

# Diffuse knapweed

## *Centaurea diffusa* Lam.



Dirk V. Baker, Tara L. Steinke, Sandra K. McDonald 1/03



**Other common names:** spreading knapweed, tumble knapweed

**Family:** Asteraceae (Sunflower)

**USDA Code:** CED13

**Bayer Code (WSSA):** CENDI

**Life cycle classification:** Biennial or short-lived perennial forb.

**Legal Status:** Colorado Noxious List B (top ten worst)

**Native to:** Eurasia.

**Entry into Colorado:** No information available.



**Current distribution in Colorado:** The worst infestations occur along the Front Range in Larimer, Boulder, Douglas and El Paso counties. Severe infestations also occur in Archuleta and La Plata counties. A 1998 survey found 83,000 acres infested with diffuse knapweed and 3,900 infested with spotted knapweed (Beck 2000).

### **Biology**

**Seasonal development:** Diffuse knapweed plants first form low rosettes and may remain in this form for one to several years depending on environmental conditions. Diffuse knapweed is a semelparous perennial; it grows as a rosette until it reaches a critical size, then bolts, flowers and usually dies (Thompson and Stout 1991). Flower buds are formed in early June and flowering occurs in July and August (Watson and Renney 1974). Mature seeds are formed by mid-August (Watson and Renney 1974).

### **Reproduction**

**Most commonly reproduces by:** Reproduces by seeds (Beck 2000)

**Numbers of seeds/plant:** No information available

### **Description**

**Roots:** Taproot

**Stems:** Stems are upright, 4-24 inches tall, highly branched, angled, with short, stiff hairs on the angles (CNAP 2000).

**Leaves:** Basal leaves are stalked and divided into narrow, hairy segments. Stem leaves are smaller, alternate, less divided, stalkless, and become bract-like near the flower clusters (CNAP 2000).

**Flowers:** Flower heads are broadly urn-shaped, 0.6-0.8 inches tall, solitary or in clusters of 2-3 at the ends of the branches. Floral bracts are yellowish with a brownish margin, sometimes spotted, fringed on the sides, and terminating in a slender bristle or spine. The heads contain two types of flowers, ray flowers around the edges surrounding tubular disk flowers. The ray flowers are white, rose-purple, or lavender (CNAP 2000).

**Fruits & seeds:** Seeds are light brown to black (CNAP 2000).

## **Value & Uses**

**Wood products:** No information available

**Importance to/impact on livestock & wildlife**

**Palatability:** Spotted knapweed has a bitter taste, but it is sometimes grazed by deer (Stubbendieck et al. 1995). Livestock (sheep, goats, cattle) will eat diffuse knapweed (Beck 2000).

**Nutritional value:** No information available

**Cover value:** No information available

**Value for rehabilitation of disturbed sites:** No information available

**Other uses & values:** No information available

## **Infestations**

**Habitat:** Diffuse knapweed is found on plains, rangelands, and forested benchlands. It is generally found on light, dry, porous soils. Diffuse knapweed has been observed at elevations up to 8,500 feet (Beck 2000). It grows in open habitats as well as shaded areas (Watson and Renney 1974). Diffuse knapweed is not common on cultivated lands or irrigated pasture because it cannot tolerate cultivation or excessive moisture (Watson and Renney 1974).

**Impacts/Threats:** Diffuse knapweed reduces the productivity of rangeland by displacing desirable forage species. Diffuse knapweed is a pioneer species that can quickly invade disturbed and undisturbed grassland, shrubland, and riparian communities. Once established, diffuse knapweed out-competes and reduces the quantity of desirable native species such as perennial grasses. Stand densities can range from 1-500 plants/m<sup>2</sup>. The replacement of native grassland with diffuse knapweed can reduce biological diversity and increase soil erosion (Sheley et al. 1997).

**Special Challenges to Management:** Diffuse knapweed has been reported to contain allelopathic chemicals, which can suppress competitive plant growth and create single species stands (Watson and Renney 1974). There are anecdotes of knapweeds causing severe ailments such as tumors and miscarriages. While such reports are unproven, they do emphasize the need for gloves when conducting management practices, particularly hand-pulling.

## Control Methods

### Physical

**Manual:** Pulling may be effective for knapweed control, but it must be repeated frequently and may stimulate seedling recruitment.

#### Mechanical:

**Cultivation:** Probably not an effective means of control unless combined with re-seeding as the disturbance simply creates an optimal seedbed (Roché and Roché 1999).

**Mowing:** Cutting or mowing the above-ground portion of the plant before seed set may provide an effective way to reduce seed production, but it will not control the infestation. Mowing actually increases diffuse knapweed density, due to stimulated germination from the soil seed bank. Hence, mowing should be followed by a fall herbicide treatment (Sebastian and Beck 1999). When a diffuse knapweed plant has been cut, the rosette may live and re-bolt. Additionally, seed dormancy can be several years, requiring any cutting program to be repeated several times annually (spring, summer, and fall) to be effective. Mowing or fire can be used as a way to remove standing dead material thereby increasing the effectiveness of later herbicide application (Roché and Roché 1999).

