

Thistles of Colorado

Identification and Management Guide

**Produced by the
Larimer County
Weed District**

*Partners in Land Stewardship
2nd Edition*



About This Guide

Many individuals, organizations and agencies from throughout the state (acknowledgements on inside back cover) contributed ideas, content, photos, plant descriptions, management information and printing support toward the completion of this guide.



Mountain thistle (*Cirsium scopulorum*) growing above timberline

Casey Cisneros, Tim D'Amato and the Larimer County

Department of Natural Resources Weed District collected, compiled and edited information, content and photos for this guide.

We welcome your comments, corrections, suggestions, and high quality photos. If you would like to contribute to future editions, please contact the Larimer County Weed District at 970-498-5769 or email ccisneros@larimer.org or tdamato@larimer.org.

Front cover photo of *Cirsium eatonii* var. *hesperium* by Janis Huggins

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Introduction

Native thistles are dispersed broadly across many Colorado ecosystems. Individual species occupy niches from 3,500 feet to above timberline. These plants are valuable to pollinators, seed feeders, browsing wildlife and to the beauty and diversity of our native plant communities. Some non-native species have become an invasive threat to agriculture and natural areas. For this reason, native and non-native thistles alike are often pulled, mowed, clipped or sprayed indiscriminately. The purpose of this guide is to provide information that enables private landowners, park visitors, plant enthusiasts, public land managers and seasonal employees to identify and distinguish between the 15 native and 5 non-native thistle species found in Colorado. The purpose of this guide is to prevent inadvertent pulling or spraying of native species and to encourage an appreciation for native thistle beauty and diversity.



Featured Sections:

- Native Thistles
(alpha by common name)
- Non-native Thistles
(alpha by common name)
- Invasive Thistle Management
- Thistle Look-alikes
- Thistle Key
- Illustrated Thistle Glossary

Individual plant descriptions include photos, ID tips (provided by contributors, Ackerfield, Weber and Whittmann, and the USDA plant database), growth habit, blooming season, geographic descriptions of state locations and generalized environmental gradients. Key characteristics are in bold lettering to make



identification simpler. Variations occur with soil type, moisture availability, aspect and other environmental factors. The Colorado State University herbarium is another great resource to learn about Colorado flora with its catalogue of pressed specimen samples and thoroughly knowledgeable staff. This guide also provides management techniques for control of non-native, invasive thistles. For specific information pertaining to herbicide options for individual species, contact any county weed management office or the Colorado State University Weed Science Program.



Barneby's Thistle

Cirsium barnebyi

- Northwestern Colorado (Garfield and Rio Blanco counties)
- Shaley slopes in pinyon-juniper zone; 5,900-8,000 feet in elevation
- Duration: Perennial
- Tap-rooted
- **Leaves completely white-tomentose (cottony) on both sides of leaf, woolly and lobed**
- Flowering heads small. Phyllary spines about 3 mm long.
- Flowers blue or red-purple; June-August

Cainville Thistle

Cirsium calcareum

- Southwestern Colorado
- Foothills, pinyon-juniper woodlands and rocky flats in sandy soil; 5,000-8,400 feet in elevation
- Duration: Biennial or perennial
- Leaves grayish; tomentose (woolly-cottony) beneath.
- Flowering heads exserted (sticking out beyond) from the upper leaves. Flowering head appears pineapple-like before bloom. Phyllary spines 7-8 mm long.
- **Corolla lobes at least twice as long as tube**
- Flowers purplish-red; June-September
- Seed head resembles Canada thistle
- Uncommon



Eaton's Thistle

Cirsium eatonii

- Mountainous areas of Colorado
- Rocky open slopes, road banks and in meadows; 8,000-13,500 feet in elevation
- Duration: Biennial or perennial
- Leaves narrow, whorled and densely spiny with numerous closely spaced lobes. Stems taper toward the top; Stems are soft; not spiny or winged
- Flower head cluster subtended by leaves extending past the cluster. Phyllaries with spiny margins and a stout terminal spine.
- **Phyllary margins with interconnecting hairs (like 2 combs side by side)**
- Flowers rose-purple or white; July-September
- Prevalent along the Continental Divide

Elk Thistle, Meadow Thistle

Cirsium scariosum

- Forest clearings, along streams, roadsides and wet meadows; 7,000-12,500 feet in elevation
- Duration: Biennial or short-lived perennial
- Two growth habits: a short plant with a massive rosette of lobed, spiny basal leaves with a cluster of sessile (stemless) flowering heads; or, a taller plant with sessile flowering heads in leaf axils.
- **Only thistle that can be aculescent**
- Stems soft, lacking spines
- Cluster of flower heads subtended by leaves that extend past the cluster
- Phyllaries smooth and glossy; the back covered with minute yellowish glands
- Flowers white; June-September



Flodman's Thistle

Cirsium flodmanii

- Rare; only found in eastern Colorado
- Moist meadows, pastures and disturbed sites; 4,800-8,500 feet in elevation
- Duration: Perennial
- Reproduces by rhizomes (underground stems that root and shoot at the node)
- Leaves tomentose (cottony-woolly) underneath with a grayish cast resembling Scotch thistle; highly lobed with wavy margins. Upper stems often branching
- Solitary flowering heads
- Flowers deep purple; July-September
- Look-alike: Canada thistle. Reflexed phyllary spines and perfect (having both male and female parts) flowers distinguish this thistle from Canada thistle.

