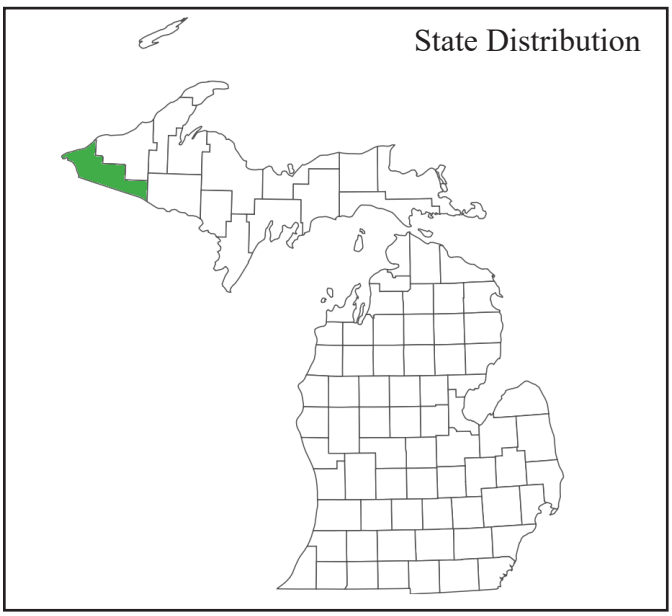
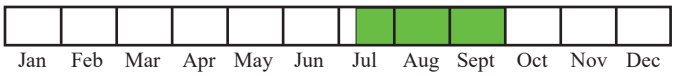
Artemisia serrata Nutt. Sawtooth wormwood

Photograph by Nate Martineau, iNaturalist



Best Survey Period



Legal status: State Threatened

Global and state rank: G4 (Apparently Secure) / SNR (Not Ranked)

Other common name(s): Saw-tooth wormwood, serrate-leaved sage, leafy mugwort, toothed sage

Family: Asteraceae (Asters)

Synonyms: *Artemisia ludoviciana* var. *serrata* (Nutt.) Torr. & A. Gray, *Artemisia vulgaris* subsp. *serrata* H. M. Hall & Clem

Taxonomy: Sawtooth wormwood is a member of Asteraceae, or the sunflower family, which is one of the largest and most diverse plant families in the world. The genus *Artemisia* is incredibly prolific as well with anywhere from 350 to 500 accepted species and a near cosmopolitan distribution (Shultz 2020a). There are thirteen species of the *Artemisia* genus in Michigan, although eight are introduced from Eurasia or western North America. Western mugwort (*A. ludoviciana*) is also a listed species in Michigan, and it is State Threatened (Reznicek et. al. 2011).

The taxonomy of genus *Artemisia* is notoriously difficult to parse, and *Artemisia* has historically been divided into four or five subgenera, although, recent phylogenetic analyses have revealed the currently accepted subgenera are highly likely to be polyphyletic (Jiao et. al. 2023). Sawtooth wormwood belongs to the subgenus *Artemisia* with western mugwort and common mugwort (*A. vulgaris*). Genetic and pollen studies have placed the subgenus *Artemisia* as originating in the semi-arid steppes of Asia and radiating into North America across the Bering Strait (Garcia et. al. 2011).

Total Range: Sawtooth wormwood is mostly restricted to a Midwestern distribution. Wisconsin and Minnesota appear to be the core of its range which then extends west to North Dakota, south to Kansas, east to Iowa and Illinois, and north to New York and Michigan. It is listed as Vulnerable (S3) in Iowa and as No Status Rank (SNR/SU/SNA) in North Dakota, Kansas, Minnesota, Wisconsin, Illinois, Michigan, and New York (NatureServe 2023). The nativity is debatable for some peripheral populations. Reports from Kansas and Missouri may have been based on observations and collections of

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western mugwort, and New York occurrences may be garden escapees (Shultz 2020b).

