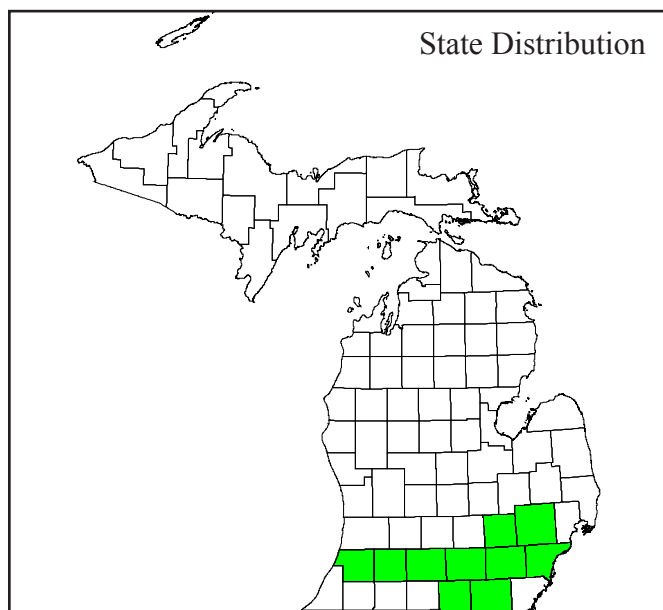




Photo by Bradford S. Slaughter



Best Survey Period



Status: State special concern

Global and state rank: G5/S3

Other common names: large twayblade

Family: Orchidaceae (orchid family)

Synonyms: *Ophrys liliifolia* L. (as *lilifolia*); *Leptorchis liliifolia* (L.) Kuntze; *Malaxis liliifolia* (L.) Swartz; *Ophrys trifolia* Walter

Taxonomy: Freudenstein (1991) used anatomical characteristics of anthers of representative orchid genera as a basis for examining classification within the orchid family, and found that these features largely corroborated the distinction of generic groups previously recognized. According to Case (1987) this genus is closely allied with *Malaxis*, the adder's-mouth orchids. *L. liliifolia* is one of three species of *Liparis* in North America north of Mexico (Flora of North America 2002).

Range: Purple twayblade occurs from New Hampshire south to Georgia and Alabama, ranging westward to Oklahoma, Arkansas, Missouri, Iowa, Wisconsin, and southern Ontario. It is considered rare in Alabama, Connecticut, Delaware, Georgia, Illinois, Iowa, Massachusetts, New Jersey, New York, North Carolina,

Oklahoma, Ontario, Rhode Island, and Vermont, and is considered extirpated in New Hampshire (NatureServe 2006).

State distribution: There are just over 20 occurrences for purple twayblade, though it should be emphasized that many new localities have been documented in recent years, apparently due to the observation that this species has been colonizing habitats not identified previously, such as pine plantations (Case 1987), for which there is considerable potential habitat. The distribution includes ten counties, with more than half of the localities occurring in Washtenaw and Kalamazoo counties.

Recognition: *Liparis liliifolia* is a perennial ranging to about 2 dm in height or more, with two sheathing leaves at the base that are elliptic and lily-like with numerous parallel veins. The single, slightly angled to winged flowering stem, which lacks leaves, consists of a relatively open, loose raceme of at least 4-5 to 20 or more wide-spreading, stalked flowers. **The distinctive portion of the flower is the wide, pale purple and somewhat translucent lip, in addition to the purplish, string-like, drooping lateral petals; these contrast with the narrow, yellowish-green sepals.** *Liparis loeselii* (Loesel's or green twayblade) is a related species most likely to be confused with purple twayblade (although it occurs in much different habitats,



including bogs, swamps, and marl fens), but is easily distinguished by its yellowish-green flowers and much smaller lip as well as by capsules that are longer than the pedicels; **in *L. liliifolia* the capsules are equal to or shorter than the relatively long pedicels.**

Best survey time/phenology: This species is best sought when in flower, although experienced botanists are able to recognize fruiting plants. Occurrence data indicate a relatively wide range of flowering dates, from the end of May into August and even early September. Based on the majority of field reports, June through August is suggested as an optimal survey window, although reliable recognition can occur earlier or later depending on the widely varying phenologies of different colonies.



Photo by Bradford S. Slaughter

FQI Coefficient and Wetland Category: 8, FACU-

Habitat: According to Case (1987), typical habitats in the western Great Lakes region include deciduous forests, brushy thickets, and occasionally floodplain forests, especially sites with somewhat acid humus.