Fringed, Fish Lake Thistle

Cirsium centaureae, C. clavatum var. americanum

- Foothills to mountainous areas of northwest Colorado
- Grows in meadows, forests, roadsides and open areas up to the Continental Divide; 6,800-10,800 feet in elevation
- **Lower elevation than *C. eatonii***
- Duration: Perennial
- Roughly fringed leaves; reddish stem
- Inner phyllaries of flowering heads have dilated, fringed tips. Phyllaries lack terminal spine.
- **Phyllaries margins often fringed**
- Flowers whitish-brown; June and September



Mountain Thistle

Cirsium scopulorum

- Mountainous areas of Colorado
- Grows in tundra, boulder fields and scree along the Continental Divide; 9,000-13,000 feet in elevation
- Duration: Biennial
- Basal leaves long and very spiny
- Stems are very woolly, not spiny, and are covered with overlapping leaves
- Densely woolly, massive flowering heads congested in often nodding or slouching terminal clusters subtended by leaves extending past the cluster
- Flowers yellow, white or less often, pinkish; July-September
- Common along the Continental Divide

New Mexico Thistle

Cirsium neomexicanum

- Southwest Colorado
- Canyonsides, roadsides and dry open slopes, often in clay or shale soil; 4,500-6,900 feet in elevation
- Duration: Biennial or short-lived perennial
- Leaves have a grayish cast. Leaves lack long, woody spines; stems lack spines or wings
- Phyllaries have loose tufts of soft, cottony hairs; **lower bracts bent abruptly downwards at midpoint**
- Flowers white to pink; May-July
- Look-alikes: bull, Scotch and plumeless thistles. Unarmed stems and leaves as well as flower color distinguish this thistle from look-alikes.



Ousterhout's, Aspen Thistle

Cirsium clavatum var. *osterhoutii*

- Central mountains of Colorado (Eagle, Grand, Gunnison, Lake, Park, Pitkin, and Summit counties)
- Grows in mixed-conifer forests and meadows; 10,000-13,000 feet in elevation
- Duration: Perennial
- Compared to other thistles, leaves are thinner, flatter, and less spiny; broad lobes and whitish mid-stripe, woolly underneath
- Purple, hairy stems
- Phyllaries have purple centers, margins fringed with woolly hairs. Spines are straight and tan; tips are not flanged
- Flowers cream colored; June-September
- **Commonly found growing next to Eaton's thistle**

Ownbey's thistle

Cirsium ownbeyi

- Moffat County, Colorado
- Open areas of rocky, sandy or clay soils; 5,500-6,200 feet in elevation
- Duration: Perennial
- Leaves glabrous (**hairless and green on both sides**) and very spiny with smooth, finely divided lobes; strongly decurrent (extends down the stem below the level of attachment)
- Flowering heads hidden in mass of spines
- Flowers white to rose pink; June-August
- **Thought to be Colorado's rarest thistle**



Parry's Thistle

Cirsium parryi, *C. pallidum*

- South central Colorado (Archuleta, Costilla, Conejos, Dolores, Hindsdale, Huerfano, Las Animas, Mineral, Ouray, Saguache, San Juan and San Miguel counties)
- Open subalpine forests and alpine meadows; 8,500-12,500 feet in elevation
- Duration: Biennial, perennial
- Leaves clasping, shallowly lobed; hairless above, cobwebby below
- Outer phyllaries spiny-margined with long, cobwebby hairs. Terminal spine is straight (not reflexed or bent away from the flower head)
- Flowering heads often in a branched inflorescence
- Flowers greenish-yellow; June-August

Platte or Prairie Thistle

Cirsium canescens

- Statewide
- Sandy or gravelly soil in upland prairies, especially disturbed sites; 3,500-9,000 feet in elevation
- Duration: Biennial
- Leaf base long-decurrent on the stem
- Leaves blue-green in color; upper leaves reduced
- Phyllaries tipped with a yellow, reflexed (bends away from the flowering head) spine.
- Flowers yellowish-white or rarely, pale lavender or pink; May-September
- Common on the open grasslands of eastern plains



Rocky Mountain, Adobe Thistle

Cirsium perplexans,
C. perplexans

- Western Colorado (Delta, Garfield, Mesa, Moffat and Montrose counties)
- Shale slopes, adobe hills in pinyon-juniper or sagebrush communities; 4,500-8,000 feet in elevation
- Duration: Perennial
- Tap-rooted
- Stems reddish
- Toothed leaves with faint yellow spines
- **Fringed phyllaries with dark purple tip**
- Flowers purple or reddish-purple; late May and early July
- Rare

Wavyleaf Thistle

Cirsium undulatum

- Statewide, more common in eastern Colorado
- Sandy, gravelly soil in canyon bottoms, foothills and sagebrush communities; 3,500-9,000 feet in elevation on the Front Range
- Duration: Biennial or a short-lived perennial
- **Leaf base not long-decurrent on the stem**
- Leaves grayish; highly lobed with wavy-margins
- Solitary flowering head
- Phyllaries narrow, phyllary spines are reflexed (bent away from flowering head).
- Flowers purple or cream; June and August
- May be rare on the Western Slope; subspecies *tracyi*
- Look-alikes: yellowspine thistle (wavyleaf has solitary flowering head and lacks dark phyllaries as they dry)



Yellowspine Thistle

Cirsium ochrocentrum

- Eastern plains and Middle Park
- Dry sites in prairies and piedmont valley; 3,500-9,500 feet in elevation
- Duration: Biennial or short-lived perennial
- Plants form clumps of several stems. Individual stems are densely leafy. Leaves deeply lobed, with prominent yellow spines
- Long decurrent leaf base on stem
- Phyllaries have stout, yellow, reflexed (bent away from the flowering head) spine tips. Phyllaries darken as they mature.
- Flowers reddish purple, purple, pink or rarely white; June to September
- Look-alikes: bull thistle (yellowspine lacks cobwebby phyllaries), wavyleaf thistle (yellowspine forms clumps with multiple stems)

