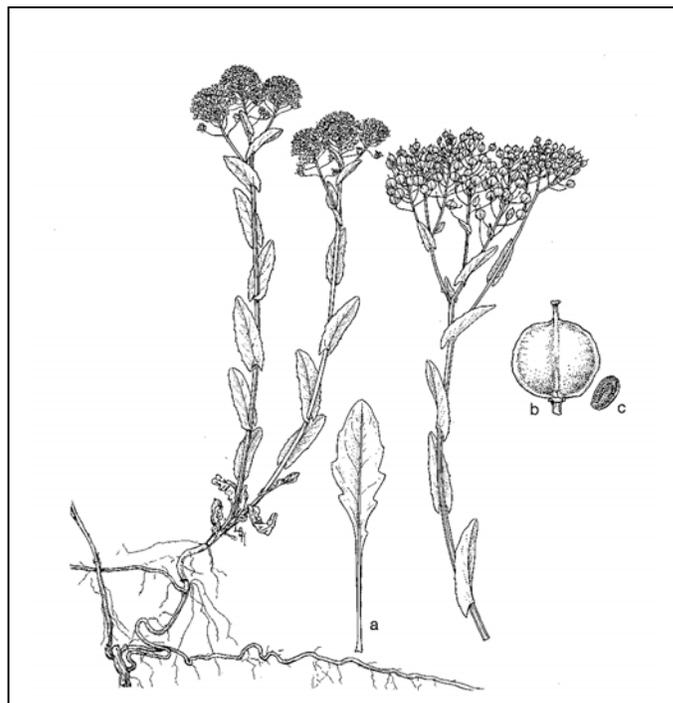


HOARY CRESS (WHITETOP) Cardaria draba

Life History/Identification:

Hoary Cress is one of several species in the mustard family of the genus *Cardaria* that are recognized as exotic invasive plants. The species is a deep-rooted perennial that can grow up to 2 feet tall with creeping rhizomes. The leaves are grayish-green in color and have the shape of an arrowhead. The leaves are also covered with fine hairs that feel soft to the touch. Lower leaves often taper to a short stem that attaches to the crown near ground level. Hoary Cress, however, is distinguished by its flowers, white with four petals, which are clumped at the tops of the stems giving the plant a distinctive flat-looking appearance. Reproduction occurs from seeds or from buds on underground rhizomes. The seedpods of hoary cress look like small hearts, and contain two oval, reddish-brown seeds. Lateral roots spread and produce new rosettes and flowering shoots as well. The rosettes of whitetop emerge very early in the spring and the mature plant sets seed by mid-summer. A single plant can eventually form a large colony, producing a dense monoculture similar to leafy spurge. Hoary Cress prefers alkaline soils and disturbed sites, including excessively grazed areas. Potential habitat includes fields, meadows, pastures, and waste areas, and is often found in areas dominated by other exotic species.



Northern Arizona Localities:

Hoary Cress is recognized as a restricted noxious weed in the state of Arizona, presently there are isolated small infestations around Flagstaff. Small infestations of whitetop have been sighted in a pull-off of FH3 near Mormon Lake and on the Rio de Flag near Northern Arizona University. There are several populations growing with Russian knapweed in the Verde Valley.

Origin & Impacts:

Hoary Cress is native to Central Europe and Western Asia. Apparently introduced as a contaminant in discarded ship ballast, by 1889 it grew near seaports on the East and West coasts of the United States. Despite its designation as a noxious weed in the laws of most western states, it has become a familiar roadside plant throughout the country. Hoary Cress is very aggressive and will eventually displace native species in areas where it occurs. It is found to be especially invasive to rangeland, field crops, and vegetable crops. In the absence of a competitor, a single plant can spread over an area 12 feet in diameter in one year. The species also contains compounds known as glucosinolates, which can be toxic to cattle. These compounds are mildly toxic to other animals but the foliage has adequate nutritional value to meet most of the dietary needs of animals, especially early in the season.

Control:

The prevention of new infestations of hoary cress is an effective and inexpensive method of control. Once a whitetop community becomes established, control becomes increasingly difficult due to the perennial root system, abundant seed production, and the diverse habitat of the plant. People and animals can spread seeds outside of the infested site. Driving should be discouraged in areas

where hoary cress is known to exist. Recreationists should be encouraged to inspect their clothing, animals, and gear and remove seeds and portions of the plant before leaving an area. Weed-free forage should be used for grazing animals.

