



SCA Weed Management Plan

The Weed Management Plan for Spring Creek Association, Spring Creek, NV is herein provided. The Spring Creek Association, a home owners' non-profit corporation, is located in Elko County, Nevada. Land holdings include over 5,000 lots and parcels including residential and commercial properties, greenbelts, and roadside right-of-ways as well as large recreational properties including sports fields, marina, equestrian complex, and a campground bordering the Humboldt-Toiyabe National Forest.

In keeping with the requirements of NRS Chapter 555, it is the plan of the Spring Creek Association (SCA) to map, control, and monitor all noxious weeds found in the area and to work cooperatively with Spring Creek Region Cooperative Weed Management area, Inc. (SCRCWMA) and state/federal agencies/educational extensions to protect the natural resources in and surrounding our rural community.

Disclaimer: All information and chemicals are not intended to be a complete list of suitable chemicals. The reader is strongly encouraged to read and understand the label directions for the selected herbicide before application. Some of the products are long lasting and can damage subsequent desirable vegetation planted. The label will provide the information necessary to make an informed decision. **Brand names are provided for example purposes only. Other brands may also be licensed for use in Nevada. Information herein is offered with no discrimination. Listing a commercial product does not imply an endorsement by the authors, Spring Creek Association, or its personnel. Descriptions, control methods, and other information courtesy of University of Nevada Cooperative Extension and the Spring Creek Region Cooperative Weed Management Area.

SCA Rules & Regulations Regarding Noxious Weeds

EXCESSIVE BRUSH/WEEDS OR DEAD TREES/SHRUBS, NOXIOUS WEEDS: All structures must have a minimum clearance of fifty (50) feet void of excessive weeds, brush materials. Weeds over 12" in height and/or covering more than 50% of the property are considered excessive. Dead trees and/or shrubs are considered unsightly and shall be removed from the property. Noxious weeds shall be promptly removed from any lot, developed or undeveloped. The most common noxious weeds in this area are: Hoary Cress, several varieties of Thistle and Spotted Knapweed.

A complete list can be found at: http://agri.nv.gov/Plant/Noxious_Weeds/Noxious_Weeds_List/.

Nevada Statues Regarding Noxious Weeds

NRS 555.150 Control of noxious weeds by owner or occupant of land. Every railroad, canal, ditch or water company, and every person owning, controlling or occupying lands in this State, and every county, incorporated city or district having the supervision and control over streets, alleys, lanes, rights-of-way, or other lands, shall control all weeds declared and designated as noxious as provided in [NRS 555.130](#) in any manner specified by and whenever required by the State Quarantine Officer. [Part 1:174:1929; NCL § 414] — (NRS A 1961, 524; [1987, 1728](#); [1997, 480](#); [2015, 3588](#))

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PRIMARY FOCUS – NOXIOUS WEEDS

“Noxious weed” is a legal term used at the federal, state, and county level to identify and list plants that pose a significant threat to agriculture, the environment, recreation, and public health. Typically, noxious weeds are invasive non-native plants, that once established are not only difficult to control but spread aggressively. Nuisance weeds are common species that can be found throughout the State, and as such are very difficult to eliminate. They can cause significant economic losses, but are so biologically suited to Nevada that they cannot be eradicated. Table 1 provides a list of the major noxious weeds found within the SCA boundaries. Table 2 provides a list of the major nuisance weeds found in the area.

TABLE 1 – Noxious and Nuisance Weeds found in the SCA Community

| NOXIOUS WEEDS | | |
|----------------------|----------------------------|-------|
| Common Name | Scientific Name | Notes |
| | | |
| Russian knapweed | <i>Acroptilon repens</i> | |
| Spotted knapweed | <i>Centaurea maculosa</i> | |
| Canada thistle | <i>Cirsium arvense</i> | |
| Scotch thistle | <i>Onopordum acanthium</i> | |
| Musk thistle | <i>Carduus nutans</i> | |
| Dyer’s woad | <i>Isatis tinctoria</i> | |
| Leafy spurge | <i>Euphorbia esula</i> | |
| Poison hemlock | <i>Conium maculatum</i> | |
| Perennial pepperweed | <i>Lepidium latifolium</i> | |
| Hoary cress | <i>Cardaria draba</i> | |
| Western waterhemlock | <i>Cicuta douglasii</i> | |

TABLE 2 – Nuisance Weeds found in the SCA Community

| NUISANCE WEEDS | | |
|------------------|--------------------------------|-------|
| Common Name | Scientific Name | Notes |
| | | |
| Curlycup gumweed | <i>Grindelia squarrosa</i> | |
| Curly dock | <i>Rumex crispus</i> | |
| Bull thistle | <i>Cirsium vulgare</i> | |
| Cheatgrass | <i>Bromus tectorum</i> | |
| Bur buttercup | <i>Ranunculus testiculatus</i> | |

Noxious Weeds Overview



Russian Knapweed



Spotted Knapweed



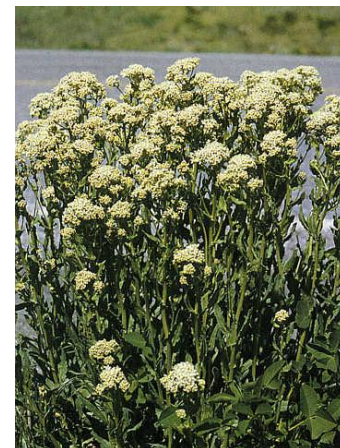
Leafy Spurge



Perennial Pepperweed AKA Tall Whitetop



Scotch Thistle



Hoary Cress ADA Short Whitetop

Noxious Weeds Overview Continued



Canada Thistle



Russian Knapweed



Musk Thistle



Dyers Woad



Poison Hemlock



Western Hemlock

RUSSIAN KNAPWEED

Background

It is an aggressive invader of pastures, non-crop areas, grain fields and other cultivated fields. In addition, the plant is poisonous to horses, causing chewing disease (equine nigropallidal encephalomalacia). Livestock may avoid this species.

Distinguishing Features

- **General Description:** Russian knapweed is a bushy, branched perennial, reaching 1 to 3 feet tall and forming clones or colonies from vigorous, deep, spreading rhizomes.
- **Flower Description:** Many flower heads, pink to purple in color. The outer bracts under the flower heads are greenish to straw colored and have a broad, papery tip.
- **Leaf Description:** Leaves at the base of the stem (basal leaves) are gray-green and lobed. Upper stem leaves are smaller with toothed edges or entire (smooth) edges.
- **Stem Description:** Stems are upright, branched and hairy. Young plants are whitish and woolly.
- **Fruit/Seed Description:** Seeds (achenes) are ivory white and have a feather-like plume (pappus).

Control Measures

General Control Strategy: Productivity can be maximized in less time if Russian knapweed populations are treated with a suitable herbicide, farmed, and seeded to a competitive forage.

Cultural Control: Depending on the moisture regime, nitrogen fertilizer applied in conjunction with an herbicide significantly improves the competitiveness of residual grasses. In addition, improved grazing management will significantly influence the life span of Russian knapweed control efforts.

Herbicidal Treatments



SPOTTED KNAPWEED

Background

Spotted knapweed, introduced from Eurasia as a contaminant in alfalfa and clover seeds, is one of the leading problem weeds in the United States. This biennial plant can dominate rangelands that receive less than eight inches of annual precipitation. Difficult to control because of its prolific seed production and early seedling emergence, it flourishes in areas with more moisture or at higher elevations where moisture is more reliable. It suppresses the growth of other plants by releasing inhibiting chemicals from its roots. Large plants may produce up to 25,000 seeds that remain viable in the soil for five years or more. Its seed survives rangeland fires to recolonize after the first moisture following the fire, before most native species. Consistently eliminating new seedlings is key to reducing the soil seed bank and controlling spotted knapweed. Missing one year of control will negate any previous efforts to manage it.

Distinguishing Features

- A rosette of small leaves appears the first year.
- Leaves are deeply lobed, 6 inches long, and up to 1 inch wide, particularly near the base of the second-year plant.
- Spotted knapweed develops a very deep root system.
- Spotted knapweed grows up to 4 feet tall the second year.
- Flowering stalks emerge from the rosette the second year.
- Flowers are pink to purple (occasionally white), solitary, up to 1 inch in diameter, and bloom from June to October.
- Seeds are brownish, less than 1/4 inch long, and have a short tuft of bristles at the tip.

