

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

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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 & Phillippe, which is neotypified here, must replace the long-accepted name *S. gregaria* E. P. Bicknell.

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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.

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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 mid-summer. 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; Scoggin 1979). In his doctoral dissertation, Phillippe (1978a) 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 (1978a) 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 (1978a) 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 (1978a) 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

¹A 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.

(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 involucre bracts are 1–3, sessile or short petiolulate, subfoliaceous, and reduced upward; involucre 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 triangular 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 exerted. 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 1 ½ 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 1 ½ times as long as calyx, inconspicuously exerted 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 exerted 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

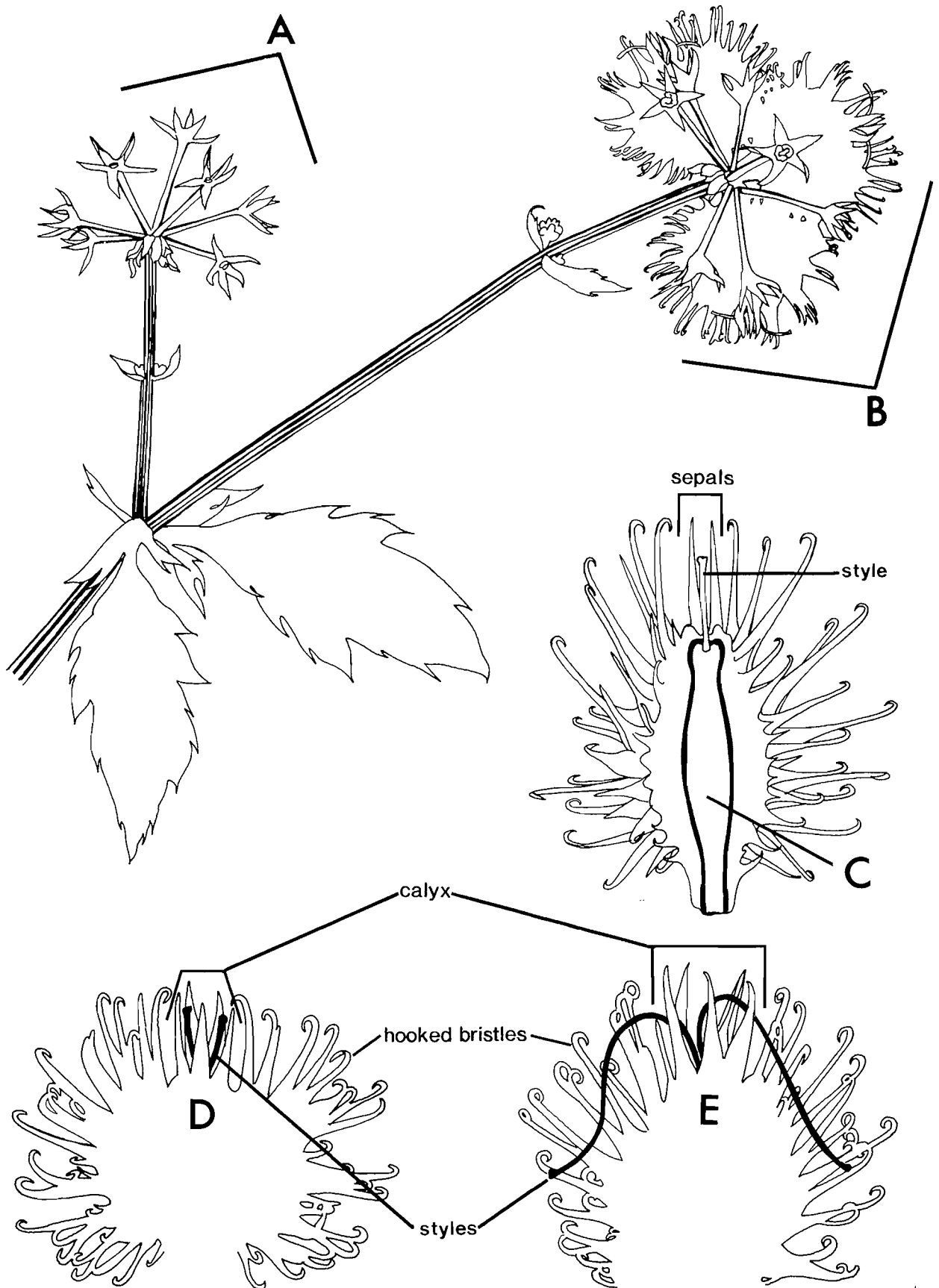


FIG. 1. Diagrammatic sketches illustrating inflorescence and fruit features of *Sanicula*. (A) Staminate umbellet: staminate flowers only. (B) Polygamous umbellet: mixture of hermaphrodite and staminate flowers. (C) Commissural scar on inner seed face of mericarp. (D) Styles shorter than calyx. (E) Styles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

