

THE NATIONAL HISTORICAL DISTRIBUTION OF
PLATANATHERA PERAMOENA (A. GRAY) A. GRAY
(ORCHIDACEAE) AND ITS STATUS IN OHIO

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ABSTRACT

An updated county distribution map of *Platanthera peramoena* was made utilizing data from state natural heritage programs and similar organizations. Herbarium and field surveys were conducted by Ohio Division of Natural Areas and Preserves staff for Ohio localities of the species. These studies identified 41 sites of *P. peramoena* in Ohio, and habitats were identified where new populations are likely to be found.

In Ohio, *P. peramoena* is a plant of wet acidic soils on the Illinois till plain and in the unglaciated Allegheny plateau. While not common in the state it is not in imminent danger of extirpation.

Platanthera (Habenaria) peramoena (A. Gray) A. Gray (Purple Fringeless Orchid) was placed under review as a threatened species by the U.S. Fish and Wildlife Service (the Service), as a result of the 1974 Smithsonian Institution's Report on endangered and threatened species of the United States. This report was requested by Congress in the Endangered Species Act of 1972 (Public Law 93-205, Approved Dec. 29, 1973). Subsequent to this proposal, the Service received additional information on this species from various states, and on December 15, 1980, *P. peramoena* was formally withdrawn from consideration because it was found to be more widespread than was previously believed (U.S. Fish and Wildlife Service, 1980).

The formal review of this and other species by the Service focused attention on their possible rarity. Partly as a result of this listing, *Platanthera peramoena* was included on many newly developing state and regional rare plant lists. Attention was further focused when the Service contracted various state natural heritage programs and other similar agencies to study the status of plants listed within their respective states. The Ohio Department of Natural Resources, Division of Natural Areas and Preserves, manager of the Ohio Natural Heritage Program, entered into a formal two-year study of this species.

METHODS

Ohio records of *P. peramoena* were obtained from the Ohio Natural Heritage Program data base. These records were obtained from a survey of 26 Ohio herbaria and the U.S. National Herbarium. Field work was planned utilizing these records as guides to previous occurrences of the species. When the locational data was specific enough, the old records were field checked.

The following organizations were consulted to obtain updated distributional information outside of Ohio:

- The Arkansas Natural Heritage Inventory
- The Indiana Natural Heritage Program
- The Illinois Department of Conservation
- The Kentucky Nature Preserves Commission
- The Maryland Natural Heritage Program
- The Mississippi Natural Heritage Program
- The Missouri Department of Conservation
- The Conservation and Environmental Studies Center, Inc. of New Jersey
- The North Carolina Natural Heritage Program
- The South Carolina Heritage Trust Program
- The Tennessee Natural Heritage Program
- The Tennessee Valley Authority Regional Natural Heritage Project
- The Virginia Natural Diversity Information Program
- The Western Pennsylvania Conservancy
- The West Virginia Natural Heritage Program

In addition, recent state and regional floras (references 3, 9, 10, 11, 16, 19, 21, 25, 27, 30, 33), state endangered species publications (4, 12, 18, 20, 26, 31, 34), and regional treatments of orchids (7, 8, 13, 14, 23, 24), were consulted for relevant information.