Control Measures

Most Effective Strategy:

Once established, this plant is difficult to control. The most effective treatments combine herbicides, biological control agents, and cultural controls. Consistent, uniform herbicide applications in spring and early summer control rosettes and mature plants. Plant bare soil with competitive vegetation. Retreatment is necessary when new spotted knapweed seedlings emerge. A long-term effort must be continued until the soil seed bank is depleted.

Mechanical Control:

Persistent hand-pulling, before plants produce seed, controls small infestations. The entire plant must be removed. Properly dispose of flowering plants after removal. Repeated tillage, 7 inches deep, reduces spotted knapweed and encourages the growth of grasses. Fire may increase the establishment of this plant. Repeated mowing can reduce seed production if it is delayed until seeds are near maturity but before they reach full maturity and are viable.

Herbicidal Treatments

Either clopyralid or picloram.

TRANSLINE, 2,4-D



CANADA THISTLE

Background

Canada thistle is an aggressive perennial from Europe that has spread across North America. It occupies croplands, rangelands, waste areas and rights-of-way. Canada thistle adapts to most environments and forms large colonies that are difficult to control due to its creeping roots and long-lived seed that is easily spread by wind, animals, equipment, and as a contaminant of seed and feed. Mechanical control, tilling, plowing, or even mowing creates more plants from the adventitious roots. Infestations of Canada thistle significantly reduce land and crop values.

Distinguishing Features

- The ridged, branched stems grow 12 to 48 inches tall.
- The 1- to 8- inch-long leaves are irregularly lobed with spines at each lobe tip. Upper leaves are smaller than lower leaves.
- Purple to light pink flowers appear in July and August, forming clusters at the branch ends. The individual, erect flower heads are up to 3/4 inch across and have spineless bracts.
- The flat, 1/8 inch long, brown seeds have tufts of hair on the top.

Control Measures

Most Effective Strategy:

Canada thistle is difficult to control, especially in croplands. Seedlings are easily controlled, but once the deep roots are established, control is difficult. A combination of mechanical, cultural, and repeated applications of herbicides can decrease Canada thistle populations. Once this plant becomes established, eradication is virtually impossible and a long term management plan is needed.

Mechanical Control:

Frequent cultivation (at least every 21 days during the growing season) is effective but only when plants are seedlings or when new plants grow from root pieces. Repeated mowing in alfalfa and other forage crops controls Canada thistle.

Cultural Control:

Good sanitation practices when handling hay and livestock products or when transporting equipment help control seed spread. Intensive grazing by sheep or goats in its early stages of growth may reduce its spread. Mature Canada thistle is not palatable to livestock due to the spines on its leaves, so grazing's effect on established plants is minimal. Grasses and alfalfa can successfully compete with Canada thistle when good management practices are used, but alfalfa will not establish in an extensive infestation.

Biological Control:

There are 3 commercially available biocontrol agents for Canada thistle. They are the Canada thistle stem weevil (*Ceutorhynchus litura*), Canada thistle bud weevil (*Larinus planus*), and the thistle stem gall fly (*Urophora cardui*) that was released in 1977 in Elko County.

Chemical Control:

Clopyralid (Transline® or Stinger®)

Rate: Apply at 2/3 to 1 1/3 pints per acre or 4 to 8 ounces a.e. per acre. Use a nonionic surfactant at a rate of 1 to 2 quarts per 100 gallons of water carrier.

Time: Apply after most basal leaves have formed through flower bud formation.

CANADA THISTLE CONTINUED

Remarks: Clopyralid, a selective herbicide, effectively kills plants in the Asteraceae family but does not harm most plant species that compete with Canada thistle.

Caution: Use Transline® in noncroplands only and Stinger® in croplands, but do not rotate to any crop other than wheat, barley, oats, or grass for 1 year after treatment. Do not apply by airplane when a temperature inversion exists. Follow label directions. These products remains active in the soil and may contaminate water.

Picloram (Tordon®)

Rate: Apply Tordon 22K® at 1 to 2 pints per acre or 1/4 to 1/2 pound a.e. per acre. Lower application rates may require annual spot treatments. Control from a lower rate may be improved by tank mixing with 1 pound a.e. per acre 2,4-D.

Time: Apply when most basal leaves have emerged but before bud stage, or apply to regrowth in the fall. Apply Tordon 22K® at a rate less than 1 1/2 pints per acre (3/8 pounds a.e. per acre) only under favorable conditions and in combination with 1 pound a.e. per acre of 2,4-D. Retreatment may be required.

Remarks: Up to 4-years control of Canada thistle seedlings has been demonstrated in picloram research plots. Adjustment of the application rate will affect the selectivity of picloram. At the recommended rate, picloram will not damage established perennial grasses.

Caution: This restricted-use herbicide must be applied by, or its application supervised by, a certified applicator. Follow the label directions. Picloram remains active in the soil for a long time. Do not contaminate water.

Clopyralid plus 2,4-D (Curtail®)

Rate: Apply 2 to 4 quarts per acre or 0.19 pound a.e. clopyralid and 1 pound a.e. 2,4-D per acre or 0.38 pound a.e. clopyralid and 2 pounds a.e. 2,4-D per acre.

Time: Apply after most of the rosettes have emerged but before flower bud formation.

Remarks: Apply only in rangeland, pastures, and noncropland.

Caution: Do not permit lactating dairy animals or meat animals being finished for slaughter to graze treated fields within 1 week following treatment. Do not plant broadleaf crops in treated areas until an adequately sensitive bioassay shows no detectable clopyralid is present in the soil. Do not apply by airplane when a temperature inversion exists. Follow label directions. This product remains active in the soil and may contaminate water.

MCPA

Rate: Use 6 pounds a.i. per acre.

Time: Apply from the bud to early bloom stages of growth and again in the fall.

Remarks: Apply when weeds are young and continue treatment for 2 to 3 years. Apply in 20 to 100 gallons water carrier per acre.

Caution: Do not plant crops for 3 months following treatment. Use according to label instructions.

2,4-D amine or ester

Rate: Use 1 to 2 pounds a.e. per acre.

Time: Apply prior to flower bud formation. Repeated herbicide applications may be necessary during the growing season for newly germinating seeds. When Canada thistle is present in cereal crops, apply 2,4-D before the cereal crop reaches the boot stage.

Remarks: Annual treatments are needed to control Canada thistle seedlings or rosettes.

Caution: It is not lawful to apply more than 2 pounds a.i. per acre per year. Avoid drift to crops, especially with a volatile ester formulation. Follow the label directions. Do not contaminate water unless using a product specifically formulated for use in water.

CANADA THISTLE CONTINUED

Chlorsulfuron (Telar®)

Rate: Use 0.75 to 2 1/4 ounces per acre of chlorsulfuron (1 to 3 ounce of Telar® per acre).

Time: Apply during the prebloom to bloom stages of growth or late in the fall.

Remarks: Use a nonionic surfactant to increase the herbicide's effectiveness. In alkaline soils, above pH 7.5, reestablishment of competitive vegetation may be difficult due to residual herbicidal action on germinating seedlings.

Caution: Only apply to noncrop sites. Chlorsulfuron is a selective broadleaf herbicide that also affects many grasses. Follow the label directions, especially as they apply to herbicide persistence in the soil and effect on any competitive vegetation. Do not contaminate water.

Metsulfuron (Escort®)

Rate: Use 1/2 to 2 ounces per acre.

Time: Apply anytime plants are growing well.

Remarks: Suppression (reduced plant vigor and stand) is only achieved with full coverage. Escort® is not considered effective on Canada thistle, but can be tank mixed with other products to broaden the spectrum of weed control. Use a nonionic surfactant to increase the herbicide's effectiveness. In alkaline soils, above pH 7.5, reestablishment of competitive vegetation may be difficult due to residual herbicidal action on germinating seedlings.

Caution: Only apply to pasture, rangeland, and noncrop sites. Follow the label directions. Do not contaminate water.

Imazapyr (Arsenal®)

Rate: Apply 4 to 6 pints per acre.

