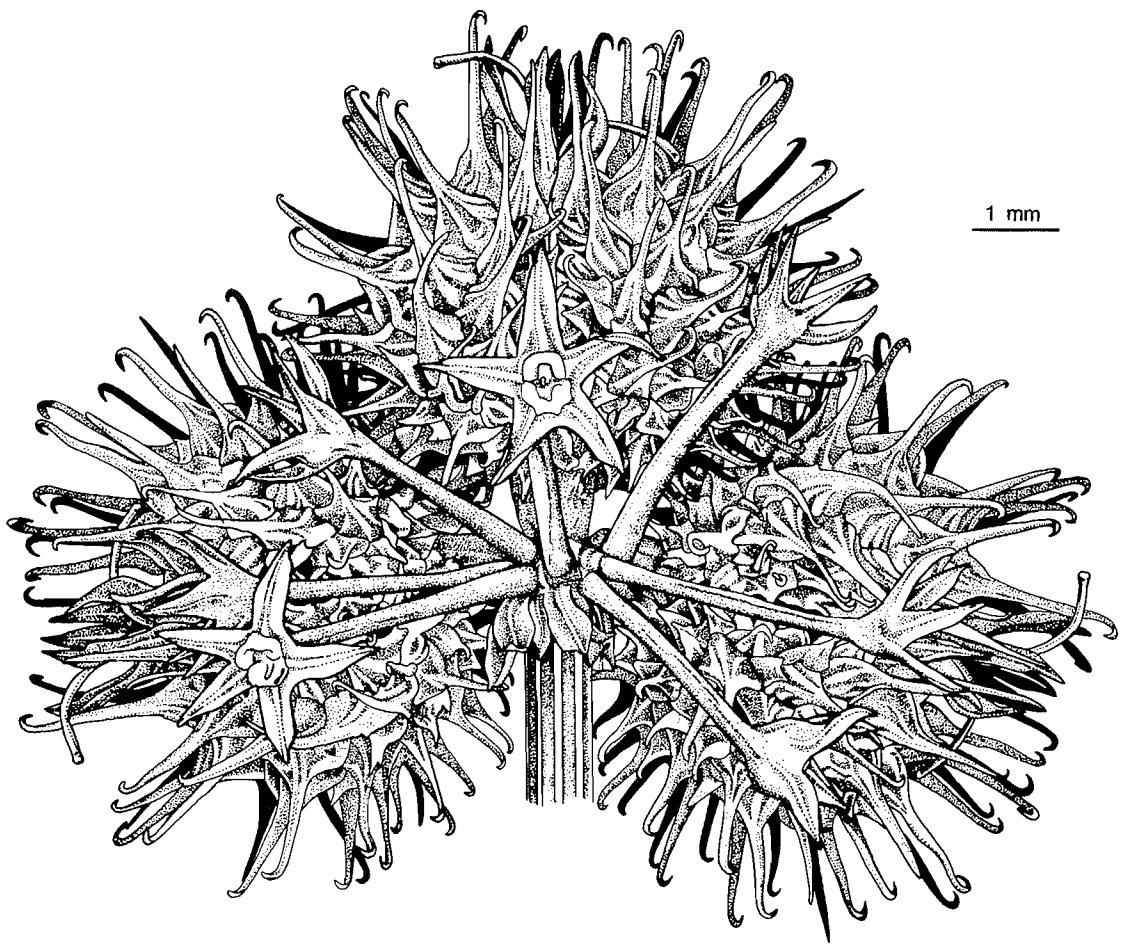

FIG. 6. Umbellet morphology of *Sanicula canadensis* var. *grandis*. Polygamous umbellet with pedicellate mature fruits and staminate flowers. Styles about 1½ times as long as calyx, inconspicuously exserted from between calyx lobes and recurved.

