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# KNOW AND CONTROL SPOTTED AND DIFFUSE KNAPWEED

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Idaho range and pasture users are losing valuable feed to spotted and diffuse knapweed where these have invaded a broad spectrum of range sites. A practical control program can eliminate this loss and produce up to an 8-fold increase in forage.

Spotted and diffuse knapweeds are closely related species. Spotted knapweed, *Centaurea maculosa*, and diffuse knapweed, *Centaurea diffusa*, both thrive in range and pasture soils throughout Idaho. Both weeds are good competitors. Both grow well under moisture conditions as low as 12 inches per year. Neither weed has any forage value. In fact, high levels of consumption of either species can cause toxicity symptoms, especially in horses.

Spotted knapweed now is found primarily in northern counties and in the Salmon River area while diffuse knapweed is centered in the Blaine-Camas County area (Fig. 1). However, both species are spreading rapidly, invading adjacent counties and moving into range areas throughout the state.

These weeds may appear to be annuals or biennials under Idaho environmental conditions. However, spotted knapweed is a biennial or short-lived perennial and diffuse knapweed is a winter annual, occasionally acting as a biennial. Seedlings that establish in the summer or fall form a flat rosette of leaves. In May to July of the second year, flower stalks develop. Seed is produced in August and the flower stalk dies when soil water is depleted or when frost occurs. A few plants will regrow from crown buds, form a new rosette and produce seed a second or third time.

## RECOGNITION

The first steps in preventing these weeds from spreading

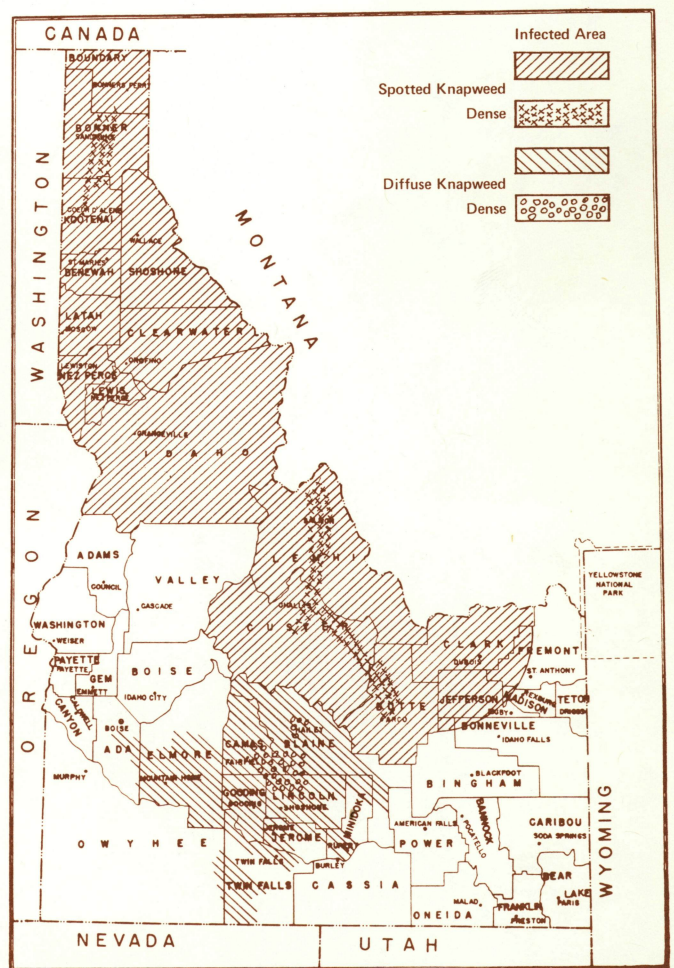


Fig. 1. Location of spotted and diffuse knapweed infestations in Idaho.



into new areas are learning to recognize the weed and eliminating any established plants before an infestation develops. In the early stages of growth both spotted and diffuse knapweed have deeply cut leaves with grayish, thin, small hairs and ridged stems (Figs. 2 and 3). The plants are gray-green in color.

Spotted knapweed grows taller and has more limited branching than the bushy diffuse knapweed. Spotted knapweed reaches heights of 12 to 60 inches, while diffuse knapweed grows to heights of 4 to 40 inches. Except in very dense stands, diffuse knapweed will develop a growth habit that is round-bushy and when it matures it will break off and roll like a tumbleweed.

