



IDAHO BLM

**TECHNICAL BULLETIN**

THREATENED AND ENDANGERED SPECIES  
TRAINING AND INVENTORY PROJECT

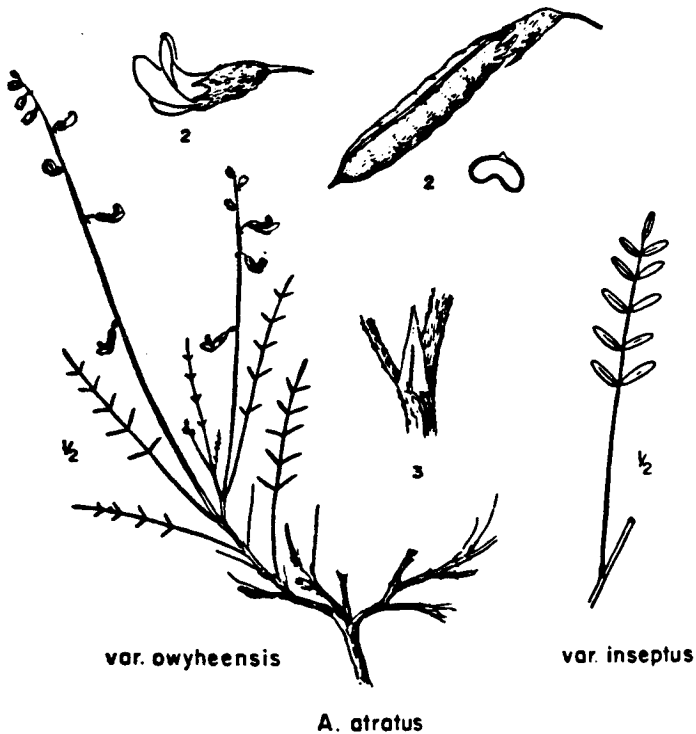
*Astragalus atratus* Wats. variety *inseptus* Barneby

prepared for

SHOSHONE DISTRICT  
BUREAU OF LAND MANAGEMENT

by

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Astragalus atratus Wats. variety inseptus Barneby



Photograph by Linda Parsons 1988

## TABLE OF CONTENTS

	PAGE
INTRODUCTION	1
TRAINING AND FIELD STUDIES	2
HISTORY AND RELATIONSHIPS	3
Geologic History	3
Related Taxa	3
Soil and Moisture Relationships	5
Associated Species	5
LIMITS OF RANGE	6
North	7
South	7
East	8
West	8
STABILITY OF THE TAXON	9
Health	9
Reproduction	9
Climatic Fluctuation	10
Predation	11
Destruction of Habitat	11
RECOMMENDATIONS	12
APPENDICES	
A. Range Map	15
B. Herbarium Data	16
C. Sources	20

## INTRODUCTION

Astragalus atratus var. inseptus has been designated as a Category Two Candidate Species for federal protection by the U.S. Fish and Wildlife Service. It has been placed in Category Two because more data were needed on the extent and the condition of its range prior to making a final determination on its status.

This taxon was reviewed by Eidemiller in the Threatened and Endangered Plant Inventory Report: Bennett Hills Environmental Impact Study Area prepared for the Shoshone District BLM in 1976. During the following year A. atratus var. inseptus could not be found even at known locations on Macon Flat (Eidemiller 1977). Although additional collections have been made since 1976, no clear understanding of the taxon's range emerged, which demonstrated the need for an up-to-date status survey.

Funding for the status survey was provided through Shoshone District BLM Purchase Order ID050-PH8-49. The status survey was undertaken by Lynda C. Smithman. The statement of work for the study contains the following elements:

1. Provide a key and field guide for identification of Astragalus atratus var. inseptus.
2. Provide field training to BLM personnel on identification of the species.
3. Make appropriate collections to document the species' range and curate them in the Harold M. Tucker Herbarium at the College of Idaho in Caldwell in accordance with standard herbarium procedures. Prepare at least two duplicates for the Shoshone District Herbarium.
4. Prepare two copies of a report detailing the following information for the species.
  - a) current range depicted on 1:100,000 scale maps (provided by the BLM);
  - b) plant community and soil associations;
  - c) threats to the species existence;

- d) recommendations for management of the species on public lands;
- e) recommendations for the appropriate federal and/or state status.

## TRAINING AND FIELD STUDIES

Field reconnaissance for the status survey commenced 22 May 1988 and continued through 22 June 1988. Lynda C. Smithman was assisted in field by Carol Prentice, former Botanist Region III Idaho Department of Fish and Game, from 31 May through 3 June 1988. Shoshone District BLM staff members, who participated in field studies included Richard Mayberry and Linda Parsons. Ed Bottum, Region IV Idaho Department of Fish and Game, also participated in field studies. Ann De Bolt, Botanist with the Boise District BLM, and Roger Rosentreter, Botanist with the State BLM, provided valuable field assistance.

