

Plants Commonly Found in Established Minnesota Horse Pastures

Non-Poisonous Weeds and Recommended Grass and Legume Pasture Species

Krishona Martinson, Ph.D. - Roger Becker, Ph.D. - Lynn Hovda, D.V.M., M.S. - Mike Murphy, D.V.M., Ph.D.



UNIVERSITY OF MINNESOTA

EXTENSION

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About the authors: Krishona Martinson is the equine Extension specialist for the University of Minnesota in the Department of Animal Science, Roger Becker is an Extension weed scientist for the University of Minnesota in the Department of Agronomy and Plant Genetics, Lynn Hovda is the chief veterinarian for the Minnesota Racing Commission, and Mike Murphy is the veterinary toxicologist for the University of Minnesota in the College of Veterinary Medicine.

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Contributing authors: Beverly Durgan, Ph.D. and Paul Peterson, Ph.D., University of Minnesota

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Table of contents

Introduction	3
Recommended pasture species	4
Non-poisonous weeds	
Annual grasses	8
Perennial grasses	10
Annual broadleaf weeds.....	12
Biennial thistles.....	14
Common burdock	16
Common mullein	17
Prickly lettuce	18
Spotted knapweed.....	19
Absinth wormwood	20
Canada thistle.....	21
Common dandelion	22
Common milkweed	23
Curly dock	24
Leafy spurge	25
Stinging nettle.....	26
Perennial sowthistle	27
Pink family	28
Plantain family.....	30
Native wildflowers	32
Introduced wildflowers	33
Woody weed species.....	34
Buckthorn.....	36
Primary noxious weeds of Minnesota	37
Chemical control table	40
Grazing restriction table	41
Glossary	42
References and resources	44

Introduction

Pasture weed control is a challenge for most horse owners. Considerable grass pasture acreage in Minnesota is infested with broadleaf and grassy weeds. Weeds are generally less palatable, less nutritious, less dependable and lower yielding than recommended species. Good grazing management, especially avoiding overgrazing, will reduce weed infestations. There are three types of weeds: annuals, biennials and perennials. Annuals complete their life cycle in one growing season. Biennials complete their life cycle in two growing seasons. Perennials normally live for three or more years. The objectives of this publication are to aid horse owners in identification of non-poisonous weeds and desirable pasture species commonly found in established Minnesota horse pastures and to offer weed control options. Information on poisonous plants can be found in the University of Minnesota Extension publication *Plants Poisonous or Harmful to Horses in the North Central United States* (08491).

The key to management of any weed is to prevent its establishment with good pasture management, which includes overseeding thin areas, selecting appropriate forage species and maintaining soil pH and fertility. Once weeds are established, effective control requires a combination of mechanical, chemical and cultural methods. For annuals, mechanical weed control, such as mowing, is an effective method of control if done prior to flowering and seed production. Using an herbicide to control annual weeds is most effective when applied in the spring to actively growing, small weeds. For biennials, mowing is not an option in the first year of growth because the rosettes are too close to the ground. Mowing is an effective control method in the second year as long as the mowing is complete before seed production. Chemical control of biennials is most effective when applied during the first year's growth. If treatment is delayed until the second year, an early season application of an herbicide before the flowers bloom is recommended.

Management of perennial weeds requires integrating cultural, mechanical and chemical control methods. Mowing alone may take several growing seasons to effectively control perennial weeds and may never result in complete control. Herbicides alone, or a single herbicide application, likely will not eradicate perennial weeds. Fall herbicide applications provide the most effective perennial weed control. Application of herbicides in spring, or mowing during the summer, can be effective in controlling growth until fall. Apply herbicides selectively, carefully, and only if necessary. Always read and follow the herbicide label and comply with all grazing restrictions. Herbicides labeled for use in pastures are not harmful to horses when applied at the recommended usage rates and when all directions are carefully followed. Biological control, using host-specific natural enemies, has been successful on weeds like leafy spurge and purple loosestrife where traditional weed management methods are economically, logistically or environmentally undesirable.

If the pasture is a mixture of grasses and legumes like alfalfa or red clover, there are no herbicides that can be used to control broadleaf weeds selectively while not injuring or killing the legumes. Legumes can be seeded back in after weeds are controlled if a mixed pasture is the goal. Mowing and good pasture management should be used for a mixed pasture to avoid the need to use an herbicide. A well managed pasture will outcompete most weed species. Recommended pasture management includes avoiding overgrazing, testing soil pH and fertility every three years, fertilizing if needed and resting the pasture for 30 days after grazing. Mowing, dragging and controlling weeds should be done during the rest period. More information on pasture management can be found in the University of Minnesota Extension publication *Managing Established Horse Pastures* (M08460).



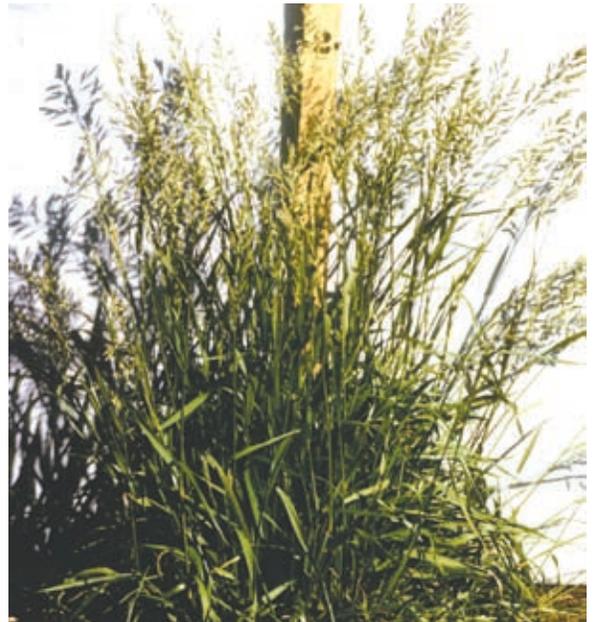
Crested wheatgrass



Orchard grass seed head



Perennial ryegrass



Tall fescue



Timothy seed head

Recommended Grass and Legume Pasture Species

When evaluating a pasture, it is sometimes easier to identify beneficial grasses and legumes than the plethora of possible weeds.

