

# spotted knapweed

## *Centaurea stoebe* ssp. *micranthos* (Gugler) Hayek

Synonyms: *Acosta maculosa* auct. non Holub, *Centaurea biebersteinii* DC., *C. maculosa* auct. non Lam, *C. maculosa* ssp. *micranthos* G. Gmelin ex Gugler

Other common names: None

Family: Asteraceae

**Invasiveness Rank:** 86 The invasiveness rank is calculated based on a species' ecological impacts, biological attributes, distribution, and response to control measures. The ranks are scaled from 0 to 100, with 0 representing a plant that poses no threat to native ecosystems and 100 representing a plant that poses a major threat to native ecosystems.

### Description

Spotted knapweed is a biennial to short-lived perennial plant. Stems are 30½ to 91 cm tall and generally branched. Rosette leaves are compound with several irregularly lobed segments. Stem leaves are alternate, 5 to 15 cm long, more or less hairy, and resin-dotted. Lower stem leaves are narrowly divided, while the upper stem leaves are undivided. Flower heads are 19 to 25½ mm wide and are composed of purple disc florets (Royer and Dickinson 1999, Whitson et al. 2000).



*Centaurea stoebe* L.

**Similar species:** Spotted knapweed can be confused with two other species potentially occurring in Alaska. Diffuse knapweed (*C. diffusa*) can be distinguished from spotted knapweed by its spine-tipped floral bracts. Unlike spotted knapweed, yellow star-thistle (*C. solstitialis*) has yellow flowers and floral bracts that are tipped with sharp yellow spines (Royer and Dickinson 1999). Knapweeds can be distinguished from thistles (*Cirsium* species) by their lack of spiny leaves.

### Ecological Impact

**Impact on community composition, structure, and interactions:** Spotted knapweed often forms dense stands in natural communities. Infestations reduce the vigor of native plants, decrease the species diversity of plant communities, and degrade the forage quality of wildlife habitats. Winter-ranging elk may avoid foraging in spotted knapweed dominated communities (Rice et al. 1997). Knapweeds are allelopathic, inhibiting the establishment and growth of surrounding vegetation (Whitson et al. 2000).

**Impact on ecosystem processes:** Infestations of spotted knapweed have been shown to increase the erosion of topsoil. Sediments in surface run-off were approximately three times the amount in sites dominated by spotted knapweed than they were in sites dominated by native bunchgrass (Rice et al. 1997).

### Biology and Invasive Potential

**Reproductive potential:** Spotted knapweed reproduces by seeds only. Large plants can produce over 20,000 seeds (Royer and Dickinson 1999). Approximately 30% of seeds buried in the soil remain viable after eight years (Mauer et al. 1987).

**Role of disturbance in establishment:** Anthropogenic disturbances, including overgrazing and mechanical soil disturbance, accelerate the establishment of spotted knapweed. Both biotic and abiotic soil disturbances (frost heaves, burrowing by small mammals, and trampling and grazing by native ungulates) can facilitate the invasion of spotted knapweed (Tyser and Kye 1988).

**Potential for long-distance dispersal:** Seeds lack pappi, but have been reported to be dispersed by wind. They can be transported by rodents and livestock (Mauer et al. 1987).

**Potential to be spread by human activity:** The dispersal of spotted knapweed seeds is primarily related to human activities. Seeds can be transported on vehicles, machinery, and aircraft. They are also widely dispersed as a contaminant in hay, commercial seed, and floral arrangements (Mauer et al. 1987).

**Germination requirements:** Spotted knapweed seeds germinate over a wide range of soil depths, moisture

conditions, and temperature regimes. Seedlings that emerge early in spring have a high probability of survival and reproduction during the following year. Those emerging later (in June or July) have reduced survival rates and almost no stem production during the following season (Schirman 1981).

**Growth requirements:** Spotted knapweed grows well in light, porous, fertile, well-drained, high pH soils, especially in areas with warm summers. It tolerates both dry and moist conditions (Beck 2003).

**Congeneric weeds:** Twelve *Centaurea* species are considered noxious weeds in one or more state of the U.S. or province of Canada. All *Centaurea* species are listed as noxious weeds in Ontario (Invaders 2010, USDA 2010).

### Legal Listings

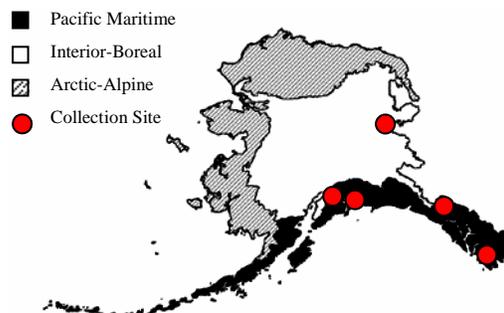
- Has not been declared noxious
- Listed noxious in Alaska
- Listed noxious by other states (AZ, CA, CO, CT, ID, MA, MT, ND, NE, NM, NV, OR, SD, UT, WA, WY)
- Federal noxious weed
- Listed noxious in Canada or other countries (AB, BC, MB, ON, SK; New South Wales)

### Distribution and abundance

Spotted knapweed establishes primarily along highways, waterways, railroads, and pipelines. Semi-arid grasslands and open forests have been invaded by spotted knapweed in Montana, Idaho, Colorado, Massachusetts, and North Dakota (Lym and Zollinger 1992, Rice et al. 1997).

**Native and current distribution:** Spotted knapweed is native to central and southeastern Europe. It now grows

in nearly all states of the U.S. (USDA 2010). It has also invaded northern Europe, Asia, and Australia, where it is listed as a noxious weed in New South Wales (Weeds Australia 1998). Spotted knapweed has been documented from the Pacific Maritime and Interior-Boreal ecogeographic regions of Alaska (AKEPIC 2010).



Distribution of spotted knapweed in Alaska

### Management

Long-term control requires a combination of grazing management, herbicide use, and biological control. Areas must be monitored for several years to control seedlings as they emerge from the seed banks. Most spotted knapweed control has been conducted in agricultural settings, with relatively little information available on the use of herbicides in native communities for conservation purposes (Lym and Zollinger 1992, Rice et al. 1997). However, a number of biological control agents have proven moderately successful at controlling spotted knapweed in Montana and other western states (Story et al. 1989, Story et al. 1991).

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