Acroptilon repens (L.) DC.
(= *Centaurea repens* L.)

Russian knapweed

Family: Asteraceae
Range: All western and central states. Less common in eastern and southern United States.
Habitat: Fields, rangeland, cultivated sites, orchards, vineyards, roadsides, ditchbanks, and waste places. Grows on many soil types, but prefers sites that have moist soils such as drainages, riparian zones, river bottoms, irrigated fields, and runoff areas that are not excessively wet. Once established, Russian knapweed is extremely drought tolerant and favors dry sites with full sun.
Origin: Native to central Asia.
Impacts: Russian knapweed is competitive and capable of forming dense monotypic stands. It also appears to have allelopathic properties. It has been shown that the plant can take up zinc from deep in the soil profile and deposit it on the soil surface to create a toxic environment. Russian knapweed can rapidly colonize disturbed areas. Populations are often extremely long-lived due to extensive root systems. Russian knapweed is toxic to horses, but livestock usually avoid grazing it because of its bitter taste.
Western states listed as Noxious Weed: Arizona, California, Colorado, Idaho, Montana, Nevada, New Mexico, North Dakota, Oregon, South Dakota, Utah, Washington, Wyoming
California Invasive Plant Council (Cal-IPC) Inventory: Moderate Invasiveness

Russian knapweed is a noxious perennial to 3 ft tall. The stems are erect, branched, leafy, and mostly covered with gray hairs. The leaves are alternate and do not extend down the stem as wings. Basal and lower stem leaves are mostly oblong, 2 to 5 inches long. Upper stem leaves are narrow, lanceolate to linear, 0.5 to 1.5 inches long. Old flower stems can persist for an extended period after senescence, eventually lodging and forming a significant thatch layer.

The flower heads are hemispheric, in panicle-like or flat-topped clusters. They consist of about 30 white, pink, or lavender-blue disk flowers interspersed with bristles on the receptacle. The flower heads remaining on old stems can aid in identification.

Russian knapweed roots can grow several feet deep, branching frequently to form an extensive vertical and horizontal root system. The plant reproduces primarily by vegetative shoots from creeping roots. Root fragments as small as 1 inch can develop into a new plant from depths to 6 inches. Russian knapweed also produces small quantities of viable seed, which fall near the parent plant or disperse with the seedheads. However, seedlings are uncommon. Seeds appear to survive 2 to 3 years under field conditions.

NON-CHEMICAL CONTROL

Mechanical (pulling, cutting, disking)	Seedlings are easily controlled by hand-pulling or digging, but these techniques do not control established plants because shoots quickly resprout from vast root reserves. Multiple mowing passes during a season can suppress Russian knapweed, but mowing alone will not eliminate an infestation, and can even stimulate an increase in shoot density the following year. Removal of top vegetation stimulates shoot sprouting from roots. Cutting or mowing three times a year depletes nutrients in the roots, but unless mowing is continued, plants will recover. Mowing may not be possible in environmentally sensitive areas. Summer mowing followed by herbicide in fall can be effective. Root fragments resprout following tillage. Clean equipment after tillage to prevent spreading root

	fragments. Repeated tillage to 1 ft deep over a period of about 3 years can kill much of the root system.
Cultural	Livestock usually avoid grazing Russian knapweed because of its bitter taste. Russian knapweed is toxic to horses. Goats have been used to graze Russian knapweed. Burning is not effective at controlling Russian knapweed, but it is helpful at removing accumulated thatch. Thatch burns best in winter or spring under dry conditions before initiation of spring growth. Russian knapweed is sensitive to light competition, and crops that produce dense shade can be used to suppress it. Cultivation of dense competitive crops such as cereal grains, alfalfa, or perennial grasses can reduce Russian knapweed in crop fields. Reseeding with perennial grasses following control with herbicides can be effective at suppressing reinfestation in dryland areas.
Biological	*Subanguina picridis* (Russian knapweed gall nematode) and *Aceria acroptiloni* (Russian knapweed mite) have been introduced and are established in several western states. These agents may help to stress the plant but will not eliminate it.

CHEMICAL CONTROL

The following specific use information is based on published papers and reports by researchers and land managers. Other trade names may be available, and other compounds also are labeled for this weed. Directions for use may vary between brands; see label before use. Herbicides are listed by mode of action and then alphabetically. The order of herbicide listing is not reflective of the order of efficacy or preference.