Below is a list of common perennial, cool-season pasture species divided into bunch grasses, sod-forming grasses and legumes. Cool-season grasses are well suited for pastures in the upper Midwest, but are not as productive during the heat of the summer. Bunch grasses tend to grow in bunches, while sod-forming grasses usually cover most of the soil surface. When selecting pasture forages, try to include both types of grasses. Legumes add nutrition to grass pastures and reduce the amount of nitrogen fertilizer that is needed because legumes fix nitrogen from the atmosphere.

Bunch grasses

Crested wheatgrass (*Agropyron desertorum*) is leafy and hardy, and because of its deep roots, is more drought tolerant than other species. The forage quality is excellent when the plant is in the vegetative stage. Once established, crested wheatgrass will persist for many years.

Orchard grass (*Dactylis glomerata*) is leafy, has rapid regrowth, and good early spring and late fall growth. However, orchard grass can be competitive with legumes, has marginal winter hardiness without snow cover, and can be very bunchy if planted at low rates.

Perennial ryegrass (*Lolium perenne*) has rapid regrowth, is high quality (very leafy), and is palatable when in the vegetative stage. However, perennial ryegrass has marginal winter hardiness, limited heat and drought tolerance, is susceptible to disease, and can be competitive with legumes.

Tall fescue (*Festuca arundinacea*) is adapted to a wide range of soils including wet soils, is tolerant of continuous grazing, and has excellent fall productivity. Tall fescue can have marginal winter hardiness and low palatability. Endophyte infected fescues can cause reproductive problems in mares and stallions and dry gangrene in all horses. Labels of pasture mixes containing tall and other fescues should be checked to ensure fescue is endophyte free. Endophyte infected or enhanced fescues should not be planted in horse pastures.

Timothy (*Phleum pratense*) is winter hardy and has a broad window for quality and palatable forage because it is late maturing. Timothy does well in cool, moist areas. However, timothy has an uneven yield distribution, slow regrowth, and poor heat and drought tolerance.



Kentucky bluegrass seed head



Reed canarygrass seed head



Bromegrass seed head



Alfalfa

Sod-forming grasses

Kentucky bluegrass (*Poa pratensis*) is winter hardy and tolerant of continuous grazing. However, Kentucky bluegrass has poor heat and drought tolerance. Because of its low-growing habit, it can have lower yields compared to other pasture grasses.

Reed canarygrass (*Phalaris arundinacea*) is tolerant of flooding and poorly drained soils. Reed canarygrass is relatively productive during heat and drought. However, reed canarygrass is relatively coarse and unpalatable when mature, and slow to establish. Newer varieties are less invasive than older varieties. Use only low-alkaloid varieties. Many naturalized stands of reed canarygrass have alkaloids (a potential toxin), and should be grazed with caution.

Smooth bromegrass (*Bromus inermis*) is very winter hardy, and persists through heat and drought. However, smooth bromegrass can have uneven yield distribution, slow regrowth, and poor summer productivity, and should not be used under continuous grazing.

Perennial legumes

Alfalfa (*Medicago sativa*) requires a soil pH of 6.5 to 7.0, high soil fertility, and cannot withstand water-logged soils or flooding. Pure alfalfa hay and pasture is not recommended for most horses because it usually contains more protein than most horses require. Research has shown that some horses grazing pastures planted with a high percentage of alfalfa may exhibit photosensitive reactions or sunburn. Refer to the University of Minnesota Extension publication *Plants Poisonous or Harmful to Horses in the North Central United States* (08491) for more information on photosensitive reactions.

Bird's-foot trefoil (*Lotus corniculatus*) is low growing with bright yellow flowers, and is commonly used by highway departments for roadside seedings. Bird's-foot trefoil is best suited for acidic, poorly drained soils. Bird's-foot trefoil seed is more expensive than other legumes, and is difficult to establish. However, once established, it persists via natural reseeding and provides high quality forage, even at or after maturity.

Red clover (*Trifolium pratense*) has hairy stems and leaves, and large red or reddish-purple flowers. It grows best on acidic, wet soils, and is usually used in areas where alfalfa will not grow. Mold-infested red clover can cause slobbers and sunburn or photosensitive reactions. Refer to the University of Minnesota Extension publication *Plants Poisonous or Harmful to Horses in the North Central United States* (08491) for more information on slobbers and photosensitive reactions.

White clover (*Trifolium repens*), **alsike clover** (*Trifolium hybridum*), and **sweetclover** (*Melilotus species*) grow better in moist conditions. Although they are rarely recommended, they are commonly found in pre-packaged pasture mixes. Mold-infested white clover, alsike clover and sweetclover can cause sunburn or photosensitive reactions. Refer to the University of Minnesota Extension publication *Plants Poisonous or Harmful to Horses in the North Central United States* (08491) for more information on photosensitive reactions.



Bird's-foot trefoil



Red clover



Alsike clover



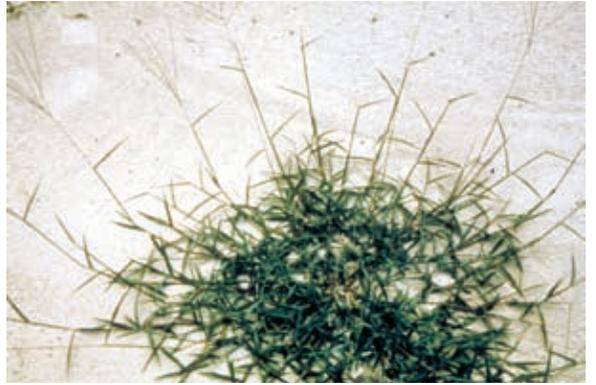
White clover



Yellow sweetclover



White sweetclover



Large crabgrass



Barnyardgrass and foxtail seed heads

Annual Weedy Grasses

Species and scientific name: Barnyardgrass (*Echinochloa crus-galli*) and large crabgrass (*Digitaria sanguinalis*)

Origin: Barnyardgrass is native to Europe and India. Large crabgrass is native to India and Africa.

