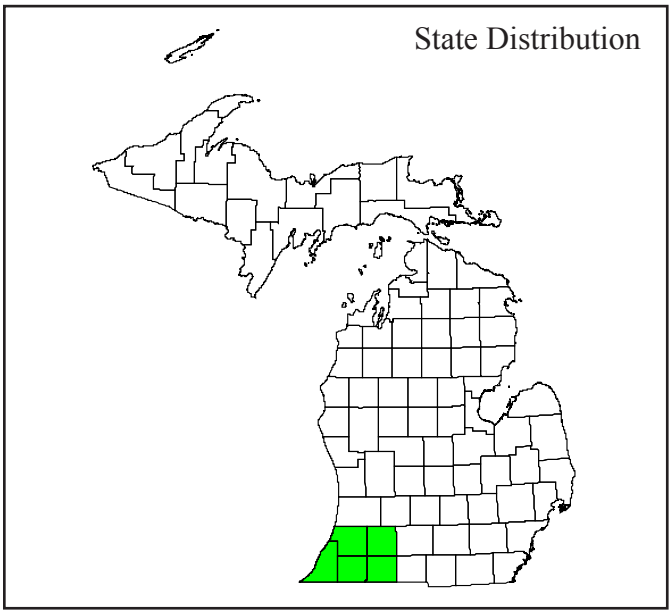
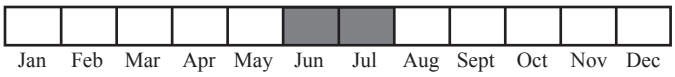
Coreopsis palmata Nutt. — prairie coreopsis

Photo by Bradford S. Slaughter



Best Survey Period



Status: State threatened

Global and state rank: G5/S2

Other common names: stiff coreopsis, stiff tickseed, finger coreopsis

Family: Asteraceae (aster family); also known as the Compositae

Taxonomy: The Asteraceae or Compositae is a very large family of flowering plants, with perhaps greater than 20,000 species (Voss 1996). The genus *Coreopsis* is characterized by radiate heads with few, conspicuous rays, biseriate (arranged in two rows), dimorphic involucral bracts, glabrous, perfect, fertile disk flowers, and strongly flattened, unbeaked, often winged achenes.

Range: Prairie coreopsis is widespread in the central United States, where the species occurs in the Great Plains states of South Dakota, Nebraska, Kansas, and Oklahoma east to Michigan and Indiana, and south to Louisiana and Alabama. The species is considered rare in Louisiana, Nebraska, and South Dakota (NatureServe 2009).

State distribution: Prairie coreopsis is known from approximately 30 occurrences in southwestern Lower Michigan, where the species has been documented from Berrien, Cass, Kalamazoo, St. Joseph, and Van Buren counties.

Recognition: Prairie coreopsis is a small, **erect, rhizomatous perennial forb** ranging to 90 cm in height, characterized by numerous **firm, narrow, essentially sessile leaves that are trilobed at or somewhat below the middle**, giving them a "bird's foot" appearance. The bird's foot appearance of the leaves is accentuated by the **decurrent blade tissue that extends along the midrib to the base**. Plants are glabrous except for the scabrociliate (rough-haired) leaf margins and somewhat hairy nodes. Individuals develop **one to few short-stalked heads with 5-merous yellow disks 8-15 mm wide, yellow rays 1.5-3 cm in length,** linear-clavate (club-like) acutish receptacular bracts, and acute styles with sharp, firm appendages. **Outer phyllaries are nearly as long as the inner phyllaries.** The fruit is a narrowly winged achene, 5-6.5 mm long. *Coreopsis tripteris* (tall coreopsis), which is often associated with prairie coreopsis, is a tall (1-3 m), single-stemmed perennial characterized by petioled, compound leaves with outer phyllaries half or less than half as long as the inner phyllaries. The leaves blacken distinctively in the fall.

Best survey time/phenology: In Michigan, prairie coreopsis flowers in June and July, and fruits in August. Although prairie coreopsis is most conspicuous during

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

its flowering period, the species can be identified by its distinctive sessile, trilobed leaves throughout the growing season from May through late September.