Time: Use as a postemergence application only.

Remarks: Apply higher rates where dense or well-established infestations occur. Use a tank mix with Tordon®, Garlon®, Banvel®, Escort®, or Telar® to increase its effectiveness. Tank mixing with 2,4-D has resulted in reduced performance by Arsenal®.

Caution: Use on noncropland only.

Triclopyr (Garlon®)

Rate: Use 1 to 8 quarts per acre of Garlon 4® or 2 to 3 gallons of Garlon 3A®.

Time: Apply when plants are actively growing.

Remarks: Can be mixed with other products to increase effectiveness of both products.

Caution: Follow the label recommendations closely. Avoid water contamination, do not apply on irrigation ditches. At application rates of 2 quarts per acre or less, wait 7 days to harvest hay and 14 days to graze after application. At application rates of 4 quarts per acre, do not harvest hay until the next growing season.

Glyphosate (Roundup®, Landmaster™, Rodeo®, or Aquamaster™)

Rate: Use 1 1/2 pints to 2 quarts according to label rates plus 2 quarts of nonionic surfactant per acre.

Time: Apply when plants are actively growing, before flower bud formation.

Remarks: Glyphosate is a nonselective herbicide that kills most plants, including those that compete with new weed seedlings. Wait 10 days after treatment, then seed with locally adapted species.

Caution: Follow the label recommendations and precautions, especially for use in and near water.



SCOTCH THISTLE

Background

Scotch thistle is an aggressive plant from Europe and western Asia that has naturalized, often forming dense stands impenetrable by people, wildlife, and livestock. In Nevada, it grows along roadsides, fence lines, ditch banks, open dry areas, and in pastures. It is rarely found in gardens and cultivated fields. Scotch thistle may grow as an annual, biennial, or shortlived perennial. In most of Nevada, it grows as a biennial and produces a large, distinctive rosette in the first year. The second year, Scotch thistle produces many large, branched, winged stalks with smaller leaves, flowers, and seeds. Scotch thistle reproduces only from seed, which is dispersed by water, wind, equipment, animals and humans.

Distinguishing Features

- It grows more than 8 feet tall.
- During the first year, a rosette forms with leaves that can be 24 inches long and 12 inches wide.
- The second-year leaves are large, hairy, coarsely lobed, and have a velvet-gray appearance.
- The midrib of the leaves is white.
- The stems have very wide wings.
- The flowers are globe-shaped, 1 to 2 inches in diameter, upright, spiny, and violet to reddish in color.
- They are borne singly on branch tips from June to September.

Control Measures

Most Effective Strategy:

Scotch thistle is a biennial, so effective control can be achieved by destroying the plant during the rosette stage before seed development. The most effective treatments combine herbicides, biological control agents, and cultural controls. Consistent, uniform herbicide applications in spring and early summer control rosettes and mature plants. Plant bare soil with competitive vegetation. Retreatment is necessary when new Scotch thistle seedlings emerge. A long-term effort must be continued until the soil seed bank of Scotch thistle seed is depleted.

Mechanical Control:

Small infestations may be controlled by cutting the taproot below the soil surface or by hand-pulling the plant. Tillage kills the plant. Mowing makes the stand more uniform so that herbicide application is more effective but does not kill Scotch thistle. Mowing before seed development and dispersal will limit the amount of seed available for germination. Mowing is only recommended when used with a follow-up herbicide application.

Cultural Control:

Goats will graze Scotch thistle in the rosette stage, but sheep and cattle avoid the plant. Establish desirable vegetation to provide competition to Scotch thistle.

Biological Control:

There are currently no biological control agents available for Scotch thistle.

Chemical Control:

Picloram (Tordon®)

Rate: In the fall, apply Tordon 22K® at 1/2 to 3/4 pint per acre or 1/8 to 3/8 a.i. per acre. In the spring, apply 1/2 to 3/4 pint Tordon 22K® at 1/8 to 3/8 pound a.e. per acre plus 1.0 pound a.e. per acre 2,4-D.

Time: Apply at the rosette stage, before bolting, in the spring or in the fall prior to the soil freezing.

Remarks: Adjustment of the application rate will affect the selectivity of picloram. At the recommended rate,

SCOTCH THISTLE CONTINUED

picloram will not damage established perennial grasses.

Caution: This restricted-use herbicide must be applied by, or its application supervised by, a certified applicator. Follow the label directions. Picloram remains soil active for a long time. Do not contaminate water.

Clopyralid (Transline® or Stinger®)

Rate: Apply at 1/3 to 1 pint per acre or 2 to 6 ounces a.e. per acre. Use a nonionic surfactant at a rate of 1 to 2 quarts per 100 gallons of water carrier.

Time: Apply after the rosette's emergence and bolting stage of growth. The lower rate of 1/4 pint per acre provides acceptable control only when the plants are 3 to 6 inches tall.

Remarks: Clopyralid, a selective herbicide, effectively kills plants in the Asteraceae family but does not harm most plant species that compete with Scotch thistle.

Caution: Use Transline® in noncroplands only and Stinger® in croplands, but do not rotate to any crop other than wheat, barley, oats, or grass for 1 year after treatment. Do not apply by airplane when a temperature inversion exists. Follow label directions. These products remain active in the soil and may contaminate water.

2,4-D amine or ester and/or dicamba Rate: Use 1 to 2 quarts per acre or 1 to 2 pounds a.e. per acre.

Time: Apply prior to flower bud formation. Repeat herbicide applications may be necessary during the growing season to kill newly germinating seeds. When Scotch thistle is present in cereal crops, apply 2,4-D before the cereal crop reaches the boot stage.

Remarks: Annual treatments are needed to control Scotch thistle seedlings or rosettes.

Caution: It is not lawful to apply more than 2 pounds a.i. per acre per year. Avoid drift to crops, especially with a volatile ester formulation. Follow label directions. Do not apply near or over water unless using a product specifically formulated for use in water.



MUSK THISTLE

Background

It invades pastures and fields, crowding out desirable forage plants. Livestock will not graze in areas heavily infested with musk thistle, thus decreasing available pasture. It hinders stream bank access, and is problematic in grain fields.

Distinguishing Features

- **General Description:** Musk thistle is typically a biennial though may be a winter annual. It can grow up to 7 feet tall.
- **Flower Description:** Flowerheads mostly solitary and large, up to 3.1 inches across and nodding. Bracts under flowerheads are broad, some reflexed with a spiny tip. Each plant can have 50 to 100 flower heads.
- **Leaf Description:** Leaves are alternate, deeply lobed, spiny and may have some hairs on the underside leaf veins.
- **Stem Description:** Stems have spiny wings.
- **Fruit/Seed Description:** Seeds (achenes) are smooth and hairless.

Control Measures

General Control Strategy: Establishing a dense, well-maintained pasture is effective in preventing a musk thistle infestation.

Mechanical Control: Musk thistle can be dug or grubbed out.

Cultural Control: Cultivation in cropland will kill young musk thistle seedlings.

Biological Control: A seed eating weevil, *Rhinocyllus conicus*, is quite effective in reducing seed output.

Herbicidal Treatments



DYERS WOAD

Background

Dyers woad is a noxious weed that is gaining a foothold in Nevada. It is currently known to be growing in Elko County; however, it may occur in other locations and early detection is critical in any control program. Dyers woad is believed to have been imported by early colonist from Europe during the 1700's. It was probably imported as a source of deep blue dye or as a medicinal plant. It has been used since pre-Christian times and is still cultivated today by traditional Dyers and herbalists. Most land managers and users view dyers woad as an invasive, noxious weed that should be controlled. Since its introduction it has spread throughout much of the United States. It continues to spread rapidly through the Intermountain west displacing native plants and reducing wildlife and livestock forage on rangelands in eight western states. It is especially worrisome because it is able to invade healthy rangelands with or without disturbance. It can grow and thrive on a wide variety of sites.