The flower heads of spotted knapweed are larger than diffuse knapweed and can be grasped with a bare hand. The bracts under the flower heads on spotted knapweed have dark comblike tips which give the head a spotted appearance (Fig. 4). Spotted knapweed usually has pink-purple flowers with occasionally a few white ones. The flower heads open soon after the seed is mature and the seed is shed when the plant is shaken by the wind. Some of the seeds have a short pappus or parachute which enables them to be carried by the wind, and thus spread farther from infested areas.

The uniform colored bracts on diffuse knapweed are comblike and tipped with small spines which give the plant its disagreeable, spiny character (Fig. 5). Diffuse knapweed

has dirty white, creamy or purple flowers. The seeds are strongly held in the head. This character enables the seed to be spread widely with the tumbling of the plant during fall and winter.

## MANAGEMENT

Since both of these knapweed species spread by seed, a control program to prevent seed development is essential.

These invading weeds usually first gain a foothold on disturbed soil areas such as along roadsides, powerlines and cattle and sheep driveways. Often these species establish most readily on gravelly soils where other plants are poor competitors. After establishing on disturbed soil areas, they then spread rapidly into more stable areas.

Good management of the land is essential to reduce invasion of these knapweeds. Vigorous grass stands will provide competition and improve the results from control measures.

## CONTROL

Control with cultivation is effective. However, cultivation is not always practical on range sites, and it also opens up the land for invasion by other weeds. Generally, these knapweeds are unable to compete on land that regularly produces cultivated crops such as small grains or row crops.



Fig. 2. *Centaurea maculosa* Lam. Spotted Knapweed. A, Habit; B, enlarged leaf; C, flower head; D, disk flower; E, achenes.



Fig. 3. *Centaurea diffusa* Lam. Diffuse knapweed. A, Habit; B, young rosette, showing long petioled basal leaves; C, cauline leaf, sessile; D, flower head; E, flower; F, achenes.





Fig. 4. Flower heads of spotted knapweed.



Fig. 5. Flower heads of diffuse knapweed.

Biological control is under study for infested areas which are difficult to reach with herbicide application equipment. A small fly, *Erophora affinis*, is on trial for reducing seed production of both diffuse and spotted knapweed. A moth, *Metzneria aucipunctella*, also shows possibilities for control of these two knapweeds. Biological control will never eliminate the weed but it may keep populations at a low enough level to allow grasses to compete better, thus slow the spread and economic impact of the knapweeds.

Control with herbicides is the most practical and effective method for reducing and eventually eradicating these weeds from roadside, fence row, pasture and rangeland. Knapweeds are most easily controlled with herbicides when the weeds are in the seedling or rosette stage. Once flowering has started plants are more difficult to kill and more herbicide is needed. A continuing herbicide program must be followed to eradicate the weeds.

Treatment with 2,4-D will economically and effectively control either spotted or diffuse knapweed. The amine and ester formulations of 2,4-D are equally effective. Apply at the rate of 1 to 1½ pounds active ingredient per acre. Apply 2,4-D when the plant is in the early rosette stage before first bud. Summer rains bring new seedlings, so two treatments a year may be needed to prevent late flowering and seed production.

Treatment with an herbicide that has longer soil residual is desirable to control seedlings as they emerge after the initial treatment. Properly timed application of

picloram (Tordon) will result in excellent control of established plants. Picloram at ¼ to ½ pound per acre will control seedlings for 1 or 2 years after application.

Other growth regulator herbicides such as Dicamba (Banvel), Silvex and 2,4,5-T will also control these knapweed species. However, because they have a relatively short residual life, these chemicals are less economical than 2,4-D unless another weed species is to be controlled in the same spray operation.

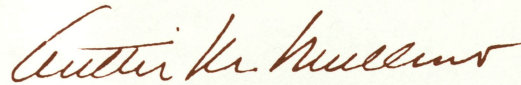
### Your Action Program To Control Knapweeds

1. Learn to recognize spotted and diffuse knapweed.
2. Plan and conduct a persistent, comprehensive herbicide treatment program to eradicate existing knapweed plants and prevent establishment of new seedlings. Prevent seed production and further spread by proper application of herbicides such as 2,4-D or picloram. Do this at least 2 years, more as necessary.
3. Manage areas to allow development and growth of competitive vegetation as soon as possible if soil surface is disturbed.

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