

## Biennial thistle biology, ecology, and management

**Introduction:** Land managers often have questions about managing large-statured, non-native biennial thistles. This group of plants includes bull thistle (*Cirsium vulgare*, photo right), musk thistle (*Carduus nutans*), plumeless thistle (*Carduus acanthoides*), and scotch thistle (*Onopordum acanthium*).

**Biology and Identification:** Biennial thistles usually germinate and emerge in the summer and fall and overwinter as a rosette (photo below). In spring and summer of the second year, they bolt, flower, and produce seeds. Biennial thistles die by the end of summer their second year.



Forest and Kim Starr, Bugwood.org.



John Randall, Bugwood.org.

**Habitat:** Seedlings of biennial thistles establish on bare soils found in sparsely vegetated or disturbed sites and can become quite abundant in these types of habitat (photo below). Biennial thistles can germinate and grow in a wide range of environmental conditions such as pasture, range and forest lands along with roadsides, waste areas, ditch banks, stream banks, and grain fields.

**Spread:** Reproduction is only by seed, and seeds can be dispersed by human activities such as movement of hay and crop seeds, or by animals, water or wind. Despite these various vectors, most seeds fall relatively close to the parent plant.

**Impacts:** The impact of biennial thistles on forage is twofold; they act as a physical barrier to livestock and compete with desired vegetation after disturbance. For example, in favorable conditions musk thistle can form dense stands of up to 150,000

plants/hectare. Dense stands can restrict livestock movement, and have been referred to as a "living barbed wire fence." Livestock tend to avoid grazing near this species due to its numerous spines, causing a reduction in usable forage. In fact, researchers have found that one musk thistle plant per square meter decreases sheep weight by four pounds per animal. Since the vegetative parts of these plants are unpalatable to most livestock, biennial thistles tend to increase with overgrazing.

**Management Priorities:** As biennial thistle establishment is dependent on bare ground and disturbance, establishing a competitive stand of desired perennial vegetation should be the first management priority to reduce their prevalence over the long term. These goals may require revegetation or limiting of disturbance like overgrazing. Short term biennial thistle control can be accomplished using cultural, mechanical and chemical methods. Biennial thistles can be killed by mechanical means that sever the taproot below the soil surface. Hoeing or hand-pulling are useful tools in small patches, and tillage is effective in croplands. Mowing is not considered an effective control method as it does not kill the plant, and variation in flowering times within a population ensures some seed will be produced. Several herbicides are available for control if applied at the rosette stage, and there are also a few choices for use during the bolting and bud stages. For herbicide recommendations, see [http://www.fs.usda.gov/Internet/FSE\\_DOCUMENTS/stelprdb5410130.pdf](http://www.fs.usda.gov/Internet/FSE_DOCUMENTS/stelprdb5410130.pdf).



Norman Rees, Bugwood.org.

**Word Scramble: Test your knowledge of biennial thistles**

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SETTOER

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Overwintering stage of biennial thistles

ABRE

\_\_\_\_\_

Type of soil biennial thistle seedlings usually establish in

MKUS

\_\_\_\_\_

Type of thistle that can form dense stands of up to 150,000 plants/ hectare

DESE

\_\_\_\_\_

The method of reproduction for biennial thistles

PSESIN

\_\_\_\_\_

This part of a thistle makes it function like a living barbed wire fence

GITELLA

\_\_\_\_\_

Type of effective management practice for biennial thistle control in croplands

OREYCNSAED

\_\_\_\_\_

When do biennial thistles bolt, flower, and produce seeds?

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For information about thistle identification, see our new publication, "Guide to exotic thistles of Montana and how to differentiate from native thistles":

[http://store.msuextension.org/Products/Guide-to-Exotic-Thistles-in-Montana-and-How-to-Differentiate-from-Native-Thistles\\_EB0221.aspx](http://store.msuextension.org/Products/Guide-to-Exotic-Thistles-in-Montana-and-How-to-Differentiate-from-Native-Thistles_EB0221.aspx)

Solutions are posted to the MSU Extension Invasive Rangeland Weed website:

<http://www.msuextension.org/invasiveplantsMangold/extensionsub.html>

