

correlates with the idea that A. atratus var. inseptus is a recently derived taxon. Self pollinating plants may have a selective advantage for colonizing new habitats or open niches. Such factors as immediate fitness and rapid production of offspring can result in an entire colony after only several generations.

The decumbent to prostrate flowering stems form a low rosette. Fruit born along these stems dehisce and often drop their seed in a somewhat circular pattern around the parent, which results in a slow, but effective method for the colonization of open niches in its habitat. Other methods of seed dispersal for A. atratus var. inseptus are not well understood at this time. Packard (unpublished status report) believes that gut transport is involved, possibly by birds or large herbivores.

Eidemiller (1976) suggests that A. atratus var. inseptus may be seral. Packard (unpublished status report) observes that the taxon occupies scabland habitat, which contains a somewhat seral flora, but the scabland flora can also be thought of as edaphic climax. If A. atratus var. inseptus is seral, it would require open niches, which can be found in habitats grazed by large herbivores. Although the taxon has a demonstrated ability for colonizing, its rather narrow habitat requirements appear to limit both its distribution and its population numbers.

Climatic Fluctuation

Astragalus atratus var. inseptus occurs in such a restricted area within the Snake River Plains, that it appears vulnerable to climatic fluctuations. Should the climate become, for example, cooler and wetter there might be an unfavorable effect on the northern population. With this potential scenario there could be more competition from moisture tolerant species, which would force A. atratus var. inseptus southward, where suitable habitat has been usurped by Agropyron cristatum and Bromus tectorum. In contrast a warm drying trend might put more pressure on the scattered southern populations, but might favor expansion of the northern populations.

A small population near Thorn Creek Reservoir demonstrates the rather narrow tolerances of A. atratus var. inseptus. It is absent from the better drained soil, which supports

Zygadenus sp., but it is also absent from the more dense clay which supports Polycatenium fremontii. Consequently A. atratus var. inseptus is restricted to a few individuals, which occur in a rather erratic pattern in the Artemisia mosaic in this region. Even minor fluctuations could have a negative effect on the smaller, more isolated populations throughout the range of A. atratus var. inseptus.

Predation

Several forms of predation were observed during the 1988 field season. These included rabbits, which apparently found the fruits quite palatable, and web-spinning insect larva, which appears to have an affinity for several species of Astragalus in the region. Evidence of fruit bored by insects was noted throughout the range of A. atratus var. inseptus.

Predation appears to be a serious threat to the stability of A. atratus var. inseptus, particularly in the southern portion of the range, where small, quite isolated populations could be easily eradicated. The more continuous northern populations have not only better sources for seed dispersal, but also, due to additional summer rainfall, an opportunity to regenerate and produce another cycle of fruit.

Marmots were observed in the northern portion of the range. There was also evidence of deer and antelope in the vicinity of healthier populations of A. atratus var. inseptus, but it could not be determined if the taxon was being utilized. There is no direct evidence to suggest that cattle use this plant. No data has been collected on the possible impact of sheep.

Destruction of Habitat

Loss of habitat appears to be the greatest threat to A. atratus var. inseptus at this time. In the lower elevations of the range there has been considerable loss of habitat from range improvement programs, which include spraying, seeding and other treatments. Wildfire has disrupted habitat in both the southern portion and the northeast portions of its range.

Although A. atratus var. inseptus appears slow to return to

disturbed areas, it will in time return if the disturbance is limited in size and there are nearby sources for seed dispersal, as is evidenced by the Little Canyon Creek Shrub Exclosure. The taxon has also become re-established near Trestle Reservoir, which was treated and improved approximately 20 years ago, however, this area is scheduled for repeated treatment. Rather extensive treated areas adjacent to the Bliss population, contain only a few individuals. The same is true of burned areas in the eastern portion of the range, where recovery of A. atratus var. inseptus appears quite limited.

While no direct evidence of livestock grazing was observed, A. atratus var. inseptus was absent in areas where there has been livestock trailing or habitual overuse of the range as can be determined from the lack of diversity, which results in a combination of shrubs with an understory of Bromus tectorum or Ranunculus testiculatus. Well managed grazing, however, does not seem to be a threat. For example in areas where there is 60 percent or less utilization of the vegetation, such as near Trestle Reservoir and Rattlesnake Creek, there appear to be healthy populations of A. atratus var. inseptus. Dinosaur Pasture, which is near Trestle Reservoir, has not been grazed for 2 years.

Additional threats to the taxon include loss of habitat through the development of utility corridors, reservoirs, and roads. Development of land for agricultural crops also displaces A. atratus var. inseptus. Both the known and the potential habitat mapped by Eidemiller in 1976 have been reduced in size.

Packard (unpublished status report) suggests that preserving only a small segment of habitat for A. atratus var. inseptus would probably not preserve enough variability for continuance of the taxon. If the taxon is self pollinating, then its variability would not be diffused throughout its range, but would tend to be localized. A more successful approach would include devising management strategies which would offer protection throughout the range of A. atratus var. inseptus, in order to maintain variability. Once variability is lost, downward trends may be irreversible.

RECOMMENDATIONS

During the course of field studies several opportunities were identified for continued research. In coordination with the Idaho State Office BLM duplicate collections of A.

atratus var. inseptus will be sent to the New York Botanical Garden along with a letter requesting Barneby to review its current taxonomic status. The seeds collected at the Trestle Reservoir site will be sent to Berry Botanical Garden, the seed conservation reserve for our region. A small portion of the seed will be retained in Idaho for additional experimental research.

Specific recommendations for the management of A. atratus var. inseptus in the Shoshone District BLM can be outlined as follows:

designate several Areas of Critical Environmental Concern or Natural Research Areas representative of habitats occupied by A. atratus var. inseptus, such as the Bliss site, an eastern Bennett Hills site (in the vicinity of Rattlesnake Creek) and a Macon Flat site.

continue coordination with the Boise Interagency Fire Center for monitoring A. atratus var. inseptus during and after the prescribed burn at Trestle Reservoir.

review grazing practices to prevent overutilization of allotments containing A. atratus var. inseptus.

devise a method for tabulating habitat loss for A. atratus var. inseptus, for use in evaluating future proposals for development, treatments and other use, which might impact the taxon.

investigate the use of A. atratus var. inseptus for range restoration projects.

maintain A. atratus var. inseptus as a "candidate" for federal listing until adequate data on reproductive processes and population trends are gathered for decision making.

Follow-up study on A. atratus var. inseptus should be actively encouraged and funded by the BLM. Future studies might focus on reproduction biology, seed dispersal, predation and germination. It would be advisable to set up permanent transects for monitoring over several seasons to acquire a more complete understanding of population dynamics and trends. Methods utilized by Lesica and Elliott (1987) in their study of A. scaphoides would also be appropriate for A. atratus var. inseptus. Data gathered during a moist year could be quite valuable for interpreting population trends. The continuing efforts of BLM personnel could be complemented by the use of specialists and volunteers.

The apparent palatability of A. atratus var. inseptus indicates that this taxon could be quite beneficial for wildlife in range restoration projects, particularly since it seems well adapted for the harsh conditions associated with the Bennett Hills and basalt flows of the Snake River Plain. Its potential for providing wildlife nutrition should be explored further.