

RUSSIAN KNAPWEED

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RUSSIAN KNAPWEED — *Centaurea repens* —
Showing part of stem with flowers, nature of
root growth, a basal leaf and two views of
seed. Seed magnified 5 diameters.

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RUSSIAN KNAPWEED

(*Centaurea repens*)

Other names: Turkestan thistle, Blackroot

BY REX WARREN AND VIRGIL FREED*

RUSSIAN knapweed is one of the bad, noxious weeds in Oregon. It is reported in all eastern Oregon counties. This weed occasionally grows in alfalfa fields of eastern Oregon; improperly cleaned alfalfa seed could be a source of spread. The weed spreads by underground roots, as well as by seeds.

Leaves on mature stems are small and narrow with unbroken edges. Ends of leaf blades are narrowed, with small sharpish tips. Leaves and stems are covered with short, stiff, sticky hairs that are irritating to the skin. Leaves at base of plant are large and similar to dandelion leaves, but those toward the top of the stem are smaller.

The rootstock of this weed is dark brown or black, woody and scaly. It is sometimes called "blackroot." These woody, dark root-stalks provide the easiest identification of the plant. The roots penetrate downward many feet, and a few inches from the surface send out lateral rootstocks that form new plants at frequent intervals. Portions of roots, if broken off, may grow and form new plants.

Young stems of Russian knapweed are covered with soft gray nap, not usually present on the branches. Stems normally grow 3 or 4 feet high. The plant has very little forage value, either green or dry. It appears to be distasteful to animals and the stems are stiff and woody even when young. The mature stems are hard and harsh.

The flowers somewhat resemble those of common bachelor button or French pink, and are borne on rather long, leafy stems. Flower heads are from $\frac{3}{8}$ to $\frac{1}{2}$ inch in diameter, range in color from lavender to white, and are usually almost round. Absence of thorns, size of the heads, and the way the flowers are borne distinguish this weed from most of the true thistles.

Seeds of Russian knapweed are light gray, almost straw-colored, and shine like fresh, clean wheat straw. Sometimes they are slightly curved, but are generally symmetrical—flattened, one end pointed, and the other rounded. Although the seed is slightly larger than alfalfa it is rather difficult to clean from it and also from red and sweet clover. Seeds have short, rather stiff hairs, that usually break off in threshing or handling.

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Damage

Russian knapweed ordinarily grows in very dense patches, so thick that they are difficult to walk through. They completely occupy the ground, and no crop will grow among them. They also spread and enlarge their patches in alfalfa or even in bluegrass sod, although spread is more rapid in cultivated land. Hogs seem to like the heavy roots, but no other animals get much of value from the plant at any stage except very early in the spring.

Oregon Seed Law

► Seed containing *any* seeds of Russian knapweed may not legally be offered for sale in Oregon.

Control by Cultivation

For large patches of an acre or more, continuous cultivation is a recommended control method. Two to three years of continuous cultivation will be needed for eradication. Best results have been obtained with 10 to 12 cultivations each season. Control is obtained more quickly when the new plants have 8 to 12 days green growth between cultivations. This delayed cultivation results in the plant utilizing more stored food reserves than under clean cultivation.

In the lower-elevation, long-seasoned sections of Oregon the deferred fallow system would probably work as well as season-long cultivation, and it costs only a third as much. To use the deferred fallow method, seed a fall crop at about twice the usual rate, cut early for hay, then plow and work the ground. Recultivate when the regrowth has 8 to 12 days green growth. In the fall seed another crop and repeat the operation.

Control by Chemicals

Sodium chlorate applied either in the spray or powder form is an effective chemical. It should be applied on most soils at the rate of 4 to 6 pounds of chlorate to the square rod. When used in the spray form, 1 pound of the chemical is dissolved in one gallon of water. If spraying is to be practiced, spray as the weeds are approaching maturity, in the late summer or fall.

Applying the dry chlorate directly to the soil has given as satisfactory control as spraying the foliage. This practice has the advantage of requiring less equipment and no hauling of water, and to a large degree eliminates the fire hazard that is present after spraying. As the chemical does not distribute itself any distance

laterally through the soil, it is very important that the entire area be evenly covered. Dry applications are made easier after the top growth of the plants has been mowed. Fall applications are more satisfactory in areas of less than 30 inches of rainfall.

Sodium chlorate is dangerous to use if due caution is not exercised. When applied as a spray, the clothing and footwear of the operator should be thoroughly washed or discarded immediately after spraying. This precaution lessens fire hazards to the operator.

Soil fumigant materials have proved their effectiveness in controlling Russian knapweed. Carbon bisulfide has been used successfully for years but is now being replaced by the chlorinated propanes and propenes, commonly called prochlor. These prochlor are liquids that form a gas when injected into the soil. They are easier to apply and less expensive to use than carbon bisulfide. These materials give best results when applied after the soil has been worked, similar to preparing a seed bed. The moisture content of the soil should be about the same as needed for seed germination. The prochlor should be injected 4 to 6 inches deep into the soil, at the rate of 40 to 60 gallons per acre ($\frac{3}{4}$ to 1 teaspoon per injection for individual hand applications). The prochlor should be spaced not more than 9 to 12 inches apart for best results.

Heavy applications of 2,4-D have been used successfully in eastern and southern Oregon. Five to fifteen pounds of 2,4-D applied with 25 to 50 gallons of water per acre when the knapweed is in the bud stage has given 70 to 80 per cent control. Several applications over a period of two or more years are needed for eradication. Certain mixtures of 2,4-D with other chemicals have shown promise on this weed experimentally.

Crop Competition

Fair results have been obtained by planting infected areas to perennial grass crops. These crops offer competition to the Russian knapweed and aid in keeping it suppressed. The planted crop needs heavy fertilization to insure good growth. Best results in establishing stands of competitive crops are obtained when the Russian knapweed areas are cultivated for at least one year prior to the planting of the competitive crop. Grass crops are better adapted for competitive crop purposes than legumes. They can be sprayed selectively with 2,4-D.