

North Dakota State University
NDSU Extension Service

The Thistles of North Dakota

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Thistle is an old English name, essentially the same in all languages, for a large group of plants with a dubious reputation. In ancient history the thistle represented part of the primeval curse on the earth in general, and on man in particular. In Greek history Earth made the thistle in a moment of grief for the loss of Daphnis, shepherd and musician, poet and hunter. In Norse mythology Thor, the thunderer, protected the plant, known as the lightning plant, and all those that wore it from harm. The common cotton thistle or Scotch thistle (*Onopordum acanthium* L.) has regal stature. During the reign of Malcolm I of Scotland, Norsemen attempted to capture the Staines Castle by wading across the moat in their bare feet, only to find the moat dry and overgrown with thistle. The painful cries of the warriors roused the castle guards and the Norsemen were defeated. To commemorate this victory, the flower became the emblem of Scotland. In some translations, thistle is also the basis of Hans Christian Anderson's tale *The Wild Swans*, where eleven princes were freed from their entrapment as swans when their sister made shirts from thistle and placed them on their backs.

Thistles in agriculture have a reputation as a sign of untidiness and neglect, and are often found on good ground not properly cared for. However, this unfortunate characteristic is only true of a few invasive species and is not accurate for the vast majority of native thistles which have many useful traits. Europeans, Native Americans, and early settlers found many thistle species edible as well as useful for medicinal purposes. Thistle achenes as raw seeds are bitter but were often roasted before being eaten. The young leaves of Canada, bull, and plumeless thistle, with the spines removed, can be served as a salad or cooked like spinach. The inner stem pith can be steamed and served like asparagus, once the outer layer is peeled off. The heads of these plants also can be used as a rennet to curdle milk for cheese making.

Blessed thistle (*Cnicus benedictus* L.) is cultivated in southern Europe and has the reputation of curing many ills, including the plague. Extracts from milk thistle [*Silybum marianum* (L.) Gaertn.] are sold in health food stores to combat the liver diseases, hepatitis and cirrhosis. The extracts contain silymarin, a compound that may inhibit toxins from translocating across liver cell membranes. Thistle plumes, especially musk thistle pappus, were used to make paper during the 18th century.

Many native birds and insects utilize the various thistle species as a food source and for materials to build nests. Goldfinches feed on several thistle species, and bees utilize the plants to make an especially sweet honey. Many butterfly larvae, especially in the metalmark group, use thistle as their main or only food source. Wasps, flies, and beetles feed on the pollen of thistle flowers, which in turn provide a food source for other wildlife.

Nine species of thistle are found in North Dakota, of which five are native and one is considered rare. North Dakota has a relatively low population of native thistles compared to most western states, which commonly have 25 or more native thistle species. Some plants referred to as thistles such as perennial sowthistle (*Sonchus arvensis* L.) and Russian thistle (*Salsola iberica* Sennen) are not true thistles, but rather are plants with poorly chosen common names. Most native thistle species go unnoticed. Only a few introduced thistles have become weedy pests. There are approximately 160 native thistle species in North America, with at least 110 species north of Mexico and 50 in Latin America south of the Mexican border.

Native North Dakota Thistles

Of the five native thistle species in North Dakota, Flodman and wavyleaf thistle are perennials, while tall, field, and swamp thistle are biennials. Flodman thistle is the most common of these plants and is found in all North Dakota counties, while tall thistle is considered rare and is on the threatened/endangered species list in some regions.

Figure 1. Distribution of native thistles in North Dakota by county. A highlighted county indicates one or more documented occurrences, although the species may be found elsewhere.