FQI Coefficient and Wetland Category: 10, UPL

Habitat: Prairie coreopsis occurs in remnant upland oak savanna and prairie communities, including bur oak plains, dry-mesic prairie, mesic prairie, oak barrens, and oak openings. In these habitats, prairie coreopsis is associated with a variety of herbaceous and woody associates, including *Amorpha canescens* (leadplant), *Andropogon gerardii* (big bluestem), *Anemone cylindrica* (thimbleweed), *Asclepias tuberosa* (butterfly-weed), *Aster laevis* (smooth aster), *Carya* spp. (hickories), *Ceanothus americanus* (New Jersey tea), *Coreopsis tripteris* (tall coreopsis), *Cornus* spp. (dogwoods), *Corylus americana* (hazelnut), *Desmodium illinoense* (prairie tick-trefoil), *Euphorbia corollata* (flowering spurge), *Helianthus occidentalis* (western sunflower), *Lupinus perennis* (wild lupine), *Monarda fistulosa* (wild bergamot), *Prunus serotina* (black cherry), *Quercus alba* (white oak), *Q. prinoides* (dwarf chinquapin oak), *Q. velutina* (black oak), *Ratibida pinnata* (yellow coneflower), *Rhus* spp. (sumacs), *Rosa carolina* (Carolina rose), *Rubus flagellaris* (dewberry), *Sassafras albidum* (sassafras), *Schizachyrium scoparium* (little bluestem), *Solidago rigida* (stiff goldenrod) and *Tradescantia ohiensis* (Ohio spiderwort), in addition to several other taxa of open prairie and partial-canopy savanna systems.

In the Chicago region, prairie coreopsis occurs in sand prairies, black oak savannas, and gravelly hill prairies (Swink and Wilhelm 1994). Associates in sand prairies and black oak savannas in this region include black oak, flowering spurge, Ohio spiderwort, *Lespedeza capitata* (round-headed bush-clover), *Liatris aspera* (rough blazing-star), *Phlox pilosa* (prairie phlox), and *Stipa spartea* (porcupine grass). Associates in hill prairies in the Chicago region include *Arenaria stricta* (rock sandwort), *Aster sericeus* (western silver-leaved aster), *Bouteloua curtipendula* (side-oats grama grass), *Dalea purpurea* (purple prairie-clover), and *Sporobolus heterolepis* (prairie dropseed).

Biology: Like many prairie and savanna species, prairie coreopsis appears to benefit from application of fire, and declines in the absence of fire (Ehrenreich and Aikman 1963, Bowles et al. 2003). Prairie coreopsis responds to fire by producing more flowering stalks and more fruits per flower stalk (Ehrenreich and Aikman 1963). The species' tendency to form large colonies makes it a showy component of the early- to mid-summer prairie and savanna flora. Prairie coreopsis is self-incompatible and is pollinated by several insects; primary visitors appear to be small, generalist bees in the family Halictidae and bee flies in the family Bombyliidae (Parrish and Bazzaz 1979).

Conservation/management: Prairie coreopsis was once likely a widespread, locally abundant species in oak savannas and grasslands in southwestern Lower Michigan. Fragmentation and conversion of these habitats to agricultural and urban land following European settlement, in addition to the succession of undeveloped savanna areas to forest due to long-term fire suppression, has significantly reduced populations of this species in the state. Today, nearly all populations of prairie coreopsis in Michigan occur in degraded prairie or savanna habitat in railroad rights-of-way or along roadsides, where the plants are vulnerable to bulldozing, mowing, plowing, herbicide use, and other anthropogenic disturbances. Frequent disturbance has reduced or eliminated native associates at several sites, and allowed invasion of most sites by several aggressive, non-native species, including *Berteroa incana* (hoary alyssum), *Bromus inermis* (smooth brome), *Centaurea maculosa* (spotted knapweed), *Daucus carota* (Queen-Anne's-lace), *Hypericum perforatum* (spotted St. John's-wort), *Melilotus alba* (white sweet-clover), *M. officinalis* (yellow sweet-clover), and *Poa pratensis* (Kentucky bluegrass). Fire suppression and lack of management has further contributed to the decline of prairie coreopsis by fostering an increase in shrub and tree cover in formerly open habitats. Dense clones of *Rhus glabra* (smooth sumac) and *R. typhina* (staghorn sumac) have degraded or eliminated several former prairie sites in railroad rights-of-way.