Reconnaissance efforts included documenting the occurrence of A. atratus var. inseptus through collection of vouchers as well as characterization of the habitat and investigation of predation or other threats. Emphasis was placed upon gathering more data on the limits of range and re-examining selected known sites to evaluate condition and assess threats. Unpublished data from winter range studies conducted by the Idaho Department of Fish and Game in 1975 and 1976 provided an excellent framework for documenting the range of A. atratus var. inseptus.

Additional field training for Shoshone District BLM staff took place 21 June 1988. Site visits were made to Macon Flat and to Trestle Reservoir near Magic Dam. Participants were familiarized with A. atratus var. inseptus, its habitat preferences and its associated species. Seeds were collected for further studies. BLM Wildlife Biologists, Range Conservationists and other field personnel generously shared observations and insights on the status of A. atratus var. inseptus and its habitat, based on their experiences in the Shoshone District BLM.

All collections of A. atratus var. inseptus and its associated species were taken to the Harold M. Tucker Herbarium at the College of Idaho in Caldwell, Idaho, for identification and confirmation. These collections are being curated in accordance with standard herbarium procedure and as part of the herbarium's permanent record system are available for review.

The field guide and key for A. atratus var. inseptus have been enclosed in the report packet. Maps, which depict the current range on 1:100,000 scale are also attached. Three duplicate collections of A. atratus var. inseptus have been submitted to the Shoshone District BLM Herbarium. A complete list of all currently documented locations is contained in Appendix B of this report.

## HISTORY AND RELATIONSHIPS

### Geologic History

Astragalus atratus var. inseptus, is endemic to the Snake River Plains of southern Idaho. Physiographically this region is situated within the Columbia Plateau Province, but floristically this region belongs to the Great Basin Section of the Intermountain Region.

The portion of the Snake River Plains, which is occupied by A. atratus var. inseptus is generally composed of shallow soils over basalt. According to the Bureau of Mines (1978) the basalts include both recent unweathered flows and Middle Pliocene flows, while the Thorn Creek region contains Pliocene tuff. Smith (1966) in his study of the Bennett Hills characterizes a large portion of the Thorn Creek region as composed of broken red basalt.

The soils occupied by A. atratus var. inseptus did not exist before post-glacial times, about 10,000 years ago (Harris in Packard & Smithman 1984). The ancestral stock probably migrated northward from more southern parts of the Great Basin during the last glacial period. The migrating stock may have had no marked soil preference, but A. atratus var. inseptus adapted to the new clay soils (Packard & Smithman 1984). These new thin, clay soils, which are wet in the spring, are characteristic of the Bennett Hills and the Camas Prairie.

### Related Taxa

A. atratus var. inseptus can be characterized as a rather wiry, depauperate appearing member of the genus Astragalus, which flowers from May through June. Although the whitish petals tinged with pale lilac are somewhat inconspicuous, the red mottled pods are quite distinctive.

This taxon occurs primarily within the Shoshone District Bureau of Land Management (BLM). It was originally collected by Barneby (Ripley & Barneby 10673) near Fairfield in Camas County, Idaho, during the field season of 1951. Barneby later described the taxon as a separate variety; the description was published in Vascular Plants of the Pacific Northwest (Hitchcock et al 1961).

Unfortunately not all of the duplicates shared with various herbaria in the region have been annotated, which causes considerable confusion in demarcating the ranges of A. atratus var. inseptus and A. atratus var. owyheensis. It also appears that a few collections have been confused in the past with similar taxa and that these duplicates have not uniformly been annotated. In an effort to dispel some of the confusion, which has complicated past literature searches Appendix B contains a current compilation of herbarium data.

It is believed that A. atratus var. inseptus is derived from A. atratus var. owyheensis. There are several subtle morphological differences between the two varieties:

	var. <u>inseptus</u>	var. <u>owyheensis</u>
terminal leaflet	jointed to rachis	confluent with rachis
leaves	linear oblong	linear & more reduced in size
pod texture	leathery	papery

Barneby (1982) states that in Gooding County, Idaho, A. atratus var. inseptus passes into and may not be taxonomically distinguishable from A. atratus var. owyheensis.

There may be some differences in habitat; A. atratus var. inseptus is associated with stony flats and clay soils in the Bennett Hills, while the more widespread A. atratus var. owyheensis is associated with deeper soils on sagebrush hillsides in northeast Nevada, southeast Oregon and southwest Idaho. A. atratus var. mensanus is restricted primarily to Inyo County, California, while var. atratatus occurs in central and north-central Nevada.