[Flodman Thistle](#), *Cirsium flodmanii* (3KB color map)

[Field Thistle](#), *Cirsium discolor* (3KB color map)

[Wavyleaf Thistle](#), *Cirsium undulatum* (3KB color map)

[Swamp Thistle](#), *Cirsium muticum* (3KB color map)

[Tall Thistle](#), *Cirsium altissimum* (3KB color map)

Flodman thistle [*Cirsium flodmanii* (Rydb.) Arthur]

Flodman thistle is more competitive than most other native species, has the potential to infest large areas, and is found throughout North Dakota ([Figure 1](#) - 3KB color map). Flodman thistle is a deep-rooted perennial (sometimes biennial) and grows 2 to 3 feet tall (Figure 2). The leaves are shiny green on top with slight pubescence and are white and very pubescent below (Figure 3), alternate, rigid and deeply lobed, and end in a spine. Each lobe has three points, one of which sticks out at near right-angles giving them a "flipping appearance", which is a helpful way to tell this plant from the often similar appearing wavyleaf thistle (Figure 4). The rosettes are often 4 to 6 inches in diameter with oblong or lanceolate leaves which vary from very lobed to only remotely lobed (Figure 5). The leaves are green to gray and especially pubescent below.

[Figure 2.](#) Flodman thistle flowering plant showing deeply toothed alternate leaves and gray stem. (28KB color photo)

[Figure 3.](#) Underside of Flodman thistle leaves which are gray and highly pubescent. (39KB color photo)

[Figure 4.](#) The nearly upright or "flipping" lobes of Flodman thistle and the shiny green upper-surface of the leaves, help distinguish it from wavyleaf thistle. (30KB color photo)

[Figure 5.](#) Flodman thistle rosette with lance shaped leaves. (41KB color photo)

The flowers are deep purple to pink, tube shaped and approximately 1 inch long (Figure 6). The flower heads (involucre bracts) have a strong yellow spine and a sticky secretion which attracts and catches insects. Flodman thistle usually flowers from mid-July through September. A white flowering form occasionally is found in North Dakota (Figure 7). The achenes are about 0.1 to 0.15 inches long, oval, vary from tan to brown and have a conspicuous yellow collar ([Figure 25a](#) - 18KB color photo).

[Figure 6.](#) Flodman thistle flower with strong yellow spine on the tube shaped head. A sticky secretion attracts and catches insects. (31KB color photo)

[Figure 7.](#) A white flowering form of Flodman thistle can be found in small patches surrounded by the much more common purple flowering form. (52KB color photo)

Flodman thistle is tolerant to high salt concentration in soil but grows best under moist conditions, as most thistles do. Flodman thistle can survive under drought conditions which gives it a competitive advantage on semi-arid rangeland. The stems of Flodman thistle can be peeled and eaten and were part of the Native American diet.

Wavyleaf thistle [*Cirsium undulatum* (Nutt.) Spreng.]

Wavyleaf thistle is often confused with Flodman thistle but is a larger plant and generally is found in drier locations than those occupied by Flodman thistle. Both species are perennials in North Dakota. Generally, Flodman thistle is more common than wavyleaf in eastern North Dakota, but wavyleaf gradually becomes the predominate species in central and western portions of the state ([Figure 1](#) - 3KB color map). Wavy-leaf thistle flowers from July to September, which is a week or two earlier than Flodman thistle. Wavyleaf thistle tends to be more spiny than Flodman thistle and often grows to 4 feet in height (Figure 8).

Figure 8. Flowering wavyleaf thistle plant which is very pubescent and gray in color with leaves much less divided than Flodman thistle. (72KB color photo)

The leaves of wavyleaf thistle are alternate and tipped with yellow spines. This thistle is sometimes called gray thistle because it has a white cast. The surfaces are very pubescent and the margins are strongly undulated or wavy (Figure 9). The leaves are less deeply lobed than Flodman thistle. The stem of wavyleaf thistle is very pubescent and generally thicker than Flodman thistle (Figure 10). Rosette leaves also are very wavy and gray in appearance (Figure 11), unlike Flodman thistle. The underside of the rosette is especially pubescent.

Figure 9. Wavyleaf thistle leaves are tipped with a yellow spine, similar to Flodman thistle. However, the leaves of wavyleaf thistle are very pubescent both above and below and undulated without the "flipping" appearance of Flodman. (46KB color photo)

Figure 10. Stems of wavyleaf thistle are very pubescent and thicker than Flodman thistle. (30KB color photo)

Figure 11. Rosette of wavyleaf thistle, which is also called gray thistle because of the dense pubescence. (34KB color photo)

The flowers of wavyleaf thistle are larger than Flodman, usually more than 2 inches long (Figure 12). The large globe-shaped heads contain glands that are tipped with strong yellow spines. The flowers are most often pink or purple, but there is a white flowered form, f. *album* Farwell. The achenes are brown without a lighter apical band or with only a very narrow lighter margin ([Figure 25b](#) - 17KB color photo).