Cultural Control:

Good perennial grass cover is one of the best methods of controlling an infestation by hoary cress. Undisturbed grass plants are able to compete with whitetop plants and keep them from becoming dominant members of the plant community. Careful monitoring of grazing activities in an area where hoary cress exists is necessary to ensure that the native grasses maintain vigor and dominance. Livestock grazing in contaminated areas during the flowering and seed of the plant can transport seeds in their feces, thereby generating new infestations. Animals should be held in a holding area for 10 to 14 days before being moved from an infested site to ensure that all seeds have passed through their digestive tracts.

Mechanical Control:

Cultivation can be used to control whitetop in fields if the land is tilled within 10 days of each emergence, beginning in the early spring. Because these weeds bloom in the early spring, even one cultivation before flowering will reduce the amount of seed produced that season. Repeated tilling is necessary, however, and there is some risk of growing new plants from the root segments. This method may be useful in agricultural settings, but it is not practical at a larger landscape level. Remember to clean all equipment before moving from an infested site. Hand pulling and grubbing is effective in controlling very small populations of hoary cress. Root grubbing is necessary. Removal of only the portions of the plant that are above ground will not result in control. To be successful, hand pulling and grubbing should be done within 10 days of plant emergence throughout the growing season, and continued for 2 to 4 years. Mowing can help control infestation by reducing seed production in existing plants, but it will not eradicate the existing populations. Flooding can control hoary cress because their seeds lose viability after being in wet soil for one month. Irrigation, however, if not done correctly, can help facilitate the spread of hoary cress by transporting seeds to new areas such as unattended ditch banks. Fire is probably not effective as a control method. With its extensive underground root system and high germination rate of seeds, it may actually be favored by fire. Reduction of competition from other species after a fire may also be favorable to whitetop.

Chemical Control *(Noted here are chemical control techniques that have been used in other areas. Always check with weed specialists or chemical suppliers before treatment to ensure correct dosage and application. Mention of these products does not imply endorsement by the USDA Forest Service, Northern Arizona Weed Council or The Nature Conservancy.):*

Hoary cress can be controlled with herbicides but it is a difficult and expensive process.

Successful control usually requires repeated applications with foliar herbicides applied during the rosette stage. Escort™ (chemical name: Metsulfuron) can be used on rosettes but it is ineffective after the plants start to bloom. 2,4-D is somewhat effective on mature plants.

Tordon 22K™ (chemical name: picloram) does not control hoary cress.

Biological Control *(No exotic species should be introduced into an ecosystem without extensive research into its long-term effects. Mention of the species below does not imply appropriateness for use in Northern Arizona.):*

There are currently no insects or pathogens approved for biological use on hoary cress.

Note: No single control method, or any one-year treatment program, will ever achieve effective control of an area contaminated with hoary cress. The perennial root system, abundant seed production, and diverse habitat of this plant require long-term cooperative integrated management programs and planning to prevent, contain, and reduce hoary cress infestations.

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Species Action Plan
Hoary cress (White top)
Cardaria draba (L.) Desv.

Life History/Identification: Hoary cress is a native of Eurasia. It may have arrived in the U.S. in the contents of ship ballasts. It has become a common roadside weed in many areas of the country. *Cardaria draba* is one of several species of the genus *Cardaria* that are recognized as exotic invasive plants. The species is a deep-rooted perennial up to 2 feet tall with creeping rhizomes. The plants have blue-green foliage. The lower leaves have stalks, and the upper leaves are two lobed and are clasping at the stem. The plants form many white four petaled flowers at the tops of the stems, giving the plant a flat looking appearance. Seeds are formed in small purplish globe shaped pods. The species can reproduce from seeds or from buds on underground rhizomes. Lateral roots spread and produce new rosettes and flowering shoots. A single plant can eventually form a large colony, producing a dense monoculture similar to leafy spurge. Seedling plants appear above ground in 5 to 6 weeks after planting. The seedling plant can begin forming lateral roots, and therefore begin cloning in 3 weeks after emergence. White top grows in disturbed and alkaline soils. Habitat includes fields, meadows, pastures and waste areas. Hoary cress is generally found in areas dominated by other exotic species.