Bull Thistle

Noxious Weed

Cirsium vulgare

- Statewide
- Wet, shaded areas; 3,500-9,000 feet in elevation
- Duration: Biennial
- Large (up to 6 feet tall), taprooted
- Leaves clasping, deeply lobed, spiny and hairy. Leaves decurrent; extending down from the attachment point to the node below
- **Short, rough hairs not at all woolly**
- Phyllaries are cobwebby-pubescent.
- Flowers purple; July-September
- Reproduces by seed
- Status: Colorado Noxious Weed List B



Canada Thistle

Noxious Weed

Cirsium arvense,
Breca arvensis

- Statewide
- Easily adapted to multiple habitats; up to 9,000 feet in elevation
- Duration: Perennial
- Can grow up to 6 feet tall
- Reproduces by rhizomes or by seed
- Leaves have shallow lobes, wavy margins, not at all soft with wooly or cobwebby hair
- Flowering heads with appressed (pressed against the flowering head) phyllaries. Flowers are imperfect (individual flowers have only female or male parts, not both)
- Flowers pink, purple and in rare occasions, white; June-September
- Status: Colorado Noxious Weed List B

Musk, Nodding Thistle

Noxious Weed

Carduus nutans

- Statewide
- Easily adapted to multiple habitats; up to 9,000 feet
- Duration: Biennial
- Can grow up to 8 feet tall
- Taprooted
- Leaves somewhat lobed, wavy white outlined margins with a prominent, light green mid-vein with long-decurrent base
- One flowering head per stem, subtended by broad, spreading, pinecone-like bracts
- Flowers purplish; June-October
- Reproduces prolifically by seed
- Introduced rather recently, first reported in Colorado in 1953
- Status: Colorado Noxious Weed List B



Plumeless Thistle

Noxious Weed

Carduus acanthoides

- Not found statewide; alien roadside weed in some mountain valleys. Common and aggressive in the Lower Roaring Fork Valley.
- Disturbed sites and roadsides; 6,900-8,300 feet in elevation
- Duration: Biennial
- Taprooted
- Young rosettes possess wavy-edges with yellow spines along margins. Leaves prominent mid-rib found on musk thistle leaves. Stems branching; covered with spiny wings extending to flower heads
- Flowers pink, red, purple; July-October
- Reproduces by seed
- Status: Colorado Noxious Weed List B; First reported in Colorado in 1957

Scotch Thistle

Noxious Weed

Onopordum acanthium
and *O. tauricum*

- Statewide
- Disturbed sites and roadsides; 3,500-8,000 feet in elevation
- Duration: Biennial
- Taprooted
- Extremely spiny; grows up to 12 feet tall. Forms stands too dense for livestock to walk through
- Leaves, particularly at the rosette stage, are covered with white hair giving them a gray-blue color
- Phyllaries cobwebby and reflexed (bend away from flowering head)
- Flowers large, purple; June-August
- Reproduces by seed
- Status: Colorado Noxious Weed List B



Managing Invasive Thistles

In addition to providing landowners and land managers with tips and tools for distinguishing between native and non-native thistle species, this guide provides an overview of effective management techniques for controlling non-native thistle species. Of the five exotic thistle species in this guide, four are biennials, which present different management strategies and are less difficult to control than the deep-rooted perennial species, Canada thistle. When planning weed management, keep in mind **the best and most cost effective tool for controlling or suppressing any weed species is restoring or establishing desirable, competitive vegetation.**

Invasive Biennial Thistles

The four non-native, biennial thistles—bull, musk, plumeless and Scotch—are all taprooted plants; reproducing only from seed. The key to managing these weeds is to prevent seed production each year with hope the soil seed bank will eventually be depleted. Seed viability in the soil for these species is approximately 10 years, which can present a challenge. Germination increases dramatically in high moisture years, depleting the seed bank more quickly. However, the inverse occurs in drought years making the process of weed control longer. Prevention or suppression of seed production and/or dispersal can be accomplished in various ways.

- **Pulling or digging:** Be sure the top 3-4 inches of the taproot is removed or re-growth can occur. If the plants are in the bud stage, or earlier, disposal is unnecessary since no seed has been produced. Once flowering starts, plants should be bagged and disposed of to prevent seed dispersal.
- **Mowing, clipping and bagging:** Removing seed heads can be effective if the plants are mature enough to prevent re-growth. Mowing thistle plants prior to flowering will result in re-growth and seed production from a reduced height. Mowing plants that are in the flowering/seed production stage does not prevent seed spread in the immediate area, but can reduce dispersal to adjoining areas.
- **Livestock grazing:** Effects are similar to mowing or seed head clipping, depending on the growth stage of the plants. This provides suppression of infestations by reducing seed production, but keep in mind intense grazing is detrimental to desirable vegetation. When using livestock grazing, managers need to be mindful of the possibility of movement of weed seed from one site to another by way of manure dispersal or seed carried on hooves and fur.
- **Herbicide control:** Numerous herbicides provide effective control of thistle species without injury to grass species. One spray application in spring or early summer will control an infestation but follow-up control efforts are necessary until the soil seed bank is depleted.



- **Biological control:** Two insect biocontrol agents have been released for control of musk thistle; *Rhinocyllus conicus* a seed-head feeding weevil, and the crown feeding weevil *Trichosiromus horridus*. *R. conicus* was first released in the western U.S. in 1969 with rather dubious results. At that time, there was little concern for biocontrol impacts on native thistles. *R. conicus* weevils fed on seed heads of musk thistle as well as several native thistle species and now present a threat to rare native thistles. While these weevils are no longer released, they are present throughout Colorado. Their impact on musk thistle has been cyclical; some years significantly reducing seed production and subsequent thistle populations. Other years, weevils have little or no effect. *T. horridus* feed on the center growth of the musk thistle rosette and may provide effective control, especially when *R. conicus* are present. Unlike *R. conicus*, *T. horridus* are still released for musk thistle control.

