

Knapweeds *Centaurea* spp., *Acroptilon repens*

Diffuse knapweed *Centaurea diffusa*

Spotted knapweed *Centaurea maculosa*

Russian knapweed *Acroptilon repens*

Knapweeds are a serious problem in Oregon because they vigorously invade disturbed or degraded sites and form dense populations that exclude native and desirable plant communities, causing economic and ecological losses. Their ability to spread rapidly by seeds and roots makes control very difficult. Seeds can remain viable for 5 years or more, and once a large number of seeds builds up in the soil, it can take years to eradicate knapweeds from that site.



Figure 1.—Spotted knapweed. Photo: Eric Coombs, Oregon Department of Agriculture.

All knapweeds contain carcinogens, so it is best to wear gloves and use extreme caution when handling plants. Horses that consume Russian knapweed and yellow starthistle can develop “chewing disease” which affects the nervous system and can cause death. However, sheep can graze knapweeds.

Description

Knapweeds are bushy with mostly erect stiff branches (Figure 1). Plants range from 1 to 4 feet tall; flowers can be white, pink, lavender, or purple (Figures 2a–c). Leaves are up to 6 inches long at the base and get smaller toward the top of the plant.

Spotted knapweeds are perennial; diffuse knapweeds may be annual, biennial or short-lived perennials; Russian knapweed is a woody perennial with roots that can extend to 23 feet deep. Diffuse knapweed spreads primarily by seed, but spotted and Russian knapweeds spread by both seed and roots. Wind, water, wildlife, human foot traffic, livestock, and machinery all carry seeds long distances. Knapweeds produce between 1,000 and 25,000 seeds per plant per year. Seeds can germinate under a wide range of environmental conditions. Seedling emergence is typically highest after the first fall rains.

Management options

Herbicides readily control diffuse and spotted knapweeds, but they will reinvade the site without follow-up cultural control. Russian knapweed, with its very deep taproot,

is more difficult to control. In general, management that combines cultural, mechanical, biological, and chemical treatments is the most effective. Whatever control is selected, the key is a long-term, continuous effort.



Figures 2a–c.—Flowers of, from left, diffuse, Russian, and spotted knapweed. Photos: (a) Oregon Department of Agriculture; (b) University of Georgia; (c) Eric Coombs, Oregon Department of Agriculture.

Prevention

Preventing infestations is essential. When driving or walking or moving livestock through infested areas, inspect and clean clothing, vehicles, and animals to remove any seeds before going into uninfested areas.

Biological control

The U.S. Department of Agriculture has cleared 12 insect species for use in controlling knapweeds. Some researchers believe it will take a complex of insects to reduce knapweed populations. Insects reduce a plant's overall seed production by weakening the plant or by eating the seeds. In Oregon, weevils and flies are being introduced. For example, *Larinus minutus* (lesser knapweed flower weevil) in drier parts of the state is effectively reducing the production of new diffuse and spotted knapweed seeds by attacking the flowers.

Chemical control

Note: Before you apply herbicide on forest land, you must file a "notification of operations" with the Oregon Department of Forestry at least 15 days in advance.

The following information about herbicides is only a brief summary; consult your local Extension agent or Oregon Department of Agriculture representative for specific recommendations for your situation. Read and follow the herbicide label carefully. Before spraying over or around seedlings, ensure the chemicals pose no hazard.

Long-term reduction of the seed bank in the soil is essential for knapweed control. Several herbicides are effective against knapweeds, but successful weed treatment depends on careful timing and persistence until the infestation is controlled, so plan for several years. Control is much better if a competitive crop such as perennial grass is established.

Use pesticides safely!

- Wear protective clothing and safety devices as recommended on the label. Bathe or shower after each use.
- Read the pesticide label—even if you've used the pesticide before. Follow closely the instructions on the label (and any other directions you have).
- Be cautious when you apply pesticides. Know your legal responsibility as a pesticide applicator. You may be liable for injury or damage resulting from pesticide use.

2,4-D in the rosette stage in fall or early spring is effective at 2 lb (2 quarts of a 4 lb/gal concentration) per acre.

Picloram (restricted use) at 1 to 2 pints per acre can be effective for 2 to 3 years. Apply at the rosette stage in fall or bud to bloom stage in spring. Use caution to not spray conifer seedlings.

Dicamba at 1 to 2 quarts per acre in spring with annual follow-up treatment of 2,4-D for at least 2 years to prevent reinfestation. Avoid spraying conifer seedlings. Note that some labels are for use in forestry, but others are not.

Clopyralid + 2,4-D applied in fall is also effective, but a follow-up treatment may be necessary the following year.

Glyphosate at 5-percent concentration is effective but is nonselective, so use caution.

2,4-D and aminopyralid + triclopyr amine may also be used as a directed spray.

Any herbicide treatment program should rotate among chemicals to prevent developing herbicide-resistant strains of the weed.

For details on chemical control, refer to the current edition of the *PNW Weed Management Handbook* and to *Herbicide-resistant Weeds and Their Management*, PNW 437. Both are available from OSU Extension <http://extension.oregonstate.edu/catalog/>

Fire

Fire by itself has yielded mixed results in suppressing knapweeds, but herbicides applied to vigorous young growth following a fire may be more effective than using herbicides alone.