Figure 12. Large globe-shaped head of wavyleaf thistle which can vary in color from pink to wine-red. (25KB color photo)

Various Native American tribes used wavyleaf thistle to treat gonorrhea and syphilis. The remedy involved drinking a tea made from the plant and then elevating the body temperature to induce sweating. If the patient were male, he had to run a mile then, wrap himself in a blanket. A female patient just sat bundled in a heavy blanket to induce sweating. Others have reported that a tea from the roots can be made to treat diabetes and stomachache. The roots were also boiled and used in soup.

Field thistle [*Cirsium discolor* (Muhl. ex Willd.) Spreng.]

Field thistle has only been documented to occur in extreme eastern North Dakota ([Figure 1](#) - 3KB color map), although it is quite common in Minnesota and most of eastern North America. Field thistle is found by roadsides, in clearings and openings in wooded areas, and in moist but not marshy locations. It generally grows 6 to 7 feet tall in North Dakota, but can reach heights up to 10 feet. The tall plant and leaves that resemble oak leaves are two good characteristics for identification of this plant in North Dakota (Figure 13).

Figure 13. Field thistle grows 6 to 7 feet tall in North Dakota and is usually found on the edge of woods in the eastern part of the state. Each stem has a single head. (52KB color photo)

The stems of field thistle are woody, hollow, ribbed and green to green-brown with little pubescence. The plant has many

branches, and each branch has a single flower head. The lower leaves are large (10 by 20 inches) and deeply lobed, resembling an oak leaf (Figure 14). The leaves are light green and shiny on top, pubescent underneath, with very small unimpressive spines. The leaves get progressively smaller toward the top of the plant. The rosette leaves are similar in shape to stem leaves but grow up to 12 inches long (Figure 15).

[Figure 14.](#) Leaves of field thistle grow 10 to 20 inches long, have few spines, and resemble an oak leaf. (28KB color photo)

[Figure 15.](#) The initial leaves of a field thistle rosette are very large but otherwise indistinguishable from other thistles until the characteristic oak-leaf shape is exhibited. (23KB color photo)

The flowers are pink to lavender, rarely white in color, and the heads are 1.5 to 2 inches wide by 1.5 inches in height (Figures 16 and 17). Each flower head has about eight rows of progressively longer bracts, the outer five rows of which have 0.25 inch long spines bent out and down. There are numerous leaflike bracts around each flower head. The plant begins flowering in late July through September. Achenes are 0.2 inches long, light brown with darker stripes and a yellow apical collar ([Figure 25c](#) - 19KB color photo).

[Figure 16.](#) The common pink head of field thistle has many short spines and is surrounded by small very divided leaves which give the plant an elegant appearance. (32KB color photo)

[Figure 17.](#) The white flowering form of field thistle. (16KB color photo)

Field thistle is closely related to tall thistle. North Dakota is on the border of the ranges of both species. While they have been found in the state, they are considered uncommon.

Swamp thistle (*Cirsium muticum* Michx.)

As its name implies, swamp thistle is found in moist low-lying woodland areas, thickets, and near rivers and especially wet meadows. It is found in eastern North Dakota and in the Bottineau area ([Figure 1](#) - 3KB color map). Swamp thistle is an elegant long-stemmed flowering plant that usually grows 3 to 6 feet tall (Figure 18). Swamp thistle has very few and weak spines on the leaf margins and no spines around the flower head, which is an easy way to tell it apart from field thistle and tall thistle.

[Figure 18.](#) Swamp thistle grows in and near wooded areas and is difficult to spot even when it flowers in mid-July. (22KB color photo)

Swamp thistle is a biennial with a soft, hollow, and ribbed stem green in color with fine hairs. The leaves are light green, oblong with deep lobes to lanceolate, and the lobes usually are tipped with a small weak spine and almost hairless (Figure 19). The leaves are up to 10 inches long and 4 inches wide at the base but become progressively smaller and more lanceolate towards the tip (Figure 20). The rosette leaves are generally oblong and can grow to 22 inches long and 8 inches wide.