Canada Thistle Management

Canada thistle is a tenacious perennial weed requiring several seasons of management effort for effective control. Canada thistle reproduces by seed and rhizomes, though many will argue that spread by rhizomes is most significant.

Management factors to keep in mind:

- **Clipping:** Removing seed heads provides suppression of seed production, but may be less effective than hand pulling.
- **Hand pulling:** Removing a deep-rooted perennial plant using this method is ineffective unless the puller is extremely persistent. See picture on pg. 29.

- **Shallow tillage:** Tillage, such as disking or sweeping, can actually be counterproductive. Re-growth is quick and the spread of root stalks results in Canada thistle stands more dense and uniform than prior to tillage.
- **Mowing and/or grazing:** These methods provide suppression of a perennial plant. Continuous depletion of carbohydrate reserves for re-growth of above ground tissue results in less aggressive plants.
- **Biological control:** Insect agents are available for suppressing Canada thistle. These insect species have been passed a stringent screening process to ensure specificity to Canada thistle. Insect biocontrol releases have not had a significant impact on Canada thistle infestations.
- **Herbicide control:** Selective and effective herbicides are available for control of Canada thistle with no injury to grasses. As previously stated, several seasons of management effort are necessary for effective control.



Dr. Phil Waestra, Colorado State University Weed Science Program, at demonstration box showing fourteen months of Canada thistle growth from a single shoot.

Thistle Look-alikes

This section offers helpful tips for indentifying plants commonly mistaken for thistles.

Prickly Lettuce (*Lactuca serriola*)

Non-native but not noxious member of the sunflower family that can grow up to 5 feet tall. Look for small, yellow flowering heads, a spined mid-rib under the leaf and a white milky juice if leaves and stems are broken. Prickly lettuce is not considered noxious, but it is an invader of fallow fields, roadsides and run-down pastures.



Prickly Poppy (*Argemone polyanthemos*)



Native annual of the poppy family growing up to four feet tall. Leaves are deeply lobed, wavy and prickly throughout with prominent white veins. Stems are also prickly and contain yellow latex. Showy, white flowers with six petals bloom June through August.

Prickly Sowthistle (*Sonchus asper*)

Non-native, but not noxious, annual of the sunflower family. Alternate, lobed, obovate leaves with small thorns at the margins. Produces bright yellow flowers early to mid-summer, followed by mature puffball seedheads similar in appearance to dandelions. This forb grows six inches to four feet tall and is most common in disturbed sites and neglected pastures.



Western Salsify (*Tragopogon dubius*)

Non-native biennial of the sunflower family. The plant has long, narrow leaves and a milky juice. Western salsify produces bright yellow flowers early to mid-summer, followed by large mature puffball seedheads. This forb grows up to two feet tall and is most common on disturbed sites and neglected pastures.



Yellow Starthistle (*Centaurea solstitialis*)

Non-native, highly invasive, Colorado Noxious Weed Act A List annual member of the sunflower family. Plants are gray green to blue green; stems and leaves are covered with cottony wool. Flowers are disk only, bright yellow, with one to two inch straw-colored spines below, creating a star-like appearance on the end of short branches. Though not palatable, inadvertent consumption of hay contaminated with yellow starthistle can cause chewing disease in horses.



Yellow starthistle is potentially Colorado's worst weed problem. Though less than 100 acres statewide are currently infested, this invasive species could rapidly dominate rangeland and natural areas if aggressive management steps are not taken. Infestations are known to be located in Boulder, Delta, Larimer, Mesa and Pueblo Counties. **Report any sightings, or suspected sightings, to your local county weed manager.**

Colorado Thistle Key

By Jennifer Ackerfield

- 1a. Pappus of plumose (featherlike) bristles; receptacle densely bristly... **Cirsium**
- 1b. Pappus of barbellate bristles; receptacle densely bristly or naked...2
- 2a. Receptacle pitted, naked or with very short bristles... **Onopordum**
- 2b. Receptacle not pitted, densely bristly... **Carduus**

CARDUUS KEY:

- 1a. Heads smaller, 1-2 cm in diameter; outer involucre bracts narrowly lance-shaped, 1-2 mm wide at the base... **C. acanthoides L., PLUMELESS THISTLE**. Found in disturbed places, open fields, and along roadsides, 6900-8300 ft. July-Oct. E/W. Adventive.
The first specimens of *C. acanthoides* documented for Colorado were from Jefferson County in 1957. Although not as widespread as the next, *C. acanthoides* is another relatively recently introduced plant native to Europe, and is becoming a troublesome weed.
- 1b. Heads larger, 3-7 cm in diameter; outer involucre bracts ovate-lanceolate to lance-shaped, 2-10 mm wide... **C. nutans L., MUSK THISTLE; NODDING THISTLE**. [= *Carduus nutans* L. ssp. *macrolepis* (Peterm.) Kazmi]. Common in disturbed places, open fields and meadows, and along roadsides, 3500-8500 ft. June-Oct. E/W. Adventive.

Although *C. nutans* is a common and widespread plant today, it is a relatively recently introduced plant. When Harrington (1954) published his *Manual of the Plants of Colorado*, he stated that "[*C. nutans*] has been reported in northeastern Arizona and may well be in Colorado". Although the first specimens of *C. nutans* appeared in 1953 in Boulder and Jefferson Cos., anyone who goes hiking these days knows that *C. nutans* is now incredibly widespread. *Carduus nutans* has been reported for over 50% of the counties in Colorado, and is widespread on both the eastern and western slopes.