Distribution: Both barnyardgrass and large crabgrass are common weeds found throughout the world, including Minnesota and a majority of the United States.

Habitat: Barnyardgrass is found in barnyards, crop areas and waste areas. Large crabgrass is found in lawns, gardens, fields, pastures and croplands. Large crabgrass is considered the most troublesome grassy lawn weed in Minnesota and other areas.

Life cycle: Both grasses are annuals. Large crabgrass is considered a summer annual.

Identification: Barnyardgrass is a tall, up to four feet, erect, hairless grass that branches at the base. Seed heads (panicles) are rough, bristly and green to purplish in color. Large crabgrass can be erect, up to three feet, or prostrate with hairy or somewhat hairy grayish-green leaves. Seed heads are multiple, long, narrow, and originate from a whorl.

Control options: Annual weedy grass control in a grass horse pasture is very difficult. Herbicides that control grassy weeds will also injure beneficial forage grasses. Presence of annual weeds indicates a pasture with frequent disturbance and bare soil. Good pasture management that promotes consistent, complete ground cover of desirable forages will prevent annual

weed establishment. A well managed pasture will outcompete most weed species. Avoid overgrazing and maintain soil pH and fertility by soil testing every three years and fertilizing or liming if needed. Plant forage species adapted for the soils and climate of your area. Reseed thin areas. Rest the pasture for 30 days after grazing. Mow, drag, and control weeds during the resting period. If annual weeds have invaded, aggressively prevent new seed from being produced and accumulating in the soil seed bank. When annual grasses do invade pastures and become more than 25 percent of the available forage, removing the weedy grasses with a non-selective herbicide like glyphosate and replanting is recommended.



Quackgrass seed head



Quackgrass auricle

Perennial Weedy Grasses

Species and scientific name: Quackgrass (*Agropyron repens*) and wirestem muhly (*Muhlenbergia frondosa*)

Origin: Quackgrass is native to Europe. Wirestem muhly is native to North America.

Distribution: Quackgrass is distributed throughout the United States with the exception of Hawaii, Arizona and Florida. Wirestem muhly is distributed in the eastern two-thirds of the United States and north into Canada.

Habitat: Quackgrass is found in yards, gardens, pastures and croplands, and along fence lines and roadways. Wirestem muhly is found in croplands and pastures, and along fence lines, roadways and windbreaks.

Life cycle: Both grasses are perennials. Quackgrass is a cool season grass while wirestem muhly is a warm season grass.

Identification: Quackgrass can reach a height of one to four feet. It has thin, flat, bright ashy green leaf blades. The presence of an auricle, or a pair of projections located at the juncture of the sheath and leaf blade, distinguishes quackgrass from other grasses. The flower appears in July. Rhizomes (underground stems) are yellow to white with distinct joints or nodes every inch. Each node is capable of producing a new plant. Wirestem muhly can reach a height of two to three feet. Leaves are flat, rough, pale green, thin, and relatively short, giving a bushy appearance. Stems are relatively thin, shiny, and distinctly tough like wire, thus the name “wire” stem. Wirestem muhly is a clumpy, patchy grass, whereas quackgrass is a sod forming grass.

Control options: Perennial weedy grass control in grass pastures is very difficult. Herbicides that control grassy weeds will also injure beneficial forage grasses. Following recommended pasture best management practices (mowing, overseeding thin areas, fertilizing and rotational grazing) and not overgrazing are preferred ways to avoid infestations of perennial grasses. When perennial weedy grasses do invade pastures and become more than 25 percent of the available forage, removing the weedy grasses with a fall applied non-selective herbicide like glyphosate and replanting is recommended. Cultivation should not be used as a control method for perennial weedy grasses. Cultivation can actually cut and spread rhizomes, which can increase the weed population.



Horseweed



Shepherd's purse



Russian thistle



Wild mustard

Annual Broadleaf Weeds

Species and scientific name: Horseweed (*Conyza canadensis*), Russian thistle (*Salsola kali*), wild mustard (*Brassica kaber*), and shepherd's purse (*Capsella bursa-pastoris*). Horseweed is also known as marestail. Russian thistle is also known as tumbleweed.

Origin: Horseweed is native to the United States. Russian thistle, wild mustard and shepherd's purse are native to Europe and Asia (Eurasia).

Distribution: Horseweed is common throughout the United States and Canada. Russian thistle is distributed mostly west of the Mississippi River. Wild mustard is common in the upper Midwest. Shepherd's purse is common in the upper Midwest and northeastern United States.

Habitat: All are found in pastures, wastelands, croplands, and along roadsides.

Life cycle: All are annuals. Wild mustard and shepherd's purse are considered winter annuals.

Identification: Horseweed can reach a height of six feet and branches near the top. Beginning as a rosette, long, narrow, dark green leaves grow alternately along the stem. Leaves are whorled, giving it a bottlebrush appearance. Flowers are small and yellow. Russian thistle can reach a height of one to three feet. The stems are profusely branched and at maturity can resemble a shrub. The leaves are short, narrow, stiff and prickly. Wild mustard is a shorter stature plant, less than two feet, with bright green upper leaf surfaces. Leaves are toothed, alternate along the stem, and are often deeply lobed, especially toward the base of the plant. Flowers are small, with

four petals, and yellow. Shepherd's purse is pale green in color and can reach a height of 20 inches. Growing from a rosette, the first leaves have smooth margins, but later leaves are lobed. Flowers are small with four petals and white. The seed pods are heart shaped.

