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Astragalus—rare but everywhere?

By Julie K. Combs, Ph.D.

Astragalus (milk-vetch, locoweed) is a plant genus in the legume family comprised of annual and perennial herbaceous species. Many people recognize the name *Astragalus* because of its popular use in traditional Chinese medicine. For example, *Astragalus membranaceus* has been used for thousands of years for its healing properties as an antioxidant. Ranchers and farmers may have knowledge of the “locoweed” varieties because of their toxic effects on livestock. However, the majority of *Astragalus* species are of the “milk-vetch” variety, and while their secondary compounds may be toxic to generalist insect herbivores, they are quite tasty (and non-toxic) to browsing bovines.

Astragalus has more species than any other flowering plant genus in the world (more than 2,500 species!). It originated in the Old World (southwest Asia) but is well represented in western North America and along the Andes in South America. In fact, recent molecular evidence suggests that neo-*Astragalus* species join a growing list of recent rapid radiations of plants, especially in areas with high physiographic diversity, such as the Andes—many habitats; many opportunities to disperse, adapt and evolve.

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Rare Care launches two new projects

In cooperation with the US Fish and Wildlife Service, Washington Natural Heritage Program and Department of Natural Resources, a population estimate of the largest *Sidalcea oregana* var. *calva* population will be made in 2012. The population contains numerous discrete subpopulations spread out over a wet meadow within a Douglas-fir and ponderosa pine forest. This intensive, multi-day effort is tentatively scheduled for the third week of July. If you are interested in helping for one or more days, please email rarecare@uw.edu.

Rare Care will also assist the Forest Service in mapping *Sisyrinchium sarmentosum* populations and evaluating the hybridization of this rare blue-eyed grass with its more common relative *S. idahoense*. Rare Care’s rare plant monitors will conduct the mapping, and a UW graduate student will participate in the hybridization study.

Wendling recognized for monitoring, collecting accomplishments

Barry Wendling (shown here examining a plant during Rare Care’s 2010 Wenatchee Mountain Monitoring Weekend) is one of Rare Care’s earliest volunteers. His expertise has benefited the rare plant monitoring, rare seed collecting and Seeds of Success projects. Since 2001, he has tackled numerous, often challenging, monitoring assignments, from Whitman County’s *Astragalus arrectus* to Skagit’s *Ranunculus californicus* (for which he detailed obstacles to identification that is based solely on morphological features because of hybridization with *R. occidentalis*). He consistently contributes more than 100 hours of volunteer service during a field season. Thank you, Barry! Photo by J. Youngman





Top left: The stalked, sickle-shaped pods of *Astragalus sinuatus* are present until the end of July. Top right: The species blooms from mid-April to early May, and the flowers are white or cream-colored. Photos by J.K. Combs.



Above, center: A Silvery Blue butterfly (*Glaucopsyche lygdamus* var. *columbia*) probes *Astragalus sinuatus* flowers for nectar. Immediately above: A caterpillar of the Silvery Blue is seen here with tending ants on a bud. Photos by J.K. Combs.

Pods distinguish *A. sinuatus*

There are 157 *Astragalus* species in the Pacific Northwest, but because *A. sinuatus* is a narrow endemic, it overlaps with only two other *Astragalus* species, *A. liebergii* and *A. purshii*. It is easily distinguished from its congeners by mature fruits. *A. sinuatus* has sickle-shaped pods with inconspicuous hairs, whereas the pods of *A. purshii* (aka woolly-pod milk-vetch) are tomentose (densely hairy) and *A. liebergii* pods are erect and non-sickle shaped.

Combination of factors determines rarity

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Its ability to rapidly evolve may explain why we find *Astragalus* “everywhere,” but why do many of them remain rare?

In general, plant rarity is driven by a combination of factors including genetic, environmental, ecological, historical and inescapable, destructive human influences. In Washington State, there are 16 *Astragalus* species designated as sensitive to endangered by the Natural Heritage Program. *Astragalus sinuatus* (Whited’s milk-vetch) is a state endangered species, one of the rarest. It is found in only eight populations within ten square miles in Chelan County in central Washington. While it may be that this species is newly evolved and hasn’t reached the potential of its range, our recent research suggests that competition with *Bromus tectorum* (cheatgrass), a non-native invasive plant species, limits the growth and survival of this rare species. In this study, we found that in plots where *B. tectorum* was removed, plant survival was much higher than in plots where *B. tectorum* was present. Additionally, we found that insects can consume up to 82% of seeds! While many plants have the capability to reproduce asexually, *A. sinuatus* relies solely on seeds to reproduce. What is most alarming about this scenario is that we expect both competition with *B. tectorum* and seed loss by insects to increase under future climate conditions. Therefore, it is important to start planning now to ensure its survival into the future.

Despite the small range of *Astragalus sinuatus*, it has many important functions in the shrub-steppe community where it is found. For example, it fixes nitrogen, which means that it likely provides a limiting nutrient to other plants growing nearby. It serves as a host to several butterfly species and is a source of shelter, food, pollen and nectar for over 70 species of native insects! So, while rare, it is prudent to remember that species limited in numbers and/or range can perform important ecological services that can influence dozens, hundreds or even a thousand different species in its local environment.

Rare Care hosts regional biodiversity conference

More than 160 botanists, conservationists and land managers gathered in March for the 2012 Plant Biodiversity Conference hosted by Rare Care and University of Washington Botanic Gardens. The two-day conference included 55 presentations on subjects ranging from adapting management for climate change, to ecology and biology of rare plants, reintroductions, and strategies for implementing conservation projects. Rare Care’s Wendy Gibble gave a talk presenting the impact our rare plant monitoring project has on documenting the status of Washington’s sensitive plant species. Proceedings from the conference will be available as a downloadable file from the conference website. Hard copies may be ordered until April 30, 2012 (<http://bit.ly/plantbiodiversity2012>).

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