

***BROMUS TECTORUM* IN SUMMERHAVEN, MT. LEMMON,
SANTA CATALINA MOUNTAINS, PIMA COUNTY, ARIZONA**

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Introduction

The writer was asked to survey for *Bromus tectorum* (cheatgrass, downy cress, downy brome) in the village of Summerhaven to determine its current distribution. In the aftermath of the 2003 Aspen Fire, the community is concerned about the potential of the grass to produce a large and highly flammable biomass that readily carries wildfire.

Description of *Bromus tectorum*

Bromus tectorum is an annual grass up to twenty-four inches high with one or more, usually erect, culms (stems) per plant. The spikelets hang down from a nodding panicle (flowering spike). Unlike perennial grasses typical of Mount Lemmon's higher elevations, in optimal conditions cheatgrass germinates in the fall, grows throughout the winter, and dies by mid-July.¹ Introduced from Europe in the 1890s, cheatgrass was described by Gould (1951) as a weed of waste places and disturbed soils that is now common throughout most of the country.² The Northern Arizona University *Forage Grasses* web page notes: "Despite its early growth and rich color, cheat grass is unpalatable to sheep and other livestock, which tend to overgraze native plants when it begins to prevail."³

Roughly circular clumps of many individuals, with prostrate to ascending stems (less than 45° from horizontal) are common in Summerhaven. Two clumps found at the end of a guard rail on East Upper Goat Hill Road at the intersection with North Sabino Canyon Park Road were eighteen and twenty-four inches across with basal diameters of six and eight inches, respectively. Blooming plants only two inches high were found frequently. The tallest plant, located at the Waste Water Treatment Facility, was eighteen inches high. When the grass dies, it sometimes forms a thatch of up to one half inch deep which may help conserve moisture for the next season's growth; this thatch does not appear to impede germination. Like red brome, cheatgrass develops a distinctive reddish cast as seeds mature. During the survey, numerous small clumps were found that had new growth arising from the base of plants that had either been

¹ Northern Arizona University Web Server. Forage Grasses of the Colorado Plateau Cold Desert. <http://jan.ucc.nau.edu/plants-c/forage/>

² Gould, Frank W. 1951. *Grasses of the Southwestern United States*. The University of Arizona Press, Tucson, p. 52.

³ NAU Web Server, op. cit.

browsed down to a height of about an inch or had been killed back during freezing temperatures. This characteristic, as well as its clumping habit, can make the grass appear to be perennial.

Historic and current locations in the Santa Catalina Mountains

A search of herbarium specimens at the University of Arizona, Arizona State University, and Northern Arizona University indicates that the species was first collected in the Santa Catalina Mountains in 1976 at Lemmon Creek, ⁴ three miles from road, ⁴ at 8400 feet elevation. Subsequently, four collections were made in Bear Canyon in 1983, 1984, 1992, and 1995. Other than specimens collected during this survey, no other Santa Catalina Mountain specimens are included in these herbaria.⁴

Following the Aspen Fire, a large population of cheatgrass was observed in Summerhaven, primarily in the area of the public restrooms. On public lands, the grass was found at numerous locations, including Loma Linda Picnic Area, Palisades Ranger Station, Middle Bear Canyon Picnic Area, Mount Bigelow; and along the road leading to Marshall Gulch.⁵ Except for the Bear Canyon population, it seems likely the current ⁴ infestation ⁴ in Summerhaven resulted from fire-fighting vehicles contaminated with cheatgrass seed; construction vehicles have likely further spread the seed during the rebuilding process. The U.S. Forest Service is aware of the locations on public lands and has made efforts to control the grass there; continuing action is planned this year. A major concern of the Forest Service is preventing spread of the grass into lower Sabino Canyon via waterways.⁶

Survey method

Field trips were made May 3, 8, 10 and 15, 2006. All roads in Summerhaven were either driven or walked and selected private parcels were surveyed. Binoculars were used where feasible to search for the grass on posted parcels.

⁴ Specimens were collected in the Rincon Mountains at Spud Rock Cabin, elevation 7400 feet, in June 1976 and May 1982.

⁵ The writer discovered another roadside population at Showers Point on Organization Ridge (downhill from Palisades Ranger Station) during the current survey.

⁶ Heidi Schewel, U. S. Forest Service, personal communication, May 8, 2006.