Control options: Presence of annual weeds indicates a pasture with frequent disturbance and bare soil. Good pasture management that promotes consistent, complete ground cover of desirable forages will prevent annual weed establishment. A well managed pasture will outcompete most weed species. Avoid overgrazing and maintain soil pH and fertility by soil testing every three years and fertilizing or liming if needed. Plant forage species adapted for the soils and climate of your area. Rest the pasture for 30 days after grazing. Mow, drag, and control weeds during the resting period. If annual weeds have invaded, aggressively prevent new seed from being produced and accumulating in the soil seed bank. Several broadleaf herbicides offer some level of control for these annual broadleaf weeds. These herbicides should be applied in the spring when annual broadleaf weeds are less than six inches in height. For specific herbicide recommendations, see page 40.

Other information: Russian thistle is especially troublesome in dry years. The stems of Russian thistle break at the ground level and blow across open fields, scattering seeds along the way. Wild mustard and shepherd's purse have a very short life cycle and can emerge and mature to produce seed within 30 days. Seeds of wild mustard and shepherd's purse are toxic to horses.



Bull thistle rosette



Bull thistle flower



Musk thistle rosette



Musk thistle flower



Plumeless thistle rosette



Plumeless thistle flower

Biennial Thistles

Species and scientific name: Bull thistle (*Cirsium vulgare*), musk thistle (*Carduus nutans*), and plumeless thistle (*Carduus acanthoides*). Musk thistle is also known as nodding thistle.

Origin: All are native to Europe and Asia (Eurasia).

Distribution: All are common throughout Minnesota and the northern United States.

Habitat: All are found in pastures, meadows, waste areas, and along roadsides.

Life cycle: All are biennials.

Identification: Bull thistle grows to a height of two to five feet. Leaves are dark green, coarsely lobed and end in a long, sharp spine. The upper leaf surface is covered with short, stiff hairs and spines, while the underside of the leaf is covered with dense, woolly, gray hair. Flowers are reddish-purple, are surrounded by spines, and narrow to a relatively tight constricted area. Musk thistle grows to a height of three to six feet. The leaves are bluish-green with light green midribs, a central vein in the leaf, and white margins that end in a white to yellowish spine. The leaves are coarsely lobed and slightly wavy. The leaves have little to no hair. Flowers are purple, surrounded by spines, and are often very large, making them droop. Plumeless thistle grows to a height of three to six feet tall. The leaves are narrow and deeply divided, with scattered hair on the upper surface and dense white hair on the lower surface. Lobes of the leaves end in a white to yellowish spine. Flowers are reddish-purple with spines.

Control options: Mowing is ineffective in the first year because the rosettes are tight to the ground. Mowing can be an effective control method in the second year, and should be completed between stem elongation and flower development. All mowing should be finished prior to seed production. Hand spading or cutting to remove flower stalks prevents seed production, breaks the life cycle and is an effective control method for small infestations. Control of biennials with herbicide is most effective if applied during the first year's growth or in the early spring to the second year's growth before the flower stalks elongate. For specific herbicide recommendations, see page 40.

Other information: These non-native thistles are Minnesota primary noxious weeds and by law must be controlled on all public and private land. Biological control has reduced the severity of musk thistle infestations in Minnesota. Native thistles are desirable. A thistle that remains scattered and occasionally present is likely one of the native *Cirsium* species such as tall, field, or Flodman's thistle. These thistles do not require control, and offer desirable habitat for various finches and wildlife.

Common Burdock



Common burdock rosette



Common burdock burrs (immature burrs)

Scientific name: *Arctium minus*

Origin: Native to Europe

Distribution: Common throughout the United States except in the southern states bordering Mexico

Habitat: Found in pastures, waste areas and undisturbed fields

Life cycle: Biennial

Identification: Common burdock grows as a rosette in the first year. Rosette leaves are large, heart shaped and hairy. In the second year of growth, a stalk with smaller leaves extends to three to five feet and produces small reddish flowers that are surrounded by hooked bracts that dry to form burrs.

Control options: Mowing is ineffective in the first year because the rosettes are tight to the ground. Mowing can be effective in the second year, but should be completed before seed production. Hand spading or cutting to remove flower stalks prevents seed production, breaks the life cycle and is an effective method of control for small infestations. Control of biennials with herbicide is most effective if applied during the first year's growth or in the early spring to the second year's growth before flower stalks elongate. Spot application of 2,4-D with a handheld sprayer is also an effective way to control common burdock. For specific herbicide recommendations, see page 40.

Other information: Common burdock burrs are considered a nuisance as they can become tangled in a horse's mane and tail.

Common Mullein



Common mullein rosette



Common mullein

Scientific name: *Verbascum thapsus*

Origin: Native to Europe and Asia (Eurasia)

Distribution: Common throughout the United States and southern Canada

Habitat: Found along roadways or in fence rows, old or undisturbed fields, pastures and croplands

Life cycle: Biennial

Identification: Common mullein forms a rosette of basal leaves during the first year of growth. Rosette leaves are long and densely covered on both sides with soft hairs. Each rosette produces a single two to eight foot flowering stem. The stem leaves are wooly, smaller and have a winged appearance. The top of the flowering stem is densely packed with small yellow flowers.

Control options: Mowing is ineffective in the first year because the rosettes are tight to the ground. Mowing can be an effective control method in the second year, and should be completed between stem elongation and flower development. All mowing should be finished prior to seed production. Hand spading or cutting to remove flower stalks prevents seed production, breaks the life cycle and is an effective method of control for small infestations. Control of biennials with herbicide is most effective if applied during the first year's growth or in the early spring to the second year's growth before flower stalks elongate. For specific herbicide recommendations, see page 40.

Other information: Common mullein can also be a desirable wildflower.