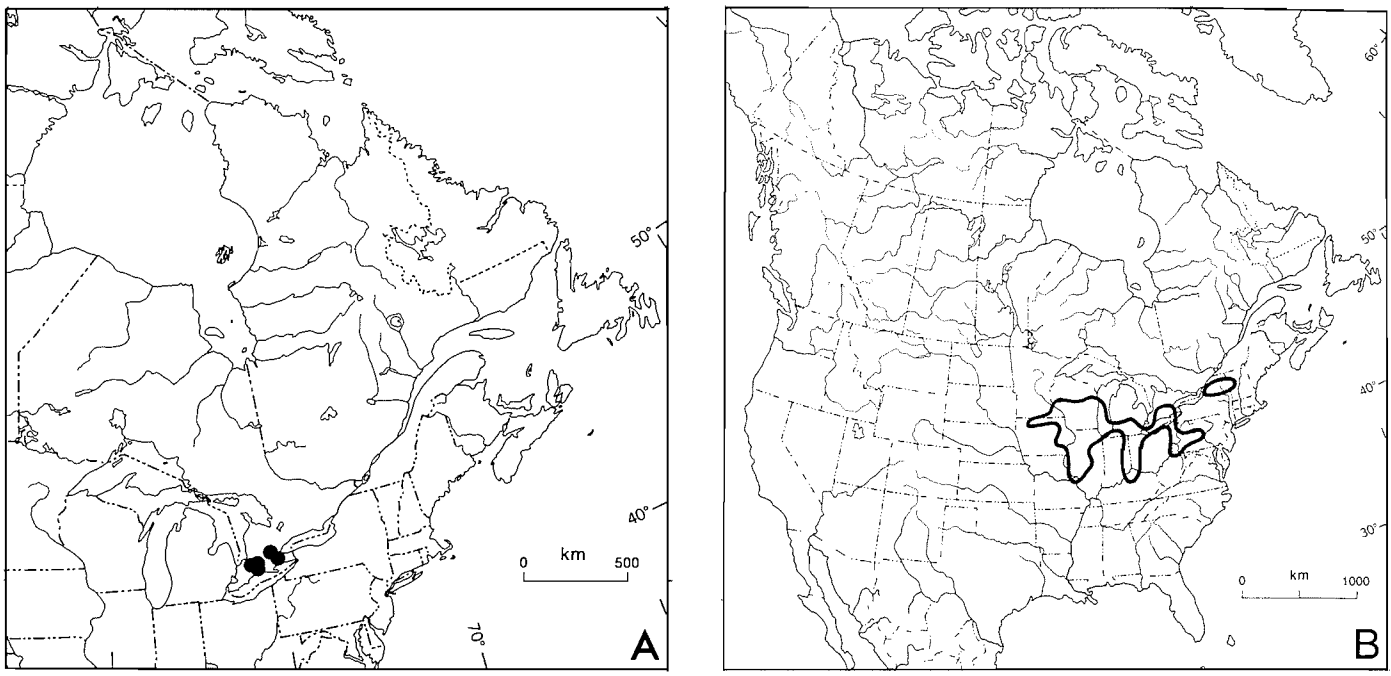

FIG. 7. Distribution of *Sanicula canadensis* var. *grandis*. (A) Canadian distribution based on verified specimens at OAC, PFM, TRT, UWO. (B) North American range based on Phillippe (1978*a*) and herbarium specimens.

1989), where it is known from only four southwestern counties in Ontario (Fig. 7A; Pryer and Argus 1987). It has not been collected there since 1959 and should be looked for in appropriate habitats. The range of *S. canadensis* var. *grandis* in the United States extends from Vermont southward to northern Kentucky and westward to Iowa, Minnesota, and Wisconsin, where it is more common (Fig. 7B). Its rare status in the United States could not be accurately determined. In only three states (Illinois, Iowa, and Wisconsin) is it known to occur in more than three localities (Phillippe 1978*a*). It is sympatric with var. *canadensis* only in the northern one third of the range of that variety.

COMMON NAME: Long-styled Canadian sanicle.

NOTES: *Sanicula canadensis* var. *grandis* was described by Fernald (1940) solely on the basis of plants with leaves larger than in var. *canadensis* and with a broad inland range. Fernald's type specimen, however, proved to be applicable to the long-styled variety recognized here within *S. canadensis*. Hence the name is retained for this now differently circumscribed taxon. The varietal epithet *grandis* more appropriately describes fruit width and fruit length, whose mean measurements are significantly larger in var. *grandis* than in var. *canadensis* (Phillippe 1978*a*).

Evidence for recognizing this taxon at the varietal level, rather than considering it as a hybrid, was presented by Phillippe (1978*a*) and is summarized here: (*i*) interspecific cross-pollination experiments between possible parents did not result in seed development; and (*ii*) average pollen stainability is very high (98%) in var. *grandis*, whereas low pollen stainability would be expected in a hybrid taxon.

Sanicula marilandica L., Sp. Pl. 235. 1753. Figs. 8, 9A, 9B

TYPE: UNITED STATES. VIRGINIA: "Sanicule D. Clayton An. 1734. Num. 28. D. Claython [sic] ex Virginia An 1734 Num. 28. Lappula sere umbellata Astrantia foliis Virginiana. Plukn. Mant. 114" *Clayton 28* (LECTOTYPE, BM [designated by Reveal, Bot. J. Linn. Soc. 92: 171–172. 1986]. This is the "long-styled" specimen annotated as "the type of marilandica" by A. Gray, and accepted as such by Shan and Constance (1951)).

Sanicula canadensis L. var. *marilandica* (L.) A. S. Hitchc., Trans. Acad. Sci. St. Louis 5: 497. 1891.

Sanicula marilandica L. var. *borealis* Fern., Rhodora 28: 220. 1926.