Distinguishing Features

Dyers woad (*Isatis tinctoria* L.) can grow as a winter annual, a biennial or short-lived perennial. It is a member of the mustard family. It grows up to 4 feet tall, but is normally about 2 feet in height. The stems grow from a group of basil leaves and don't branch until the very top of the plant. The stem leaves are longer than they are wide, clasp the stem and are blue-green in color. They have a prominent crème colored midrib growing from the base of the leaf to its' tip. The leaves have smooth edges and no hair on them. Dyers woad produces abundant bright yellow flowers growing densely above the leaves. The flowers are small (about ¼ inch across) and numerous. They have 4 petals that grow in groups at the end of numerous stems. Each flower produces one seedpod of about ¾ inches in length, which are formed as the flowers fade. The pods start out green but turn to a shiny black or deep purple color as the age. Several pods grow on each stem and each pod contains one seed. Dyers woad begins growth in the fall as a small rosette of leaves. These rosette leaves have fine hairs growing and are widest near the tip. The stems grow from the middle of the rosette leaves and can grow up to 4 inches per day when conditions are right. It generally doesn't flower until the second year of its life. Flowering in spring or early summer, the bright yellow flowers are obvious and attractive to many observers. The black or purple pods are also very obvious in the early fall and help identify this plant.

Control Measures

Dyers woad has a deep thick taproot that can grow as long as five feet. It can resprout if it is cut off and reproduces easily from seed. Its rapid growth rate and wide adaptability make it a very effective competitor with all types of native vegetation. All of these factors make controlling dyers woad difficult.

Prevention: Preventing dyers woad from becoming established is the best control method of all. Vehicles, trains or infested hay, most often spread dyers woad. To prevent it from becoming established, closely watch roadways, railways and areas where hay is fed. Individual plants are easily controlled by the methods listed below. Immediate action is necessary to prevent the infestation from growing. Competition from other desirable plants is important in slowing the spread of dyers woad. Proper management techniques that benefit desirable plants are the first step in a control program. If dyers woad has displaced all other desirable plants, reseeding with adapted species after control measures have been implemented may be necessary.

Mechanical: Hand pulling, digging chopping or grubbing can be effective on smaller populations. The taproot must be removed below the crown of the plant or it will resprout. Seedling rosettes are the easiest plants to control with this method. Because of the taproot produced by dyers woad, multiple treatments over several seasons will normally be required to eliminate this plant.

Biological: Biological control means using a living organism to control a targeted weed. Unfortunately no animal or insect has been discovered which seems to prefer dyers woad to other plants. However a naturally occurring fungus is showing some promise in controlling dyers woad. The fungus, a rust known as *Puccinia thlaspeos* damages the plant enough to provide substantial control while not infecting any other plant growing nearby. The rust normally spreads slowly but researchers in Utah are actually spraying it to increase the rate of

infection. They dried and ground rust-infected dyers woad plants, which were mixed in a solution for spraying. This rust is especially promising in rugged, inaccessible areas or wilderness where herbicide sprays or mechanical means are impractical.

Chemical: Dyers woad can normally be controlled using a planned herbicide spray program. The herbicide selected will depend on several factors. These include cost, location, non-target plant species present, ability to respray and a host of others. Before using any herbicide read and understand the label directions. If you are unsure of any factor contact the retailer where the herbicide was purchased, or other individuals qualified to answer your question.

Herbicidal Treatments

| Table 1. Herbicide Options for Dyers Woad Control | | |
|---|--|--|
| Herbicide Rate/ac | When to Spray | Remarks |
| 2, 4-D LV ester 2.0 lb ae | Spring & Fall to rosettes Early Summer in Bud stage Both treatments may be necessary | Avoid drift to sensitive crops |
| chlorsulfuron (Telar) .75 to 2.25 oz (1 to 3 oz Telar) | Pre to post emergence Best on young actively growing weeds | non-cropland use only several other restrictions (apply) |
| metsulfuron (Escort) .3 to .6 oz (.5 to 1 oz Escort) | preemergence to bloom stage in spring | Extremely long lasting in soil. Read crop rotation restrictions carefully |



LEAFY SPURGE

Background

Leafy spurge, a Eurasian native, has spread aggressively in rangelands throughout the northern United States. In Nevada, it is present in Elko, Humboldt, Washoe, Nye, and White Pine Counties in rangelands, pastures, and disturbed soils. It can cause severe irritation to the mouths and digestive tracts of some domestic and wild grazing animals. The extensive root system of this long-lived perennial may grow to depths of 40 feet or more. Efforts should be made to find and eradicate new infestations before this happens. Once the root system is developed, complete control may never be achieved. Seed capsules explode when dry, shooting the seeds up to 15 feet. Seeds remain viable in the soil for up to eight years. With long-term diligence, leafy spurge numbers can be reduced so that it does not dominate extensive acreages.

Distinguishing Features

- The plant grows up to 3 feet tall with a deep root system.
- Its alternate leaves are narrow and linear with smooth margins that are ¼ inch wide and 1 to 4 inches long.
- The true flowers are small, light-green, and enclosed by a pair of larger, yellowish green, heart-shaped bracts.
- Flowering occurs from June through midsummer.
- The shoots are erect and pale green.
- Stems and roots have a milky latex that is damaging to eyes and sensitive skin.

Control Measures

Most Effective Strategy:

Leafy spurge is one of the most difficult of Nevada's noxious weeds to control. Its extensive root system ensures the plant adequate water under most conditions, and food reserves to carry it through harsh times, including many control treatments. A combination of herbicides and cultural controls have proven to be the most effective treatment. Cleaning equipment and using weed-free hay limits the number of infestations. Finding leafy spurge in its first year of establishment and initiating control efforts then is critical. Established infestations should be regularly and intensively grazed by sheep or goats to limit top growth, seed production, and its spread. Follow summer-long grazing with a fall herbicide application. If that is not possible, repeated spring grazing will slow its spread. Efforts may include seeding with appropriate species to provide competitive vegetation. A long-term effort over many years is required to have any effect on an infestation. Missing even 1 year of control reduces the effectiveness of the past efforts.

Mechanical Control:

Intensive, repeated cultivation throughout the growing season is somewhat effective in reducing aboveground plant materials. Mowing and burning reduces seed production, but plants will regrow from the perennial root system.

Chemical Control:

Picloram (Tordon®)

Rate: Apply Tordon 22K® at 2 to 4 pints per acre or 1/2 to 1 pound a.e. per acre. Spot treat at a rate up to 2 quarts per acre (1 pound a.e. per acre). At lower rates, tank mix with 1 pound a.e. per acre 2,4-D to improve control. Time: Apply at the true flower stage of growth or apply to fall regrowth. Reapply when the level of control falls below 80 percent.

Remarks: Adjustment of the application rate affects the selectivity of picloram. At the rates recommended, picloram will not damage established perennial grasses.

Caution: This restricted-use herbicide must be applied by, or its application supervised by, a certified applicator. Follow the label directions. Picloram remains active in the soil for a long time. Do not contaminate water.

Imazapic (Plateau®) Rate: Use 8 to 12 ounces of Plateau® per acre or 2 to 3 ounces a.i. per acre.

Time: For best results, apply in the late summer or fall (August through mid-October). Consecutive year applications will optimize long-term control. Applying Plateau® at 12 ounces per acre in the spring or fall, or 4 ounces per acre in the spring following an 8-ounces per acre fall treatment, may result in excessive injury to cool season grasses in some areas. For best results, always use a methylated seed oil at 2 pints per acre. Nitrogen fertilizer applied at a rate of 2 pints per acre may also increase leafy spurge control.

Remarks: Plateau® may not control some naturally occurring weed biotypes (plants within a species with a slightly different genetic makeup) with resistance to this and/or other herbicides with an ALS/AHAS enzyme inhibiting mode of action. When treating ALS/AHAS resistant biotypes, tank mix Plateau® with an appropriately registered herbicide having a different mode of action and sequentially treat the area to ensure control. Caution: No grazing restrictions exist, but do not harvest hay for at least 7 days following application of Plateau®. When cool-season grasses such as bluegrass and smooth brome are present, do not exceed 8 fluid ounces per acre. *Dicamba (Clarity™, Diablo™, Fuego™, Vanquish™, Veteran™, or Banvel®)*

Rate: Use 1 to 2 pounds of Dicamba per acre. Time: Apply when plants are in the rosette stage of growth.

Remarks: Use higher rates when treating dense or tall vegetative growth. Use in a tank mix with other herbicides to increase its effectiveness. Check the label for tank mixing instructions. Caution: Avoid drift to sensitive crops. Read and follow the label directions.



