A5. KNAPWEEDS

All the knapweeds and starthistles are closely related members of the thistle tribe within the sunflower family. There may be as many as 1300 species worldwide, but only a handful are native to the U.S. Many knapweeds have moved from their native areas in Europe, Asia and North Africa to other parts of the world and established as weedy pests.

1. Diffuse Knapweed (Centaurea diffusa)

A. Description

Diffuse knapweed is a biennial plant and like all the other knapweeds, a member of the sunflower family. Its flowers are usually white, but occasionally have a purple or bluish tinge. As a mature plant, it grows to 2-3 feet in height and often forms thick stands which are nearly impenetrable by livestock and wildlife.

B. Native Area/Arrival In The U.S.

Diffuse knapweed, native to grasslands and shrub steppes of the eastern Mediterranean and western Asia, occurs from the southern former USSR to western Germany, and is especially common in the Ukraine and Crimea. The earliest record of diffuse knapweed in western North America is from an alfalfa field at Bingen, Washington in 1907. The spread of diffuse knapweed has been like a wildfire: sending out fingers along roads establishing spot infestations in disturbed sites, and then eventually with the spots coalescing.

C. Current Status

Diffuse knapweed has increased in range by more than double in Oregon in the last decade. It is credited with reducing biodiversity, increasing soil erosion, reducing land value, increasing cost of roadside maintenance, threatening natural preserves, and replacing wildlife and livestock forage on rangeland and pasture. Economic losses are often calculated in terms of forage loss. For example, a 1988 estimate of loss of forage production of knapweed infested range and pasture in eastern Washington was 130 million lbs (29 million kg) of feed annually, which was translated into $951,000 as pasture or rangeland AUMs; or $2.9 million in hay as replacement feed.

The long-term solution to diffuse knapweed includes a combination of proper grazing management, judicious use of herbicides, development of effective biological control agents, and a high level of public awareness

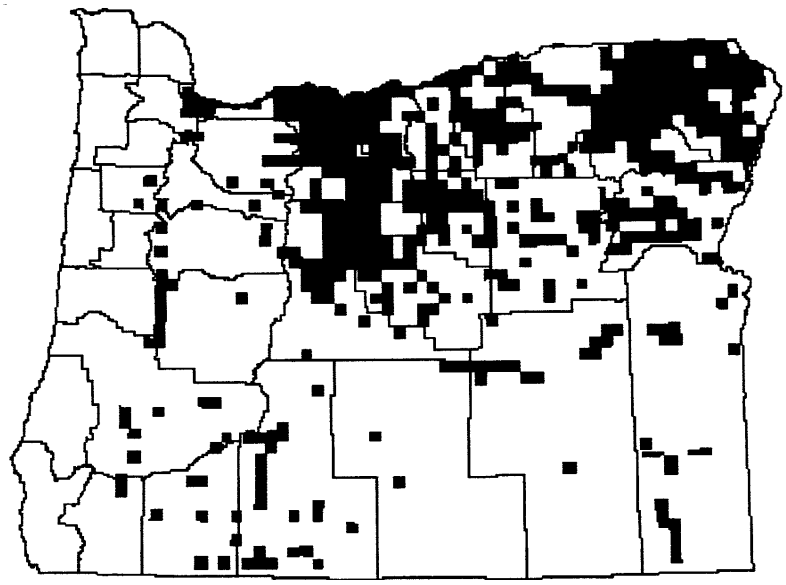
D. References For More Information

Roché. Ben F. Jr. and Cindy Talbott Roché. Diffuse Knapweed. Pp 217-230. In: Sheley, Roger L. and Janet K. Petroff (eds.). Biology and Management of Noxious Rangeland Weeds. Oregon State University Press. Corvallis, Oregon. 1999.

Figure A.9
Diffuse Knapweed

Source: Photo by R. D. Richard. USDA-APHIS. Bozeman, MT.