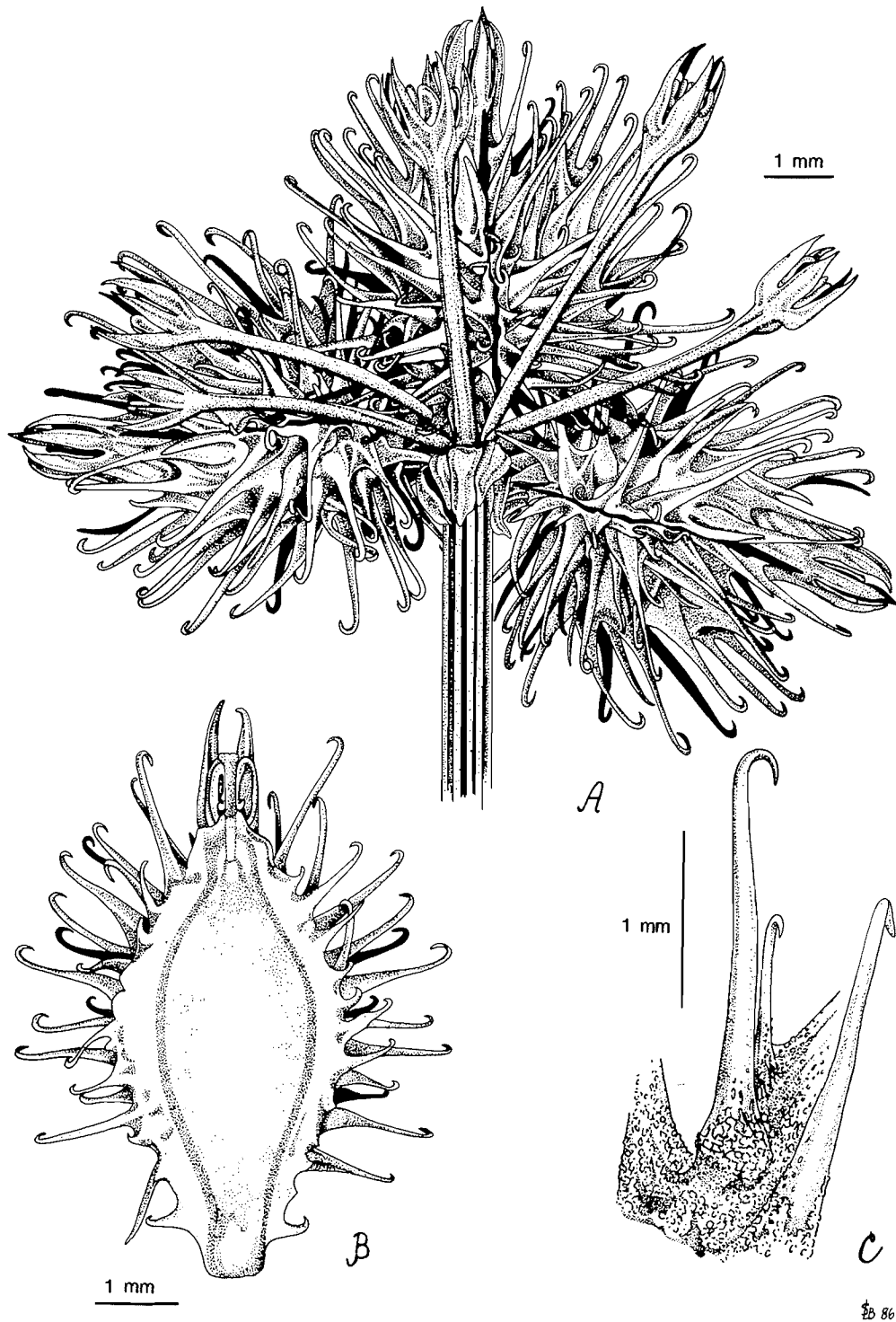


FIG. 2. Umbellet and fruit features of *Sanicula trifoliata*. (A) Polygamous umbellet with sessile mature fruits and pedicellate staminate flowers. (B) Inner seed face of mericarp showing broadly oval commissural scar; style shorter than sepals; included stamens; and sepals with subulate, incurved tips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