Overall, the habitat is relatively non-specific, including mixed woods, various types of shrub thickets, and also where this orchid has been increasingly found, in disturbed sites and pine plantations. As an example, in one site in Kalamazoo County purple twayblade was found in moist loamy sand, occurring under a canopy of *Fraxinus americana* (white ash), *Sassafras albidum* (sassafras), *Prunus serotina* (black cherry), *Ulmus americana* (American elm), *Carpinus caroliniana* (blue-beech), and *Cornus florida* (flowering dogwood), where groundcover associates included *Pedicularis canadensis* (wood-betony), *Asplenium platyneuron* (ebony spleenwort), *Diphasiastrum complanatum* (ground-cedar), and *Goodyera pubescens* (downy rattlesnake plantain). In the Fort Custer Training Center in Kalamazoo and Calhoun counties, this species was found in openings in dry-mesic southern forest to openings in moist woods, where it occurred under *Quercus velutina* (black oak), sassafras, black cherry, and *Acer rubrum* (red maple).

Biology: *Liparis liliifolia* is a perennial, arising from a bulbous corm (Case 1987.) In a study of dormancy and growth in selected North American herbaceous species, Holm (1925) described this corm as being formed from the swollen base of the floral stem, which is characteristic of other orchids such as *Arethusa* (dragon's-mouth orchid). Mycorrhizae, which are well known orchid symbionts, are critically important to most orchids for germination and growth, as detailed in early investigations by Curtis (1939) and in more recent studies by Rasmussen (2002). For an overview of the role of mycorrhizae, as well as general life history information concerning orchid pollination biology, the reader is referred to the comprehensive regional orchid flora by Case (1987).

Conservation/management: Due to the tendency of purple twayblade to occur in artificially disturbed sites and pine plantations, as well as within mixed woods and lowland forests in floodplains, it is difficult at best to summarize specific management and conservation strategies. Many orchids characteristically respond positively to disturbance, whether artificial or natural, and following colonization and reproduction, populations may thrive but often peak, decline, and eventually die out. Maintenance of a natural disturbance regime is thus likely to be the best approach for perpetuating this opportunistic species by enabling it to be able to move to and colonize new disturbance patches



(e.g. forest openings) as they appear. Owing to the abundance of such habitats as conifer plantations, it is probable that such artificial types will continue to serve as a refuge for this species and perhaps play a significant role in maintaining it. Case (1987) cites an example of a small, stable Wisconsin population persisting in a mature forest in the University of Wisconsin Arboretum, which quickly colonized a localized area converted to pines, exploded in size, and then diminished as the pines matured and shaded the site.

Research needs: The considerable ongoing work concerning orchid mycorrhizae and the role of fungi in germination will undoubtedly result in information useful to management and long-term conservation. Additional investigations that would be beneficial include breeding system studies (e.g. pollination biology), genetic research, and an overview of life history.

Related abstracts: Dry-mesic southern forest, mesic southern forest, oak openings, Blanding's turtle, Cooper's hawk, Eastern box turtle, gray rat snake, red-shouldered hawk, ginseng, goldenseal, panicked hawkweed, whiskered sunflower.

Selected references:

- Case, F.W., Jr. 1987. Orchids of the Western Great Lakes Region. Revised ed. Cranbrook Institute of Science, Bull. 48. 251 pp.
- Curtis, J.T. 1939. The relation of specificity of orchid mycorrhizal fungi to the problem of symbiosis. *Amer. J. Bot.* 26: 390-399.
- Flora of North America Editorial Committee. 2002. Flora of North America, North of Mexico. Volume 26: *Magnoliophyta: Liliidae: Liliales and Orchidales*. Oxford Univ. Press. New York, N.Y. 723 pp.
- Freudenstein, J.V. 1991. A systematic study of endothelial thickenings in the Orchidaceae. *Amer. J. Bot.* 78: 766-781.
- Holm, T. 1925. Hibernation and rejuvenation, exemplified by North American herbs. *Amer. Mid. Naturalist*. 9: 477-512.

Homoya, M.A. 1993. Orchids of Indiana. Indiana Academy of Science. Indiana University Press, Bloomington and Indianapolis. 276 pp.

Luer, C.A. 1975. The Native Orchids of the United States and Canada, Excluding Florida. Bronx. (Native Orchids U.S. & Canada). 361 pp.

NatureServe. 2006. NatureServe Explorer: an online encyclopedia of life [web application]. Version 6.1. NatureServe, Arlington, Virginia. Available <http://www.natureserve.org/explorer>. (Accessed: December 15, 2006).

Rasmussen, H.N. 2002. Recent developments in the study of orchid mycorrhiza. *Plant and Soil* 244: 149-163.

Smith, W.R. 1993. Orchids of Minnesota. Minnesota Dept. of Natural Resources. Univ. of Minnesota Press, Minneapolis. 172 pp.

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