Figure A.10
Oregon Diffuse Knapweed 1999



2. Spotted knapweed (Centaurea maculosa)

A. Description

Spotted knapweed, a perennial, is a taprooted Eurasian weed invading rangeland throughout the western United States and Canada. Its root invades portions of the soil profile not much used by native plants, forms thick stands and probably competes directly with established perennial plants for moisture and nutrients. Spotted knapweed invasion is associated with reduction in biodiversity, wildlife and livestock forage, and increased soil erosion.

B. Native Area/Arrival In The U.S.

Little is known of the way in which spotted knapweed came to North America, but it was probably introduced in several different instances. This weed had spread to 20 counties in the Pacific Northwest by 1960, and to 48 counties by 1980. Between 1980 and 1999, the range of spotted knapweed rapidly increased to include 326 counties in the western United States, including every county in Washington, Idaho, Montana, and Wyoming. In Europe, spotted knapweed is most aggressive in the forest-grassland interface on deep, well-developed to dry soils, but can form dense stands in more moist areas on well-drained soils including gravel, and in drier sites where summer precipitation is supplemented by runoff.

C. Current Status

Currently spotted knapweed probably occupies less than 10% of its total potential range in Oregon. Its effects on native communities is more studied than other knapweeds, and in one study, spotted knapweed infestations decreased bluebunch wheatgrass yield by 88 percent. Elk use was reduced by 98 percent on spotted knapweed-dominated range. Spotted knapweed dominance on bunchgrass rangeland is also detrimental to water and soil resources. Surface water runoff and stream sediment yield were higher by factors of 0.56 to 1.92, respectively, for spotted knapweed-dominated sites compared to bunchgrass-dominated sites. On the beneficial side, however, spotted knapweed provides nectar and pollen for domestic bees.

Preventing spotted knapweed from spreading onto adjacent rangeland is the most cost-effective management strategy. On areas with a competitive grass stand, proper grazing management ensures that grasses remain strong and vigorous, thereby minimizing knapweed encroachment.

D. References For More Information

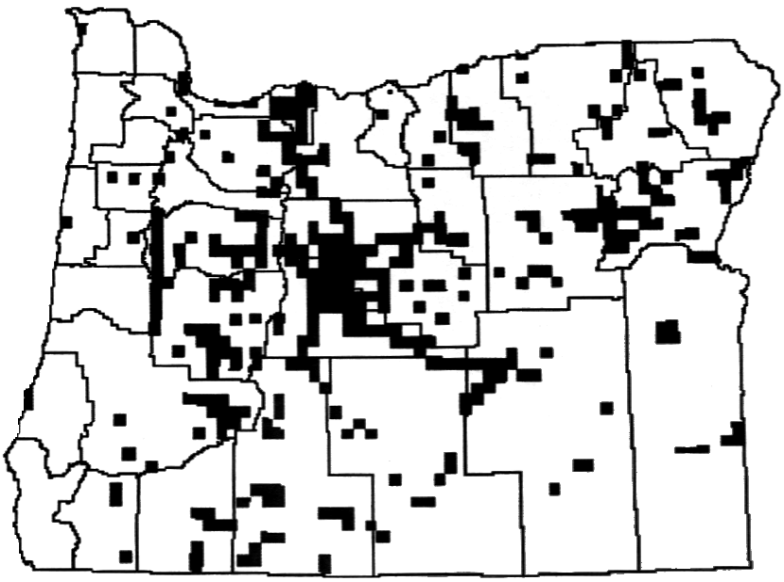
Sheley, Roger L., James S. Jacobs, and Michael L. Carpinelli. Spotted Knapweed. Pp 350-36. In: Sheley, Roger L. and Janet K. Petroff (eds.). Biology and Management of Noxious Rangeland Weeds. Oregon State University Press. Corvallis, Oregon. 1999.