Status: Hoary cress is recognized as a noxious weed on the Coconino, Kaibab and Prescott National Forests. It is a Restricted Noxious Weed on the Arizona Noxious Weed List. Restricted Weeds are known to occur in the state but have isolated infestations or very low populations.

Impacts: Hoary cress is very aggressive and will eventually displace native species in areas where it occurs. This can impact forage production and wildlife habitat. Hoary cress contains compounds known as glucosinolates, which can be toxic to cattle. These compounds are mildly toxic but the foliage has adequate nutritional values to meet most animals needs, especially early in the season.

Distribution:

Currently, there are a few populations of hoary cress known to exist in the Verde Valley.

Control:

Preventing new infestations of this species is one of the best methods of control. Disturbed sites offer good habitat for this species, while a healthy perennial grass community provides protection through plant competition. People and animals can spread seeds from infested sites. Driving should be discouraged in areas where hoary cress is known to exist. Recreationists should be encouraged to inspect their clothing, animals and gear and remove sees and plant parts before leaving an area. Weed free forage should be used for animals.

1. Cultural Control:

Good perennial grass cover is one of the best methods of controlling infestation by hoary cress. The grass plants are able to compete with hoary cress plants and keep them from becoming dominant

members of the plant community. Careful **monitoring of grazing activities** in an area where hoary cress exists would be necessary to ensure that the native grasses maintaining vigor and dominance. Livestock grazing in areas that are infested with hoary cress during flowering and seed set can transport the seeds in their feces. Animals should be held in a holding area for 10 to 14 days before being moved from the area to ensure that all seeds have passed through their digestive tracts.

2. Mechanical Control

Cultivation can be used to control hoary cress in cultivated fields if the land is tilled within 10 days of each emergence, beginning in the early spring. This method may be useful where the plants exist in agricultural settings but is not practical in National Forest lands. Repeated tilling is necessary, and there is some risk of growing new plants from root segments. Equipment should be cleaned before moving from an infested site.

Mowing can help control infestation by reducing seed production in existing plants but will not eradicate existing populations.

Hand pulling and grubbing is effective in controlling small populations. Root grubbing is necessary. Removal of only above ground portions of the plants will not result in control. To be successful, hand pulling and grubbing should be done within 10 days of plant emergence throughout the growing season and continued for 2 to 4 years.

Flooding can control hoary cress. Hoary cress seeds lose their viability after being in wet soil for one month. However, irrigation can help facilitate the spread of hoary cress by transporting seeds to new areas such as unattended ditch banks.

Fire is probably not effective in controlling hoary cress. With its extensive underground root system and high germination rate of seeds, it may actually be favored by fire. Reduction of competition from other species after a fire may also be favorable for hoary cress.

3. Chemical Control: *Noted here are chemical control techniques in use in other areas. Always check with weed specialists or chemical suppliers to ensure correct dosage and application. Mention of these products does not imply endorsement by the Northern Arizona Weed Council, San Francisco Peaks Weed Management Area, the USDA Forest Service, nor the Nature Conservancy. Currently the use of herbicides is not allowed on lands administered by the Coconino, Kaibab and Prescott National Forests. Always check with your local land manager before using herbicides on public lands.*

Hoary cress can be controlled with **herbicides** but control is difficult. Successful control usually requires repeated applications. Metsulfuron can be used on rosettes but is ineffective after the plants start to bloom. 2,4-D is somewhat effective, but Tordon 22K, a commonly used broad-spectrum herbicide does not control hoary cress.

Nitrogen fertilizer can be useful in stimulating grass growth therefore increasing plant competition.

4. Biological Control:

There are currently **no approved insects or pathogens** for use on hoary cress. **Plant competition** can be beneficial for the control of hoary cress. Perennial grasses are known to control hoary cress through plant competition. Some legume crops such as alfalfa can also provide control through plants competition. Alfalfa might be practical in agricultural areas but would be an introduced exotic in a wild land situation.

5. Integrated Control:

Effective control of noxious weeds usually involves the use of more than one method of control. All methods should be considered when establishing a treatment plan for a noxious weed population. For example, mowing followed herbicide treatment may provide better control of hoary cress than mowing alone.

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