TYPE: CANADA. QUEBEC: Gaspé Co., alluvial thicket and woods near the mouth of Dartmouth River, 26 and 27 Aug. 1904, *Collins, Fernald and Pease s.n.* (HOLOTYPE, GH!; photo TENN!).

Diagnostic characters

Branches of inflorescence stout. Umbellets dimorphic, some polygamous and others staminate only. Polygamous umbellets with 12–120 flowers, usually 3–4 of these hermaphrodite and 9–117 staminate. Pedicels of staminate flowers 2–4 mm long. Hermaphrodite flowers sessile to subsessile. Calyx lobes 1–2 mm long, rigid, narrowly triangular to subulate with indurate, straight, sharp-pointed tips; less than the lower ¼ of calyx connate. Sepals on mature fruit inconspicuous among the uppermost bristles. Petals greenish white, about equal to or slightly longer than calyx. Stamens long-exserted from calyx. Styles more than twice as long as calyx, conspicuously exserted and recurved. Fruits 4–6 mm long, 4–7 mm wide, ovoid, sessile to subsessile. Bases of fruit bristles stout, prominently bulbous, and with a minutely warty-reticulate surface pattern. Margins of inner seed face of mericarp wrinkled. Commissural scar elliptical.

Habitat, distribution, and rare status

Sanicula marilandica is found in open deciduous woods, moist wooded riverbanks, dense alder–willow thickets, cedar swamps, along margins of woods, wet-mesic prairies, limestone barrens, railroad embankments, and abandoned road-