***Bromus tectorum* sites in Summerhaven**

The largest population of cheatgrass, seen on May 3, 2006 at the location of the future community center, was fortuitously buried under several feet of fill by the time of the next field trip. It seems highly unlikely that any mature seed present would be able to grow through the compacted fill dirt. Plants on the south side of East Turkey Run Road opposite the first house were also destroyed by the construction activity. Most populations found during this survey were growing on roadsides in full sun, in soil types ranging from loam to sand. Sites in Summerhaven where *Bromus tectorum* was found on or after May 8, 2006 are described below.

Site 1. *N 32° 26.601' W 110° 45.596'* East side of North Sabino Canyon Park Road beginning at the south end of the guard rail to the first drive north of the General Store. All plants seen were pulled up on May 10, 2006.

Site 2. *N 32° 26.627' W 110° 45.499'* Cabin site on east side of North Tucson Avenue above masonry barbeque structure (across from Hanks= residence). Most plants were inside the foundation. The location strongly suggests seed was transported by foot traffic. All plants seen were pulled up on May 10, 2006.

Site 3. *N 32° 26.517' W 110° 45.561'* Southeast end of bridge on East Upper Goat Hill Road at North Sabino Canyon Park Road. The two large clumps described above were found here. All plants seen were pulled up on May 10, 2006.

Site 4. *N 32° 26.344' W 110° 45.602'* Pima County Waste Water Treatment Facility. Most plants are located on the west and north sides of the building. No cheatgrass was seen along the drainage immediately south of the facility. Plants could be removed by hand grubbing or with herbicide. Specimens were given to an employee to assist in future identification.

Site 5. *N 32° 26.478' W 110° 45.297'* West side of road, across from 12711 North Upper Loma Linda Road. Many small blooming plants are found in a patch less than two feet wide, starting from across from the house number sign to just beyond the north end of the drive. Because of the number of small plants, treatment with a herbicide would probably prove most effective if it can be applied before seeds mature or if the herbicide kills the seed.

Site 6. *N 32° 26.653' W 110° 45.391'* South side of road, beginning at south edge of drive at 11450 East Florence, west to lower end of second driveway. Because of the number of small plants, treatment with a herbicide would probably prove most effective if it can be applied before seeds mature or if the herbicide kills the seed.

Site 7. *N 32° 26.572' W 110° 45.568'* Flower bed in front of the General Store. The owner of the business is aware of the problem with cheatgrass and asked for

specimens to assist in identification for continued eradication efforts. All plants seen were pulled up on May 10, 2006.

Site 8. $N 32^{\circ} 26.394'$ $W 110^{\circ} 45.824'$ Eight plants at 11051 East Carter Canyon Road. All plants seen were pulled up on May 10, 2006.

Site 9. $N 32^{\circ} 26.704'$ $W 110^{\circ} 45.659'$ In front of second residence on north side of East Turkey Run Road and on south side of road from west edge of residence to lower edge of driveway. Given the number of plants, treatment with herbicide would probably prove most effective if it can be applied before seeds mature or if the herbicide kills the seed.

Site 10. $N 32^{\circ} 26.768'$ $W 110^{\circ} 45.786'$ North side of road across from 11090 East Turkey Run Road. Cheatgrass is very common in a patch about fifty feet long. Several plants that were going to seed were pulled up on May 10, 2006. Given the number of plants, treatment with a herbicide would probably prove most effective if it can be applied before seeds mature or if the herbicide kills the seed.

Site 11. $N 32^{\circ} 26.531'$ $W 110^{\circ} 45.622'$ Two plants in lot next to and south of 12816 North Phoenix Avenue, approximately 65 feet from the street. Both plants were pulled up on May 15, 2006.

Site 12. $N 32^{\circ} 26.536'$ $W 110^{\circ} 45.630'$ Many plants in front yard of 12816 North Phoenix Avenue, all of which were eradicated on May 15, 2006. The owners were informed of the potential problem posed by cheatgrass and said they would pull it up whenever they saw it on their property. Photographs of plants were taken by the home owner for future identification.

Site 13. $N 32^{\circ} 26.691'$ $W 110^{\circ} 45.293'$ Numerous plants in recently disturbed soil within ten feet of the east side of the house at 12938 North Upper Loma Linda Road. All were pulled up on May 15, 2006.

Site 14. $N 32^{\circ} 26.830'$ $W 110^{\circ} 45.337'$ Numerous plants in the parking area/driveway in front of 13055 North Upper Loma Linda Road. (None was found at nearby construction sites.) All plants were eradicated on May 15, 2006.