RESULTS

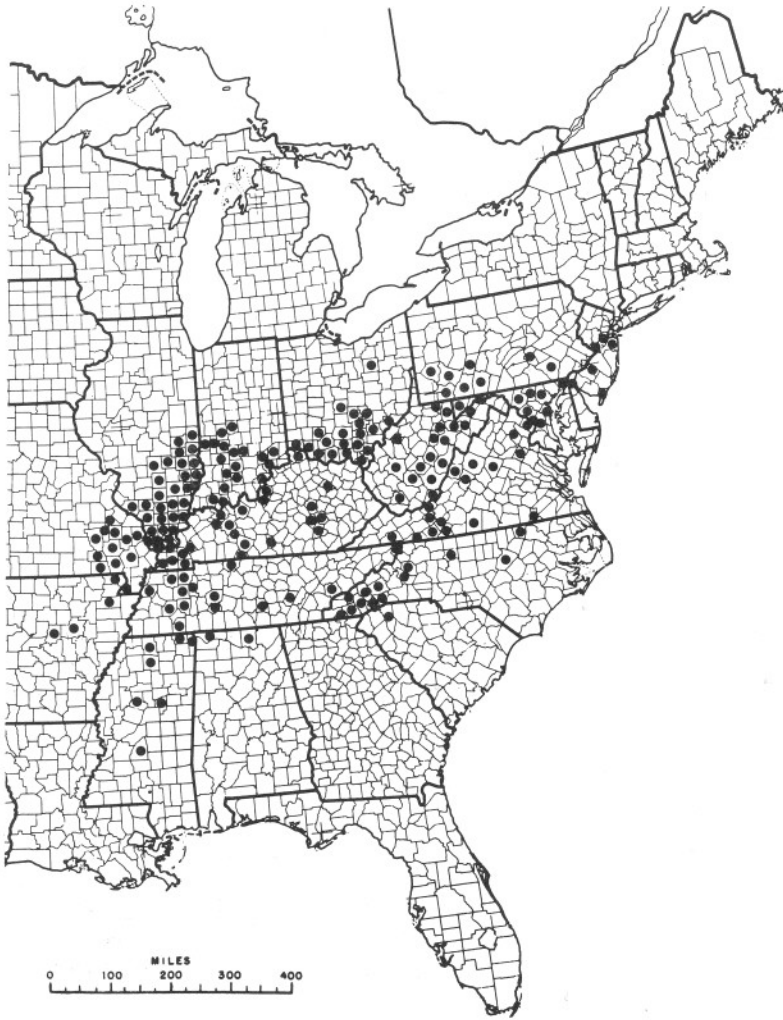
Total Distribution

The only published county dot map of *Platanthera peramoena* for its entire range is that of Ayensu (1974). Literature references and heritage information added new records. New maps were made for the distribution of this species in Ohio (Map 1), and for its national historical range (Map 2).



Map 1. Ohio distribution of *Platanthera peramoena*. The lines to the north and west are the limits of Wisconsin glaciation. The numbers in the counties represent the number of stations reported in the counties. Uncircled numbers represent populations located since 1978; circled numbers represent populations not relocated since this date. The date is the most recent record for the county. B refers to a reference from Braun (1967).

Platanthera peramoena is often listed or diagrammed as occurring in New York. This is apparently based on House (1924). Zenkert (1934), however, pointed out that this report was due to an error in transcription, *P. peramoena* being substituted for *P. fimbriata*. Sheviak (personal communication, 1981) checked the New York State Museum (NYS), and found no New York specimens of *P. peramoena*. Another possible source of error may have been misidentifica-



Map 2. Total historical distribution of *Platanthera peramoena*.

tions with *P. psycodes* or *P. grandiflora*. Both of these errors were found in old New York specimens deposited at The Ohio State University (OS).

Platanthera peramoena is also often listed or diagrammed as occurring in Georgia. Correll (1950) lists it for Georgia, citing S. B. Buckley as the collector. Duncan and Kartesz (1981) also list it for Georgia. Many of Buckley's labels read "in montibus Carolinae et Georgiae." We have records from 26 Ohio herbaria, and sent inquiries to the New York State Museum (NYS), the University of Georgia (GA), the U.S. National Herbarium (US), the Missouri Botanical Gardens (MO), the Philadelphia Academy of Natural Sciences (PH), and Yale University (Y). Correll suggested the last four herbaria, as he obtained many of his records there. We have found no Georgia record for this species. If it exists in another herbarium, it can only doubtfully be ascribed to Georgia if the locational data is like the one above.

Status in Ohio

Over the past three years, the Division of Natural Areas and Preserves field staff has found many new sites for *Platanthera peramoena*. In many cases, old records have been relocated. Post-1978 populations are now known from 41 locations in nine counties. Herbarium specimens exist from ten other counties. In addition, Braun (1967) maps an Adams County record. We were not able to locate any specimen from this county, or pre-1967 specimens from Brown and Scioto counties.