Prickly Lettuce



Prickly lettuce flowers



Prickly lettuce leaf

Scientific name: *Lactuca serriola*

Origin: Native to Europe and Asia (Eurasia)

Distribution: Common throughout the United States except for areas in northern Maine and southern Florida

Habitat: Found along roadsides and railways, and in sidewalk and street cracks, waste areas, pastures and cultivated croplands

Life cycle: Biennial or sometimes a winter annual

Identification: Prickly lettuce grows as a rosette its first year. Each rosette gives rise to a single, somewhat branching stem with small, dandelion-like, yellow flowers. Stem leaves are lobed and have spiny edges and a distinctive row of stiff, sharp spines on the underside of the middle of the leaf. Prickly lettuce exudes a milky juice when cut.

Control options: Mowing can be an effective control method in the second year, and should be completed between stem elongation and flower development. All mowing should be finished prior to seed production. Hand spading or cutting to remove flower stalks prevents seed production, breaks the life cycle and is an effective method of control for small infestations. Control of biennials with herbicide is most effective if applied during the first year's growth or in the early spring to the second year's growth before flower stalks elongate. Mowing is ineffective in the first year because the rosettes are tight to the ground. For specific herbicide recommendations, see page 40.

Other information: Prickly lettuce resembles, and is often confused with, perennial sowthistle. Prickly lettuce has a distinct line of sharp spines on the underside of the middle of each leaf; perennial sowthistle does not.

Spotted Knapweed



Spotted knapweed



Spotted knapweed flower

Scientific name: *Centaurea maculosa*

Origin: Native to Europe

Distribution: Commonly found throughout the northern United States and in southern Canada

Habitat: Spotted knapweed establishes along roads and trails from which it rapidly invades adjacent areas of minimal disturbance, including pastures and range lands.

Life cycle: Biennial

Identification: In its first year of growth, spotted knapweed produces a rosette of basal leaves that are deeply divided. Both upper and lower surfaces of leaflets are slightly woolly and covered with specks. Several leafy stems, up to three feet tall, emerge in the spring of the second year. The flower is purple and resembles a common dandelion flower in size and shape.

Control options: Mowing is ineffective in the first year because the rosettes are tight to the ground. Mowing can be an effective control method in the second year, and should be completed between stem elongation and flower development. All mowing should be finished prior to seed production. Hand spading or cutting to remove flower stalks prevents seed production, breaks the life cycle and is an effective method of control for small infestations. Control of biennials with herbicide is most effective if applied during the first year's growth or in the early spring to the second year's growth before flower stalks elongate. For specific herbicide recommendations, see page 40.

Other information: Spotted knapweed is considered a noxious weed in several western states. Biological control insects have been released in the United States, including Minnesota, and are starting to control stands in some areas.

Absinth Wormwood



Absinth wormwood



Absinth wormwood in a pasture



Absinth wormwood

Scientific name: *Artemisia absinthium*

Origin: Native to Europe and Asia (Eurasia)

Distribution: Common throughout Minnesota and the northwestern United States

Habitat: Found in pastures and waste areas, and along roadways

Life cycle: Perennial

Identification: Absinth wormwood can grow to five feet, is woody, and can have a shrubby appearance. Leaves are light green and deeply lobed. Leaves and stems are covered with fine silky hairs that give the plant a grayish appearance. The entire plant is very fragrant.

Control options: Mechanical control such as mowing, spading or hand pulling is most effective in the late bud to early flower stage of growth. Mowing alone may take several growing seasons to effectively control perennial weed populations and may never result in complete control. Fall herbicide applications provide the most consistent control of perennial weeds. Multiple herbicide applications may be needed to completely control the root system. Application of herbicides in spring, or mowing during the summer, is also effective in suppressing growth until fall. For specific herbicide recommendations, see page 40.

Other: Absinth wormwood has a strong sage fragrance. If grazed by cattle, it may adversely flavor the milk. The young flower heads are the source of aromatic oil used in the preparation of vermouth and absinth.

Canada Thistle



Canada thistle rosette



Canada thistle

Scientific name: *Cirsium arvense*

Origin: Native to Europe and Asia (Eurasia)

Distribution: Widely distributed in North America and southern Canada

Habitat: Found in croplands, pastures, waste areas, and along roadsides

Life cycle: Perennial

Identification: Canada thistle grows to a height of two to five feet. The stems are grooved and become hairy as the plant matures. The leaves have crinkled edges and spiny margins, and are somewhat lobed. The flowers are lavender, white or reddish-purple without spines.

Control options: Mechanical control such as mowing, spading or hand pulling is most effective if delayed until the late bud to early flower stage of growth. Repeating mechanical control two times each growing season will result in the best control. Cultivating can inadvertently increase the weed population by spreading the roots, which are capable of sprouting. Fall herbicide applications to active growth or regrowth, or spring applications applied in the mid-bud stage result in the greatest control. Re-treatment will be necessary to completely control the well established, spreading root system. In the spring, herbicide application should be delayed until shoots reach at least six to eight inches in height and most shoots are in the bud stage, which will result in improved control. Several biological control agents are being tested, but none have been successful to date. For specific herbicide recommendations, see page 40.

Other information: Canada thistle is a Minnesota primary noxious weed and by law must be controlled on all public and private land.

Common Dandelion



Common dandelion

Scientific name: *Taraxacum officinale*

Origin: Native to Europe and Asia (Eurasia)

Distribution: Common throughout the United States, southern Canada and several other countries throughout the world

Habitat: Found in lawns, pastures, waste areas, minimally tilled croplands, and along roadsides

Life cycle: Perennial

Identification: Common dandelion has basal leaves (close to the ground) with jagged edges, bright yellow flowers and fluffy white seed heads. At maturity, the plant exude a milky juice if cut.

Control options: Mechanical control, such as spading or hand pulling, is most effective in the late bud to early flower stage of growth. Mowing is ineffective because the basal leaves are tight to the ground. Fall herbicide applications provide the most consistent control of perennial weeds. Application of herbicides in spring is also effective in controlling new seedlings and established plants if applied early. For specific herbicide recommendations, see page 40.

Other information: Common dandelion is considered the most common broadleaf weed in home yards. Many horses seem to prefer common dandelion as a forage. However, weeds are generally less dependable as a forage source compared to other grasses and legumes.