Other non-native grasses on Mt. Lemmon

A single specimen of *Schismus barbatus* (Mediterranean grass) was collected on May 3, 2006 on the west side of North Phoenix Avenue, approximately fifty feet south of East Upper Goat Hill Road, at 7880 feet, an elevation record. Because of its small size and often prostrate habit, this species is not considered a fire threat. On May 10, 2006 *Bromus rubens* (red brome, foxtail brome, foxtail cress) was collected at the entrance to Loma Linda Picnic Area at 8000 feet, another elevation record. Numerous plants were

found in disturbed soil between the sign and the entrance. Red brome is known to carry fire in central Arizona and is considered a major threat where established. The presence of these species on Mount Lemmon is indicative of the mild winters the area has experienced in recent years; whether these species persist on Mount Lemmon will depend in large part on climatic conditions.⁷ A third non-native grass, *Bromus diandrus* (ripgut brome), was collected on May 15, 2006 just south of the entrance to Loma Linda Picnic Area at 8000 feet elevation; only two clumps were seen and both were eradicated. This grass is better known from northern Arizona and is likely to do well in this habitat.⁸

Conclusions

Although *Bromus tectorum* was found in only fifteen sites in Summerhaven during the current survey, these locations are widely distributed. The primary vector for spread of cheatgrass appears to be motor vehicles, but there is evidence foot traffic also plays a role. This indicates the potential habitat for the grass includes all roadsides and most private land, particularly since, as Gould noted, cheatgrass likes disturbed soils.

Eradication of cheatgrass in Summerhaven must be regarded as a long-term project. No matter how diligent the [attack](#) may be, continued efforts over many years will undoubtedly be necessary to accomplish the task. It seems certain that the population of cheatgrass is much reduced this year because of the current drought. One observer, for example, noted that the grass was abundant and widespread along North Upper Loma Linda Road last year.⁹ The seed bank undoubtedly remains, however, and a winter with mild temperatures and normal moisture will in all likelihood result in a population [explosion](#).

Of particular concern is the discovery of both *Bromus diandrus* and *Bromus rubens* in the immediate Summerhaven area. Like cheatgrass, both are annuals that can produce considerable biomass which is highly flammable when dry. If these grasses become established, they can produce a fire threat equal to *Bromus tectorum*.

⁷ The writer has collected *Eragrostis cillianensis* and *Eragrostis lehmanniana* above 7200 feet elevation on Mount Kimball, Santa Catalina Mountains. Both are elevation records. The latter has persisted for several years in spite of eradication efforts.

⁸ Several collections of *Bromus diandrus* (= *B. rigidus*) were made in the Tucson area as early as 1903. The first collection in the Santa Catalina Mountains appears to have been in Peppersauce Canyon Campground in 1973. The only other Catalina location is Sabino Canyon (collected October 2005).

⁹ Ed Gilbert, University of Arizona Herbarium, May 9, 2006.

Recommendations

1. Surveys and eradication efforts should be conducted on a yearly basis. Efforts should be focused not only on *Bromus tectorum* but also on *B. diandrus* and *B. rubens*. Such surveys could be conducted by volunteers with relatively little training. Two or three individuals could complete a survey of the community in a day or less.

2. Because the grass can bloom at only two inches in height, hand grubbing is not always the most efficient and effective means of eradicating it. Herbicides should be considered in areas in which cheatgrass grows thickly or where there are many small plants. The window of opportunity in the use of herbicides to kill the entire plant is quite narrow since it appears the grass can bloom and go to seed in two to three weeks. It is not known whether applications of herbicides after seeds have matured will effect seed viability.

3. Cheatgrass along the highway from Bear Canyon to Summerhaven will in all likelihood provide a continuing seed source for many years to come. Eradication of the grass on private land will not be complete as long as populations persist in Coronado National Forest. It certainly seems in the interest of Summerhaven residents to assist the Forest Service, to the extent possible, in its efforts to control invasive, non-native grasses.

4. The presence of cheatgrass along roads maintained by Pima County and at the Wastewater Treatment Facility indicates that the County must play a significant role in any eradication efforts.

5. A continuing education effort directed at residents of Summerhaven is essential if the grass is to be located and eliminated on private property. Given the relatively small size of the community, control is certainly possible. Photographs of the species of concern (even of herbarium specimens) would probably be sufficient for identification since all three non-native bromes are distinctive and are reproductive in the spring.