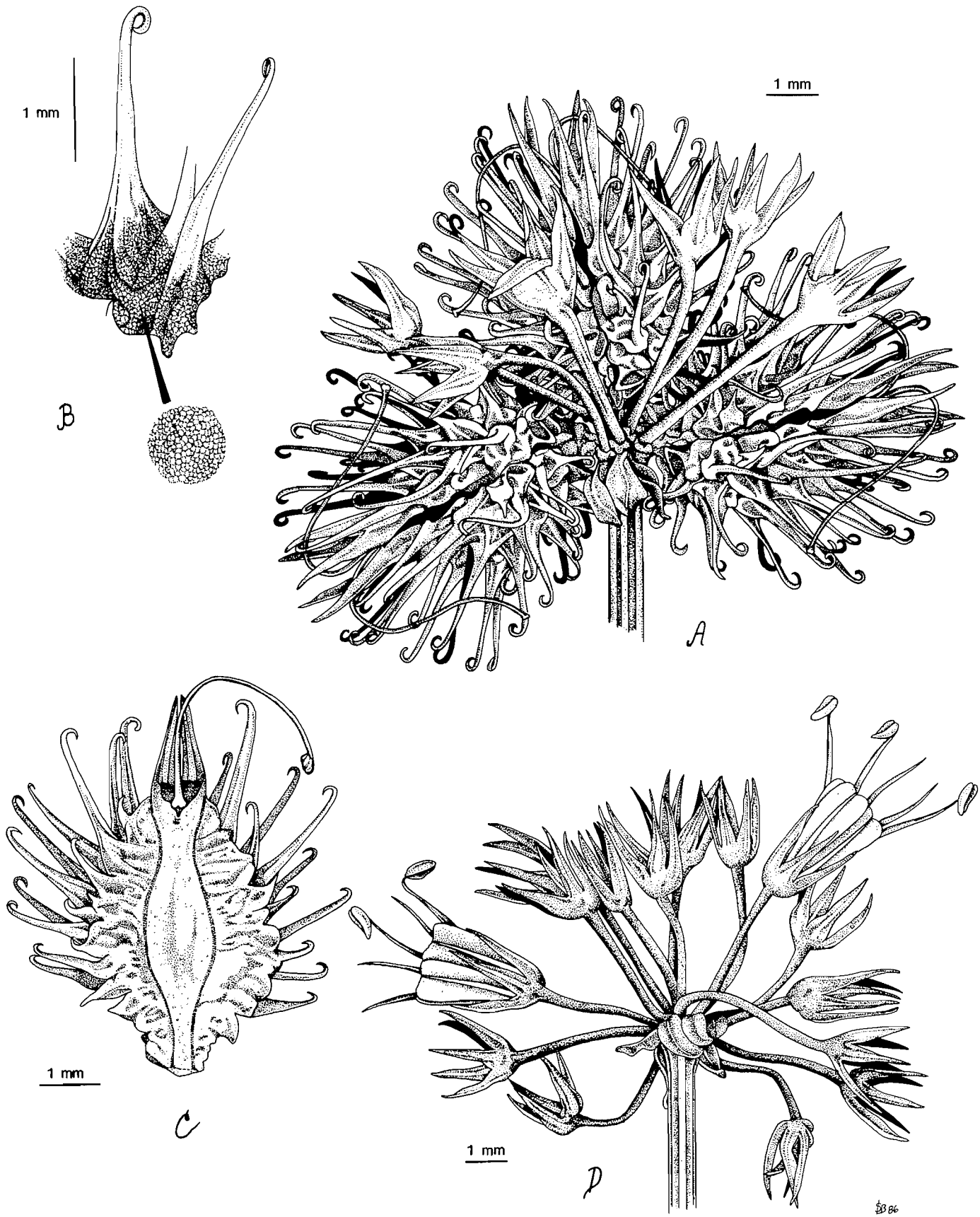

FIG. 8. Umbellet and fruit features of *Sanicula marilandica*. (A) Polygamous umbellet with sessile to subsessile mature fruits and pedicellate staminate flowers. (B) Bases of fruit bristles prominently bulbous and with a minutely warty-reticulate surface pattern. (C) Inner seed face of mericarp showing wrinkled outer margin, elliptical commissural scar, and style conspicuously exserted and recurved and more than twice as long as sepals. (D) Staminate umbellet.

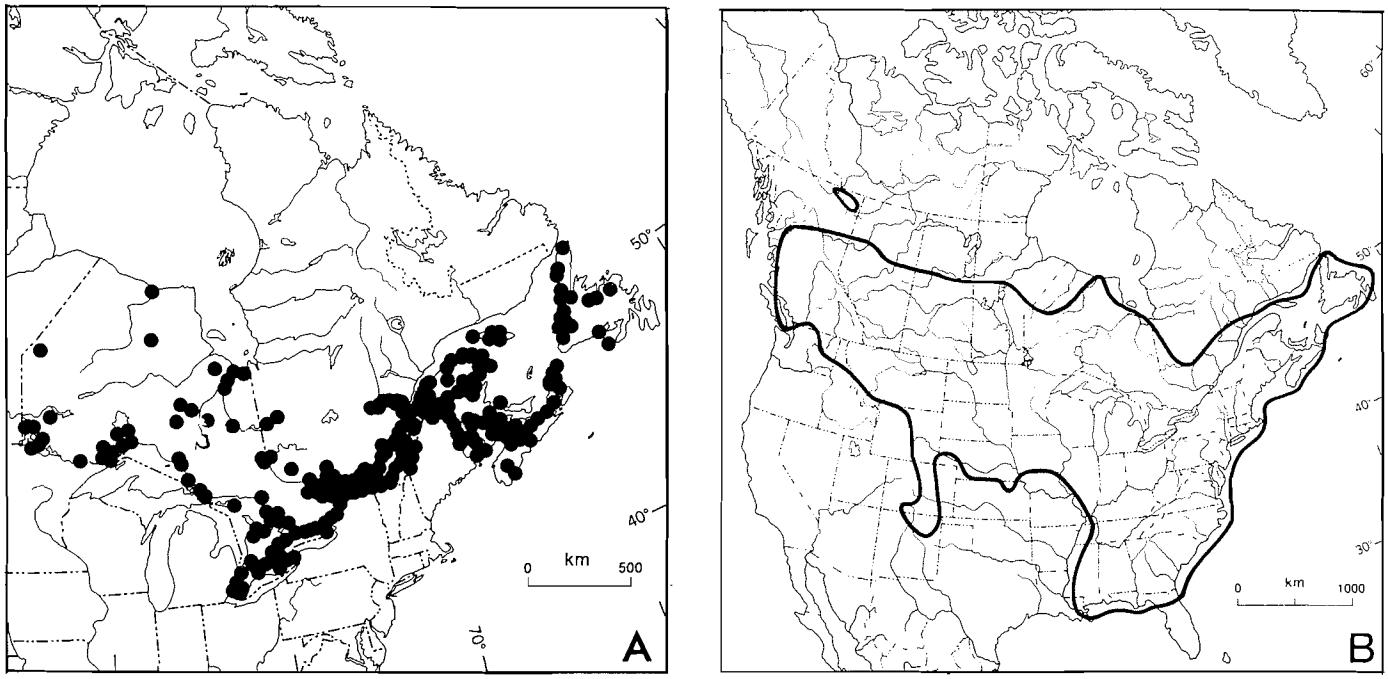

FIG. 9. Distribution of *Sanicula marilandica*. (A) Eastern Canadian distribution based on verified specimens at ACAD, CAN, COLO, DAO, DFB, F, GH, HAM, MIN, MT, MTMG, NBM, NCU, NY, OAC, PH, QK, QUE, SASK, TRT, UNB, WS, WTU. (B) North American range based on Phillippe (1978*a*), McGregor and Barkley (1977), Mohlenbrock and Ladd (1978), Moss 1983, Porsild and Cody (1980), Scoggan (1979), Washington Natural Heritage Program (1987), and herbarium specimens.

ways. It is a widespread and common species that occurs in every province in eastern Canada (Fig. 9A). It is the only northeastern species of *Sanicula* that also occurs in the western provinces (Fig. 9B). It is rare only in Prince Edward Island (Catling 1986). In the United States, the range of *S. marilandica* extends from Maine to Florida, west to northeastern Washington, and south to New Mexico (Fig. 9B). It is listed as possibly extirpated in Delaware (Tucker *et al.* 1979) and rare in Idaho (Steele and Johnson 1981), Louisiana (Louisiana Natural Heritage Program 1985), Maryland (Boone 1984), and Washington (Washington Natural Heritage Program 1987).

