RANGE

Russian Knapweed no. 3.111

by K.G. Beck [1]

Quick Facts...

Russian knapweed is a creeping perennial that reproduces from seed and vegetative root buds.

Russian knapweed emerges in early spring, bolts in May to June, and flowers through the summer into fall.

Russian knapweed is toxic to horses.

The key to Russian knapweed control is to stress the weed and cause it to expend nutrient stores in its root system.

The best management plan includes cultural controls combined with mechanical and/or chemical control techniques.

Russian knapweed (*Acroptilon repens*) is a creeping, herbaceous perennial of foreign origin that reproduces from seed and vegetative root buds. Shoots, or stems, are erect, 18 to 36 inches tall, with many branches. Lower leaves are 2 to 4 inches long and deeply lobed. Upper leaves are smaller, generally with smooth margins, but can be slightly lobed. Shoots and leaves are covered with dense gray hairs. The solitary, urn-shaped flower heads occur on shoot tips and generally are 1/4 to 1/2 inch in diameter with smooth papery bracts. Flowers can be pink, lavender or white. Russian knapweed has vertical and horizontal roots that have a brown to black, scaly appearance, especially apparent near the crown.

The weed forms dense, single species stands over time due to competition and allelopathy (biochemicals it produces that inhibit the growth of other plants). A 2002 survey conducted by the Colorado Department of Agriculture showed Colorado with more than 118,341 infested acres of Russian knapweed. Russian knapweed is toxic to horses.

Phenology, Biology and Occurrence

Russian knapweed emerges in early spring, bolts in May to June (elevation dependent) and flowers through the summer into fall. It produces seeds sparingly, approximately 50 to 500 per shoot. Seeds are viable for two to three years in soil. Its primary method of reproduction is from vegetative propagation, with seed of secondary importance. Roots from a recently established plant expand rapidly and may cover up to 12 square yards in two growing seasons.

Russian knapweed is native to southern Ukraine, southeast Russia, Iran, Kazakhstan and Mongolia. It grows on clay, sandy or rocky prairies and sunny meadows; on saline soils; or clay, rocky or sandy shores of lakes and rivers; and on rocky and clay slopes of hills and bottomlands. It is a weed of cultivated land, dry pastures and degraded noncropland (waste places) in its native land. Russian knapweed grows in most western states. In Washington, it is common on heavier, often saline soils of bottomlands and grows in pastures, hayfields, grainfields and irrigation ditches. In Colorado, Russian knapweed is not restricted to certain soils and occurs in pastures, agronomic crops, roadsides, waste places and rangeland. Stands may survive 75 years or longer.

Management

Like other creeping perennials, the key to Russian knapweed control is to stress the weed and cause it to expend nutrient stores in its root system. An integrated management plan should be developed that places continual stress on the weed. Currently, the best management plan includes cultural control combined with mechanical and/or chemical control techniques. A single control strategy, such as mowing or a herbicide, usually is not sufficient.

Colorado State University Cooperative Extension

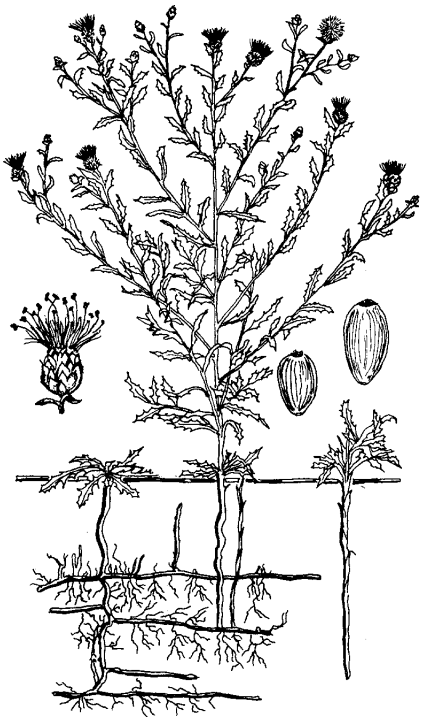

Figure 1: Russian knapweed.