In Ohio, *Platanthera peramoena* grows in areas that are wet in the spring, but which may become droughty later in the year. It grows most often in full sun or partial shade, and is occasionally found in deep shade. The most common habitat is an open swampy area or low wet depression, and in such situations populations can include scores of individuals. It is infrequent on exposed moist slopes, and in such situations both individuals and populations are generally smaller. One individual was found in an area that was extensively trampled and grazed by cattle. The most vigorous populations are known from moderately disturbed sites, such as periodically mowed or lightly grazed wet fields, or recently logged swampy areas.

All presently known populations occur on seasonally wet acidic soils of the unglaciated Allegheny Plateau, or on the highly leached acidic soils of the Illinois Till Plain, south of the Wisconsin Till

Plain border. Swampy habitats on the unglaciated Allegheny Plateau occur on lacustrine silts and clays deposited in many of the deeper pre-glacial valleys of the Teays River system and its tributaries. These lacustrine deposits were laid down during a damming of the Teays River by the Kansan or pre-Kansan glacier, forming a vast lake, which inundated the lower elevations of much of southern Ohio and adjacent West Virginia and Kentucky (Stout et al., 1943).

DISCUSSION

Platanthera peramoena is not presently an exceptionally rare plant in Ohio. There are a number of reasons, however, which may explain why it is not commonly seen and collected. First, it has a rather brief blooming period, and when not in bloom it is very inconspicuous among the surrounding tall vegetation. Most Ohio records are from mid-July to mid-August, but the blooming period in any one year lasts only about two weeks, and it quickly goes out of bloom. Second, even at a short distance, it is very similar in appearance to *Phlox paniculata* L. and *Phlox maculata* L. The size, general form of the inflorescence, flower color, and habitat of these plants are similar, and *Platanthera peramoena* is often found growing with them. These phloxes are very common and widespread in Ohio, and *P. peramoena* is easily overlooked. Third, many populations of *P. peramoena* occur in swampy, weedy habitats that are not particularly pleasant to explore. Fourth, and perhaps of greatest importance, populations do not bloom every year. This phenomenon is known for many orchid species and dramatic changes in number of blooming plants per population have been noted for *P. flava* (Buker, 1980) and *P. peramoena* (Henry & Buker, 1955; Henry, Buker, & Pearth, 1975). The reason for these yearly changes is not understood, but there are various possible explanations. Case (1964), Sheviak (1974), and Stoutamire (1974) point out that disturbance can cause rapid changes in wild orchid populations. This rapid colonization could come about by the reseeding of an area from an outside source, well documented for other orchid species (Stoutamire, 1974). Another possible reason for shifts in the population size may be the delayed germination of orchid seeds, but this is not well documented. Another reason is the possible periodic shift of the plant from an autotrophic to a temporary heterotrophic state. This

phenomenon is known for *Triphora trianthophora* (Sw.) Rydb., and Sheviak (1974) has observed it for other orchid species under horticultural conditions. Case (1964), however, doubts that this is a cause for population shifts in nature. This autotrophic to heterotrophic shift might very possibly be triggered by environmental conditions that are as yet very poorly understood. Sheviak (1964) points out that these conditions may operate on the mycorrhizae of the orchid. Clearly, this is a fertile area for research.

The general distribution of *Platanthera peramoena* on the Illinois Till Plain of Ohio parallels the situation in Illinois, where a similar Wisconsinan-Illinoian edaphic transition exists. Similar wet acidic soils developed on silts of lacustrine origin in southeastern Ohio. The occurrences of *P. peramoena* in Franklin County (one record, 1896—"Clintonville"), and in Wayne County (one record, 1906—county only mentioned) are apparently disjunct. Soil surveys of Franklin County (McLoda & Parkinson, 1980) and of Wayne County (Bureau & Scherzinger, in press) were checked to see if there were any areas that might be favorable for the growth of this species. There were indeed many sites in these counties that seemed to have similar conditions of moisture and acidity. While the majority of Wisconsinan-age soils in Ohio are generally calcareous, there are also many locally wet acidic soils. It is not understood why *P. peramoena* apparently has not colonized them.

