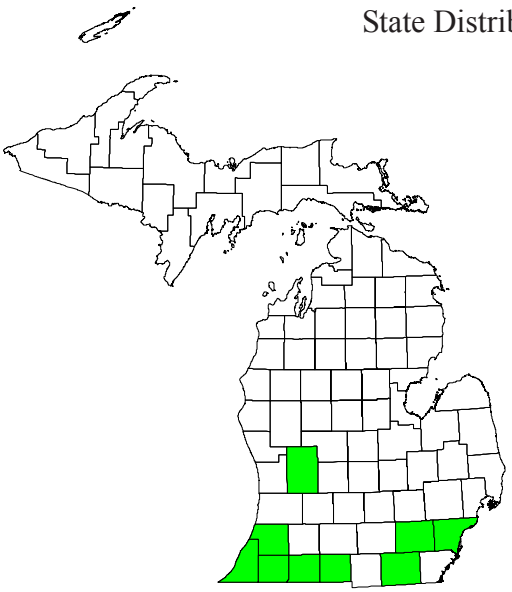
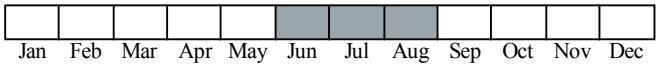
Aristolochia serpentaria L. — Virginia snakeroot

Photo by Ryan P. O'Connor

State Distribution



Best Survey Period



Legal status: State threatened

Global and state rank: G4/S2

Other common names: pipe vine, birthwort

Family: Aristolochiaceae (birthwort family)

Taxonomy: *Aristolochia serpentaria* was originally described by Linnaeus in 1753. This taxon is highly variable in leaf form and several additional species were later described, but all were eventually reduced to varieties and later to synonyms (Allard 2002).

Total range: Virginia snakeroot occurs from Connecticut to southern Michigan, and south to Texas and Florida. It is considered endangered in New York and threatened in Connecticut, Illinois, and Iowa. In Washington D.C. and Kansas it is known only from historical records and is thought to be extirpated. Though wide-ranging, this species is typically infrequent with populations seldom exceeding 100 individuals (NatureServe 2003).

State distribution: Reaching the northern edge of its range in southern Michigan, Virginia snakeroot occurs primarily in the first and second tier counties. Only 10 of the 17 Michigan occurrences for the species have been confirmed extant since 1980, and four are historical populations dating from 1933 or earlier. Most populations are sparse and highly localized, with only one reported to exceed 100 plants.

Recognition: The low, erect (not twining) stems of Virginia snakeroot grow up to 5 dm in height and produce **narrowly heart-shaped, alternate leaves** 6-12 cm long. Flowers are borne singly on nearly **leafless stalks (peduncles) near the base of the stem**, and are **dark purple with a tubular, S-shaped corolla,** a shape similar to the dutchman's-pipe flower characteristic of other species in the genus. Although somewhat similar ornamental species of *Aristolochia* have been introduced, they may be easily differentiated by either their twining, woody vine habit (*A. macrophylla)*, or their broader leaves and axillary flowers occurring near the top of the plant (*A. clematis*). Wild-ginger (*Asarum canadense*), a superficially similar species in the birthwort family likely to occur with *A. serpentaria* in floodplain forest habitats, is a stout, low forb easily distinguished by its broad, blunt, kidney-shaped leaves and gingery odor of bruised leaves and roots.

Best survey time/phenology: This species is easily overlooked due to its low habit and sparseness of populations, but can be recognized by its relatively

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P.O. Box 30444 - Lansing, MI 48909-7944
Phone: 517-373-1552

distinctive leaves throughout the summer months. In areas with abundant maple seedlings, which can look superficially similar, this species may be more easily sought later in the growing season.