**Cultural:** If desirable grass competition is evident in diffuse or spotted knapweed stands, judicious herbicide application that does not injure grasses may allow them to compete effectively with the weeds. Irrigation (where possible) may help stimulate grass competition in these cases. However, rangeland or pastures often are degraded, allowing knapweed encroachment, and herbicides alone will not restore the land to a productive state. Seeding suitable perennial grasses is necessary to prevent weed reinvasion.

### Biological:

**Insects:** Currently, biological control agents are available but the extent to which they effectively control diffuse knapweed populations is unclear. The Division of Plant Industry's Biological Pest Control Section has six species that may be available for redistribution. These five species are *Urophora affinis*, *Urophora quadrifasciata*, *Agapeta zoegana*, *Sphenoptera jugoslavica*, *Cyphocleonus achates* and *Larinus minutus*.

**Pathogens:** None known

### Chemical

#### Conventional:

Trade Name ( <u>common name</u> )	Product/Acre ( <u>Active ingredient/Acre</u> )	Remarks
Curtail (clopyralid + 2,4-D)	0.19 + 1.0 lb (2 qt)	Optimum timing is from mid-bolt to bud growth stage
Tordon (picloram)	0.25 – 0.5 lb (0.5 – 1 qt)	Apply from rosette to early bolting
Tordon + 2,4-D (picloram + 2,4-D)	0.188 + 1.0 lb (1-1.5 pt + 1 qt)	
Vanquish/Clarity (dicamba)	0.5 - 1.0 lb (0.5 – 1.0 qt)	Apply when weeds are actively growing
Vanquish/Clarity + 2,4-D (dicamba + 2,4-D)	0.5 + 1.0 lb (0.5 qt)	Apply spring or fall when in the rosette stage before bolting

**Organic:** No information available - research needed

**USE PESTICIDES WISELY:** Always read the entire pesticide label carefully, follow all mixing and application instructions and wear all recommended personal protective gear and clothing.

**NOTICE:** Mention of pesticide products in this profile does not constitute endorsement of any material.

**Additional comments:**

**Contacts:**

**Links:**

Colorado Dept. of Agriculture, Division of Plant Industry  
<http://www.ag.state.co.us/DPI/weeds/Weed.html>

Colorado Natural Areas Program  
[http://parks.state.co.us/cnap/IWM\\_handbook/IWM\\_index.htm](http://parks.state.co.us/cnap/IWM_handbook/IWM_index.htm)

Colorado Weed Management Association  
<http://www.cwma.org>

Colorado Weed Management Guide  
[http://www.cepep.colostate.edu/WeedGuide/Weed\\_Guide\\_2004.pdf](http://www.cepep.colostate.edu/WeedGuide/Weed_Guide_2004.pdf)

Colorado State University Extension Fact Sheet  
<http://www.ext.colostate.edu/pubs/natres/03102.html>

Plants National Database:  
<http://plants.usda.gov>

Weed Science Society of America  
<http://www.wssa.net>

Western Society of Weed Science  
<http://www.wsweedscience.org>

**References:**

Beck, K.G., S.K. McDonald, S.J. Nissen, P.H. Westra. 2002. Colorado Weed Management Guide. Colorado State University Cooperative Extension. Fort Collins, CO. XCM-205.

Beck, K.G. 2000. Colorado State University Cooperative Extension Fact Sheets. No. 3.110. Diffuse and Spotted Knapweed. [www.ext.colostate.edu/pubs/natres/03110.html](http://www.ext.colostate.edu/pubs/natres/03110.html). 2 pages.

Colorado Natural Areas Program. 2000. Creating an Integrated Weed Management Plan: A Handbook for Owners and Managers of Lands with Natural Values. Colorado Natural Areas Program, Colorado State Parks, Colorado Department of Natural Resources; and Division of Plant Industry, Colorado Department of Agriculture. Denver, CO. pp 138-141.  
[http://parks.state.co.us/cnap/IWM\\_handbook/IWM\\_index.htm](http://parks.state.co.us/cnap/IWM_handbook/IWM_index.htm)

Roché, B.E. and C.T. Roché. 1999. Diffuse knapweed. In R.L. Sheley and J.K. Petroff, eds. Biology and Management of Noxious Rangeland Weeds. Oregon State University Press, Corvallis, OR.

Sebastian, J.R. and K.G. Beck. 1999. The influence of various control methods on diffuse knapweed on Colorado rangeland. Proc. West. Soc. Weed Sci. 52:41.

Sheley, R.L., B.E. Olson, and L.L. Larson. 1997. Effect of weed seed rate and grass defoliation level on diffuse knapweed. Journal of Range Management 50: 39-43.

Stubbendieck, J., G.Y. Friisoe, M.R. Bolick. 1995. Weeds of Nebraska and the Great Plains. Nebraska Department of Agriculture. Lincoln, NE. pp 104-105.

USDA, NRCS. 2002. The PLANTS Database, Version 3.5 (<http://plants.usda.gov>). [National Plant Data Center](#), Baton Rouge, LA 70874-4490 USA.

Thompson, D.J. and D.G. Stout. 1991. Duration of the juvenile period in diffuse knapweed (*Centaurea diffusa*). *Canadian Journal of Botany* 69:368-371.

Watson, A.K., and A.J. Renney. 1974. The biology of Canadian weeds. *Centaurea diffusa* and *C. maculosa*. *Canadian Journal of Plant Science* 54:687-701.