CIRSIUM KEY:

- 1a. Plants dioecious (flowers with only stamens or pistils, but not both); heads small, the pappus of female heads longer than the corollas and that of the male heads shorter than the corollas; involucre 10-20 mm high and 5-10 mm wide... **C. arvense (L.) Scop., CANADA THISTLE**. [= *Breea arvensis* (L.) Less.]. Common and widespread in disturbed places, along roadsides, and in fields and meadows, 4500-9600 ft. June-Sept. E/W. Adventive.
- 1b. Plants monoecious (flowers with both stamens and a pistil); heads usually larger...2
- 2a. Upper leaf surface with rough, hispid-scabrous hairs, not at all soft with woolly or cobwebby hairs; leaves with strongly decurrent bases, the base

- extending from one node to the next... ***C. vulgare* (Savi) Ten., BULL THISTLE.** Found in disturbed places, along roadsides, and in moist fields, 4100-9200 ft. E/W. Adventive.
- 2b. Upper leaf surface glabrous to woolly (sometimes thinly so), but never rough and scabrous; leaves with a shortly decurrent base, this usually not extending from node to node, or the leaves sessile and clasping the stem...3
- 3a. Leaves all basal or nearly so... ***C. scariosum* Nutt., ELK THISTLE; MEADOW THISTLE.** [= *C. acaulescens* K. Schum.; *C. coloradense* Cockerell ex Daniels; *C. drummondii* misapplied by authors, not Torr. & Gray; *C. erosum* (Rydb.) K. Schum.; *C. tioganum* (Congd.) Petr.]. Common in forest clearings, along streams and roadsides, and in wet meadows; more often found in moist places, 7000-12,500 ft. June-Sept. E/W.
- 3b. Plants with a conspicuous leafy stem...4
- 4a. The outer involucre bracts strongly reflexed with the reflexed tip including not only the spine but a significant portion of the green bract as well... ***C. neomexicanum* Gray, NEW MEXICO THISTLE.** Found in southwestern Colorado on dry hillsides or along roadsides, often in clay or shale soil, 4500-6900 ft. May-July. W.
- 4b. Spine tips ascending or spreading, or if the spine tips are reflexed, than the reflexed spine tip does not include a significant portion of the green bract...5
- 5a. Outer and middle involucre bracts with spine-tips reflexed (pointing downward) to spreading, the body with a dark, well-developed ridge in the middle of the bract; heads usually indented around the top of the peduncle...6
- 5b. Outer and middle involucre bract spine-tips ascending to somewhat spreading, the body with or without a dark, well-developed ridge; heads rarely indented around the top of the peduncle...10
- 6a. Middle and upper leaves decurrent (extending downward) on the stem for more than 1 cm...7
- 6b. Middle and upper leaves sessile and clasping or decurrent on the stem for less than 1 cm...8
- 7a. Corolla lobes 5.5-7 mm long; disk flowers yellowish-white or rarely pale lavender or pink; outer involucre bracts lance-shaped with spines 2-4 mm long... ***C. canescens* Nutt., PRAIRIE THISTLE.** [= *C. plattense* (Rydb.) Cockerell ex Daniels]. Found in gravelly soil of dry places, especially common on dry, open grasslands of the eastern plains, but also found along roadsides and in open meadows in the mountains, 3500-9500 ft. June-Sept. E/W.
- 7b. Corolla lobes 9-14 mm long; disk flowers reddish purple, purple, pink, or rarely white; outer involucre bracts egg-shaped with spines 4-12 mm long... ***C. ochrocentrum* Gray, YELLOWSPINE THISTLE.** Common in dry soil of the eastern plains, along roadsides, and on dry, open slopes, 3500-9500 ft. June-Sept. E/W.

- 8a. Plants from horizontal creeping roots; achenes mostly 3-4 (5) mm long, 1.5-2 mm wide; spines on the tips of involucre bracts 2-4 mm long, weak and slender; usually in wet places... ***C. flodmanii* (Rydb.) Arthur, FLODMAN'S THISTLE**. Typically found in moist habitats such as along streams, near springs, and in wet meadows, 4800-8500 ft. July-Sept. E.
- 8b. Plants from deep stout taproots; achenes 4-8 mm long, 2-3 mm wide; spines on the tips of involucre bracts 3-7 mm long, robust and stout; in drier places than the previous...9
- 9a. Heads smaller, the involucre 18-25 (28) mm high; involucre bracts mostly egg-shaped, in 3-4 (5) rows... ***C. tracyi* (Rydb.) Petrak, TRACY'S THISTLE**. [= *C. undulatum* (Pursh) Spreng. var. *tracyi* (Rydb.) S.L. Welsh]. Common on dry, open places such as on hillsides, in canyons, and along roads and railroad tracks, 4600-8500 (10,500) ft. June-Aug. W.
- 9b. Heads larger, the involucre 28-50 mm high; involucre bracts lance-shaped to narrowly egg-shaped, in 5-7 rows... ***C. undulatum* (Pursh) Spreng., WAVYLEAF THISTLE**. Common in sandy or gravelly soil of the plains and open hillsides, 3500-9000 ft. June-Aug. E.
- 10a. Leaves lacking hairs on both sides or only sparingly woolly along the abaxial midrib, tripinnately divided into numerous lanceolate, narrow segments (mostly 2-3 mm wide), the midstrip narrow (about 2 mm)... ***C. ownbeyi* Welsh, OWNBEY'S THISTLE**. Found in open places in rocky, sandy, or clay soil, known only from Moffat County, 5500-6200 ft. June-Aug. W.
- 10b. Leaves woolly below (usually densely so) and nearly hairless or woolly above, pinnately divided or lobed into ovate, elliptic or triangular, wider (greater than 3 mm wide) segments, the midstrip wider (4-10+ mm); if nearly hairless above and below then the leaves shallowly lobed...11
- 11a. Leaves densely and closely white woolly on both sides, the lobes sometimes relatively closely spaced without deep sinuses between them; corolla 18-24 mm long and style tip 3.5-5 mm long... ***C. barnebyi* S.L. Welsh & Neese, BARNEBY'S THISTLE**. Restricted to shale slopes, usually in pinyon-juniper, found in the northwestern counties (Garfield and Rio Blanco), 5900-8000 ft. June-Aug. W.
- 11b. Leaves white woolly or arachnoid-pubescent below and green or gray and nearly hairless above, if densely and closely white woolly on both sides then the corolla 25-33 mm long and the style tip 2-3 mm long (= *C. arizonicum*); leaves shallowly or deeply lobed...12
- 12a. Corolla usually purplish red, the lobes (8) 10-18 mm long, at least twice as long as the corolla tube; style tip short, 1.2-3 (4.5) mm long; involucre often cylindrical... ***C. arizonicum* (Gray) Petrak var. *bipinnatum* (Eastw.) D.J. Keil, CAINVILLE THISTLE**. [= *C. calcareum* (M.E. Jones) Woot. & Standl.; *C. pulchellum* Woot. & Standl.]. Uncommon in dry, open places and canyon-bottoms, occasionally in hanging gardens, typically in sandy soil, found in the southwestern counties, 5000-8400 ft. June-Sept. W.

