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Russian knapweed: biology and management

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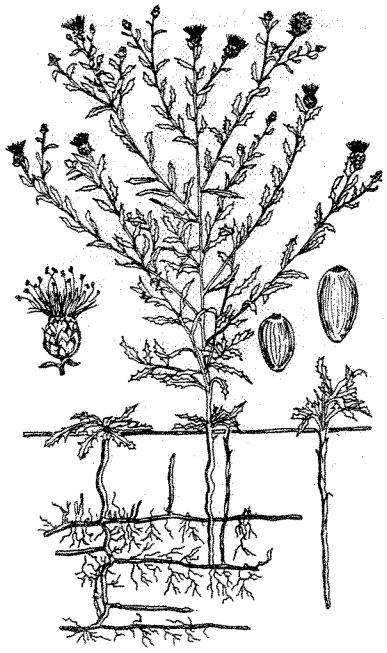
Quick Facts

- Russian knapweed is a creeping perennial that reproduces from seed and vegetative root buds.
- Russian knapweed emerges in early spring and 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.

Description

Russian knapweed *(Acroptilon repens)* is a creeping, herbaceous perennial that reproduces from seed and vegetative root buds. Shoots, or stems, are erect, about 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 urn-shaped flower heads are solitary and occur on shoot tips; they generally are one-fourth one-half inches in diameter and have smooth papery bracts. Flower color can be pink, lavender or white. Russian knapweed has horizontal roots that have a brown to black, scaly appearance, especially apparent near the crown. Russian knapweed forms dense, single species stands over time due to allelopathy (biochemicals produced by Russian knapweed that inhibit the growth of other plants) and competition.



Russian Knapweed

This information provided by:

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Phenology, Biology and Occurrence

Russian knapweed emerges in early spring, bolts in May to June (elevation dependent) and flowers through the summer into fall. Seeds are produced sparingly (approximately 1,200 per shoot) and are viable for two to three years in soil. Its primary method of reproduction is from vegetative propagation with plants produced from seed being of secondary importance. Roots from a recently established Russian knapweed 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 in these regions on clayey, sandy or rocky prairies and sunny meadows, on saline soils, or clayey, rocky or sandy shores of lakes and rivers, and on rocky and clayey slopes of hills and bottomlands. It is a weed of cultivated land, dry pastures, and degraded non-cropland (waste places) in its native land. Russian knapweed occurs 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 grows in pastures, agronomic crops, roadsides, waste places, and some rangeland. Stands may survive 75 years or longer. Russian knapweed is toxic to horses.

It is estimated that 27 Colorado counties have a total of 50,000 acres infested with Russian knapweed.

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.

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 methods (set-up treatments) is essential. Set-up treatments may include chemical or mechanical methods. Mow (mechanical control) at four- to six-week intervals over the growing season, followed by grass seeding in the fall. Begin mowing when Russian knapweed is in the early-bud stage. Follow with subsequent mowings when the weed approaches the same growth stage. Alternatively, spray a herbicide and follow with fall grass seeding. Choose a herbicide that does not negatively impact grass seedling establishment, such as glyphosate (Roundup), clopyralid plus 2,4-D (Curtail), or metsulfuron (Escort).

Research is in progress to refine and test the utility of these integrated management systems. However, it is essential to till before seeding or grasses will not establish. Currently, no biological control agents are available for Russian knapweed.

Chemical control. It is important to emphasize that in most circumstances, a herbicide alone will not effectively manage Russian knapweed. However, there may be limited situations where a land manager believes that the population of desirable plants in a Russian knapweed infestation may be sufficient to compete effectively with the weed if it is stressed with a single-weed management technique.

Russian knapweed is controlled effectively with picloram (Tordon 22K) at 0.5 to 1.0 lb ai/A (1 to 2 quarts of product). The new federal Tordon label restricts broadcast spraying to 0.5 lb ai/A but one can spot spray at rates up to 2.0 lb ai/A. Tordon plus 2,4-D (0.25-0.38 + 1.0 lb ai/A) also will provide effective control. 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 anytime the weed is actively growing. The Tordon label prohibits seeding perennial grasses the same year this herbicide is applied.

Chlorsulfuron (Telar) is a non-crop herbicide that controls Russian knapweed, but application timing is critical. Apply 0.75 oz ai/A (1 oz product) when Russian knapweed is in the bloom to post-bloom stage. Fall is a good time to apply Telar, but it may injure smooth brome or other brome species if they are present. Optimum timing for Telar applications on Russian knapweed is the bloom to post-bloom stage; earlier applications do not control the weed effectively. Always add a good agricultural surfactant at 0.25 to 0.5% v/v to the spray solution. Metsulfuron (Escort) is labelled for pasture/rangeland use. Apply it at 0.45 to 0.6 oz ai/A (0.75 to 1.0 oz product) with a good agricultural surfactant. Optimum timing for Escort application to control Russian knapweed 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. Recent research at Colorado State University indicates that smooth brome will compete with Russian knapweed. Other grasses may compete as well, but data that suggests recommendations are not available. 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 it under continual stress. When integrating chemical and cultural control, avoid using herbicide rates that injure grasses because effective competition will be reduced.