POISON HEMLOCK

Background

Poison hemlock (*Conium maculatum*) was first introduced to North America from Europe as an ornamental. This poisonous plant has since established in almost every state in the United States. Western water hemlock (*Cicuta douglasii*) is a wetland plant that is native to the intermountain region. It may be confused with poison hemlock, but causes a different type of poisoning and is considered one of the most poisonous plants in North America.

Distinguishing Features

Poison hemlock, of the Apiaceae (parsley) family, is a biennial that usually grows 6 to 8 feet tall. Its extensively branched stems are smooth, erect, and solid, with distinct ridges. Distinctive purple spots are visible on the lower portions of the stems (Fig. 1). The fleshy white taproot is long and has a smell close to that of carrots or parsnips. Shiny, green leaves are triangular shaped, arranged alternately on the stem, and divided 3 or 4 times (Fig. 2). Each leaf has several pairs of leaflets that grow from opposite sides of the stalk. The numerous leaflets are 1/8 to 1/4 inch long and segmented, with veins that run to the tips of the lobes. The lower leaves are on long stalks and clasp the stem, while the upper leaves are on short stalks. The foliage has a strong, musty odor. The white flowers bloom from June to August. They are stalkless with five petals, and develop in numerous umbrella-shaped clusters, each supported by a stalk. The inconspicuous bracts beneath the flowers are 1/4 inch long with a green center and whitish edges. The fruits are small, grayish-brown with prominent, wavy, longitudinal ribs. Two light brown, 1/8 inch long seeds are enclosed in each fruit. They are paired, ribbed, and concave.

Control Measures

Prevention: It is important to prevent small infestations of these hemlocks from becoming larger. Inspect the land for newly invading plants. Identify the plant and then remove it by hand pulling, hoeing, or applying a spot herbicide treatment. Wear gloves and protective clothing when handling these plants. To avoid spread of the seed, minimize soil disturbance by abstaining from driving machinery and vehicles through infested areas, and limiting livestock use in the area. Preventing small infestations of the plants from producing seed is vital. Control and avoidance of western water hemlock are the only ways to prevent livestock loss from poisoning. Poison hemlock grows 6 to 8 feet tall.

Mechanical Control: Plowing or repeated cultivation will prevent poison hemlock from establishing. If cultivation is not possible, mow the plants after they have bolted. Unfortunately, a single mowing will not provide complete control. Repeated mowing will reduce its competitive ability, deplete carbohydrate energy reserves in the taproot, and prevent seed production. Mowing close to the ground will also reduce the amount of leaf material available for livestock grazing. Burning is not considered a useful method for poison hemlock control, as this plant grows in wet sites and remains green all season long. Hand grubbing is a very effective method of removing western water hemlock. The roots must be entirely removed because they are attractive to grazing livestock and highly poisonous. This plant is easily removed when the ground is moist. Gather all the plant pieces after removal and burn them.

Cultural Control: Western water hemlock grows where water is abundant, which is usually areas that receive heavy grazing pressure. Animals are attracted to it because it emerges early in the spring, its green, and it has an attractive smell. Western water hemlock is pulled out of the ground very easily in areas where the ground is moist and soft, thus animals are likely to eat the entire plant. This increases the chances of livestock poisoning. Grazing should be postponed until the ground is dry and the plant is harder to remove. Controlling the access of animals to habitats where western water hemlock grows may reduce the risk of poisoning.

Biological Control: It is unknown how the European Palearctic moth (*Agonopterix alstroemeriana*) was initially introduced into the United States, but it has rapidly moved throughout and colonized the western states,

POISON HEMLOCK CONTINUED

including Nevada, demonstrating success in poison hemlock control. The larvae live in conspicuous leaf rolls, and feed on foliage, buds, and flowers in the spring and early summer. There are currently no commercial biological control methods available for western water hemlock.

Chemical Control: The herbicide tebuthiuron provides pre-emergence control of poison hemlock plants, as does chlorsulfuron and a combination of chlorsulfuron and metsulfuron. The pre-emergence photosynthetic inhibitors hexazinone, metribuzin, and terbacil also provide great control of poison hemlock. Post-emergence application of phenoxy herbicides or glyphosate can be effective, with best results when applied in early spring. Treating poison hemlock with herbicides may entail rep



PERENNIAL PEPPERWEED

Background

Perennial pepperweed, or tall whitetop, is a native of southern Europe and western Asia. It has naturalized in many parts of the United States, including Nevada. Many western states have declared this weed noxious. This perennial grows in waste places, wet areas, ditches, roadsides, and croplands, including alfalfa fields. It also grows in low-rainfall desert areas where its root system collects any available water. In streambeds, perennial pepperweed causes bank destabilization because of its lack of fine root hairs to hold the soil. It is a problem in hay bales because it does not cure. Its robust, spreading roots and numerous seeds make its control very difficult. Like many members of the mustard family, perennial pepperweed produces a significant percentage of hard seed with delayed germination, which ensures seeds remain viable in the soil for many years. Mechanical measures such as disking or mowing spread the plant. Chemical controls must be timed properly and applied only after last season's dead stems and leaves are removed or the effort is wasted.

Distinguishing Features

- This weed grows 12 to 48 inches, or taller.
- The leaves and stems are covered with a waxy layer.
- The green to gray-green leaves are blade-shaped (lanceolate).
- The lower leaves are larger than the upper leaves. The entire top of the plant blooms in dense clusters of small, white flowers in late spring (June).
- There may be sporadic blooms on young plants through the fall.
- The seeds are reddish brown.
- Dense flower clusters appear in late spring.

Control Measures

Most Effective Strategy:

Perennial pepperweed is one of the most difficult of Nevada's noxious weeds to control. Research and experience have shown that the most effective treatment is a combination of herbicides and cultural controls. Cleaning equipment and using weed-free hay limits the number of infestations. Finding perennial pepperweed in its first year of establishment and initiating control efforts is the best management strategy. Metsulfuron or chlorsulfuron are effective at killing perennial pepperweed, but these chemicals remain active in alkaline soils for many years, making establishment and maintenance of competitive vegetation difficult after treatment and limiting the effectiveness of these herbicides over the long term. If the infestation is on highly alkaline soil, use repeated applications of 2,4-D coupled with efforts to stimulate growth of competitive vegetation. This may include seeding with an appropriate species and fertilization for maximum production of the competitive vegetation. A long-term effort over many years is required to manage an infestation. Missing even 1 year of control severely reduces the effectiveness of past efforts.

Mechanical Control:

Hand-pulling can be used for small infestations or where herbicides cannot be used. It is most effective in moist, loose soils. Pulling must be continued until no new seedlings emerge, possibly 4 to 6 years or more. Digging, tilling, or mowing is ineffective: such efforts encourage plants to sprout from their crowns, perennial roots, and plant pieces.

Cultural Control:

Repeated, intensive grazing by sheep or goats may provide some control, especially in combination with herbicides. Maintain healthy stands of desirable plants to be competitive with tall whitetop. Burning or bailing of last year's dead stems and leaves is necessary to allow herbicide applications to reach the current year's growing leaf surfaces.

PERENNIAL PEPPERWEED CONTINUED

Biological Control:

There are currently no biological controls available for perennial pepperweed, but research is ongoing.

Chemical Control

2,4-D amine or ester

Rate: Use 2 pounds a.e. per acre. Time: Apply 2,4-D prior to bud formation. Repeated applications during the growing season whenever green leaf material is present (every 4 to 6 weeks). Mow perennial pepperweed at the bud stage, remove the clippings, and allow the plant to return to the bud stage in the late summer, then apply 2,4-D. After a season of intense grazing, apply 2,4-D to small plants in the fall.

Remarks: 2,4-D must move into the root system to be effective. Thoroughly wet the plant but do not over-apply the herbicide because it will not translocate to the root.

Caution: It is not lawful to apply more than 2 pounds a.i. per acre per year. Avoid drift to crops, especially with a volatile ester formulation. Follow the label directions. Do not apply near or over water unless using a product specifically formulated for use in water.