Platanthera peramoena has varying degrees of rarity in different parts of its range. It is believed extirpated from Delaware (Tucker et al., 1979), South Carolina (pers. comm., SC Heritage staff), and possibly New Jersey (Snyder & Vivian, 1981). Reveal and Broome (1981) believe it to be in danger of extirpation from Maryland due to a combination of habitat modification and overcollecting. It is listed as a "special concern" species (due to vulnerability of its habitat) in Alabama (Freeman et al., 1979), Tennessee (pers. comm., TN Heritage staff), and Virginia (pers. comm., VA Heritage staff). Pennsylvania lists it as threatened, but it is widespread throughout the southern part of the state (Wiegman, 1979). It recently has been found to be much more widespread than was originally believed in Kentucky (pers. comm., KY Heritage staff), and West Virginia, where it has been taken off the West Virginia state list (pers. comm., WV Heritage staff). Sheviak (1974) mentions it as widespread in southern Illinois, and believes it to be the most common member of its genus in southern Illinois.

In Ohio, *Platanthera peramoena* is not in imminent danger of extirpation. Populations are believed to have disappeared after cultivation of an area, and drainage of the habitat would very likely eliminate populations, but habitats exist in southern Ohio that support apparently healthy populations. We believe that moderate disturbance has increased its numbers in the state and that there are many as yet undiscovered stations for it in southern Ohio.

The increasing awareness of endangered habitats and species is stimulating the development of rare species lists and their refinement through selective and planned field surveys. Many lists are initially based on randomly collected herbarium data. Data bases of the occurrences of these species are under various stages of development in different states, and new records are being obtained by these selective field surveys. Studies of species being considered for federal listing, such as *Platanthera peramoena*, could especially benefit from heritage program data. They are studied throughout their range, and not just in peripheral areas, where they are considered rare. The information gained through natural heritage program surveys will prove to be rich sources of data in future years.

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LITERATURE CITED

1. AYENSU, E. S. 1975. Endangered and threatened orchids of the United States. *Am. Orchid Soc. Bull.* 44: 384-394.
2. ———. & R. A. DEFILIPPS. 1978. Endangered and threatened plants of the United States. Smithsonian Institution World Wildlife Fund, Inc. Washington, D.C. 403 p.
3. BRAUN, E. L. 1967. The Monocotyledonae [of Ohio]: Cat-tails to orchids. With Gramineae by C. G. Weishaupt. Ohio State University Press, Columbus, Ohio. 464 p.

4. BROOME, C. R., J. L. REVEAL, A. O. TUCKER, & N. H. DILL. 1979. Rare and endangered vascular plants of Maryland. U.S. Fish and Wildlife Service, Newton Corner, Massachusetts. 64 p.
5. BUKER, W. 1980. Population explosions among the orchids. *Castanea* 45: 144-145.
6. BUREAU, M. F., & R. J. SCHERZINGER. (to be published in 1983). Soil survey of Wayne County, Ohio. USDA Soil Conservation Service, U.S. Government Printing Office, Washington, D.C.
7. CASE, F. W., JR. 1964. Orchids of the western Great Lakes. Cranbrook Institute of Science, Bloomfield Hills, Michigan. 147 p.
8. CORRELL, D. S. 1950. Native orchids of North America north of Mexico. Chronica Botanica Company, Waltham, Massachusetts. 399 p.
9. CUSICK, A. W., & G. M. SILBERHORN. 1977. The Vascular Plants of Unglaciated Ohio. Ohio Biol. Surv. Bull. (New Series) Vol. 5, No. 4. 157 p.
10. DEAM, C. C. 1940. Flora of Indiana. Burford Printing Co., Indianapolis. 1236 p.
11. DUNCAN, W. H., & J. T. KARTESZ. 1981. Vascular Flora of Georgia. The University of Georgia Press, Atlanta. 143 p.
12. FREEMAN, J. D., A. S. CAUSEY, J. W. SHORT, & R. R. HAYNES. 1979. Endangered, threatened, and special concern plants of Alabama. Department of Botany and Microbiology, Agricultural Experiment Station, Departmental Series No. 3, Auburn University, Auburn, Alabama. 25 p.
13. HENRY, L. K., & W. E. BUKER. 1955. Orchids of Western Pennsylvania. *Ann. Carnegie Mus.* 33: 299-346.
14. ———, ———, & D. L. PEARTH. 1975. Western Pennsylvania Orchids. *Castanea* 40: 93-168.
15. HOUSE, H. D. 1924. Annotated list of the ferns and flowering plants of New York State. New York State Museum Bulletin, The University of the State of New York. 759 p.
16. LOWE, E. N. 1921. Plants of Mississippi. A list of flowering plants and ferns. Mississippi State Geological Survey, Bulletin 17. 292 p.
17. MCLODA, N. A., & R. J. PARKINSON. 1980. Soil Survey of Franklin County, Ohio. USDA Soil Conservation Service, U.S. Government Printing Office, Washington, D.C. 188 p. + 69 pl.
18. MASSEY, J. R., & R. D. WHETSTONE. 1978. Threatened and endangered vascular plants of western North Carolina. Southeastern Forest Experiment Station, Highlands Biological Station, Cooperator.
19. MOHLENBROCK, R. H., & D. M. LADD. 1978. Distribution of Illinois vascular plants. Southern Illinois University Press, Carbondale and Edwardsville. 282 p.
20. PORTER, D. M. 1979. Rare and endangered vascular plant species in Virginia. U.S. Fish and Wildlife Service.
21. RADFORD, A. E., H. E. AHLES, & C. R. BELL. 1964. Manual of the vascular flora of the Carolinas. The University of North Carolina Press, Chapel Hill, North Carolina. 1183 p.
22. REVEAL, J. L. & C. R. BROOME. 1981. Minor nomenclatural and distributional notes on Maryland vascular plants with comments on the state's proposed endangered and threatened species. *Castanea* 46: 50-82.