Roché, C.T. "Costs of Knapweed on Rangelands in Eastern Washington." *Knapweed Newsletter*. Vol. 2, No. 4:4. Washington State University. Cooperative Extension. Pullman, Washington. 1998.

Figure A.11
Spotted Knapweed

Source: Photo by Cindy Talbott Roché. Asotin, WA.

Figure A.12
Oregon Spotted Knapweed 1999



3. Russian Knapweed (Centaurea repens)

A. Description

Russian knapweed is a perennial noxious weed that establishes as monocultures. It is allelopathic (discourages or excludes nearby plants with an herbicide-like exudate) and very competitive. It fills in as other perennial plants are overgrazed or eliminated by disturbances. Russian knapweed has protein values equal to alfalfa hay, but is not eaten by livestock because of its bitter flavor. Plants infested as fresh or dried forage are toxic to horses, causing the neurological disorder nigropallidal encephalomalacia.

B. Native Area/Arrival In The U.S.

Russian knapweed is a native of Eurasia, probably introduced to North America about 1898. It is widely established in the western United States, and forms dense colonies in cultivated fields, orchards, and pastures, along stream banks and on roadsides. In 1998, Russian knapweed was considered a noxious weed in 412 counties within 21 western U.S. States Russian knapweed invades open, disturbed land, suppresses growth of surrounding plants, and once established, forms a single-species stand.

C. Current Status

The BLM estimates the average annual rate of spread to be eight percent in the northwestern United States, with an annual loss of 55 percent in livestock carrying capacity. Russian knapweed infestations in 1998 were estimated at 1,380,000 acres (557,000 ha) in the western United States. Wyoming infestations have increased annually by an 11 percent average rate, occupying about 116,000 acres. Infestation in Oregon, in 1998 is estimated to be 3,000 acres.

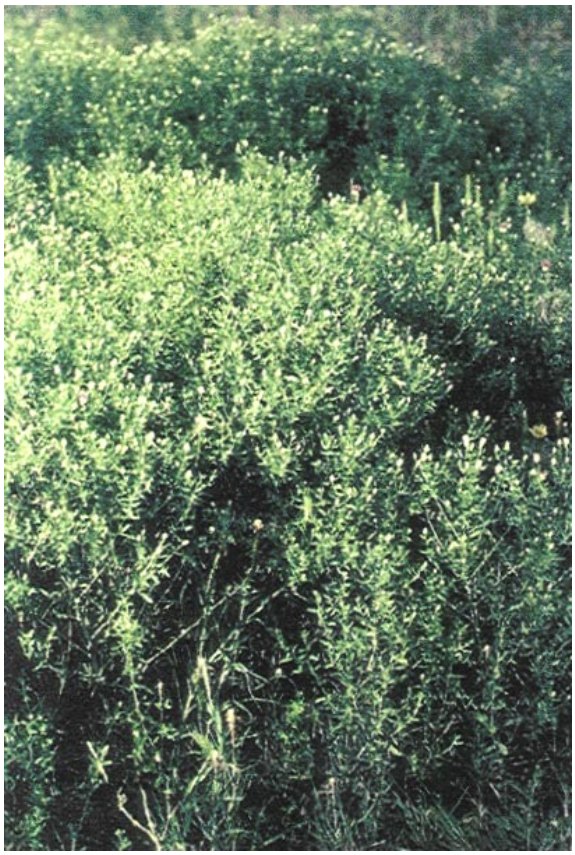
In addition to reducing forage for livestock, this perennial weed greatly reduces biodiversity for wildlife habitat. Cropland infested with Russian knapweed in past years has caused lands to be abandoned.

D. References For More Information

Whitson, Tom D. Russian Knapweed. Pp 315-322. In: Sheley, Roger L. and Janet K. Petroff (eds.). Biology and Management of Noxious Rangeland Weeds. Oregon State University Press. Corvallis, Oregon. 1999.