COMMON NAMES: Black snakeroot, black sanicle.

Sanicula odorata (Raf.) Pryer & Phillippe, comb. nov.
Figs. 10, 11A, 11B

Triclinium odoratum Raf., Fl. Ludov. 80. 1817.

TYPE: UNITED STATES. MISSISSIPPI: rich wet woods on loess, Wilkinson Co., vic. Pinkneyville, 28 April 1979, *Darwin and Sundell 1379* (NEOTYPE, here designated: NO!)

Sanicula gregaria E. P. Bicknell, Bull. Torrey Bot. Club 22: 354. 1895.

TYPE: UNITED STATES. NEW YORK: van Cortlandt Park, 22 July 1894, *Bicknell s.n.* (LECTOTYPE, NY!; photo, TENN!)

Diagnostic characters

Branches of inflorescence filiform. Umbellets dimorphic, some polygamous and others staminate only. Polygamous umbellets with 15–65 flowers, usually 3–4 of these hermaphrodite and 12–62 staminate. Pedicels of staminate flowers 1.5–3.0 mm long. Hermaphrodite flowers with short but distinct pedicels 0.5–1.0 mm long. Calyx lobes 0.4–0.7 mm long, supple, deltoid, the apices obtuse or acute (not sharp-pointed); the lower ¼–½ of calyx connate. Sepals on mature fruit inconspicuous among the uppermost bristles. Petals yellowish green, much longer than calyx. Stamens long-exserted from calyx (filaments that have shed their anthers may be mistaken for styles due to their length; however, they are much thicker and lighter in color than the styles). Styles more than twice as long as calyx, conspicuously exserted and recurved. Fruits 2.0–3.5 mm long, 3–6 mm wide, globose to obovoid, with short but distinct pedicels 0.5–1.0 mm long. Uppermost fruit bristles exceeding or equalling calyx lobes, slender, not bulbous nor much dilated at their bases; lowermost bristles much reduced. Commissural scar narrowly linear-elliptical.

Habitat, distribution, and rare status

Plants of *S. odorata* tend to grow in clumps in low and wet woods, deciduous woods over limestone, rich woods, and thickets, and are commonly associated with streams and seepage areas. The tiny yellowish green flowers are mildly fragrant and characteristic of this species. In Canada, *S. odorata* occurs in southern Ontario, southern Quebec, New Brunswick, and Nova Scotia (Fig. 11A). It is rare only in New Brunswick (Hinds 1983), as is *S. gregaria*. Figure 11A indicates fewer localities of *S. odorata* in New Brunswick than are depicted in Hinds (1983), even though the same herbaria were examined. No specimens of *S. odorata* were found in this study to confirm the dots in Restigouche or Kings Counties as mapped by Hinds (1983). In the United States, the range of *S. odorata* extends from New Hampshire and Vermont south to central Florida and westward to eastern North Dakota and central Texas (Fig. 11B). It is listed as threatened in New Hampshire (New Hampshire Natural Heritage Inventory 1985), and rare in North Dakota (North Dakota Natural Heritage Inventory 1985).

COMMON NAMES: Fragrant snakeroot, yellow-flowered sanicle, clustered snakeroot.