According to Packard (unpublished status report) A. obscurus occupies a niche similar to the niche occupied by A. atratus var. inseptus in the Bennett Hills. A. obscurus is also found in the western portion of the Bennett Hills. The attached field guide contains a key for differentiating

several similar appearing taxa: A. atratus var. inseptus, A. atratus var. owyheensis, A. convallarius, A. miser, A. mulfordiae, A. obscurus, A. oniciformis, A. salmonis and A. yoder-williamsii.

### Soil & Moisture Relationships

Astragalus atratus var. inseptus has a marked affinity for clay soils. The soils range from rather dense clay primarily in the north to clay loam in the south. Although this taxon is usually found in flats and on plains, it also occurs on gentle slopes. Shallow clay over basalt is characteristic of almost all of the range, however, the soils may be a little deeper on the sloped sites. In the southern portion of the range A. atratus var. inseptus is sometimes found on north facing slopes. At higher altitudes in the north the aspect may vary, but the slope is always rather gentle. Elevations range from 2925 feet in the south to 5600 feet in the north.

The climate for the Snake River Plains consists of cold winters and hot dry summers. According to Eidemiller (1976) the mean annual minimum is 36 degrees Fahrenheit at Gooding and 26 degrees Fahrenheit at Fairfield; the mean annual maximum is 63 degrees Fahrenheit at Bliss and 57 degrees Fahrenheit at Fairfield. She also noted that the annual precipitation is 8.5 inches at Bliss and 16.3 inches at Fairfield. Eidemiller found that 70 percent of the moisture occurs as snowfall, while only 27 percent occurs as rain between April and July.

The preference of A. atratus var. inseptus for clay soils may indicate drought tolerance. Clay binds water tightly to the clay particles, which means that water is not available to the plants (Packard & Smithman 1984). At higher elevations, where rain may be in excess to the ability of clay to bind water A. atratus var. inseptus reaches its upward limit of tolerance. Severe playa-like sites which retain surface water in the spring, but dry out during the summer are devoid of A. atratus var. inseptus. Sandy soils may also have too much water available to the plants and therefore are not suitable habitat for this taxon. At lower elevations, such as the Bliss site, A. atratus var. inseptus may tolerate clay loam soils, perhaps, because there is less rainfall.

### Associated Species



A. atratus var. inseptus is frequently, but not always, associated with mound intermound complexes, which form Artemisia mosaics. At lower altitudes the taxon occurs with A. tridentata ssp. wyomingensis and A. arbuscula, while at higher altitudes it occurs with A. tridentata ssp. vaseyana and A. longiloba. In the eastern and southern portions of its range it is sometimes found in pure stands of A. tridentata ssp. wyomingensis, such as the Hobdey Spring site in the Clover Creek drainage. At the Bliss site individual A. tridentata ssp. wyomingensis tend to be dwarfed and thus, the contrast in shrub heights gives the impression of a mosaic.

There seems to be a beneficial relationship with Artemisia. Tall flowering stems grow upright inside the shrub, which protects the fruit from predators. But the chances of successful reproduction in this situation are tempered by seed falling into an area where it must compete with grasses and other species which also seek association with Artemisia.

Species associated with Astragalus atratus var. inseptus in the southern portion of the range include: Allium acuminatum, Aster scopulorum, Antennaria dimorpha, Blepharipappus scaber, Lomatium sp. and Poa sandbergii.

In the northern portion of the range A. atratus var. inseptus occurs in conjunction with species that are endemic to the Bennett Hills and also have some affinities with the Owyhee highlands. These species include Artemisia papposa, Eriogonum thymoides, Balsamorhiza hookerii, Viola beckwithii, Penstemon cusickii, Haplopappus stenophyllus, Arabis holboellii, Erigeron bloomeri and Trifolium macrocephalum.

#### LIMITS OF RANGE

Astragalus atratus var. inseptus occupies a rather restricted area from the base of the central Idaho mountains south to the Snake River, an area where more typically Great Basin species have come in following severe climatic conditions. From the western Bennett Hills it extends eastward to the Little Wood River.

Although A. atratus var. inseptus occurs in Blaine, Camas, Elmore, Gooding and Lincoln Counties, Idaho, it is by no means widespread, for its range is quite discontinuous. While the taxon may give the appearance of being "locally abundant", it actually constitutes only a trace to one

percent of ground cover, where it occurs. The populations are often difficult to relocate, even during the same field season.