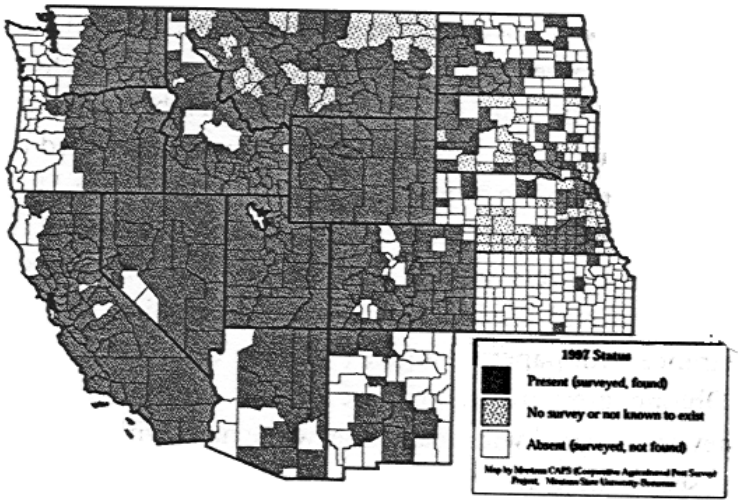
Roché, C.T. "Costs of Knapweed on Rangelands in Eastern Washington." *Knapweed Newsletter*. Vol. 2, No. 4:4. Washington State University. Cooperative Extension. Pullman, Washington. 1998.

Figure A.13
Russian Knapweed



Source: Photo by Roger Sheley. Montana State University.

Figure A.14
Distribution of Russian Knapweed by County in the Western United States



Note: Data were collected by surveying various weed authorities in each state.

4. Squarrose Knapweed (Centaurea virgata)

A. Description

Squarrose knapweed is another perennial member of the knapweed group. It prefers drier conditions than spotted knapweed, and endures very dry and harsh conditions in its native area. A long-lived perennial with deep roots and a stout crown, squarrose knapweed can endure drought at either temperature extreme, and does not depend on annual seed production or frequent seedling success to maintain its populations. Like the other knapweeds, it competes with forage species on rangeland. In the rosette stage, its palatability and nutritive value may be equivalent to diffuse or spotted knapweed. Squarrose knapweed rosettes are grazed by sheep during late winter and spring. Cattle also graze rosettes, especially in years of below-normal rainfall when cheatgrass and other annual forage is in short supply.

B. Native Area/Arrival In The U.S.

Squarrose knapweed is native to Bulgaria, Lebanon, Iran, Afghanistan, and Turkestan. The plant was first noted in California in the mid 1930's. Squarrose knapweed was first documented in Siskiyou County, California around 1969, and by 1988 had spread to approximately 300 acres. In 1994 the distribution of squarrose knapweed in California was mapped in seven counties. In Oregon, 1988 brought the first report of squarrose knapweed, a 200-acre infestation within a total area of 800 acres near Long Creek, Grant County.

C. Current Status

Squarrose knapweed is now known from only one area in Grant County near Long Creek. Two other sites have been eradicated. Sizable infestations are present in California very near the Oregon border, and in Utah, squarrose spread very rapidly and is proving difficult to control. Large rangeland infestations may be managed with a combined system using herbicides, revegetation with perennial forage species, and improved grazing management.