[Figure 19.](#) The leaves of swamp thistle are nearly hairless and tipped with weak spines. (16KB color photo)

[Figure 20.](#) Swamp thistle stems are hollow and ribbed, leaves are sparse, and heads can be found solitary or in clusters. (19KB color photo)

Swamp thistle flowers somewhat earlier than field thistle, mid-July through early September. The heads are about 1.5 inches across and bell shaped, and the bracts are sticky and gray to white resembling cobwebs (Figure 21). The flowers are dark purple to lavender, generally the color of red wine (rarely white) and can be solitary or in clusters. The achenes are about 0.25 inches long, narrow, and dark brown to black in color with a yellow apical band ([Figure 25d](#) - 19KB color photo). The swamp metalmark butterfly will lay eggs only on swamp thistle which is the caterpillar's only food source.

[Figure 21.](#) A rapid way to distinguish swamp thistle from field and tall thistle is to squeeze the flower heads, which are spineless, while the other species will leave a "sharp" impression. Also, the swamp thistle involucre bracts resemble cobwebs. (25KB color photo)

Tall thistle [*Cirsium altissimum* (L.) Spreng]

Tall thistle is closely related to field thistle and can be difficult to distinguish. Tall thistle is found in Nebraska where field thistle does not occur, and only field thistle, not tall thistle, is found in Canada. Although both species have been found in North Dakota ([Figure 1](#) - 3KB color map), they are considered uncommon and the characteristics that are used to distinguish these two species blur in the northern Great Plains.

Tall thistle is a biennial that grows from 3 to 8 feet tall. The stems are light green and freely branched ([Figure 22](#)). Most leaves are lanceolate or long-ovate, tapered at the end and not as deeply lobed as field thistle leaves. The leaves of tall thistle more closely resemble dandelion leaves, compared to the oak-leaf shape of field thistle ([Figure 23](#)). The leaves are green on top, densely pubescent and white beneath, and 4 to 11 inches long and 1.5 to 4 inches wide. Leaves near the base are largest and gradually are smaller and more elliptical toward the top. The leaves are alternate and toothed or with weak spines. Rosette leaves are similar to the lower leaves of the bolted plant, large and only slightly lobed.

[Figure 22](#). Tall thistle flowering plant with leaves resembling a dandelion, light green freely branched stems, and solitary flowers at the end of each branch. (35KB color photo)

[Figure 23](#). Leaves of tall thistle can be oval shaped or toothed, are pubescent underneath, and shiny green on top with weak spines. (23KB color photo)

The heads are 1.5 to 2 inches long and 2 inches wide, mostly solitary at the end of branches ([Figure 24](#)). The leaves surrounding the heads are oblong and not divided as they are in field thistle and have shorter spines. The flowers generally are light purple but can be dark purple, rarely white, and flowering occurs beginning in July to early September. The achenes are pale to dark brown with a yellow apical ring with incomplete stripes, 0.15 to 0.25 inches long and 0.1 inch wide ([Figure 25e](#) - 18KB color photo). Wild turkeys often feed on tall thistle seed in the fall.

[Figure 24](#). Tall thistle flowers have one or more long undivided leaves just below the head. (29KB color photo)

Tall thistle is commonly found near woods, in open lowlands, and near ditches and roads. It occasionally occurs on the slopes of open prairies. Tall thistle has only been reported in eastern North Dakota.

Figure 25. North Dakota thistle achenes, commonly called seeds:

- | | |
|--|---|
| a) Flodman (18KB color photo) | f) Canada (20KB color photo) |
| b) wavyleaf (17KB color photo) | g) bull (20KB color photo) |
| c) field (19KB color photo) | h) musk (16KB color photo) |
| d) swamp (19KB color photo) | i) plumeless (20KB color photo) |
| e) tall (18KB color photo) | |

Invasive North Dakota Thistles

Thistle species introduced from Europe and Eurasia often spread rapidly and become weedy because the natural enemies that keep the populations in check in their native habitat are not found in North America. At least 19 thistle species have been declared noxious according to state weed control laws or seed laws in the United States. The most common noxious thistle species include Canada, musk, bull, plumeless, and Scotch thistles. All except Scotch thistle are found in North Dakota. Consult North Dakota State University Extension Service Circular W-799, *Perennial and Biennial Thistle Control*, for weed control guidelines.

