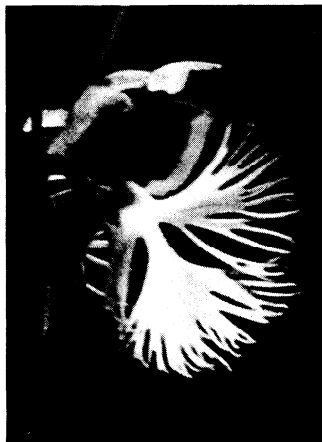


The Mysteries of a Prairie Orchid



This attractive but rare wild orchid is named for its flower's deeply fringed, three-part lower lip, as shown in below.

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The western prairie fringed orchid (*Platanthera praeclara*) is a showy wildflower that was once widespread throughout the tallgrass prairie west of the Mississippi River. Today, however, the plant is largely confined to two metapopulations (groups of smaller populations) in the United States. One of these is found in southeastern North Dakota on the Sheyenne National Grassland, which is managed by the Custer National Forest.

This species was listed in 1989 as threatened due to concerns over the limited number of populations and their relative isolation. The decline of the western prairie fringed orchid parallels the almost complete loss of tallgrass prairie habitat in the central United States and Canada. Research on the orchid focuses not only on understanding its life history and habitat needs, but also on strategies for restoring the tallgrass prairie ecosystem and its associated wetland habitats.

The western prairie fringed orchid, a perennial with two distinct life states, has many attributes that make it difficult to study, and significant questions remain about its life history. In some years, a given plant will remain vegetative throughout the growing season, and in other years it will flower. The vegetative form usually consists of two basal leaves up to 6 inches (15 centimeters) long. The inflorescences have 20 or more attractive, cream-colored flowers arranged on a spike up to 3 feet (0.9 meter) tall. The flowers produce a fragrance at night that attracts hawkmoths, which pollinate the orchid. In years when extensive flowering occurs and pollination is successful, thousands of dust-like prairie orchid seeds are produced.

At the end of the growing season, plants produce a new bud and tuber that develop into the new root system and shoot for the following growing season. In this manner, populations may persist for some time. However, seed establishment is required for recruitment of new individuals. Almost nothing is known about the species' germination ecology, and efforts to germinate seeds in the laboratory have been mostly unsuccessful. It is very likely that some species of mycorrhizae (fungi growing on plant roots that promote the absorption of nutrients) is required for germination. The absence of this beneficial fungus makes germination and seedling survival very unlikely.

The orchid is thought to be long-lived, and to have periods of dormancy when tubers persisted underground for a growing season or more. However, long-term data, involving permanently marked plants monitored over 10 years or more, are needed to confirm these aspects of prairie orchid biology.

Given the many questions surrounding this species, the Forest Service's Rocky Mountain Research Station (RMRS) collaborated with Custer National Forest in 1987 to establish permanent transects in areas of orchid concentrations and marked a total of 160 individual plants. By 1994 only 4 percent of the originally marked orchids were observed above ground. Plants may live up to eight years, but most of the monitored plants were present only one or two growing seasons. Further, once an orchid disappeared, it rarely reappeared. The question now is whether the drought conditions in the first four years of our monitoring, followed by flooding in 1993, may have reduced survival and/or increased

dormancy rates beyond levels that could be expected in more normal times.

Data collected from these transects and additional research plots have also provided the foundation for examining other questions, such as the role of soil moisture and the effects of various management activities. The most significant factor influencing orchid numbers is soil moisture. During the drought of the early 1990's, numbers dwindled and the orchid could only be found in the deepest swales (a type of lowland). Flooded swales in 1993 supported high numbers of orchids, but vegetative plants that remained submerged throughout the summer did not survive through the growing season. However, new orchids have appeared on sideslopes above the wetlands.

The transects established on the National Grassland in 1987 encompassed a variety of management regimes, including grazing, burning, a combination of grazing and burning, and neither burning nor grazing. The number of orchids has varied dramatically by year and location. However, the RMRS has not been able to detect any consistent effects of these management regimes on orchid populations. Studies of the impacts of fire, grazing, and mowing will continue.

Research on the Sheyenne National Grassland has also helped the RMRS to characterize the plant community that supports orchids and develop a model for managers to use in identifying suitable habitat for reintroduction. Baltic rush (*Juncus balticus*), woolly sedge (*Carex lanuginosa*), and northern reedgrass (*Calamagrostis stricta*) commonly occur in orchid concentration areas on the Sheyenne Grassland.

Unfortunately, some swales have been invaded by a noxious weed, leafy spurge (*Euphorbia esula*). Unless effective control methods are developed, orchid habitat on the Sheyenne National Grassland remains at risk of being taken over by this invasive species. Current efforts to curb leafy spurge include herbicides, biological control, and herbivores such as goats and sheep. We

are collaborating with universities and other agencies to overcome the severe obstacles of controlling leafy spurge without severely impacting the orchid and other components of this already imperiled prairie ecosystem.

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The flowers of a western prairie fringed orchid beginning to open.
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