D. References For More Information

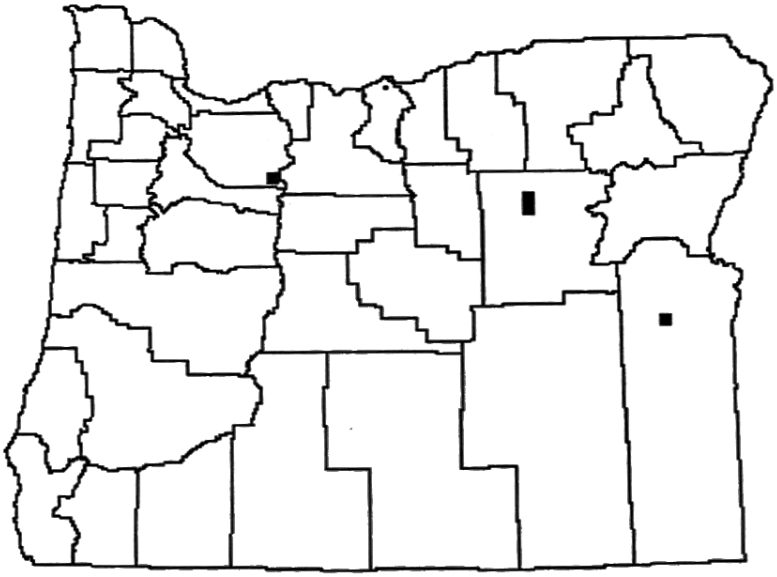
Roché, Cindy Talbott. Squarrose Knapweed. Pp 362-371. In: Sheley, Roger L. and Janet K. Petroff (eds.). Biology and Management of Noxious Rangeland Weeds. Oregon State University Press. Corvallis, Oregon. 1999.

Roché, C.T. "Costs of Knapweed on Rangelands in Eastern Washington." *Knapweed Newsletter*. Vol. 2, No. 4:4. Washington State University. Cooperative Extension. Pullman, Washington. 1998.

Figure A.15
Squarrose Knapweed

Source: Photo by Cindy Talbott Roché. Asotin, WA.

Figure A.16
Oregon Squarrose Knapweed 1999



A6. GORSE

A. Description

Gorse (Ulex europaeus) is a dense, spiny evergreen, legume shrub which resembles Scotch broom but has sharp, stiff spines the people, livestock and wildlife avoid. It flowers in late winter and early spring, with bright yellow blossoms much like those of broom.

B. Native Area/Arrival In The U.S.

Introduced up and down the West Coast from Europe as an ornamental late in the 1800's, gorse succeeds well in regions of mild winters and sandy or gravelly solids with abundant moisture. At many sites in the western U.S., it survives and reproduces in drier areas and in areas of clay soils. There are established infestations from the Olympic Peninsula and Puget Sound in Washington, south through coastal counties in southern California.

C. Current Status

Gorse in common in coastal areas of Lane, Douglas, Coos and Curry Counties in Oregon, and small infestations are known from other coastal counties and from inland areas as well. Slow in becoming established and spreading, gorse crowds out other vegetation and forms dense and persistent thickets that render land almost worthless. The oil in the plant combined with dead any-matter creates a serious fire hazard. Its persistence, constant fire hazard and ability to encroach on agricultural and recreational lands make it a troublesome brush pest. Once gorse becomes established with long living seed deposited in the soil, eradication is difficult, if not impossible.

D. References For More Information

Parker, Robert, and Larry Burrill. Gorse. Pacific Northwest Extension Publication. PNW 379.

Figure A.17
Established Gorse Plants

Figure A.18
Gorse Flowers

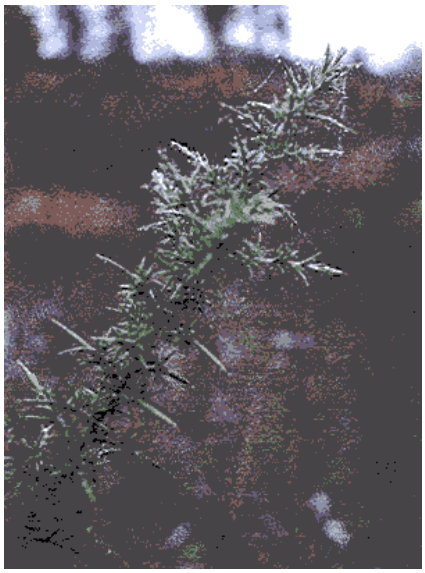



Figure A.19
Stiff Spinelike Leaves of Gorse