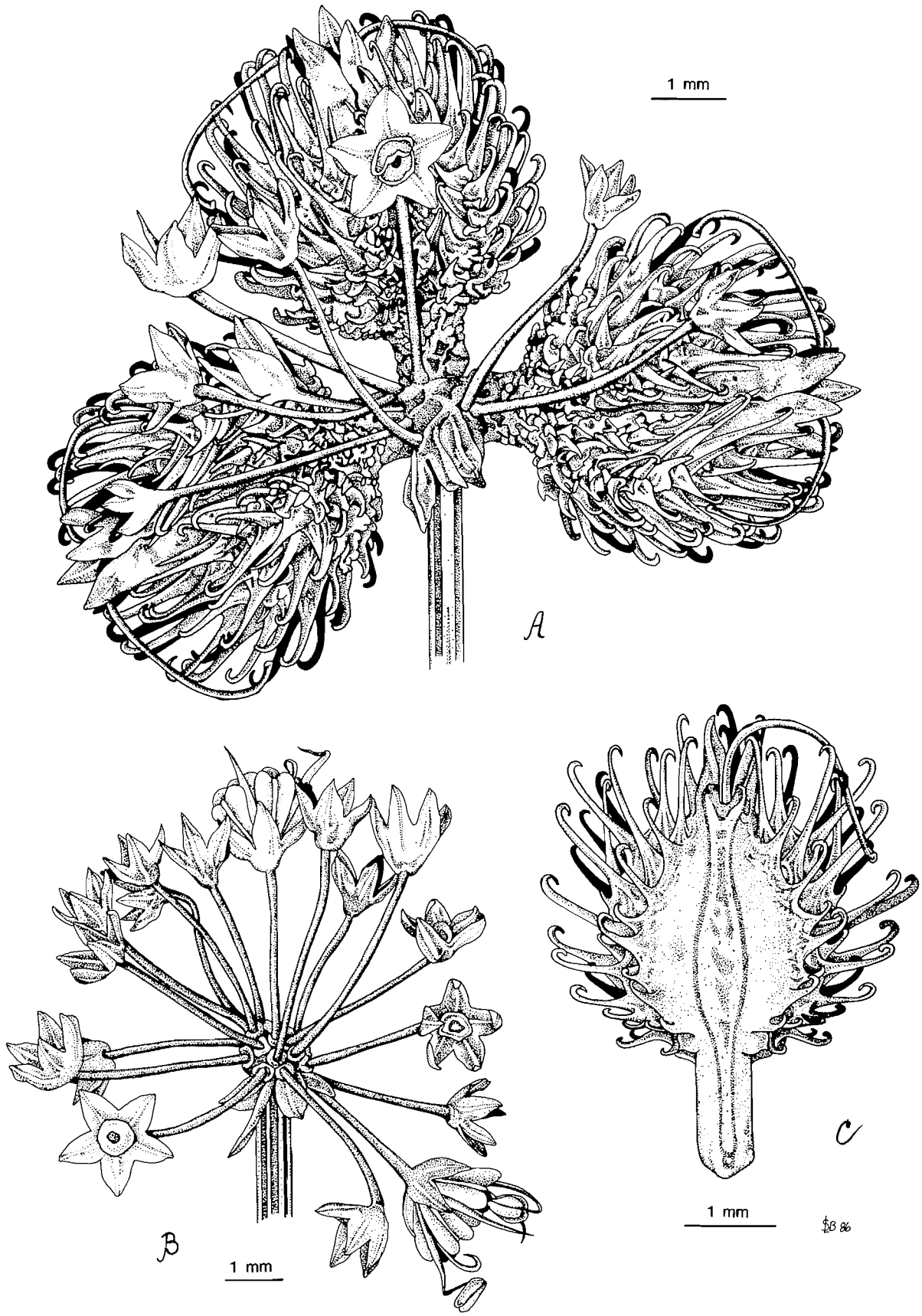

FIG. 10. Umbellet and fruit features of *Sanicula odorata*. (A) Polygamous umbellet with pedicellate mature fruits and staminate flowers. (B) Staminate umbellet with staminate flowers attached to swollen, dome-shaped receptacle. (C) Inner seed face of mericarp showing narrowly linear-elliptical commissural scar, and style conspicuously exserted and recurved and more than twice as long as sepals.