During May and June of 1975 and 1976 personnel with the Idaho Department of Fish and Game recorded observations on A. atratus var. inseptus, while they conducted the Mule Deer Winter Range Study in the Bennett Hills. Approximately 986 acres were surveyed and community descriptions were prepared. Of the sites surveyed A. atratus var. inseptus occurred only in 21 out of 215 total sites. These 21 sites comprised about 42.5 acres. The percent of ground cover provided by A. atratus var. inseptus ranged from a trace to one percent, thus it could be roughly estimated that this taxon occupied .23 acres of the 986 acres surveyed. Although these estimates are only approximate, the extrapolated data indicate that A. atratus var. inseptus comprised less than 1% of the sampled acres in the region.

#### North

The clay soils of the Bennett Hills, Camas Prairie and Macon Flat comprise the northern habitat for A. atratus var. inseptus. At one time the populations may have been rather continuous across the plains south of the Timmerman Hills to the Little Wood River. The Idaho Batholith creates a definite northern boundary for the taxon.

At higher altitude sites such as Mud Spring (5600 feet) in Camas County, there is increased precipitation and cooler temperatures, which may favor an extended flowering and fruiting season. But at these altitudes there is a heavier stand of vegetation, which seems to exclude the open niches required by A. atratus var. inseptus.

The populations observed on the rocky tablelands of Rattlesnake Creek and tributaries of Thorn Creek seem to be more extensive than the Mud Springs population, particularly in the elevation ranges of 5000-5400 feet. Conditions appear more severe and there are significant interspaces between the shrubs, so that A. atratus var. inseptus has less competition.

#### South

In these areas there is less rainfall, higher temperatures

and possibly a higher rate of evaporation, than in the north. The flowering and fruiting season appears to somewhat shortened due to lack of summer rain. Numerous clay slopes and flats exist in the southern portion of the range, but many of these do not support A. atratus var. inseptus. This portion of the range has been interrupted with improvement programs as well as fire, which has resulted in the removal of native vegetation. Competition from Agropyron cristatum and Bromus tectorum may retard the re-establishment of A. atratus.

Densities vary among the rather discontinuous populations in the south. For example only a few traces of A. atratus var. inseptus were observed near Hobdey Spring in the Clover Creek drainage, yet a ridgetop site near Bliss provides one of the healthiest populations within the entire range. Near Little Canyon Creek in Elmore, County, A. atratus var. inseptus was observed in a small shrub enclosure, which was cleared in the spring of 1987.

#### East

The Little Wood River appears roughly to serve as an eastern boundary. From this point A. oniciformis replaces A. atratus var. inseptus on the sandier soils eastward across the Snake River Plain. Fire has destroyed many acres of native vegetation south of the Timmerman Hills. Although there are a few locations where A. atratus var. inseptus is attempting to re-colonize these burned areas, the populations numbers are small and the progress seems slow.

Population densities of A. atratus var. inseptus vary among the sites which contain native vegetation. Several sites were field checked, which have native shrubs, but are almost entirely lacking in native grasses and herbs. A. atratus var. inseptus was conspicuously absent. Some of the grazing allotments in this area habitually receive greater than 60 percent utilization, which may explain the absence of A. atratus var. inseptus. Where diversity remains, there are healthy populations of A. atratus var. inseptus.

#### West

Little Canyon Creek and Bennett Mountain in Elmore County, Idaho, provide a western boundary for the range for A.

atratus var. inseptus. Although there continue to be suitable sites with clay soil and native vegetation at low to middle elevations A. atratus var. inseptus appears to be replaced by A. obscurus in the west. At higher elevations the granitic substrates associated with Bennett Mountain appear to provide an effective barrier for further westward distribution of A. atratus var. inseptus.

## STABILITY OF THE TAXON

### Health

During the 1988 field season very little decadence among the various populations of A. atratus var. inseptus was observed; examples of necrosis seemed to be associated with insect predation. The taxon may be a rather short lived perennial. Rather premature withering of the leaves and aborted inflorescences were noted, which may have been drought related. No chlorotic individuals were observed. Field observations made during a year with more moisture would be helpful for developing a better understanding of the taxon's health and ability to regenerate. The taxon's ecological amplitude appears to be rather restricted.

### Reproduction

Eidemiller (1976) indicates that the growing season has 153 days at Bliss and 121 days at Fairfield. Lack of summer rainfall abbreviates this potential season for A. atratus var. inseptus. During 1988 the author noted a somewhat shorter season at lower altitudes than with the northern counterparts. At lower elevations there seemed to be only one flowering and fruiting, while the availability of early summer rain at higher altitudes in the north enabled the plants to have an extended or perhaps second flowering and fruiting cycle.

Reproductive effort in A. atratus var. inseptus appears to be by seed. According to Packard (unpublished status report) this plant fits the stereotype of a self pollinated species. For example it has inconspicuously colored, small corollas, which are generally closed. Individual plants are strikingly uniform. Autogamy or self pollination is considered to be an advanced or derived condition, which