GROWTH REGULATORS	
Aminocyclopyrachlor + chlorsulfuron *Perspective*	**Rate:** 4.75 to 8 oz product (*Perspective*)/acre **Timing:** Postemergence, bud stage to senescence. Although above-ground stems die back in late summer and fall, the subsurface crown buds of Russian knapweed are highly susceptible to fall applications of this herbicide. Applications can be made into winter if conditions permit. **Remarks:** *Perspective* provides broad-spectrum control of many broadleaf species. Although generally safe to grasses, it may suppress or injure certain annual and perennial grass species. Aminocyclopyrachlor provides excellent control of Russian knapweed. It also gives soil residual control 1 year after application. Do not treat in the root zone of desirable trees and shrubs. Do not apply to frozen ground. Do not apply more than 11 oz product/acre per year. At this high rate, cool-season grasses will be damaged, including bluebunch wheatgrass. Not yet labeled for grazing lands. Add an adjuvant to the spray solution. This product is not approved for use in California and some counties of Colorado (San Luis Valley).
Aminopyralid *Milestone*	**Rate:** 3 to 7 oz product/acre (0.75 to 1.75 oz a.e./acre) **Timing:** Postemergence, bud stage to senescence. Although above-ground stems die back in late summer and fall, the subsurface crown buds of Russian knapweed are highly susceptible to fall applications of this herbicide. Applications can be made into winter if conditions permit. **Remarks:** Aminopyralid is one of the most effective herbicides for this weed. It is a broadleaf herbicide like picloram, but more selective. It also has a longer soil residual activity compared to clopyralid and can provide 2 years of control. Aminopyralid is safe on most grasses, although preemergence application at high rates can greatly suppress some annual grasses, such as medusahead. Applications can decrease seed production in some annual and perennial grass species. For postemergence applications, a non-ionic surfactant (0.25 to 0.5% v/v spray solution) enhances control under adverse environmental conditions; however, this is not normally necessary. Do not apply to frozen ground. Other premix formulations of aminopyralid can also be used. These include *Opensight* (aminopyralid + metsulfuron; 2.5 to 3.3 oz product/acre) and *Forefront HL* (aminopyralid + 2,4-D; 1.5 to 2.1 pt product/acre).
Clopyralid *Transline*	**Rate:** 0.67 to 1.33 pt product/acre (4 to 8 oz a.e./acre). Use higher rate for older plants or dense stands. **Timing:** Postemergence, bud stage to senescence. Although above-ground stems die back in late summer and fall, the subsurface crown buds of Russian knapweed are highly susceptible to fall applications of this herbicide. Applications can be made into winter if conditions permit. **Remarks:** Clopyralid has shorter soil residual activity compared to aminopyralid or aminocyclopyrachlor. It controls or injures plants in the Asteraceae and Fabaceae, but is safe on

	most other broadleaf species and all grasses. For postemergence applications, addition of a non-ionic surfactant (0.25 to 0.5% v/v spray solution) enhances control under adverse environmental conditions; however, this is not normally necessary. Clopyralid can also be tanked mixed with aminopyralid (*Milestone*) for effective control. Do not apply to frozen ground.
Clopyralid + 2,4-D *Curtail*	**Rate:** 2 to 4 qt *Curtail*/acre **Timing:** Same as for clopyralid. **Remarks:** Add a non-ionic surfactant.
Picloram *Tordon 22K*	**Rate:** 1 qt product/acre (0.5 lb a.e./acre) **Timing:** Postemergence, bud stage to senescence. Although above-ground stems die back in late summer and fall, the subsurface crown buds of Russian knapweed are highly susceptible to fall applications of this herbicide. Applications can be made into winter if conditions permit. **Remarks:** Picloram controls a wide range of broadleaf species and has relatively long soil residual activity. Although well-developed grasses are not usually injured by labeled use rates, some applicators have noted that young grass seedlings with fewer than four leaves may be killed. Do not apply near trees, or where soil is highly permeable and where water table is high. Do not apply to frozen ground. Picloram is a restricted use herbicide. Picloram is not registered for use in California.
AROMATIC AMINO ACID INHIBITORS	
Glyphosate *Roundup*, *Accord XRT II*, and others	**Rate:** 4 qt product (*Roundup ProMax*)/acre (4.5 lb a.e./acre). Spot treatment: 2% v/v solution. **Timing:** Postemergence to rapidly growing plants in the bud stage. **Remarks:** Glyphosate does not control Russian knapweed as well as some other products and will not kill seeds or inhibit germination the following season. Glyphosate has no soil activity and is nonselective. It can create bare ground conditions that are susceptible to weed recruitment. In areas with desirable vegetation, use spot treatment. Glyphosate is a good control option if reseeding is planned shortly after application, as it will not injure seedlings emerging after application. Add a surfactant when using a formulation where it is not already included (e.g., *Accord, Rodeo*, *Aquamaster*).
BRANCHED-CHAIN AMINO ACID INHIBITORS	
Chlorsulfuron *Telar*	**Rate:** 1 to 2.6 oz product/acre (0.75 to 1.95 oz a.i./acre) **Timing:** Postemergence at flower bud to flowering stage, or fall rosette stage, or winter. **Remarks:** Always use a surfactant. Included with aminocyclopyrachlor in *Perspective*.
Imazapic *Plateau*	**Rate:** 12 oz product/acre (3 oz a.e./acre) **Timing:** Late postemergence in fall when the top 25% of the plant is necrotic, but before a hard frost. Application should be made when some green stem and foliage remains on plant. Timing should correspond to fall basal growth. **Remarks:** Some trials show this treatment to provide no or only partial control, but Russian knapweed is included on the *Plateau* label. Selective to most native grasses. Higher rates may suppress seedings of some cool-season grasses. Add ammonium sulfate and a methylated seed oil. Imazapic is not registered for use in California.
Metsulfuron *Escort*	**Rate:** 1 to 2 oz product/acre (0.6 to 1.2 oz a.i./acre) **Timing:** Postemergence at flower bud to flowering stage or to fall rosettes. **Remarks:** Always use a surfactant. Other premix formulations of metsulfuron can be used at similar application timing. These include *Cimarron Max* (metsulfuron + dicamba + 2,4-D), *Opensight* (metsulfuron + aminopyralid), and *Cimarron X-tra* (metsulfuron + chlorsulfuron). Metsulfuron is not registered for use in California.

RECOMMENDED CITATION: DiTomaso, J.M., G.B. Kyser et al. 2013. *Weed Control in Natural Areas in the Western United States*. Weed Research and Information Center, University of California. 544 pp.