- 12b. Corolla white, greenish-yellow, pink, or lavender, the lobes shorter, 4-9 mm long; style tip mostly longer, 3-6 mm long; involucre usually bell-shaped...13
- 13a. Leaves very shallowly lobed, almost entire, hairless above and cobwebby below (but not evenly white woolly), sessile and clasping on the stem; corolla greenish-yellow; involucre bracts densely hairy... ***C. parryi* (Gray) Petrak, PARRY'S THISTLE.** [= *C. pallidum* (Woot. & Standl.) Woot. & Standl.]. Found in open subalpine forests and alpine meadows, known from the southern counties (Archuleta, Costilla, Conejos, Dolores, Hinsdale, Huerfano, Las Animas, Mineral, Ouray, Saguache, San Juan, and San Miguel), 8500-12,500 ft. June-Aug. E/W.
- 13b. Leaves deeply pinnatifid, or if shallowly lobed then the corolla not greenish-yellow, hairless or sparsely hairy above, hairless or white-woolly below (at least thinly so), the bases usually decurrent on the stem; involucre bracts densely hairy or not...14
- 14a. Involucre bracts densely cobwebby or woolly pubescent, or with partitioned, multicellular hairs along the margins that horizontally connect adjacent involucre bracts...15
- 14b. Involucre bracts hairless or thinly cobwebby pubescent on the margins, but without partitioned, multicellular hairs connecting adjacent involucre bracts...17
- 15a. Heads numerous, sessile or short-pedunculate in a dense, massive, nodding terminal spike-like or raceme-like inflorescence; involucre bracts densely cobwebby-woolly pubescent, the hairs obscuring the bracts; flowers yellow, white, or less often pinkish... ***C. scopulorum* (Greene) Cockrell ex Daniels, MOUNTAIN THISTLE.** Common in subalpine and alpine meadows, especially frequent along the Continental Divide, (9500) 10,500-13,000 ft. July-Sept. E/W.
- 15b. Heads in erect spike-like inflorescences or terminal clusters, usually fewer (6 or less); involucre bracts cobwebby pubescent, but this usually not so dense that it obscures the bracts; flowers pink, purple, or white...16
- 16a. Heads in open, spike-like inflorescences, usually not closely subtended by a whorl of leaves which overtop the heads; leaves usually flat, less spiny with more widely spaced lobes, and widely and evenly spaced on stem... ***C. osterhoutii* Rydb., OSTERHOUT'S THISTLE.** [= *C. araneans* Rydb.]. Found on gravelly and rocky open slopes, in open forests, and along streams, known from high elevations in the central mountains along the Continental Divide (Eagle, Grand, Gunnison, Lake, Park, Pitkin, and Summit Cos.), where it is often found growing next to *C. eatonii*, 10,000-13,000 ft. July-Sept. E/W. Endemic.

This is quite a distinctive species when seen in the field with its dark red stem and multicellular-pubescent involucre bracts. It is typically found at a higher elevation than *C. clavatum*. Higher elevation *C. osterhoutii* specimens sometimes have more densely septate pubescent involucre bracts and more undulate leaves, and this could be through hybridiza-

tion with *C. eatonii*. *Cirsium osterhoutii* is often found growing right next to *C. eatonii* at high elevations, so hybridization is possible.

