

UTE LADYS' TRESSES

Spiranthes diluvialis Sheviak

Plant Symbol = SPDI6

Contributed by: USDA NRCS Idaho Plant Materials Program



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Uses

Ute Ladies'-Tresses is a showy, perennial flowering orchid that has not been successfully propagated. It was first described by C.J. Sheviak in 1984. Ute Ladies'-Tresses are found in open wetland and riparian areas and is pollinated mostly by bumblebees (*Bombus spp.*). This species has scientific significance in studies addressing its evolutionary isolation, which has been an important subject in conservation biology research. It has no known agricultural, economic, or other human uses at this time.

Status

Consult the PLANTS Web site and your State Department of Natural Resources for this plant's current status (e.g. threatened or endangered species, state noxious status, and wetland indicator values). In 1992, it was designated as Threatened in its Entire Range by the U.S. Fish and Wildlife Service.

Description

Ute Ladies'-Tresses is a perennial, terrestrial orchid with mainly 1 stem 12-50 cm tall, arising from tuberously thickened roots. Its linear-lanceolate (1 cm wide) leaves can reach 28 cm long and persist during flowering. Basal leaves are the longest and become reduced in size up the stem. The inflorescence consists of few to many white or ivory flowers clustered in a spike of 3-ranked spirals at the top of the stem. The sepals and petals are oriented perpendicular to the stem, the lateral sepals often spreading abruptly from the base of the flower and all sepals are free to the base. The lip petal is somewhat constricted at the median. Flowering occurs in early August and may persist into early September barring frost or drought. Flowers are faintly fragrant with the scent of coumarin. The seed is ellipsoidal and dust-like, very well adapted to being carried by the wind.

Adaptation and Distribution

Ute Ladies'-Tresses occurs along riparian edges, gravel bars, old oxbows, high flow channels, and moist to wet meadows along perennial streams. It typically occurs in stable wetland and seep areas associated with old landscape features within historical floodplains of major rivers. It also is found in wetland and seep areas near freshwater lakes and springs



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Populations of Ute Ladies'-Tresses are known from three broad general areas of the interior western United States. Near the base of the eastern slope of the Rocky Mountains in southeastern Wyoming and adjacent Nebraska and north central and central Colorado; in the upper Colorado River Basin, particularly the Uinta Basin; and in the Bonneville Basin along the Wasatch Front and westward in the eastern Great Basin, in north-central and western Utah, extreme eastern Nevada and southeastern Idaho. It has also been discovered in southwestern Montana and in the Okanogan area and along the Columbia River in

north-central Washington. Many populations have less than 100 individuals, though a couple of populations have over 500 plants.

Ute Ladies'-Tresses are restricted to a small, sporadic microhabitat represented by calcareous, wet-mesic, temporarily-inundated meadow in shallow wetlands. The shallow meandered wetlands are in alluvial fans that correspond with two uncommon soils series. They are part of broad, flat, arid, open, low-elevation valley bottoms. The meandered wetlands include narrow channels and broader swales, both of which parallel the existing river courses, and most are set back over a mile from the river and without surface-water connections to the river. The microhabitat is temporarily inundated in the spring, often located right below the outer wetland margin. Subsurface hydrological conditions are ameliorated by high organic content at the surface, and coarse alluvial cobble directly below. Water chemistry as inferred from soils data is moderately alkaline and high in calcium carbonate. Soils are loamy calcareous wetland soils with gley features, generally high in micronutrients and organic matter, but are low in phosphorus compared to average values for agricultural soils. The range of pH values for these types of sites in Colorado and Utah are 6.6-8.1 and at sites in Nebraska, Wyoming and Montana 7.6-8.2. Most locations of Ute Ladies'-Tresses are classified as subirrigated ecological sites.

Establishment

Ute Ladies'-Tresses is a showy flowering orchid that has not been successfully propagated. Efforts are underway by the Denver Botanic Gardens and the Red Buttes Gardens of Salt Lake City to determine if Ute Ladies'-Tresses can be propagated. The plant can produce as many as 7,300 tiny seeds per fruit. Seedlings may persist for up to 8 years as subterranean saprophytes dependent on mycorrhizal fungi. Small inconspicuous leaf rosettes may emerge at the end of the growing season and overwinter. Individual plants may flower in consecutive years or under adverse environmental conditions and may persist below ground with their mycorrhizal symbionts. Reproduction is sexual in the strictest sense, though each year's plant comes from a separate lateral bud. Most orchids produce new tubers every year by lateral buds. There is no evidence that lateral buds produce underground shoots, but in collecting voucher specimens, it was observed that the multiple, tuberously-thickened roots have high turgidity and snap easily. Although the majority of plants are single-stemmed, a small number of multi-stemmed plants or small clumps have been noted in sites that were trampled by livestock that may indicate vegetative reproduction.

Ute Ladies'-Tresses exhibits a mixed-mating system. The degree of selfing depends in part upon the abundance of pollinators visiting the flowers. Outcrossing is promoted by male flowers maturing before female flowers and the movement of long-tongued bees on inflorescences. No

self-fertile fruit set has been observed, indicating that a pollen vector is required for reproduction. The only pollinator visits observed have been late afternoon visits by bumblebees (*Bombus spp.*). Bees are provided nectar rewards but the pollen are in masses that are not available to them for food. The distinctive odor of coumarin from the flowers may indicate that there are other rewards to the bumblebee such as critical chemicals for producing pheromones. Other suspected pollinators are anthophorid bees and hawkmoths. Seeds are very short-lived and have a limited time span for germination after seeds dehisce and are generally considered to require endomycorrhizae to germinate in the field. Seeds are very small and require a narrow range of moisture and temperature conditions to germinate and it is likely they require direct contact with mineral soil.

Management

Modeling of monitored populations in Colorado and Utah project population extinction for almost all of the populations under most agricultural practices except the "grazed only" population and to a lesser extent the "twice clipped" population in modeling studies. Species' longevity and the primary causes of mortality are unknown. At most observation sites, leaves of Ute Ladies'-Tresses showed signs of browse by herbivores. Even plants represented by immature rosette leaves under a continuous canopy cover of grass had browse on one or more leaves, though sometimes only the tip of the leaf. Some of the browsing may be caused by whitetail deer because their numbers were high in the general area of observation. Livestock grazing takes place at many sites though it tends to be earlier in the growing season when the uplands are still green rather than during flowering when only the wetlands and riparian areas are green. Clear signs of trampled plants were found at one monitoring site where livestock grazing overlapped with the flowering period in part of one season. Vole herbivory of inflorescences at a Colorado site was identified as a significant threat. Land managers should include pollinators and pollen producing plants in their plans to preserve this rare orchid. The effects of pest management programs on bumblebees and the availability of suitable bee nesting habitat should be considered.

Pests and Potential Problems

Besides herbivory, the only other noted observations of pests were weevils browsing some inflorescences in Montana.

Environmental Concerns

In 1992, Ute Ladies'-Tresses was designated as Threatened in its Entire Range by the U.S. Fish and Wildlife Service. Modeling of monitored populations in Colorado and Utah project population extinction for almost all of the populations under most agricultural practices. The effects of pest management programs on bumblebees and the availability of suitable bee nesting habitat should be considered.

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