Photo of flower by Eleanor Saulys, courtesy Connecticut Botanical Society

Habitat: In Michigan, *A. serpentaria* is found in southern floodplain forests, in rich dry-mesic forests, and occasionally in mesic southern forests, and is often, but not always, found in proximity to river systems. In the central portion of its range, it prefers calcareous sites, but occupies a wide variety of forested upland habitats elsewhere (NatureServe 2003, Allard 2002). Overstory dominants in Michigan populations include *Acer saccharum* (sugar maple), *A. saccharinum* (silver maple), *Fraxinus pennsylvanica* (red ash), *Quercus rubra* and *Q. alba* (red and white oak), *Carya ovata* and *C. glabra* (shagbark and pignut hickory), and *Sassafras albidum* (sassafras) Common shrub species include *Lindera benzoin* (spicebush) and *Staphylea trifolia* (bladdernut), and groundcover associates include *Hepatica americana* (round-lobed hepatica), *Geranium maculatum* (geranium), *Solidago caesia* (goldenrod), *Osmorhiza claytonii* (sweet cicely), *Parthenocissus quinquefolia* (Virginia creeper), and *Podophyllum peltatum* (may apple). Rare but characteristic associates may include such species as *Diarrhena americana* (American beak grass, state threatened), *Hybanthus concolor* (green violet, state threatened), *Hydrastis canadensis* (goldenseal, state threatened), *Morus rubra* (red mulberry, state threatened), *Silphium perfoliatum* (cup-plant, state threatened), *Euonymus atropurpurea* (wahoo, state special concern), *Gymnocladus dioicus* (Kentucky coffee tree, state special concern), and *Jeffersonia diphylla* (twinleaf, state special concern) among many other potential species.

Biology: Virginia snakeroot is a rhizomatous perennial that blooms in June and bears capsular fruits in July. The flowers, which lie near the ground and are dark red at the mouth, mimic carrion and are thought to be pollinated by flies. The genus is characterized by an elaborate pollination mechanism in which inward-pointing hairs in the floral tube allow entry, but not retreat, of pollinators. Once pollen is shed on the imprisoned insects these hairs wilt, freeing them to find and fertilize another plant. Virginia snakeroot also bears cleistogamous (small, closed, self-pollinating) flowers (Pfeifer 1966). *Aristolochia serpentaria*, along with other species of *Aristolochia*, is the larval food plant for the large and striking pipevine swallowtail butterfly (*Battus philenor*). Also rare in Michigan (state special concern), larvae of this butterfly species often require leaves from 25 plants each in order to complete development (Rausher 1980). It is thought that the low stem density and patchy distribution of Virginia snakeroot throughout its range may be related to herbivory by the swallowtail larvae (Allard 2002).

Conservation/management: Two Michigan colonies of Virginia snakeroot are located in Michigan Nature Association (MNA) preserves, and an additional population is located within the Huron-Clinton Metroparks. This species is probably sensitive to removal of the forest canopy as well as artificial groundcover disturbances. It is also threatened by habitat destruction and competition from invasive exotic species such as *Alliaria petiolata* (garlic mustard), *Hesperis matronalis* (dame's rocket), and *Rosa multiflora* (multiflora rose). Trampling and ORV use are also a concern in some localities. In the past, this species was often collected by herbalists, who may have impacted populations in Michigan and elsewhere.

Comments: Extracts from the plant have been used by herbalists as a gastric stimulant. However, modern research has shown aristolochic acid to be a potent carcinogen and kidney toxin, and the use of *Aristolochia* in herbal supplements was recently banned (Allard 2002). The name of the genus is derived from the use of the herb as an aid in childbirth: *aristos-*

(best) *lochia* (delivery); the species epithet "serpentaria" may derive from the Native American practice of using the root as a treatment for snakebites.

Research needs: The habitat and distribution of this species in the wild is poorly studied. Additional surveys are recommended to assess the habitat and status of the plant. More research is needed on the effects of the pipevine swallowtail on Virginia snakeroot, especially at the edge of their range where both species are often rare. In addition, the genetic variability and long-term viability of populations producing primarily cleistogamous flowers is unknown. Studies on population dynamics and virtually any aspect of natural history would greatly assist in the conservation and management of this rarity.

Related abstracts: Mesic southern forest, southern floodplain forest, cerulean warbler, Indiana bat, beak grass, ginseng, goldenseal.

Selected references:

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