



# CODE ENFORCEMENT

## Spotted Knapweed Identification and Management

### Background Information

#### History and Impacts

Spotted knapweed (*Centaurea stoebe* synonyms *C. biebersteinii* and *C. maculosa*) is native to Central, Eastern and Southeastern Europe. Before it was considered to be a serious weed, it was spread in domestic hay and by human activities. Spotted knapweed has invaded rangeland throughout the western United States and Canada. This weed rapidly colonizes disturbed areas, but is also capable of invading well-managed lands. Knapweed tends to dominate sites at the expense of community diversity or forage production. It can occupy over 95 percent of the available plant community. Knapweed infestations can increase soil surface runoff and sedimentation of streams.

#### Habitat

Knapweed is most common in disturbed habitats and overgrazed or poorly managed pastures. Spotted knapweed is commonly found along heavily disturbed areas such as road ditches, field margins, irrigation canals, and recently installed utility lines and also occupies vacant, unmaintained land and parking areas. The plant will spread from these sites into rangelands, meadows and other open habitats.

#### Identification

**Plant:** Spotted knapweed is a short-lived perennial forb (3-9 years) growing to 2-4 feet in height with one to 10 upright stems, and has a stout, elongated taproot. Plants stay in the rosette stage through the winter and continue growth in April.

**Leaves:** Leaves are pale to grayish green, and the leaf surface is rough. The basal leaves are up to 8 inches long, deeply lobed, and arranged in a rosette. Stem leaves, arranged alternately, are smaller (1 to 3 inches), less lobed and more linear in shape.

**Stems:** The slender, hairy stems growing 2 to 4 feet tall are upright, stiff, and branched. Small plants may have an unbranched stem and one flower head; large plants have a stem with many branches and can have over 100 flower heads. Stem growth occurs in early summer.

**Flowers:** Most flowering occurs from June to September. Pinkish purple flower heads are usually single, are 0.2 to 0.4 inch long and occur at the tips of terminal or auxiliary stems. Each flower head has stiff



bracts marked with fine, vertical streaks and tipped with dark, comb-like fringes that give the flower head a spotted appearance.

**Seeds:** Seeds are 0.1 inch long, oval, and black or brown with pale, vertical lines. At the tip of each seed is a short, bristly pappus about half the length of the seed, enabling wind dispersal. Plants can produce thousands of seeds, some of which can remain dormant for many years.

### **Reproduction and Spread**

Spotted knapweed reproduces solely by seed. Individual flower heads typically bloom from June through August (sometimes through October) for 2-6 days each. The bracts reopen after about 20 days and scatter seeds. Plants average about 1,000 seeds per plant. Seeds are viable for seven years or more, and germinate throughout the growing season. Seedlings emerging in fall develop into a rosette of leaves that resume growth in spring. Spotted knapweed can be spread by wind, water, wildlife, vehicles, contaminated hay, farm machinery, gravel distribution, equipment, and road construction.

## **Control Information**

### **Integrated Pest Management**

The preferred approach for weed control is Integrated Pest Management (IPM). IPM involves selecting from a range of manual, mechanical, chemical, cultural and biological control methods to match the management requirements of a specific site. Management will require dedication over a number of years, and allow for flexibility of methods used as appropriate to the current situation. Plan to revisit the site to control plants that have survived or sprout after initial control efforts. Persistence is necessary.

### **Early Detection and Prevention**

Early detection and prevention is the key to weed control. Watch for knapweed near known infestations. Survey the area early and often. Knapweed is easiest to find once it starts flowering in June to July but by then control options are limited so learn to identify the plant in its rosette stage. Monitor roadsides, waste and disturbed areas, pastures, rangeland, and trails for new infestations.

Small infestations and individual plants can be effectively hand-pulled or dug up. Uprooting one plant can prevent thousands of new seedlings.

Prevent new infestations by minimizing soil disturbance. Efforts should be taken to mitigate or reduce impacts of disturbance to avoid creating more opportunities for germination of weed seeds. Prevent plants from spreading away from existing populations by washing tools



and boots and clean vehicles, equipment and animals that have been in infested areas. If animals are being moved from an infested pasture to an un-infested pasture, it is best to hold them for at least five days so that the seeds pass out of the animals' digestive system. Off-road vehicles create disturbances and carry weeds. Clean off-road equipment and avoid driving in infested areas. Communicate weed control needs with neighbors and persons working in infested areas, awareness will increase prevention.