Metsulfuron (Escort®)

Rate: Use 1 to 2 ounces per acre. Time: Apply during the rosette to full bloom stages of growth. Remarks: Use a nonionic surfactant to increase the herbicide's effectiveness. In alkaline soils, above pH 7.5, reestablishment of competitive vegetation may be difficult due to residual herbicidal action on germinating seedlings. Caution: Only apply to pasture, rangeland, and noncrop sites. Follow the label directions. Do not contaminate water.

Chlorsulfuron (Telar®)

Rate: Use 0.75 to 2 1/4 ounces per acre of chlorsulfuron (1 to 3 ounce of Telar® per acre). Time: Apply during preemergence or early postemergence when plants are actively germinating or growing. Remarks: Use a nonionic surfactant to increase the herbicide's effectiveness. In alkaline soils, above pH 7.5, reestablishment of competitive vegetation may be difficult due to residual herbicidal action on germinating seedlings. Caution: Only apply to noncrop sites. Chlorsulfuron is a selective broadleaf herbicide that also affects many grasses. Follow the label directions, especially as they apply to herbicide persistence in the soil and effect on any competitive vegetation. Do not contaminate water.

Imazapic (Plateau®)

Rate: Use 8 to 12 ounces of Plateau® per acre or 2 to 3 ounces a.i. per acre. Time: For best results, always use a methylated seed oil at 2 pints per acre. Apply in the fall after a late frost (late October through November). As long as there is some green and/or leaf tissue remaining, good control can be achieved. This timing usually corresponds with fall basal growth. Applications made prior to this will result in poor control. Remarks: Plateau® may not control some naturally occurring weed biotypes (plants within a species with a slightly different genetic makeup) with resistance to this and/or other herbicides with an ALS/AHAS enzyme inhibiting mode of action. When treating ALS/AHAS resistant biotypes, tank mix Plateau® with an appropriately registered herbicide having a different mode of action and sequentially treat the area to ensure control. Caution: No grazing restrictions exist, but do not harvest hay for at least 7 days following application of Plateau®. When cool-season grasses such as bluegrass and smooth brome are present, do not exceed 8 fluid ounces per acre.

Glyphosate (Roundup®, Aquamaster™, Rodeo®, or Aquamaster™)

Rate: Use 1 1/2 pints to 2 quarts according to label rates plus 2 quarts of nonionic surfactant per acre. Time: Apply when plants are actively growing before flower bud formation. Repeated applications will be necessary; a single application is marginally effective. Remarks: Glyphosate is a nonselective herbicide that kills most plants, including those that compete with new weed seedlings. Wait 10 days after treatment, then seed with locally adapted species. Caution: Follow the label recommendations and precautions, especially for use in and near water.

PERENNIAL PEPPERWEED CONTINUED

Imazapyr (Habitat® or Arsenal®)

Rate: Use 1 1/2 pints to 2 quarts per acre. Time: Apply to nearby establishing plants or at bud stage. A fall application may be effective too. Remarks: Remove stubble before making an application. If plants are tall, mow them, remove the mowed material and allow the plant to resprout before making the application. Caution: Registered for use around water. It is not necessary to wet the foliage until the herbicide runs off. Do not allow the herbicides to drift.



HOARY CRESS

Background

Hoary cress, or short whitetop, is a member of the mustard family. This perennial weed commonly grows in dry, disturbed, alkaline soils, but can grow in a variety of soils and moisture conditions. Hoary cress is highly competitive; it reduces forage production and displaces native vegetation because it starts growing early in the spring and uses the available soil moisture other plants depend upon. In Nevada's desert, its expansive root system collects any available springtime surface water. Hoary cress grows from both seed and root fragments. Its deep root system, vegetative reproduction, and exceptional seed production make this plant difficult to control. Like many members of the mustard family, hoary cress produces a significant percentage of hard seed with delayed germination, which ensures seeds are available for germination for many years. Glucosinolates in hoary cress can be toxic to cattle.

Distinguishing Features

- It grows up to 24 inches tall, but is often shorter on very dry sites.
- Multiple stems can arise from the base.
- The leaves are bluish green, waxy, and lance-shaped.
- The upper leaves have 2 lobes that clasp the stem.
- The many, small white flowers form rounded clusters at the top of each stalk in late spring.
- Heart-shaped seed capsules follow immediately.
- Seeds often germinate and produce overwintering rosettes.

Control Measures

Most Effective Strategy:

Hoary cress is difficult to control once established. Research and experience have shown that the most effective treatment is a combination of herbicides and cultural controls. Cleaning equipment and using weed-free hay limits the number of infestations. Finding and controlling hoary cress during its first year is the best management strategy. Metsulfuron or chlorsulfuron are effective at killing hoary cress, but these chemicals remain active in alkaline soils for many years, making establishment and maintenance of competitive vegetation difficult after treatment and limiting the effectiveness of these herbicides over the long term. If the infestation is on highly alkaline soil, use repeated applications of 2,4-D coupled with efforts to grow competitive vegetation. This must include seeding with an appropriate species for maximum production of competitive vegetation. A long-term effort over many years is required to have any effect on an infestation. Missing even 1 year of control severely reduces the effectiveness of years of control efforts.

Mechanical Control:

Small infestations can be controlled by digging and completely removing the plant, including the roots, within a few days after emergence. This must be continued until no new seedlings emerge, at least 4 to 6 years or more. Do not till or mow an established plant stand. This stimulates the rhizomes to grow new plants.

Cultural Control: Moderate grazing by sheep or goats in the rosette stage provides some control by lowering hoary cress density and preventing flowering. Do not graze later in the season, since this will stimulate vegetative growth. Hoary cress may be toxic to cattle. Planting competitive legumes such as alfalfa or clover can reduce an infestation. Flooding is effective on heavy soils, but hoary cress must be completely submerged for weeks to kill it, which may also kill desirable vegetation. Flooding also reduces land fertility due to the leaching or erosion of nutrients from the soil.

Biological Control:

There are currently no biological controls available for hoary cress.

HOARY CRESS CONTINUED

Chemical Control:

2,4-D amine or ester

Rate: Use 2 pounds a.e. per acre.

Time: Apply 2,4-D in the spring prior to flower bud formation. Repeated herbicide applications may be necessary during the growing season whenever green leaf material is present (every 4 to 6 weeks). When hoary cress is present in cereal crops, apply 2,4-D before the cereal crop reaches the boot stage.

Remarks: When possible, use 2,4-D on hoary cress populations before cultivating fields in the spring. Reapply 2,4-D in the fall if new weed growth occurs.

Caution: It is not lawful to apply more than 2 pounds a.i. per acre per year. Avoid drift to crops, especially with a volatile ester formulation. Follow the label directions. Do not contaminate water unless using a product specifically formulated for use in water.

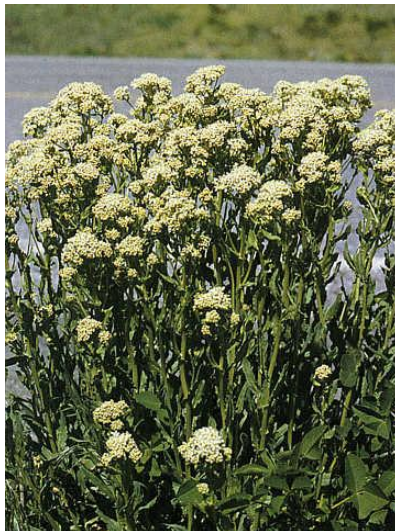
MCPA

Rate: Use 6 pounds a.i. per acre.

Time: Apply from the bud to early bloom stages of growth and again in the fall.

Remarks: Apply when weeds are young and continue treatment for 2 to 3 years. Apply in 20 to 100 gallons water carrier per acre.

Caution: Do not plant crops for 3 months following treatment. Use according to label instructions.