State Distribution: Sawtooth wormwood was recently discovered in Gogebic County in 2011 near the Black River (Reznicek et. al. 2011, Shackleford 2011). Both occurrences are close to the northeast border of Wisconsin, and Michigan is likely the easternmost natural extent of sawtooth wormwood's native range.

Recognition: Sawtooth wormwood ranges from 50 – 100 cm (20 – 39 in) in height but has been observed growing up to 300 cm (118 in) tall. Stems are single or multiple, glabrate to tomentulose, and many-branched distally near the flower panicles. Leaves are **simple, unlobed**, sessile, alternate, 5 – 15 cm (2 – 6 in) long and 1 – 2.5 cm (0.4 – 1 in) wide, and lanceolate with an acuminate tip. Leaf margins are regularly serrate with teeth reaching a maximum length of 2 mm (0.08 in). **Blades are green and glabrous above and white tomentose below.** Occasionally, leaves have a pair of stipule-like lobes at the base of the blade. Flowerheads are diminutive and sessile to subsessile along raceme-like panicles that reach a length of 10 – 15 cm (4 – 6 in). Involucres are bell-shaped (i.e. campanulate) and 2.5 – 3 mm long (0.1 – 0.12 in). Within each individual head are multiple green-yellow, **discoid florets** arranged in a pattern that is diagnostic for the subgenus *Artemisia*: **outer florets are female and central florets are bisexual**. There are typically 3 – 5 female and 9 – 10 bisexual florets per head. The fruit is a small achene (i.e., cypsela), ellipsoid, nerveless, and about 1 mm (0.04 in) long.

Sawtooth wormwood can be distinguished from most species of *Artemisia* in Michigan by its **simple, unlobed leaves**. All other species have pinnately lobed or filiform leaf blades. It is most likely to be confused with western mugwort, but sawtooth wormwood stems are sparsely tomentose to glabrous and its **upper leaf surfaces are always glabrous** while western mugwort's stems and upper leaf surfaces are both uniformly tomentose and are dusty white in hue. Sawtooth wormwood shoots may bear a slight resemblance to goldenrod before flowering, but sawtooth wormwood **leaves only have one primary midvein** and similar goldenrod species will have three primary midveins.

Best survey time/phenology: Plants flower in late July to early August and set fruit in late August to early September. Plants may be identified by vegetative characteristics as early as June, but the presence of reproductive structures makes for easier identification.

Habitat: Across its range, sawtooth wormwood grows in a variety of habitats, but it usually occurs on bluffs or ridges adjacent to rivers, river floodplains and streams, along the edges of woods and marshes, on railroad embankments and prairies adjacent to railroad rights-of-way, and along ruderal roadsides (COMH 2025). Plants typically grow in sandy soils but can grow in rich, silty, or loamy soils as well. Outside of Michigan, the most common associate species include box-elder (*Acer negundo*), silver maple (*Acer saccharinum*), sandbar willow (*Salix interior*), big bluestem (*Andropogon gerardii*), reed canary grass (*Phalaris arundinacea*), prairie cordgrass (*Spartina pectinata*), common milkweed (*Asclepias syriaca*),Joe-Pye-weed (*Eutrochium maculatum*), sawtooth sunflower (*Helianthus grosseserratus),* spotted touch-me-not (*Impatiens capensis*), wild-bergamot (*Monarda fistulosa*), cut-leaf coneflower (*Rudbeckia laciniata*), Canada goldenrod (*Solidago canadensis*), late goldenrod (*S. gigantea*), and stinging nettle (*Urtica dioica*). It is also associated with tall green milkweed (*Asclepias hirtella*), kitten-tail (*Besseya bullii*), and cup plant (*Silphium perfoliatum*), which are all State Listed species in Michigan. These species' current ranges, however, do not overlap with that of known sawtooth wormwood populations in Michigan. (COMH 2025).

Within Michigan, known populations occur on sandy, somewhat dry, open terraces above the shoreline of the Black River in association with blue-joint (*Calamagrostis canadensis*), reed canary grass, common tansy (*Tanacetum vulgare*), stinging

nettle, speckled alder (*Alnus incana*), and a few silver maples and box-elder trees (Shackleford 2011).