Figure 26. Distribution of introduced thistles in North Dakota by county. A highlighted county indicates one or more documented occurrences, although the species may be found elsewhere.

[Canada Thistle](#), *Cirsium arvense* (3KB color image)

[Musk Thistle](#), *Carduus nutans* (3KB color image)

[Bull Thistle](#), *Cirsium vulgare* (3KB color image)

Canada thistle [*Cirsium arvense* (L.) Scop.]

Though its name would indicate otherwise, Canada thistle is a native of the Mediterranean region and southeast Europe. It likely was introduced into North America in contaminated hay and grain seed during early colonization in the 17th century. Canada thistle also is found in China and Japan and has spread so extensively that it is difficult to distinguish the plant's original native range. Canada thistle has become very well established in North America and is now considered a noxious weed in at least 35 states and much of Canada. It is found throughout North Dakota ([Figure 26](#) - 3KB color map) and is considered naturalized.

Canada thistle has been classified into several varieties. These varieties are distinguished mainly by leaf shape, size, and abundance of leaf spines. Many ecotypes of Canada thistle also exist and differ in growth, phenology, photoperiodism, and susceptibility to herbicides and cultivation. A Canada thistle variety has certain phenological characteristics but can be found throughout the geographic range of the species, whereas an ecotype differs from a variety because it is a population of plants from a certain location or area with specific traits. For example, leaf shape, head structure, and the number and size of spines can differ with ecotype. Flower color can range from purple to light lavender or even white (Figures 27 and 28). Stem color also can differ from green to lavender (Figure 29). However, plant response to herbicides or cultivation is not related to any specific phenotypic variation. For instance, some ecotypes are very resistant to herbicides and/or cultivation.

[Figure 27](#). Female purple flowering Canada thistle ecotype with a green stem. (33KB color photo)

[Figure 28](#). White flowering form of Canada thistle which occurs in about 10% of the population. (15KB color photo)

[Figure 29](#). Canada thistle ecotype with dark lavender stems and flowers. (34KB color photo)

Canada thistle grows best in the northern regions of North America where temperature and rainfall are moderate. Canada thistle rosettes (Figure 30) require at least 14 hours of daylength to bolt and flower. Its growth is limited or stopped when temperature exceed 85 degrees F for extended periods. Although it will grow in a wide range of soils, Canada thistle produces deeper roots in clay or muck soils than in sand or gravel. The roots of Canada thistle have medicinal uses and have been used to treat mouth diseases.

[Figure 30](#). Canada thistle rosette with spiny tips and shiny green wavy leaves. (15KB color photo)

Canada thistle usually grows 2 to 3 feet tall with alternate, dark green leaves that vary in size (Figure 31). The leaves are generally oblong, the length 3 to 5 times the width, usually deeply lobed, and have spiny toothed edges. The leaf edge spines vary in size and number according to variety. Canada thistle is a perennial spreading both by seed and underground rhizomes. It generally forms colonies and is found in cropland, roadsides, and disturbed pasture soils. However, Canada thistle is not very competitive in healthy turf.

[Figure 31](#). Bolted Canada thistle with alternate, waxy wavy leaves, and clusters of flower heads. (31KB color photo)

Canada thistle is dioecious, that is male (Figure 32) and female ([Figure 27](#)) flowers are produced on different plants, so cross pollination is necessary for seed production. Male flowers are often slightly smaller than female. The flowers are numerous but small, usually less than 1 inch in diameter. Canada thistle is the first thistle to flower in North Dakota beginning in June through August. It is easily identified by the small, numerous, clustered, often lilac colored and very fragrant flowers. Involucre bracts are oval shaped with very short spines.

[Figure 32](#). Male flower of Canada thistle with pollen-producing stamens. Heads are usually less than 1 inch in diameter with short spines. (27KB color photo)

The flowers produce from 40 to 80 seeds per head. The smooth, light brown to straw colored achenes are 0.1 to 0.2 inches long with a conical point and are loosely attached to a tannish pappus at the tip ([Figure 25f](#) - 20KB color photo). Seeds mature rapidly, spread with pappus on the wind, (Figure 33) and are able to germinate within 8 to 10 days after pollination.