When integrating chemical and cultural control, avoid using herbicide rates that injure grasses because effective competition will be reduced.

Russian knapweed typically invades degraded areas, dominating the plant community and desirable plants (e.g. perennial grasses). Seeding competitive, perennial grass species (cultural control) after Russian knapweed has been stressed by other control measures (set-up treatments) is essential. Set-up treatments may include chemical or mechanical methods.

Cooperative research between Colorado State University and the University of Wyoming showed that chemical set-up treatments were superior to mowing. Curtail (clopyralid + 2,4-D), Escort (metsulfuron), and Roundup (glyphosate) were used to suppress Russian knapweed. Then perennial grasses were sown in late fall as a dormant seeding. Tillage is necessary to overcome the residual allelopathic effects of Russian knapweed. Curtail (3 quarts per acre) (A) or Escort (1 ounce/A) were applied at the bud-growth stage. Roundup was applied twice at 1 quart/A, first at the bud-growth stage and again about 8 weeks later. Curtail controlled Russian knapweed best and Roundup failed to control it.

None of the herbicides injured seeded grasses. Grasses established similarly among herbicide suppression treatments, even though Russian knapweed control varied. However, where Escort or Roundup was used to suppress Russian knapweed, additional herbicide treatments would be necessary to achieve acceptable control.

While two mowings, eight weeks apart (first at bud-growth stage), suppressed Russian knapweed during that year, the weed recovered vigorously the subsequent season. Perennial grasses established in the mowing treatments but much less than in herbicide treatments. Two mowings per year for several years may control Russian knapweed better, but further research is needed to test this hypothesis. Currently, no biological control is available for this weed.

Chemical control. In most circumstances, an herbicide alone will not effectively manage Russian knapweed. However, there may be situations where desirable plants within a Russian knapweed infestation may compete effectively with the weed if it is stressed with a single weed management technique.

Russian knapweed is controlled with Tordon 22K (picloram) at 1 to 2 quarts/A. Tordon may be broadcast sprayed up to 1 quart/A or spot sprayed at rates up to 2 quarts/A. Tordon plus 2,4-D (1 to 1.5 pints + 1 quart/A) also will control Russian knapweed. If low rates of Tordon or Tordon plus 2,4-D are used, application for two consecutive years may be necessary to achieve adequate control. Apply Tordon any time the weed is actively growing.

For Telar (chlorsulfuron), a noncrop herbicide that controls Russian knapweed, application timing is critical. Apply (1 ounce/A) when Russian knapweed is in the bloom to postbloom stage. Earlier applications do not control the weed effectively. Fall is a good time to apply Telar, but it may injure smooth brome or other brome species. Always add a good agricultural surfactant at 0.25 to 0.5 percent v/v to the spray solution. Escort (metsulfuron) is labeled for pasture and rangeland use. Apply it at 0.75 to 1 ounce/A with a good agricultural surfactant. Optimum timing for Escort is similar to Telar.

Cultural control. Russian knapweed tends to form monocultures and usually eliminates other plants. Therefore, sowing desirable plant species is necessary after the weed is controlled. Smooth brome will compete with Russian knapweed. Research shows that streambank wheatgrass, thickspike wheatgrass, crested wheatgrass and Russian wildrye established after Russian knapweed was suppressed with herbicides. Sod-forming perennial grasses, like streambank or thickspike wheatgrasses, help prevent reinvasion better than bunch grasses like crested wheatgrass.

If the Russian knapweed stand is not too old and grasses are still present, stimulating grass growth by irrigation (where possible) should increase grass competition with knapweed and keep the weed under continual stress.

[1] *Colorado State University Cooperative Extension weed specialist and associate professor, bioagricultural sciences and pest management.*

Issued in furtherance of Cooperative Extension work, Acts of May 8 and June 30, 1914, in cooperation with the U.S. Department of Agriculture, Milan A. Rewerts, Director of Cooperative Extension, Colorado State University, Fort Collins, Colorado. Cooperative Extension programs are available to all without discrimination. No endorsement of products mentioned is intended nor is criticism implied of products not mentioned.