### **Manual**

If soils are moist, plants can be pulled after they bolt but before they flower, typically from May to June. Roots that break off will re-sprout so consider digging if necessary. Plants in flower may form viable seeds even after they are pulled, so carefully bag and dispose of all flowering plants later in the season when seeds are forming. In areas where mature plants are pulled, there are usually many small rosettes and seeds left in the soil. Return to the same location in the following spring and summer to remove plants coming up from seeds already in the soil and continue to monitor the area for several years. Gloves should be worn when pulling spotted knapweed because plants can cause skin irritation.

### **Mechanical**

Rototilling or plowing can eliminate knapweed if done repeatedly. Cultivating with a disk will control young plants and seedlings, but established plants can survive if the taproot remains. Mowing will not control knapweed effectively. Plants are able to re-sprout and flower again in the same season when mowed. Plants that are regularly mowed can persist as short-lived perennials or can flower below the level of the mower. Mowing can be used if the infestation is found later in the year to keep the plants from flowering until an effective control method can be used. Do not mow plants that have gone to seed.

### **Cultural**

Seeding desirable species will prevent weed infestations. Minimize disturbance and re-vegetate disturbed areas to avoid creating opportunities for weed seed germination. In pastures, good grazing practices and management of grass and forage species will greatly improve control of knapweed. Grass heights should be kept above 3-4 inches. Cross fencing of pastures allows regrowth of grasses, decreasing weeds and increasing forage by allowing animals to rotate between pastures.

### **Chemical**

Herbicides are usually the best method to control large or established infestations of knapweed. The most effective time to apply selective broadleaf herbicides is in the spring. Selective broadleaf herbicides are very effective in controlling knapweed, especially in pastures and grassy areas. Established grasses are not harmed by selective herbicides and will compete with knapweed seedlings. Suppression of large infestations of knapweed with a selective herbicide will greatly increase grass production, which in



turn increases the suppression of the knapweed. Use a surfactant to increase the effectiveness of the herbicide you choose.

Readily available selective herbicides effective in controlling knapweed include 2,4-D or a combination treatment of dicamba and 2,4-D (e.g. Weedmaster, Weed-B-Gon, Speedzone). Re-treatment will be necessary to control late-germinating plants. Glyphosate (Roundup) will effectively kill individual knapweed plants or plants where damage to non-target species can be tolerated. Treatment with glyphosate should be combined with effective re-vegetation of the site to prevent seedlings from re-infesting the area.

Selective herbicides such as clopyralid (Stinger or Transline) and aminopyralid (Milestone) are the most effective herbicides for spotted knapweed control, having soil residual activity that provides extended control of germination, but must only be used in areas specified on the label such as permanent pastures, rangeland or non-crop areas.

Precautions: Herbicides should only be applied at the rates and for the site conditions and/or land usage specified on the label of the product being used. Follow all label directions, the label is the law.

### **Biological**

Biological control is the deliberate introduction of insects, mammals or other organisms which adversely affect the target weed species, reducing the population and reproductive ability of the weed. Biological control is generally most effective when used on large infestations or in areas where it is difficult to use other control techniques. Biological control can take many years to have a significant impact on an infestation. Population density and the number of flowering plants can be greatly reduced but eradication is not possible with biocontrol. Any biological control plan needs to incorporate another control method. Consult the Oregon Department of Agriculture website for more information on biocontrols. <http://www.oregon.gov/ODA/programs/Weeds/Pages/BiologicalControl.aspx>

## **Summary of Best Management Practices**

- Prevent plants from forming seed.
- Individual plants or small infestations can be pulled. Pull plants by hand if soil is wet; the plants may need to be dug up if large or in dry compacted soil. Try to minimize the amount of disturbed soil and avoid breaking off the taproot.
- Apply appropriate herbicide to actively growing plants. If using an herbicide in a grassy area, use a selective herbicide to avoid injury to the grass.
- Monitor site throughout growing season and remove any new plants.

If you have any questions or need additional assistance or would like to file a complaint, please contact Julie Craig, Code Enforcement Officer at (541)388-5527 or visit our website at [www.bendoregon.gov/weeds](http://www.bendoregon.gov/weeds)

Thank you to Deschutes County for providing the information above.