Common Milkweed



Common milkweed patch



Common milkweed



Common milkweed seed pods

Scientific name: *Asclepias syriaca*

Origin: Native to North America

Distribution: Common throughout the northern and eastern two-thirds of the United States and southern Canada

Habitat: Found in meadows, fencerows, waste areas, and reduced-tillage croplands, and along roadsides and railways

Life cycle: Perennial

Identification: Stems and leaves exude a white milky sap if cut or crushed. Purplish flowers form large, ball-shaped clusters. After seed pods mature, they release numerous tufted seeds.

Control options: Mechanical control such as mowing, spading or hand pulling is most effective in the late bud to early flower stage of growth. Mowing alone may take several growing seasons to effectively control perennial weed populations, and may never result in complete control. Fall herbicide applications provide the most consistent control of perennial weeds. Multiple herbicide applications may be needed to completely control the extensive root system. Application of herbicides in spring or mowing during the summer is also effective in suppressing growth until fall. For specific herbicide recommendations, see page 40.

Other information: Monarch butterfly caterpillars feed on the foliage of common milkweed. Common milkweed is potentially poisonous to some livestock. However, most livestock will avoid ingesting it due to its bitter taste.

Curly Dock



The ochrea on curly dock



Curly dock

Scientific name: *Rumex crispus*

Origin: Native to Europe

Distribution: Common throughout Minnesota and the world

Habitat: Found in croplands and pastures and along roadsides. Curly dock is commonly found in wet or low areas.

Life cycle: Perennial

Identification: The mature plant can reach two to five feet. Jointed stems have an ochrea, a membranous sheath at the leaf base, and swollen nodes, which are key identifiers. The leaves are long and narrow, and have a wavy appearance. Flowers are small, green, and dry to a dark brown seed head.

Control options: Mechanical control such as mowing, spading or hand pulling is most effective in the late bud to early flower stage of growth. Mowing alone may take several growing seasons to effectively control perennial weed populations, and may never result in complete control. Fall herbicide applications provide the most consistent control of perennial weeds. Multiple herbicide applications may be needed to completely control the extensive root system. Application of herbicides in spring or mowing during the summer is also effective in suppressing growth until fall. For specific herbicide recommendations, see page 40.

Leafy Spurge



Leafy spurge flower



Leafy spurge

Scientific name: *Euphorbia esula*

Origin: Native to Europe and Asia (Eurasia)

Distribution: Common in the western United States and east to Wisconsin. Distributed throughout Minnesota, but is most prevalent in western Minnesota.

Habitat: Found in pastures, croplands, waste areas, and along roadways

Life cycle: Perennial

Identification: Leafy spurge can reach a height of three feet. The stems are thickly clustered with narrow, long leaves. Stems and leaves exude a white milky sap if cut or crushed. The small flowers are yellowish-green, arranged in clusters, and enclosed in yellow-green bracts.

Control options: Mechanical control such as mowing, spading or hand pulling is most effective in the late bud to early flower stage of growth. However, mowing alone will never result in complete control. Fall herbicide applications can provide some of the best perennial weed control during the season. Multiple herbicide applications may be needed to completely control the weed due to the extensive root system. Application of herbicides in spring or mowing during the summer is also effective in controlling growth until fall. Biological control with two species of flea beetles has greatly reduced leafy spurge populations in Minnesota. For specific herbicide recommendations, see page 40.

Other information: Leafy spurge is a Minnesota primary noxious weed and by law must be controlled on all public and private land.

Stinging Nettle



Stinging nettle leaves and spines



Stinging nettle

Scientific name: *Urtica dioica*

Origin: Native to North America

Distribution: Commonly distributed throughout the eastern two-thirds of the United States

Habitat: Found in pastures, overgrown yards, waste areas, flood plains, stream banks, and along roadsides and the edges of fields and woodlots. Stinging nettle thrives in damp areas.

Life cycle: Perennial

Identification: Stinging nettle grows up to seven feet, is slightly branched at the top and covered in stinging hairs. The leaves are dark green, coarse with saw-toothed edges, and covered in stinging hairs. The flowers are small and green.

Control options: Mechanical control such as mowing, spading or hand pulling is most effective in the late bud to early flower stage of growth. Mowing alone may take several growing seasons to effectively control perennial weed populations, and may never result in complete control. Fall herbicide applications provide the most consistent control of perennial weeds. Multiple herbicide applications may be needed to completely control the extensive root system. Application of herbicides in spring or mowing during the summer is also effective in suppressing growth until fall. For specific herbicide recommendations, see page 40.

Other information: Stinging hairs on the stem and leaves of stinging nettle cause irritation upon contact with skin. If attempting to remove stinging nettle by hand, wear gloves and protective clothing.

Perennial Sowthistle



Perennial sowthistle rosette



Perennial sowthistle

Scientific name: *Sonchus arvensis*

Origin: Native to Europe and western Asia

Distribution: Common in the northern United States and southern Canada

Habitat: Found in pastures, waste areas, gardens, overgrown lawns, no-tillage croplands, and along roadsides and lakeshores

Life cycle: Perennial

Identification: Perennial sowthistle has hollow stems and lobed leaves ending in a weak prickly spine. The yellow flowers are similar to common dandelion but smaller. Perennial sowthistle exudes a sticky white juice when cut. Roots of perennial sowthistle spread horizontally and are extensive.

Control options: Mechanical control such as mowing, spading or hand pulling is most effective in the late bud to early flower stage of growth. Mowing alone may take several growing seasons to effectively control perennial weed populations, and may never result in complete control. Fall herbicide applications provide the most consistent control of perennial weeds. Multiple herbicide applications may be needed to completely control the extensive root system. Application of herbicides in spring or mowing during the summer is also effective in suppressing growth until fall. For specific herbicide recommendations, see page 40.