[Figure 33](#). Canada thistle achenes are attached to a pappus which allows long distance movement in the wind or on farm machinery, a major method of movement to new areas. (29KB color photo)

Red Admiral, viceroys and painted lady butterflies lay eggs on Canada thistle, and the subsequent larvae feed on the leaves and stems. However, only the painted lady butterfly builds up populations high enough to eliminate an infestation. This butterfly is generally found in southern states and will migrate north only once every 8 to 11 years.

Bull thistle [*Cirsium vulgare* (Savi) Tenore]

Bull thistle is the least serious of the introduced thistles in North Dakota, and generally is found in the northern and eastern counties of the state ([Figure 26](#) - 3KB color map). Bull thistle is a biennial and grows from a flat rosette of leaves the first year to a flowering stem up to 5 feet tall the second (Figure 34). Although the seed readily germinate, survival is low, and the plant is often found growing singularly or only scattered in pastures and wooded areas. Distinguishing characteristics of bull thistle are the leaves and the broad prickly wings that line the stem (Figure 35). Leaf margins are deeply toothed, and toothed again (double dentate) with prominent stiff spines. The leaves have prickly hairs above, especially along the midvein, and are cottony below. The stems are very pubescent with dark purple veins (Figure 36). The plant appears bushy rather than the candelabra appearance of plumeless or Canada thistle.

[Figure 34.](#) Bushy appearance of bull thistle with spiny conical shaped flower heads. The plant is generally found growing solitary in pastures and woodlands. (34KB color photo)

[Figure 35.](#) Double dentate leaf of bull thistle with long stiff spines at each tooth, prickly pubescence along the leaf mid-vein and a broadly winged stem. The wings run completely along the stems unlike musk thistle. (22KB color photo)

[Figure 36.](#) Bull thistle stems are very pubescent and have dark purple veins. (25KB color photo)

Bull thistle heads are usually found singularly at the end of each stem branch (Figure 34). The flowers are gumdrop shaped, large (usually 2 or 3 inches tall), with long, stiff, yellow-tipped spines (Figure 37). Bull thistle flowers from July to September, which is somewhat later than other thistles in the region. The flowers are usually purple but a rare white flowering variety has been collected in the region.

[Figure 37.](#) Common purple and rare white flowering bull thistle. The heads look like large gumdrops with long stiff and very sharp spines. (30KB color photo)

The achenes are 0.1 to 0.15 inches long, glossy light brown to pale yellow or white with narrow dark brown stripes ([Figure 25g](#) - 20KB color photo). The rosette leaves of bull thistle are deeply lobed and very pubescent with dark purple ribs (Figure 38). Native Americans used bull thistle to treat hemorrhoids, which they likely learned from French fur trappers. Bull thistle is often the thistle species referred to as an edible plant. Many parts are edible from the root to the flower. The petals were used as chewing gum or tobacco by Native Americans.

[Figure 38.](#) Deeply lobed and very pubescent bull thistle rosette. (30KB color photo)

Musk thistle (*Carduus nutans* L.)

Musk thistle likely is the most easily identified invasive thistle in North Dakota, yet many people confuse this plant with either bull thistle or plumeless thistle. Musk thistle often grows in excess of 6 feet tall and has very large flower heads that tend to droop (Figure 39). The head has very characteristic brown bracts that resemble a pine cone (Figure 40). Musk thistle is a winter annual or biennial and has been found in the northern half of North Dakota in dry areas or sandy and rocky soils ([Figure 26](#) - 3KB color map). Two subspecies of musk thistle which differ in the size of the flower head and in foliage texture and pubescence are known in North Dakota.