Long-term protection of prairie coreopsis in Michigan requires management of remaining habitat to provide open conditions required by the species. Use of prescribed fire, manual removal of trees and shrubs, and herbicide application targeting invasive shrubs and herbaceous species are recommended to restore, maintain, and enhance prairie and savanna habitats that support this species. Of the approximately 30 sites known to support prairie coreopsis in Michigan, six

are on lands managed for biodiversity conservation, including two Michigan Nature Association preserves, three sites on Amtrak rights-of-way leased by The Nature Conservancy, and one state game area. Only three of these six populations have been observed in recent years, and only one is being actively managed. All of these populations are vulnerable to railroad and road maintenance and encroachment of aggressive non-native species. Perhaps the greatest need for conservation of prairie coreopsis in Michigan is the identification and management of sites that occur outside railroad and road rights-of-way. The species could also be introduced in savanna or prairie restorations that are not likely to be negatively impacted by future development.

Comments: Prairie coreopsis is one of three native *Coreopsis* species in Michigan, blooming after *Coreopsis lanceolata* (sand coreopsis), which occurs on dunes, sandy banks, bluffs, grasslands, and open woodland, and before *C. tripteris* (tall coreopsis), which often grows with prairie coreopsis, but is more widespread throughout southern Lower Michigan (Voss 1996). The genus *Coreopsis* is derived from the Greek *koris*, "bed bug," and *opsis*, "likeness," and refers to the seeds, which resemble ticks (Black and Judziewicz 2009). The specific epithet *palmata* refers to the palm-like lobing of the leaves.

Research needs: The primary need is an updated status survey at extant and historic locations. Population data from most occurrences were last collected in the mid-1980s. Research on the impacts of fire and other management techniques on prairie coreopsis will provide land stewards with methods for maintaining and enhancing populations of the species. There is little detailed information available on the species' life history or autoecology.

Related abstracts: Bur oak plains, dry-mesic prairie, mesic prairie, oak barrens, oak openings, compass plant, Jacob's ladder, leadplant, prairie dropseed, purple milkweed, shooting-star, blazing star borer, culver's root borer, leadplant flower moth, silphium borer.

Selected references:

Black, M.R., and E.J.Judziewicz. 2009. Wildflowers of Wisconsin and the Great Lakes region: A comprehensive field guide, 2nd Ed. The University of Wisconsin Press, Madison, WI. 275 pp.

Bowles, M.L., M.D. Jones, and J.L. McBride. 2003. Twenty-year changes in burned and unburned sand prairie remnants in northwestern Illinois and implications for management. American Midland Naturalist 149: 35-45.

Ehrenreich, J.H., and J.M. Aikman. 1963. An ecological study of the effect of certain management practices on native prairie in Iowa. Ecological Monographs 33: 113-130.

Gleason, H.A., and A. Cronquist. 1991. Manual of vascular plants of Northeastern United States and adjacent Canada. The New York Botanical Garden, Bronx, New York. 910 pp.

NatureServe. 2009. NatureServe Explorer: An online encyclopedia of life [web application]. Version 7.1. NatureServe, Arlington, Virginia. Available http://www.natureserve.org/explorer. (Accessed: August 26, 2009).

Parrish, J.A.D., and F.A. Bazzaz. 1979. Difference in pollination niche relationships in early and late successional plant communities. Ecology 60: 597-610.

Swink, F., and G. Wilhelm. 1994. Plants of the Chicago Region, 4th Ed. The Morton Arboretum, Lisle, IL. 921 pp.

Voss, E.G. 1996. Michigan Flora. Part III: Dicots (Pyrolaceae – Compositae). Cranbrook Institute of Science and University of Michigan Herbarium, Ann Arbor, MI. 622 pp.

Abstract citation:

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