23. REED, C. F. 1964. Orchidaceae of Maryland, Delaware, and the District of Columbia. *Castanea* 29: 77-109.
24. SHEVIK, C. J. 1974. An Introduction to the ecology of the Illinois Orchidaceae. Illinois State Museum, Scientific Papers XIV. Springfield, Illinois. 89 p.
25. SMITH, EDWIN B. 1978. An atlas and annotated list of the vascular plants of Arkansas. University of Arkansas Bookstore, Fayetteville, Arkansas. 592 p.
26. SNYDER, D. B., & V. E. VIVIAN. 1981. Rare and endangered vascular plant species in New Jersey. U.S. Fish and Wildlife Service, Newton Corner, Massachusetts. 98 p.
27. STEYERMARK, J. A. 1977. Flora of Missouri. The Iowa State University Press, Ames, Iowa. 1728 p.
28. STOUT, W., K. VER STEEK, & G. F. LAMB. 1943. Geology of water in Ohio. Bull. 44, Ohio Division of Geological Survey. 694 p.
29. STOUTAMIRE, W. P. 1974. Terrestrial orchid seedlings. In: Withner, The Orchids, Scientific Studies. John Wiley and Sons, New York. p. 101-128.
30. STRAUSBAUGH, P. D. & E. L. CORE. 1970. Flora of West Virginia. Part 1, Ed. 2. West Virginia University Bulletin, Series 70, No. 7-2. 273 p.
31. TUCKER, A. O., H. H. DILL, C. R. BROOME, C. E. PHILLIPPS, & M. J. MACIARIELLO. 1979. Rare and endangered vascular plant species in Delaware. U.S. Fish and Wildlife Service, Newton Corner, Massachusetts. 89 p.
32. U. S. FISH & WILDLIFE SERVICE. 1980. Endangered and threatened wildlife and plants: Review of plant taxa for listing as endangered or threatened species. Federal Register 45: No. 242.
33. WHERRY, E. T., J. M. FOGG, JR. & H. A. WAHL. 1979. Atlas of the flora of Pennsylvania. Morris Arboretum of the University of Pennsylvania. 390 p.
34. WIEGMAN, P. G. 1979. Rare and endangered vascular plant species in Pennsylvania. U.S. Fish and Wildlife service. 94 p.
35. ZENKERT, C. A. 1934. The flora of the Niagara frontier region. Ferns and flowering plants of Buffalo, New York, and vicinity. Bull. Buffalo Soc. Nat. Sci. 16. 313 p.

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