Biology: Sawtooth wormwood is a rhizomatous, herbaceous perennial that is wind-pollinated and adapted to temperate and mesic climates. Other aspects of its natural history are unknown, but much can be inferred from studies regarding the closely related western mugwort, the genus *Artemisia* as a whole, and the differences between sawtooth wormwood and the rest of the genus. Sawtooth wormwood has a simple leaf, unlike the pinnately lobed leaf of most species in the genus. The formation of lobed leaves is an adaptation for heat dispersion and water loss reduction in the arid climates where *Artemisia* evolved (Jiao et. al. 2023). It is likely sawtooth wormwood, as well as other simple-leaved *Artemisia* species, lost this morphology due to differing environmental conditions. A simple leaf blade structure is better suited for more enclosed and humid environments, such as the woodlands and riverbanks in which sawtooth wormwood occurs (Jiao et. al. 2023).

Potential animal associations in pollination, seed dispersal, seed predation, or herbivory for sawtooth wormwood have not been studied, but western mugwort hosts numerous lepidopterans, including American lady (*Vanessa virginiensis*), painted lady (*V. cardui*), and two species of tortricid moths (*Eucosma infibriana* and *E. artemisiana*) (Robinson et. al. 2023). It is feasible that the closely related sawtooth wormwood has potential as a lepidopteran host as well.

Conservation/management: More studies are needed to assess the populations of sawtooth wormwood in Michigan to create a comprehensive management plan. The western Upper Peninsula of Michigan is likely the easternmost natural extent of its range, thus, Michigan populations are likely to possess unique genetics that are important to preserve, especially in the face of climate change (Rhem et. al. 2015). Peripheral populations usually endure less favorable conditions than the core population, and these environmental pressures can

Photograph by Ian Shackleford, iNaturalist

Figure 1. The leaves of sawtooth wormwood are green and glabrous above and white tomentose below.

increase genetic diversity that positively impacts the resilience of the species (Lesica and Allendorf, 1995).

Sawtooth wormwood prefers sunny, open habitat with moderately moist conditions. Populations are susceptible to competition from invasive species that typically proliferate in floodplain systems, such reed canary grass, which is a common associate plant. Other invasive species that may impact sawtooth wormwood include garlic mustard (*Alliaria petiolata*), glossy buckthorn (*Frangula alnus*), honeysuckle (*Lonicera* spp.), common buckthorn (*Rhamnus cathartica*), and multiflora rose (*Rosa multiflora*), and (Tepley et. al. 2010). Encroachment from shrubs and trees may also create unfavorable conditions by overtopping plants and reducing sun exposure.

Anthropogenic disturbances, such as ORV use, agriculture, and development, should be avoided as these activities can alter local hydrological regimes, introduce pollutants, and facilitate the spread of invasive species.

Comments: The genus *Artemisia* is named after the Anatolian Queen Artemisia who is herself named after the Greek goddess of the hunt, Artemis. To deter herbivory, many *Artemisia* species produce

Figure 2. Flowerheads of sawtooth wormwood containing discoid florets.

essential oils and volatile compounds, including terpenoids and sesquiterpene lactones. These compounds are used for numerous medicinal and culinary purposes across the globe (Schultz 2020a).

Research needs: Much remains unknown about sawtooth wormwood, including its specific ecology and biology. More surveys are needed to understand sawtooth wormwood's full extent within Michigan and to assess the viability of the species within the State. Population genetic studies can reveal more on the species' evolutionary history as well as uncover adaptations the peripheral populations in Michigan may have compared to the populations in the rest of its range. Research is also needed to better understand its habitat, determine best management practices, study the effects of disturbance, and understand animal interactions.

Related abstracts: Floodplain forest, cup plant, tall green milkweed, kitten-tail, Assiniboia sedge, large toothwort, red-shouldered hawk, wood turtle.

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Abstract citation:

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Photograph by csledge, iNaturalist

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