WESTERN WATERHEMLOCK

Background

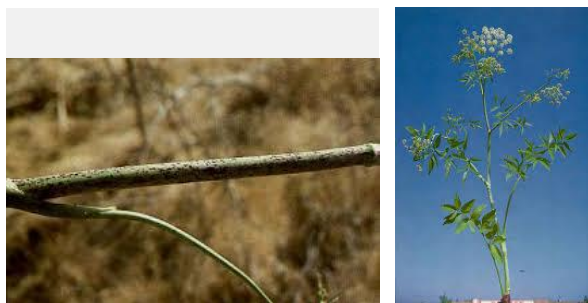
Western water hemlock is deemed the most violently toxic plant in North America. Only a small amount of the toxic substance is needed to cause poisoning in livestock and humans. The toxic substance in the plant is cicutoxin, an unsaturated alcohol that has a strong carrot-like odor. The roots are the most toxic part. The leaves and stems are poisonous in the early stages of growth, but lose much of their toxicity when mature. The green seed heads are also highly poisonous. Sheep that consume it do not seem to be as affected as cattle. Signs of poisoning can occur 15 minutes to 6 hours after the plant is consumed. Symptoms include: muscle twitch, rapid pulse, rapid breathing, tremors, convulsions, excessive salivation or frothing at the mouth, and dilation of the pupils. Animals will eat western water hemlock in the spring and graze on the green seed heads later in the season.

Distinguishing Features

Western water hemlock, also of the parsley family, is a highly poisonous perennial often confused with poison hemlock. Its stems are erect, 3 to 7 feet tall, and usually enlarged at the base. The alternate, pinnate leaves have a toothed margin. A distinguishing characteristic is the leaf veins that terminate at the bottom of leaf serrations, and not at the tips. Like poison hemlock, western water hemlock's flowers are white and grouped in umbrella-shaped clusters. Likewise, each flower is two-seeded. The tea-colored seeds are somewhat kidney-shaped with corky ridges. Figure 4. The roots of western water hemlock are the most poisonous part of the plant. The most recognizable feature of western water hemlock is its thick, tuberous rootstalk that contains many small chambers. These chambers hold a highly poisonous brown or straw-colored liquid that is released when the stem is broken or cut. Thick, fleshy tubers and slender individual roots grow from the bottom of the main rootstalk.

Control Measures

For western water hemlock, application of chemicals is most effective when done in late spring or early summer. Glyphosate, 2,4-D, and picloram will all provide excellent control of western water hemlock. Apply 2,4-D or MCPA to western waterhemlock at a rate of 2 lb ae/A in the early bolting stage of growth. Chemical application is an effective means of control, but there is some evidence that the toxicity of the plant increases after spraying until the plant dies. Most animal losses take place in the spring or after the plants were sprayed with chemicals. Therefore, keep animals away from treated plants for 3 weeks after spraying. Repeat herbicide application until eradication is accomplished.



Nuisance Weeds Overview



Curlycup Gumweed



Curly Dock



Bull Thistle



Cheatgrass



Bur Buttercup

CURLYCUP GUMWEED

Background

Curlycup gumweed grows as a ground-hugging rosette form in the first year, and then sends up branched, semiwoody stems and flowers in the second year, growing 1 to 3 feet tall. It blooms during the summer. The entire plant is aromatic.

Distinguishing Features

Leaves: Alternately attached leaves are 1 to 3 inches long, thick and have toothed edges. They attach directly to the stems and ooze a sticky material. Stems: Stiff and branched. Flowers: Yellow; borne on heads about 1/2 to 1 inch in diameter. Structures below the petals curve downward and are covered with a sticky resin. Roots: Grows a large, tough taproot.

Control Measures

Curlycup gumweed is best controlled when young. Mature plants are difficult to remove mechanically due to the large taproot and semi-woody stems.

Mechanical: Dig, hoe or pull young plants. Plants that are mowed or break off at the crown will regrow. The tough taproot makes pulling mature plants difficult, if not impossible. Woody stems make it difficult to remove by weed-whacking.

Cultural: Does not tolerate regular disturbance or competition. Plant desirable vegetation to help suppress the gumweed.

Biological: None commercially available. Curlycup gumweed may concentrate the mineral selenium to levels that can be toxic to cattle, although they generally avoid eating the plant. Poorly managed grazing favors gumweed.

Chemical: Try broadleaf-selective herbicides such as 2,4-D and dicamba on young plants. Dicamba can persist for several months and may damage desirable plants in the area treated. Pre-emergence herbicides can be used to manage existing seed banks. Glyphosate is generally not effective on this plant.



CURLY DOCK

Background

This slender weed, a member of the buckwheat family, is commonly seen in cultivated fields, along roadsides, and in ditchbanks. It grows to about four feet high and has crowds of small, dull yellow flowers. It pollinates from late spring through summer in this area.

Distinguishing Features

Leaves are dark green and smooth with an entire, crimped margin. Leaves are alternate and basal until flower stalk development. Small green flowers without petals turn reddish-brown at maturity. Grows 2 to 5 feet tall.

Control Measures

Mechanical: Mowing, grazing, digging.

Cultural: Do not allow seeds to set. Mow pasture or area to prevent flowering, or grow a row crop and cultivate regularly. Fertilize crops as needed

Chemical: Use broadleaf herbicides such as 2,4-D or dicamba (Banvelâ). Apply before flower elongation. Repeated treatments needed. Use glyphosate (Roundupâ) at early heading. Apply chlorsulfuron (Telarâ) to young actively growing weeds on non-cropland only. Chlorsulfuron will kill willows and cottonwoods; use with caution.



BULL THISTLE

Background

Bull thistle, also called spear thistle, Fuller's thistle, and lance-leaved thistle, is a biennial in the sunflower (Asteraceae) family. A native of Eurasia, it is widely established in North America after continuously being introduced as a seed contaminant. Bull thistle has been found in all Nevada counties.

Distinguishing Features

In the first year of growth, bull thistle (*Cirsium vulgare*) forms a rosette of leaves (Fig. 1) and develops its short, fleshy taproot. It overwinters as a rosette and then grows erect, spiny-winged stems. The stems grow two to five feet tall and have many spreading branches. They are sparsely hairy. The stem leaves are pinnately lobed and three to six inches long. The top of the leaves are prickly and hairy, but the undersides are cottony and woolly. The lobes have stout, needle-like spines at the tips. The fragrant flowers are one to two inches long and shaped like a gumdrop (Fig. 2). They grow singly at the ends of shoots and branches (Fig. 3) from July through September. They are usually pinkish purple but can be white. The narrow bracts at the base of the flower (involucre) are covered with spines.

Control Measures

Prevention: Since bull thistle reproduces only from seeds, preventing seed production will successfully decrease its spread. Be sure to clean any equipment or vehicles after operating in an infested area. Use clean, certified seed. If a bull thistle plant is found, take action immediately so as to prevent seed production and establishment of a stand.

Mechanical Control: To kill bull thistle till, hoe or hand pull it. Seeds will likely be left in the soil, so revegetate the site with desirable plants that will be able to compete with bull thistle and prevent reinvasion. These methods are most effective when done before bull thistle flowers. Mowing bull thistle will not eradicate the weed, but it can be used to limit the spread of seed if timed properly. Mow once after the plants produce a flower stalk (bolt) but before they flower, and then again about a month later. Mowing will be more effective if used in combination with other management techniques.

Cultural Control: Re-establishment of desirable vegetation is needed in order to successfully manage bull thistle. Perennial grasses will be the most effective. Good grazing management will encourage grass growth and keep pastures and rangeland healthy. Avoid heavy grazing because it facilitates bull thistle establishment.

Biological Control: The seedhead fly (*Urophora stylata*) was released in the United States in 1983 and successfully established for biological control of bull thistle in Colorado, Maryland, Washington, California, Montana, and Oregon. It is reportedly providing good control of bull thistle in Oregon, where both are widespread. The larvae feed on developing bull thistle seeds in the flowerheads.

Chemical Control: When bull thistle plants are in the rosette growth state, clopyralid, dicamba, MCPA, 2,4-D, or picloram can be used in pastures, rangeland, and non-crop areas. Clopyralid should be applied to rosettes in spring or fall at a rate of 0.13 to 0.5 pound active ingredient per acre (ai/A). Applying 0.2 to 0.3 pound ai/A of clopyralid plus one to 1.5 pounds ai/A of 2,4-D will also be effective. Dicamba at a rate of 0.5 to one pound ai/A can be applied to rosettes in the spring or fall, but will only be effective if good growing conditions exist. Applying 1.5 to two pounds ai/A of 2,4-D to rosettes in the spring should provide control. Using only one pound ai/A of 2,4-D while adding 0.5 pound ai/A of dicamba should also be effective. Apply picloram at a rate of 0.13 to 0.25 pound ai/A to rosettes in the spring or fall. For plants that are in the bolting to bud stages, use metsulfuron or chlorsulfuron. Apply 0.3 ounce ai/A of metsulfuron or 0.75 ounce ai/A of chlorsulfuron. The use of a nonionic surfactant increases the effectiveness of herbicide applications.