[Figure 39.](#) Musk thistle grows 6 to 8 feet tall and is often found in dry pastures. (60KB color photo)

[Figure 40.](#) Musk thistle flower head is characterized by large brown bracts that resemble a pine cone and the tendency to nod or lean because of the large size of the flower. (49KB color photo)

Musk thistle stems are usually very branched with spiny wings; however, the wings are interrupted and not complete along the stem as with bull or plumeless thistle (Figure 41). The leaves are oblong to lanceolate, lobed to four-fifths of the width

with slender spines on the margin (Figure 42). Each lobe ends in a prominent white or yellow spine. The leaves are dark green on top with light green midribs and often a white margin. There is generally little pubescence underneath, which helps to distinguish musk thistle from plumeless thistle. However, the subspecies *C. nutans* subsp. *macrocephalus* (Desf.) has very pubescent leaves.

[Figure 41](#). Stems of musk thistle have wings that do not extend completely up and down the stem which is smooth elsewhere. The heads often are 2 to 3 inches in diameter. (48KB color photo)

[Figure 42](#). Musk thistle leaves are dark green, generally with little or no pubescence and deeply lobed with small but sharp spines. The subspecies *macrocephalus* does have pubescent leaves. (24KB color photo)

The heads are borne singularly at the end of the stem and droop or nod (Figure 41). The heads are often 2 to 3 inches across and generally deep rose to violet, rarely purple. The bracts are very broad and the outer ones are bent downward. Musk thistle flowers from July to late September. Animals, especially horses, eat the flower heads of musk thistle. It is not uncommon to see almost completely "headless" plants in a horse pasture or where elk feed.

The average musk thistle plant produces more than 10,000 seeds per plant and under favorable conditions may produce 120,000 seeds per plant. The achenes are 0.15 to 0.2 inches long, glossy, light brown with stripes and a light apical rim ([Figure 25h](#) - 16KB color photo). Rosettes are dark green with a light green midrib and often grow 2 feet in diameter or more (Figure 43). The rosette leaves are usually smooth and lacking pubescence.

[Figure 43](#). Musk thistle rosette which often grows 2 feet or more in diameter. (68KB color photo)

Plumeless thistle (*Carduus acanthoides* L.)

Plumeless thistle tends to be shorter than other invasive thistles and generally reaches 1 to 4 feet tall (Figure 44). Plumeless thistle is a winter annual or biennial and is generally found only in eastern North Dakota ([Figure 26](#) - 3KB color map). Plumeless thistle can become very weedy and form dense colonies, especially along waterways, ditches, and roadsides in summers following wet falls. Plumeless thistle is seldom found in cultivated fields, even when infestations are nearby in roadsides or pastures.

[Figure 44](#). Flowering plumeless thistle showing spiny winged stems that completely extend up and down the stem unlike musk thistle. (39KB color photo)

Plumeless thistle stems are winged and very branched giving the plant a candelabrum appearance (Figure 44). The wings are very spiny and are continuous along the stem and not interrupted like musk thistle (Figure 45). The leaves are more deeply lobed and narrower than musk thistle and very pubescent underneath (Figure 46). Each lobe has one to three pointed marginal spines which are short but very sharp (Figure 47).

[Figure 45](#). Plumeless thistle is very branched and very spiny, the most prickly of all the thistles in North Dakota. (26KB color photo)

[Figure 46](#). Plumeless thistle leaves are more deeply lobed than musk thistle and have much more pubescence. (28KB color photo)

[Figure 47](#). Each leaf lobe of plumeless thistle has one to three very sharp stiff spines with a white margin that resembles holly. (26KB color photo)

The heads are small (0.5 to 1 inch in diameter) but very numerous and pink to purple in color or very rarely white (Figure 48). The bracts beneath the flowers are very narrow and resemble spines. The heads can be singular or in clusters of 2 to 5. The achenes are small, grey to light brown with a distinct, light apical collar and slightly curved ([Figure 25i](#) - 20KB color photo). Plumeless thistle flowers from May to August.

[Figure 48](#). Plumeless thistle head with short, very sharp spines on the bracts. (38KB color photo)

Rosettes of plumeless thistle resemble those of musk thistle, except they are more deeply lobed and much more pubescent (Figure 49). Plumeless thistle rosettes have wavy leaves with yellow spines along the white-colored leaf margins.

[Figure 49](#). Plumeless thistle rosette, which is similar in appearance to musk thistle except much more pubescent, especially on the underside of the leaves. (67KB color photo)

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