Mechanical control

Hand-pulling small infestations of diffuse knapweed—removing the entire plant—has been effective but must be repeated two to four times a year for several years. Spotted knapweed reproduces vegetatively from short lateral roots, so pulling is less effective. Pulled plants must be properly disposed of to prevent spread. Mowing is effective in the bud to early flowering stage, but mowing mature plants will disperse seeds. Also, rosettes are generally too low to be cut successfully.

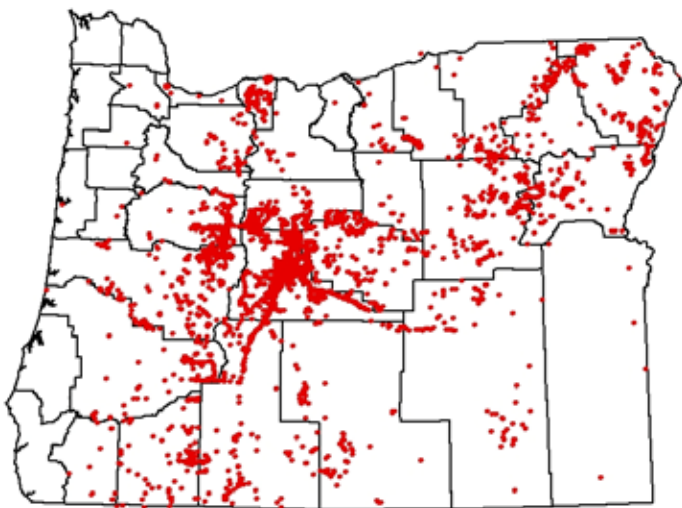


Figure 3a.—Spotted knapweed distribution in Oregon.
Map: Weedmapper.

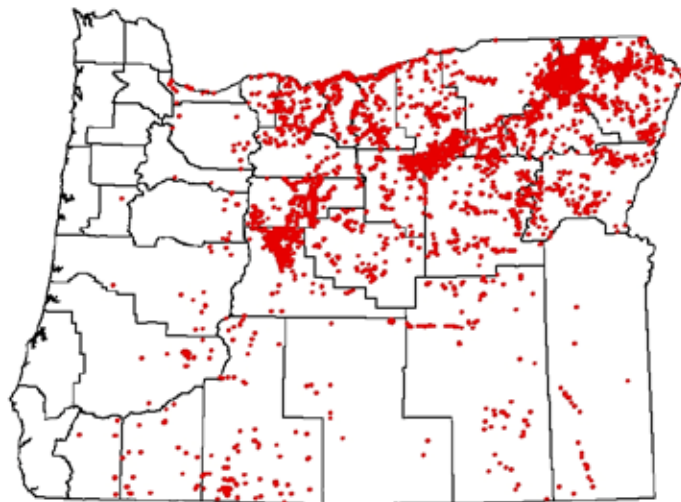


Figure 3b.—Diffuse knapweed distribution in Oregon.
Map: Weedmapper.

Grazing

Knapweeds are toxic to horses but can be grazed by cattle, goats, and sheep in early spring, which can reduce seed set significantly.

For more information

Weedmapper, a collaborative project of Oregon Department of Agriculture, Oregon State University, U.S. Bureau of Land Management, and U.S. Forest Service.
<http://www.weedmapper.org/>

California Department of Food and Agriculture, Encycloweedia.
<http://www.cdfa.ca.gov/phpps/ipc/weedinfo/>

Invasive and Exotic Species of North America.
<http://www.invasive.org/weeds/knapweed/chapter1.html>

State of Idaho Agriculture Noxious Weeds.
<http://www.agri.state.id.us/Categories/PlantsInsects/NoxiousWeeds/watchlist.php>

USDA Forest Service Database.
<http://www.fs.fed.us/database/feis/plants/forb/>

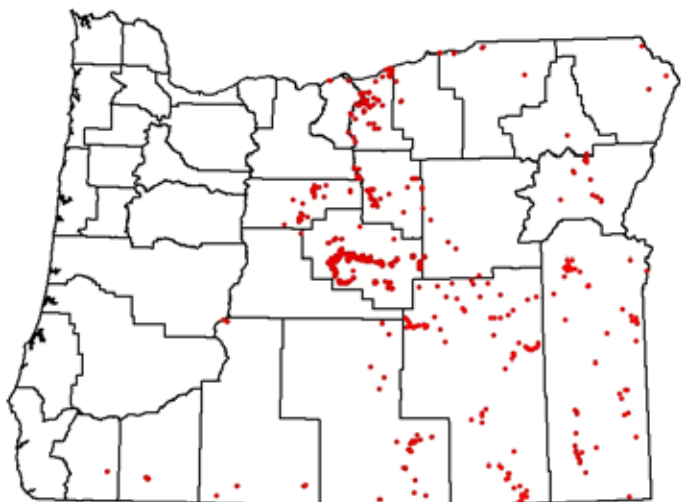


Figure 3c.—Russian knapweed distribution in Oregon.
Map: Weedmapper.

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