BULL THISTLE CONTINUED



CHEATGRASS

Background

Cheatgrass, also known as downy brome and bronco grass, is an annual plant native to Europe and Asia. We don't know how cheatgrass made it to North America, but it is now one of the most common plants in Nevada. Since its first recorded Nevada sighting in 1906, cheatgrass has come to dominate over 17 million acres in the Great Basin. It rapidly occupies areas that have been disturbed by fire, construction activities, poor grazing practices, off-road vehicle use, and other human activities. At times it can also invade undisturbed areas.

Cheatgrass has a serious environmental impact on Nevada. It dries out very quickly, becoming extremely flammable. This increases the occurrence and intensity of fires in sagebrush areas. It out-competes Nevada's native plants for soil moisture, quickly becoming the dominant form of vegetation. Nevadans living, working, or recreating in cheatgrass country should learn to identify it, take care not to ignite it, and remove it from their properties.

Distinguishing Features

Cheatgrass is an annual grass, meaning it sprouts, grows, produces seed, and dies within one growing season. It is known as a winter annual because its seed usually germinates in the early or late winter months, the plant grows in spring, and then it dies by early summer. During drought years, there may be very little cheatgrass produced. In aboveaverage rainfall years, however, this grass grows tall and is abundant, sometimes exceeding 10,000 plants per square yard. Cheatgrass can be several inches to more than 18 inches tall. Typically, it has a nodding seed head that resembles a shepherd's crook. There is often a tinge of red or purple in the leaves. The leaves are bright green and hairy for a short time in early spring. However, they quickly dry out and turn reddish-brown and eventually straw color as the summer progresses. The seeds are not notorious for getting stuck in socks and dogs' ears.

Control Measures

Mechanical Methods to Control Cheatgrass

| Control Technique | Application Season | Number of Treatments | Remarks |
|-------------------------------|---|---|---|
| Hand pulling | Spring & fall. | Repeat when new plants appear. | Effective in small areas only. |
| Disking/tilling (live plants) | Spring & fall (before seed heads turn purple). | Repeat when new plants appear. | Use disk, rototiller, spike-tooth harrow, etc. |
| Disking/tilling (seeds) | Late spring. | One time before seeding with desirable species in the fall. | Bury seeds at least 3 inches deep to prevent germination. |
| Mowing | Not recommended as a long-term control technique. | Not applicable. | Seed can be produced by mowed plants. |

Biological Methods to Control Cheatgrass

| Control Technique | Application Season | Number of Treatments | Remarks |
|-------------------|---|--|--|
| Livestock grazing | Early spring when green, but prior to seed formation. | Graze two times, approximately three weeks apart. Repeat for at least two years. | Graze cheatgrass very heavily as soon as adequate forage is available. |
| Insects | Not applicable. | Not applicable. | No insects have been approved for use. |
| Disease organisms | Not applicable. | Not applicable. | No disease organisms have been approved for use. |

Chemical Methods to Control Cheatgrass*

| Chemical | Trade Name** | Application Timing | Remarks |
|------------------------|-------------------|---|---|
| Quizaflop | Assure II | Early spring when plants are less than 4 inches tall. | Consult label for rates. |
| Fluazifop-p-butyl | Fusilade 2000, DX | Before seed head is formed. | Consult label for rates. |
| Sethoxydim | Post, Post plus | Before seed head appears. | Consult label for rates. |
| Glyphosate | Roundup-ultra | Before seed formation | Is nonselective, consult label. |
| Imazapic ammonium salt | Plateau | Fall or early spring. | For sale to governmental agencies only. |
| Trisulfuron | Amber | Early fall, before the cheatgrass emerges. | Can harm some desirable grasses, consult label. |
| Sulfosufuron | Maverick | Fall. | Long lasting, consult label for restrictions and rates. |
| Trifluralin | Treflan | Fall, before the cheatgrass emerges. | Check label for rates and application instructions. |

CHEATGRASS CONTINUED



BUR BUTTERCUP

Background

A small, 2- to 5-inch tall plant that grows and flowers early in spring, bur buttercup produces stiff burrs that help spread this weed. It is toxic to livestock.

Distinguishing Features

Leaves: Grayish-green, hairy, and attached at the base of the plant. Leaf blades look like fingers. Stems: Short; extend outward from the base of the plant. Flowers: Small, yellow, with 2 to 5 petals. Blooms from late winter to early spring. Fruit: Forms many stiff, brown burrs. This is the point at which most people notice the plant. Roots: Short taproot.

Control Measures

Control methods: Bur buttercup should be controlled prior to seed formation. As this occurs very early in the spring, careful monitoring is needed to stop the spread of this weed.

Mechanical: Dig, hoe or pull young seedlings. Use mechanical control methods prior to formation of flowers and burrs.

Cultural: Thick mulches can help prevent seed germination. Plant desirable vegetation that will shade the area and reduce germination and growth of young plants.

Biological: None. Chemical: Apply broadleaf-selective herbicides on young plants. Pre-emergence herbicides can be used to manage existing seed banks.



CHEMICAL LIST

| Brand Name | Active Ingredient | Properties | Timing |
|----------------|---|--|---|
| Actimaster | Ammonium sulfate | Use w Roundup, increases efficiency of post-emergent herbicides | |
| 2, 4-D | Chloroacetic acid 2,4-dichlorophenol | Broadleaf-selective. Some brands approved for aquatic app. This is a synthetic plant hormone | Bud to early flowering |
| Banvel | Dicamba | Leafy spurge where water is present | |
| C-activator 90 | | Non-ionic surfactant, penetrant, anti-foamer | |
| Escort | Metsulfuron-methyl | Broadleaf-selective. DO NOT apply where surface water is present. Add a non-surfactant | Bud to early flowering & also fall green-up |
| LI-700 | | Surfactant and Penetrant | |
| Milestone | Aminopyralid | Non-restrictive treatment for knapweed | |
| MSO | Methylated Seed Oil | Used as a spray adjuvant | |
| Plateau | Imazapic | Broad-spectrum herbicide | Flowering to post-flowering |
| Roundup | Glyphosate | Non-selective herbicide | Mow plants prior to flowering and apply to plants after they regrow |
| Transline | Clopyralid | Targeted for knapweed | |
| Tordon | Picloran | Targeted for leafy spurge | Full growing season. Best at peak of flowering |
| Vanquish | Diglycolamine | Targeted for leafy spurge | |

TREATMENT ASSIGNMENTS

| Tract | Area | Responsible |
|-------|------------------------|-------------|
| 400 | Roads | Roads |
| | Greenbelts | Parks |
| | Horse Palace | Rafael |
| | Ryan Ranch | Parks |
| | Thistle Pasture | Parks |
| | Oakmont Pasture | Parks |
| | Campground | Parks |
| 200 | Brent Park | Parks |
| | Roads | Roads |
| | Greenbelts | Parks |
| 300 | Roads | Roads |
| | Schuckmanns | Parks |
| | Trap and Skeet | Parks/Moe |
| | Firehouse | Parks |
| | Greenbelts | Parks |
| | Gravel Pit | Roads |
| | | |
| 100 | Roads | Roads |
| | Greenbelts | Parks |
| | Marina | Parks |
| | Playgrounds | Parks |
| | Greenbelt at Duck Pond | Parks |
| | Shop | Roads |
| | Golf Course | GC crew |
| | Offices | Parks |
| | | |

ADDITIONAL WEED CONTROL CONTACTS

United Right-of-Way
d.b.a. Basin Tree Services
 Steve Adams
 509-750-1516
www.basintreeservice.com

Slater Seeding
 738-9817
 Brandon Slater
coyote@frontiernet.net

Gary Acordagoitia
 PO Box 293
 Jordan Valley, OR 97910
 541-216-1144