



# Squarrose Knapweed

*Centaurea virgata* Lam. ssp. *squarrosa* Gugl.

C. Roché and L.C. Burrill

Squarrose knapweed, introduced from southwest Asia and the Middle East, became weedy in northern California and Utah by the early 1950s. How it was originally introduced is not known, but its spread in California and Utah was associated with the trailing of range sheep.

Four California counties, Lassen, Modoc, Shasta, and Siskiyou, currently report a total of about 1,600 acres of squarrose knapweed. In Utah, it grows on over 100,000 acres in Juab, Tooele, Millard, Utah, and Sanpete Counties.

In 1988, an infestation of about 600 acres was found in Grant County, Oregon. In 1991, the weed supervisor in Malheur County, Oregon, found squarrose knapweed near the Malheur River.

Squarrose knapweed is a Class A noxious weed in Oregon and California and is listed as a noxious weed in Utah. Because Idaho and Washington have not found squarrose knapweed, they have not listed it as a noxious weed.



Figure 1.—Multiple rosettes atop a taproot characterize this long-lived perennial.



Figure 2.—Slender, urn-shaped heads have spreading or recurved spiny bracts.

## Identification

Squarrose knapweed, with other knapweeds, is a member of the thistle tribe in the sunflower family (*Asteraceae*). Its woody crown consists of one or more clusters of rosette leaves branching from a stout taproot (Figure 1). Several to many profusely branched stems grow 1 to 3 feet tall from each crown.

The stalked, deeply lobed basal leaves often wither by flowering time. Stem leaves are not stalked and have fewer lobes progressively up the stems. Uppermost leaves are bract-like.

Flower heads are borne singly or in pairs at the tips of the branches. The heads are smaller than other knapweeds in the West, containing only four to eight rose-purple or pink flowers.

On the bracts that surround the head, the terminal spine is longer and stouter than are the four to

six pairs of lateral spines. It usually spreads outward or curves backward toward the base (Figure 2).

The shape of the head and bract are somewhat similar to diffuse knapweed, but squarrose knapweed heads are a more slender urn shape.

Seed heads are deciduous at maturity by the development of a well-defined abscission layer at the base of the head. Heads normally contain one to four seeds, but empty seed heads are common.

Seeds are  $\frac{3}{16}$  to  $\frac{1}{4}$  inch long, including the whitish plume, which may be up to  $\frac{3}{8}$  as long as the body. Seeds are golden to dark brown with faint linear stripes and an oblique scar where they detach from the head.

## Biology and Ecology

Squarrose knapweed is a long-lived perennial. Under unfavorable conditions, plants appear to remain as taprooted rosettes for several years before developing flowering stems.

Flowering occurs from June to August, followed by seed dispersal from August through the winter. At seed maturity, the heads remain closed, but their attachment to the stems weakens so that slight motion of the plant causes heads to drop.

Although many heads fall near the base of the parent plant, the recurved bracts enable the heads to

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## Use herbicides 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.
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cling like burs to hair, wool, fur, or clothing when livestock, wildlife, or people brush against the plant.

Not all of the heads drop during late summer and fall; heads remaining on plants into the following spring greatly extend the distribution period. Squarrose knapweed along roads and railways is spread by vehicles and trains.

In Utah, most squarrose knapweed grows on big sagebrush-bunchgrass rangeland, but it also extends down into the salt desert shrub range and up into the juniper-dominated rangeland. It also competes with crested wheatgrass in rangeland seedings.

In northern California, squarrose knapweed grows on dry rocky sites of degraded juniper-shrub savanna with scattered western juniper and ponderosa pine and chaparral-type understory. In Oregon, it has invaded juniper-Idaho fescue rangeland and big sagebrush-bunchgrass rangeland with cheatgrass (downy brome).

As a long-lived perennial, squarrose knapweed appears better adapted than diffuse knapweed to the harsh climate of the shrub steppe rangeland in eastern Oregon and southern Idaho. Like the other knapweeds, squarrose

knapweed competes with forage species on rangeland. In the rosette stage, it may equal diffuse or spotted knapweed in palatability and nutritive value, but the mature plant is unpalatable. Its rosettes are grazed by sheep during late winter and spring.

## Control

Squarrose knapweed probably is more abundant in eastern Oregon and southern Idaho than has been reported. This is because careful observation is necessary to detect squarrose knapweed amid the already widespread diffuse knapweed. Check areas where historic sheep trails or current commerce with Utah and northern California may have brought in the weed.

Eradicate small infestations as they are found by grubbing, cultivation or herbicides. Stout taproots resprout when broken off, making hand pulling ineffective.

Cultivation and grubbing should cut the root at least 8 inches below the soil surface to prevent new shoots growing from the root. When dislodged by a single disking, rosettes continue to grow if they are attached to a piece of root that touches the soil.

Treat large infestations on rangeland with a combination of herbicides, improved grazing management and, if needed, revegetation with perennial forage species. Spot treat surviving plants and seedlings until no additional plants can be found. How long seeds remain viable in the soil is not known, but seeds protected by remaining in heads that fall to the ground and become buried probably last longer than unprotected seeds.

Two insects introduced for biological control of diffuse and spotted knapweed also reduce seed production in squarrose knapweed. These gall-forming flies, *Urophora affinis* and *Urophora quadrifasciata*, are widespread in all areas where the other knapweeds occur.

Since herbicide registrations change frequently, resulting in more or fewer available herbicides and changes in permissible herbicide practices, this publication doesn't make specific herbicide recommendations.

For current recommendations, refer to the *Pacific Northwest Weed Control Handbook*, published and revised annually by the Extension services of Oregon State University, Washington State University, and the University of Idaho.

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Photographs by Cindy Roché.

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