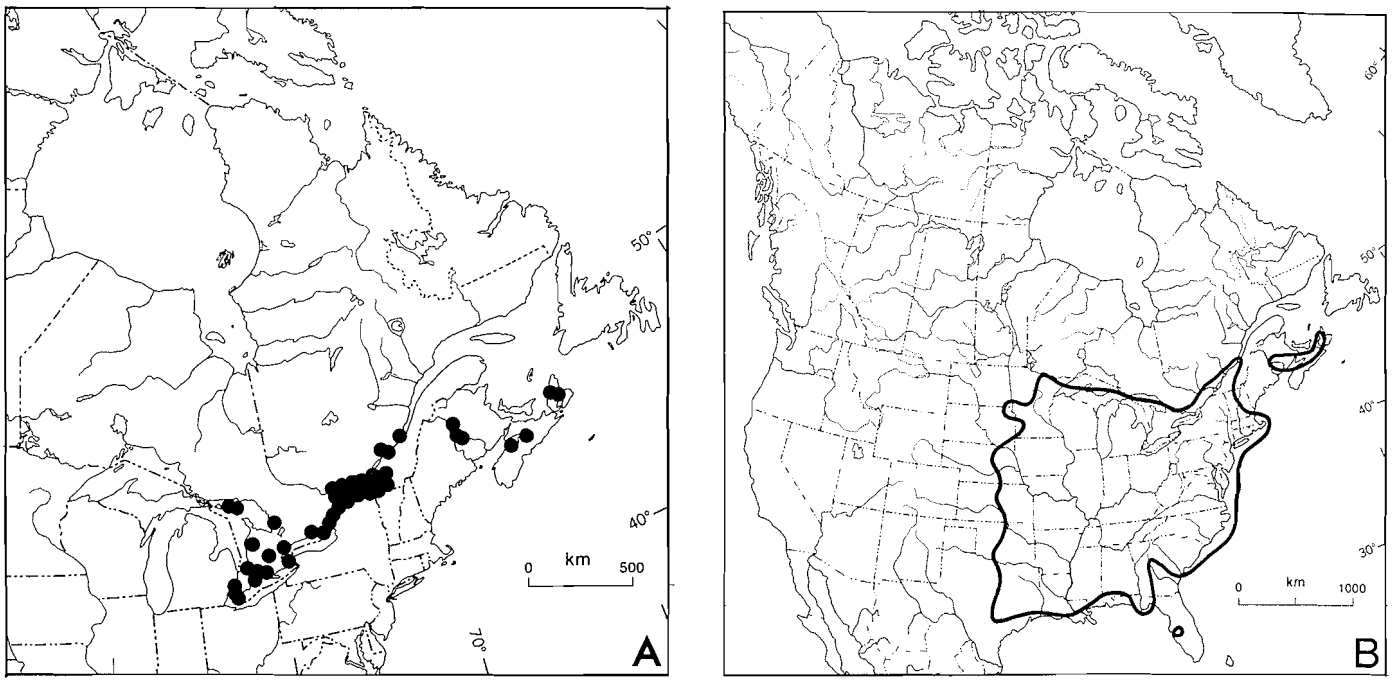

FIG. 11. Distribution of *Sanicula odorata*. (A) Canadian distribution based on verified specimens at ACAD, CAN, DAO, GH, HAM, KANU, MT, MTMG, NBM, NY, OAC, PH, QK, QUE, RM, TRT, TRTE, UNB, US, UWO, WIS. (B) North American range based on Phillippe (1978*a*), Voss (1985), and herbarium specimens.

NOTES: At the end of the last volume of Robin's (1807) "Voyages dans l'intérieur de la Louisiane . . .," he included a "Flore louisianaise" that provided descriptions of the plants he observed in his travels in Louisiana and west Florida. It was written for use by travellers and not as a technical flora. Rafinesque's (1817) "Florula Ludoviciana: or, a flora of the state of Louisiana" is a descriptive, technical flora based on Robin's (1807) "Flore louisianaise", but translated, revised, and "improved" by Rafinesque.

Triclinium was a new genus described by Rafinesque (1817), in which he made the combination *T. odoratum* for a species with ". . . flowers greenish, having the sweet scent of *Reseda odorata*. Stamina with bent filament, and yellow anthers, ovary with many rows of stiff curved filaments, styles curved and reaching the base of it . . ." Much of Rafinesque's (1817) protologue for *T. odoratum* was taken from Robin's (1807; 3: 459–460) treatment of *Panax*. Robin's (1807) description of what he referred to as *Panax* is definitely not attributable to *Panax* as we know it today, but more accurately pertains to *Sanicula*. This was clear to Rafinesque (1817) who observed that "this genus [*Triclinium*] is certainly not a *Panax*, as Robin says; but it has the greatest analogy with *Sanicula*, from which it differs by the divided calyx, crowned fruit, and double polygamy." These characters were actually misinterpreted by Rafinesque (1817) as being different from *Sanicula*. Plants of *Sanicula* do possess a divided calyx and crowned fruits (fruits "crowned" by a persistent calyx). The term "double polygamy" was presumably used to define the condition where a plant has female flowers, male flowers, and hermaphrodite flowers. *Sanicula* is andromonoecious with both male and hermaphrodite flowers on the same plant. The hermaphrodite flowers soon lose their petals and stamens. Flowers in this condition may be what Rafinesque (1817) referred to as "female" flowers.

All recent monographers of the genus (Mathias and Constance 1944; Shan and Constance 1951; Phillippe 1978*a*) have placed *Triclinium* in synonymy with *Sanicula*. In doing so, however, most have not quite known what to do with the name *T. odoratum*. Mathias and Constance (1944) put it in synonymy with *S. gregaria*, but preceded the name with a question mark. Shan and Constance (1951) agreed with Bicknell (1897) that the type of *Triclinium*, *T. odoratum*, "was a composite of more than one distinct species" and rejected it as a *nomen confusum* under the then existing Code of nomenclature (the Stockholm Code, Lanjouw *et al.* 1952: cf. Article 76, deleted at Leningrad in 1975). Since *T. odoratum* has not been dealt with satisfactorily by any worker on the genus *Sanicula*, it is the subject of the following discussion.

In 1895, Bicknell described two species of *Sanicula* from the eastern United States. One of these was *S. gregaria*, for which he noted "At flowering time the bright yellow anthers and yellowish green petals of *gregaria* give the plant a characteristic appearance and distinguish it conspicuously from our other species. The flowers, moreover, have a slight fragrance faintly suggestive of those of the spice bush."