- 16b. Heads in dense subcapitate or spike-like terminal clusters, closely subtended by a whorl of leaves which overtop the heads; leaves undulate, densely spiny, with numerous closely spaced lobes, and tightly grouped on stem... ***C. eatonii* (Gray) B.L. Robins., EATON'S THISTLE.** [= *C. tweedyi* (Rydb.) Petrak]. Common on rocky open slopes at high elevations, especially prevalent along the Continental Divide, 9500-13,000 ft. July-Sept. E/W.
- 17a. Corollas rose or reddish-purple; middle and inner bracts with erose or fringed margins at the tips; spines on outer involucre bracts spreading or downward pointing; leaves sessile and clasping the stem... ***C. perplexans* (Rydb.) Petrak, ROCKY MOUNTAIN THISTLE.** [= *C. vernale* (Osterhout) Cockerell]. Found on barren, dry hillsides in shale or clay soil, often with pinyon-juniper or sagebrush, known from Delta, Garfield, Mesa, Moffat, and Montrose Cos., 5000-8000 ft. June-July. W. Endemic.
- 17b. Middle and inner bracts without erose or fringed margins at the tips, or if with erose tips than the corollas white to yellow-white or pale pink; outer bracts lacking spines or spine-tipped but the tips spreading to erect; leaves usually decurrent on the stem...18
- 18a. Heads in dense terminal clusters or raceme-like arrays, closely subtended by leafy bracts which overtop the heads (these usually in a whorl below the heads); plants biennial; stems usually fleshy and thick; involucre bracts without a dark, narrow ridge in the middle of the bract, the inner bracts often with erose or fringed tips... ***C. scariosum* Nutt., ELK THISTLE; MEADOW THISTLE.** [= *C. acaulescens* K. Schum.; *C. coloradense* Cockerell ex Daniels; *C. drummondii* misapplied by authors, not Torr. & Gray; *C. erosum* (Rydb.) K. Schum.; *C. tioganum* (Congd.) Petr.]. Common in forest clearings, along streams and roadsides, and in wet meadows; more often found in moist places, 7000-12,500 ft. June-Sept. E/W.
- 18b. Heads in loose clusters or raceme-like arrays but not closely subtended by leafy bracts which overtop the heads; plants perennial; stems not fleshy and thick; involucre bracts usually with a dark, narrow ridge in the middle of the bract, the inner bracts with or without erose or fringed tips...19
- 19a. Middle stem leaves sessile and not decurrent on the stem; involucre bracts relatively wide and more egg-shaped, mostly 2.5-4 mm wide at the middle and mostly carrying this width well towards the tip... ***C. wheeleri* (Gray) Petrak, WHEELER'S THISTLE.** [= *C. olivescens* (Rydb.) Petrak]. Reported for southwestern Colorado. July-Sept. W.
- 19b. Middle cauline leaves decurrent to 2 cm on the stem; involucre bracts narrower, lance-shaped, mostly 1.5-2.5 mm wide at the middle and tapering to the tip...20
- 20a. Inner involucre bracts often with erose or fringed tips; corollas creamy white to pale pink; leaves with 5-9 pairs of lobes, usually with a wider midrib than the next... ***C. clavatum* (M.E. Jones) Petrak, FISH LAKE THISTLE.**

[= *C. griseum* (Rydb.) K. Schum.; *C. modestum* (Osterh.) Cockerell; *C. oreophilum* (Rydb.) K. Schum.; *C. scapanolepis* Petrak; *C. spathulifolium* Rydb.]. Common in rocky soil of mountain meadows and forest clearings, 6200-10,800 ft. June-Sept. E/W.

Cirsium clavatum is closely related to *C. pulcherrimum*, and the two species might form hybrids in the northern counties, but in general *C. pulcherrimum* is located to the west of *C. clavatum*. The erose or fringed bracts typically characteristic of *C. centaureae* (=var. *americanum*) simply fall within the variation of *C. clavatum* as a whole, as some specimens have all bracts erose while others only have a few inner bracts with erose tips. Otherwise, var. *americanum* and var. *clavatum* overlap in almost every other vegetative feature. In addition, the range of *C. centaureae* completely overlaps that of *C. clavatum*:

1a. Involucre bracts with erose or fringed apices...**var. americanum (Gray) D.J. Keil, ROCKY MOUNTAIN FRINGED THISTLE.** [= *C. centaureae* (Rydb.) K. Schum.]. Common in mountain meadows, along streams, and in forest openings, (6200) 7000-10,800 ft. July-Sept. E/W.

1b. Involucre bracts with entire apices...**var. clavatum, FISH LAKE THISTLE.** Common in rocky soil of mountain meadows and forest clearings, found in the northwestern counties, 6800-9900 ft. June-Sept. E/W.

20b. Inner involucre bracts entire; corollas usually pink or purple, occasionally creamy white; leaves usually with 8-14 pairs of lobes, usually deeply lobed with a narrow midrib (3-6 mm wide)...***C. pulcherrimum* (Rydb.) K. Schum. var. pulcherrimum, WYOMING THISTLE.** Common on shale outcroppings and rocky ridgetops, found in Rio Blanco, Moffat, and Routt Cos., 5600-8600 ft. May-July. W.

See discussion under *C. clavatum* above. *Cirsium pulcherrimum* (at least in Colorado), is very similar to *C. barnebyi* except that the leaves are green on one side. The two species apparently do not grow together.

ONOPORDUM KEY:

1a. Leaves softly tomentose-woolly; involucre bracts woolly...***O. acanthium* L., SCOTCH COTTONTHISTLE.** Locally common in disturbed places and along roadsides, 5200-7000 ft. June-Aug. E/W.

1b. Leaves glandular-hairy and not at all softly woolly; involucre bracts hairless...***O. tauricum* Willd., BULL THISTLE.** Found in waste places and other disturbed sites, and along roadsides, known from Pueblo and Huerfano Cos., 5500-5800 ft. June-Aug. E/W.