Other information: Perennial sowthistle is a Minnesota primary noxious weed and by law must be controlled on all public and private lands. Prickly lettuce resembles, and is often confused with, perennial sowthistle. Prickly lettuce has a distinct line of sharp spines on the underside of the middle of each leaf; perennial sowthistle does not.



White cockle rosette



White cockle flower



Chickweed



Chickweed flower

Pink Family

Species and scientific name: White cockle (*Silene pratensis*) and chickweed (*Cerastium* and *Stellaria* species). White cockle is also known as white campion.

Origin: White cockle is native to Europe. Chickweed is native to Europe and Asia (Eurasia).

Distribution: White cockle is common in the northern half of the United States and southern Canada. Chickweed is common throughout the United States.

Habitat: White cockle is found along roadsides, shorelines and wooded edges, and in croplands, hay fields, pastures and waste areas. Chickweed is found in pastures, lawns, and abandoned crop and horticultural fields.

Life cycle: White cockle is a perennial. Chickweed species can grow as annuals or perennials.

Identification: White cockle can grow up to three feet. The stems are branched, hairy and sticky. The leaves are long, narrow, covered in short hairs, pointed at the tip and light green. The flowers are white or pink with five petals that are attached to a swollen seed pod. Chickweed species are low growing, spreading weeds. The leaves are small and oval shaped. The flowers are small, white, and have five petals.

Control options: Mechanical control such as mowing, spading or hand pulling is most effective in the late bud to early flower stage of growth. Mowing may not be a viable weed control option for chickweed since both species grow close to the ground. Mowing of

weeds should be done prior to flowering and seed production. Chemical control of annual weeds works best when an herbicide is applied in the spring to actively growing, young weeds. Fall herbicide applications provide some of the best perennial weed control during the season. Application of herbicides in spring or frequent mowing during the summer is also effective in controlling growth until fall. For specific herbicide recommendations, see page 40.

Other information: Chickweed is very prevalent in animal traffic areas or lanes.



Buckhorn plantain rosette



Buckhorn plantain



Broadleaf plantain

Plantain Family

Species and scientific name: Buckhorn plantain (*Plantago lanceolata*) and broadleaf plantain (*Plantago major*)

Origin: Both plantains are native to Europe and Asia (Eurasia).

Distribution: Both plantains are common throughout the United States.

Habitat: Both plantains are found in lawns, landscapes, dry pastures, croplands, open woods, waste areas, and along roadsides, shorelines, and riverbanks.

Life cycle: Both plantains are perennial.

Identification: Buckhorn plantain is a low growing, rosette-forming perennial. The leaves are long and narrow. Broadleaf plantain has larger, oval leaves that are thick and leathery. Both have non-showy, small flowers that are located in clusters at the end of long stems, giving the appearance of a “rat’s tail.”

Control options: Mowing is not a recommended control option of plantain species since the rosettes grow close to the ground. Fall herbicide applications provide some of the best perennial weed control during the season. For specific herbicide recommendations, see page 40.

Other information: Both plantains are indicators of compacted soil. To loosen compacted soil, tillage or aeration can be used. In an established pasture, aerating in the fall is most effective and will not damage pasture forages. In large pastures, aerating may be cost or time prohibitive.

Native Wildflowers

Species and scientific name: Goldenrod (*Solidago* species) and aster (*Symphotrichum* species). Numerous species exist.

Origin: Both goldenrods and asters are native to North America.

Distribution: Numerous species of goldenrod and aster can be found throughout the United States and Canada.

Habitat: Both goldenrods and asters are found in recently abandoned fields, along fence lines and roadways, and in pastures, meadows, waste areas, and open woods.

Life cycle: Both goldenrods and asters are perennial.

Identification: Both goldenrods and asters have short and tall species, ranging from two to six feet. Goldenrod leaves can be hairy or smooth, and deep green to grayish in color. The lower leaves are tongue shaped and upper leaves are small and oblong. All goldenrod flowers are bright, yellow and feathery. The flower size and shape varies by species. Aster stems are often branched and hairy. The leaves are universally small, linear and numerous. The flowers are small, numerous and range in color from white to pink to purple. Asters have a distinct yellow center regardless of the color of flower petals.

Control options: Mechanical control such as mowing, spading or hand pulling is most effective in the late bud to early flower stage of growth. Mowing alone may take several growing seasons to effectively control perennial weed populations, and may never result in complete control. Fall herbicide applications

provide the most consistent control of perennial weeds. Application of herbicides in spring or mowing during the summer is also effective in suppressing growth until fall. For specific herbicide recommendations, see page 40.

Other information: There are numerous varieties of goldenrod and aster found throughout Minnesota. Contrary to common perception, goldenrods do not cause widespread hay fever in humans. Both asters and goldenrods are desirable wildflowers unless they become too abundant and crowd out other desirable species.



Goldenrod



Aster

Introduced Wildflowers

Species and scientific name: Common tansy (*Tanacetum vulgare*) and oxeye daisy (*Leucanthemum vulgare*)

Origin: Both are native to Europe and Asia (Eurasia).

Distribution: Common tansy is found throughout Canada and the United States, except in Texas and the far southeast. Oxeye daisy is found throughout the United States and Canada. Both flowers are most common in northeastern Minnesota.

Habitat: Common tansy and oxeye daisy are found along roadsides and in pastures, gardens, waste places, and old croplands. Oxeye daisy is not found in cultivated croplands.

Life cycle: Both common tansy and oxeye daisy are perennial.

Identification: Common tansy can reach a height of four feet and has a slightly hairy, unbranched stem. Leaves have toothed edges and are fern-like in their appearance. Flowers are button shaped and yellow, and are clustered on top of the plant. Common tansy has an unpleasant odor. Oxeye daisy can grow to a height of three feet. Leaves are deeply lobed. Flowers have white petals with yellow centers.