In 1897, Bicknell described another two species of *Sanicula* from the southeastern United States. In this paper, he disclosed his uneasiness with *Triclinium odoratum* by launching into a comparative discussion stating that "Taken by itself, Rafinesque's specific description would apply with tolerable exactness to our new species [*S. smallii*], but his generic definition and added remarks, insisting on long styles recurved to the base of the ovary, positively excludes this new species and, strictly taken, all other known eastern species as well." Bicknell's (1897) view is incorrect since long styles that recurve and actually extend to the base of the ovary are occasionally found in *S. marilandica* and *S. gregaria*. He does concede, however, that "it may be well here to take the opportunity of considering further our long-styled species *marilandica* and *gregaria*."

First, Bicknell (1897) examined the character "foliis longe petiolatis," attributed by Rafinesque (1817) to *T. odoratum*, and he concluded that long-petiolate leaves are "distinctly not the case" in either *marilandica* or *gregaria*. In fact, although neither Robin (1807) nor Rafinesque (1817) specified cauline or basal leaves, we have observed that both taxa have long-petiolate basal and lower cauline leaves. Another leaf character attributed by Rafinesque (1817) to *T. odoratum* is "foliolis lateralibus bipartitis." According to Bicknell (1897), the condition of having two-parted lateral leaflets is "untrue for *gregaria*, [but] describes exactly the condition in *marilandica* and nearly that in *smallii*." In fact, we have noted that this is just the case for the basal and lower cauline leaves in *all* species of *Sanicula* in eastern North America. After discussing these leaf characters, Bicknell (1897) stated, "On the other hand, there are points in the [Rafinesque] description which apparently could have applied only to *gregaria*." He finally concluded that "... we have every reason to believe that '*Triclinium odoratum*' was a composite production pretty certainly containing elements of *gregaria* and, not improbably, of *marilandica* and *smallii*, one or both. On this understanding it might be held that the name *Sanicula gregaria* should give place to *Sanicula odorata* (Raf.), and it would certainly be difficult to show that '*Triclinium odoratum*' was not, in part, the plant now known as *Sanicula gregaria*." At the time, however, Bicknell (1897) felt there was sufficient conflict of opinion to refrain from resurrecting the earlier name under the principle of priority.

Using the process of elimination, we examined each of Rafinesque's (1817) characters for *T. odoratum* and decided to which known taxon of *Sanicula* from the region of Robin's travels they were best applied. Four taxa of *Sanicula* are presently known from that region: *S. canadensis* var. *canadensis*, *S. gregaria*, *S. marilandica*, and *S. smallii*. In Rafinesque's (1817) description of *T. odoratum* he mentioned "ovary with ..... styles curved and reaching the base of it." This eliminates all but *S. gregaria* and *S. marilandica*. Another character attributed to *T. odoratum* by Rafinesque (1817) was "yellow anthers." *Sanicula marilandica* has white anthers and *S. gregaria* has yellow. Rafinesque (1817) also mentioned the greenish flowers of *T. odoratum*. This favors *S. gregaria*, although it would not entirely exclude *S. marilandica*. *Sanicula gregaria* has yellowish green petals, while *S. marilandica* has greenish white petals. From field observations of flower color, one would be much more likely to attribute green flowers to *S. gregaria*. Rafinesque (1817) also noted that the flowers of *T. odoratum* have the "sweet scent of *Reseda odorata*." Bicknell (1897) argued that though *S. gregaria* does have odorous flowers, the fragrance is "of the faintest and quite unworthy to be compared with the sweet scent of *Reseda odorata*." The fact is, however, that *S. gregaria* is the only species of *Sanicula* in the east that has scented flowers. Lastly, *S. gregaria* is more common in the region of Robin's travels than is *S. marilandica*.

It is evident from the above discussion that at the time of Bicknell's (1895) publication of the name *S. gregaria*, there already existed a Rafinesque name for what was most obviously the same taxon. In 1897, Bicknell himself anticipated the eventual proposal of the name *S. odorata* and used it in the sense of a provisional name.

Rafinesque's (1817) "*Florula Ludoviciana*" is believed to be based wholly on Robin's (1807) cursory descriptions (Merrill 1949). There is no evidence in Robin's (1807) work that he prepared actual botanical specimens to represent the plants he described and no such supporting specimens have been located (Merrill 1949; Ewan 1967). Phillippe's (1978*b*) intention to select a neotype for *S. odorata* and deposit it at TENN was never carried out. *Sanicula odorata* is therefore neotypified here and this name must unfortunately replace the long-accepted name *S. gregaria*. The neotype that was selected is from an area that falls within the probable range of Robin's travels.

Acknowledgements

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