Illustrated Glossary

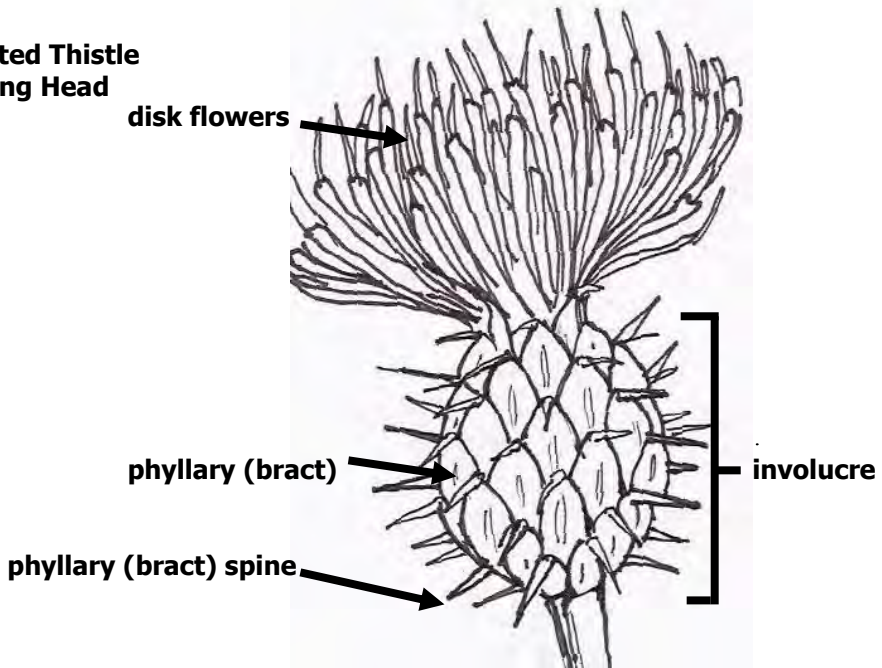
Terms related to life cycle (duration):

Annual-completes entire life cycle in one season only

Biennial-of two years duration. A biennial plant produces a rosette of basal leaves, sends up a flower stalk the second year, produces seed and dies.

Perennial-living year after year

Illustrated Thistle Flowering Head



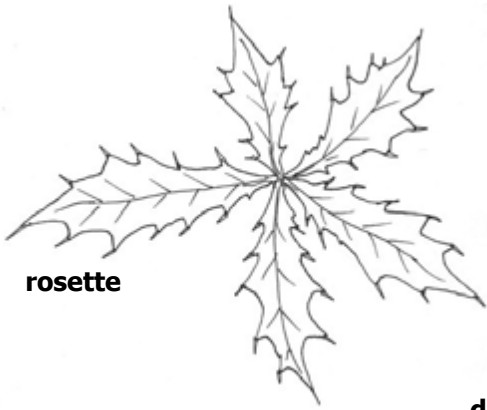
Terms related to the flowering head:

Involucre-a circle or cluster of bracts at the base of a flower head. In thistles, the shape of the involucre is often a helpful ID feature.

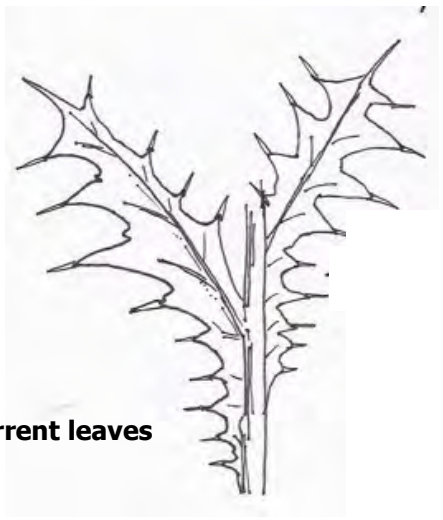
Bract-a much reduced leaf. In thistles, bracts make up the involucre, or circle of bracts at the base of the flower head. In thistles, bract shape, margin, aspect, color, and the presence or absence of a spine at the tip can provide essential ID information.

Phyllary-a more precise term for a bract of the involucre in the family Asteraceae.

Reflexed-bent abruptly down or away from the flowering stem axis. Noting if the phyllaries (bracts) or phyllary spines of a thistle's involucre are reflexed can provide essential ID information.



rosette



decurrent leaves

Terms related to leaves, roots or growth habit:

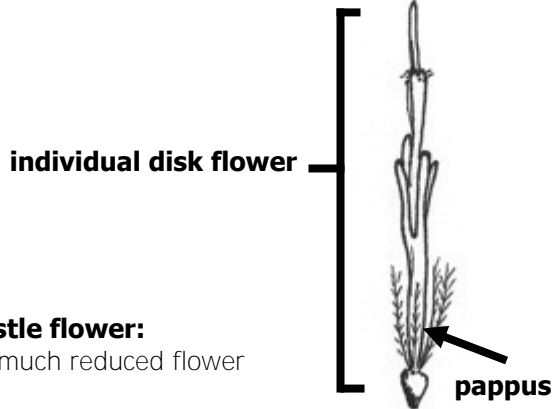
Aculescent– having no stem

Rosette-a cluster of closely crowded radiating leaves at ground level. Biennial thistles produce a rosette in the first growing season.

Decurrent leaves-leaves that continue down the stem beyond the point of attachment

Taproot-a primary, often fleshy, vertical root

Rhizome-a horizontal, underground stem capable of rooting and shooting at the nodes.



Terms related to and individual thistle flower:

Disk flower- the radially symmetrical, much reduced flower making up the flower head in thistles.

Pappus- appendages at the apex of the ovary in the family Asteraceae. In thistles, the genus *Cirsium* has plumose (feathery) pappus.

Field Notes

Field Notes

Collaborative Partners



The Devil's Backbone Open Space in Larimer County. Photo By Harry Strharsky

Larimer County Natural Resources Department manages some of Northern Colorado's great outdoor locations while also promoting sound land stewardship on public and private lands. The department administers Larimer County's $\frac{1}{4}$ -cent open spaces sales tax, which has protected over 44,000 acres through the acquisition of open spaces and conservation easements. Education and outreach material, such as the Thistles of Colorado, is meant to empower individuals and garner support for the conservation of biodiversity and protection of eco-system services everywhere.

The City of Aurora's Open Space and Natural Resources Division supports stewardship of natural resources essential to the quality of life in Aurora. Educating citizens about native and non-native thistles fosters appreciation for native thistle beauty and ecology and support for the important job of managing noxious thistles on public and private lands. Thistle education in Aurora is supported by a mini grant from Adams County Open Space.

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Weed Management Reference Guide For Larimer County, 2010.

Project funding provided by:

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