Control options: Mechanical control such as mowing, spading or hand pulling is most effective in the late bud to early flower stage of growth. Mowing alone may take several growing seasons to effectively control perennial weed populations, and may never result in complete control. Fall herbicide applications provide the most consistent control of perennial weeds. Multiple herbicide

applications may be needed to completely control the extensive root system. Application of herbicides in spring or mowing during the summer is also effective in suppressing growth until fall. For specific herbicide recommendations, see page 40.

Other information: Both species have recently become more common in the seven-county metropolitan area in Minnesota.



Common tansy



Oxeye daisy



Poison ivy leaves



Poison ivy berries



Virginia creeper leaves



Prickly ash



Prickly ash

Woody Weed Species

Species and scientific name: Poison ivy (*Toxicodendron radicans*), prickly ash (*Zanthoxylum americanum*) and Virginia creeper (*Parthenocissus quinquefolia*)

Origin: Poison ivy, prickly ash and Virginia creeper are all native to North America.

Distribution: Common throughout Minnesota, the eastern United States and Canada

Habitat: All are found along woodlands and river banks. Poison ivy and Virginia creeper can climb trees, buildings and fences, or can sprawl along the ground forming a ground cover.

Life cycle: All are perennial.

Identification: Poison ivy and Virginia creeper are woody vines. In Minnesota, poison ivy rarely reaches more than two to four feet, while Virginia creeper can extend up to 60 feet. Poison ivy leaflets occur in clusters of three. Leaf margins are smooth, but may have toothed margins, and leaves are pointed at the tip. Small green flowers produce small white berries. Poison ivy changes from a bright green to a very attractive red or reddish-yellow in the fall. Virginia creeper stems are initially green and hairless, but become brown and woody. Leaves are comprised of five leaflets with distinct toothed margins. Tendrils (slender, coiling structures) are common along the vines. Non-showy greenish flowers produce berries that turn burgundy to scarlet colored in the fall. Prickly ash is a woody shrub that usually grows to 10 feet, but can grow to 20 feet. Very distinct, sharp thorns cover the branches and trunk. Leaves are comprised of

5 to 11 leaflets. Female plants produce clusters of berry-like fruits that turn reddish-brown in the fall.

Control options: Mowing is especially effective in controlling and preventing woody vines from encroaching on pasture sites. Mechanical controls such as mowing or cutting are most effective when done in late summer or early fall. Repeating the mechanical control annually for two to three years will result in the greatest control of woody vines. Herbicide applications to active growth in the late summer or early fall when leaves are fully expanded will result in the greatest control. Re-treatment may be necessary to completely control re-sprouts from the well established root systems. For specific herbicide recommendations, see page 40.

Other information: Poison ivy is a Minnesota primary noxious weed that must be controlled on all public and private lands. Contact with poison ivy may cause severe skin rashes. Wear gloves and protective clothing when controlling poison ivy. Do not burn poison ivy. Rashes and internal harm can be caused from breathing in, or being around, the smoke. Prickly ash has numerous reported medicinal uses.

Buckthorn

Species and scientific name: Common buckthorn (*Rhamnus cathartica*) and glossy buckthorn (*Frangula alnus*)

Origin: Both are native to Europe and Asia (Eurasia).

Distribution: Found throughout Minnesota (most common in southeastern Minnesota) and the northeastern United States

Habitat: Glossy buckthorn is found in wet areas. Common buckthorn is found in upland woodlands. Both species of buckthorn are more troublesome in oak savannahs where light is available. Buckthorn does not invade dense woodlands, such as healthy stands of maple, but is more common on the edges of these established woodlands.

Life cycle: Both are perennial wood trees.

Identification: Common buckthorn leaves are egg shaped, pointed at the tip, and have a smooth surface with a dark, glossy color. The leaf margins are finely toothed. Glossy buckthorn leaves are oval, not egg shaped like common buckthorn. The upper surface has a glossy color, but the leaf margins are smooth, lacking the toothed margin of common buckthorn. The leaves of both common and glossy buckthorn stay green late into fall, compared to most other trees that drop their leaves earlier in the fall. The female plants of both species produce berries that turn dark purple or black when ripe.

Control options: Control buckthorn with cut stump, basal bark treatments containing triclopyr at any time during the season. Foliar spray can be useful on small plants, and should be applied to actively growing plants in late summer. Saplings two years old or

younger and seedlings can be controlled by spring burns, but fuel to carry a fire is often lacking in dense buckthorn stands, especially if burns have been conducted previously. Before burning, you must obtain a burning permit from local authorities. Pulling can be used on small stands but soil disturbance often leads to seedling reestablishment. For specific herbicide recommendations, see page 40.

Other information: Both common and glossy buckthorn are listed as restricted noxious weeds in Minnesota. It is illegal to import, sell or transport buckthorn in Minnesota, but unlike primary noxious weeds, control is not mandatory. Female plants produce numerous seeds which are widely distributed by birds.



Common buckthorn



Glossy buckthorn

The 11 Primary Noxious Weeds of Minnesota



Bull thistle flower

There are 11 primary noxious weeds in Minnesota. Most of the primary noxious weeds are commonly found in pastures. Noxious weeds are difficult to control and injurious to public health, the environment, roads, crops, livestock and property. By law, these weeds must be controlled on all public and private lands.

Bull thistle (*Cirsium vulgare*) grows to a height of two to four feet. Leaves are dark green, coarsely lobed and end in a long, sharp spine. The upper leaf surface is covered with short, stiff hairs and spines, while the underside of the leaf is covered with dense, woolly, gray hair. Flowers are reddish-purple and surrounded by spines. Bull thistle is primarily found in pastures, waste areas, and along roadsides throughout Minnesota. For more information, see page 14.



Canada thistle

Canada thistle (*Cirsium arvense*) grows to a height of two to five feet. The stems are grooved and become hairy as the plant matures. The leaves have crinkled edges, spiny margins, and are somewhat lobed. Flowers are lavender, white or reddish-purple without spines. Canada thistle is found in cultivated fields, pastures, waste areas and along roadsides throughout Minnesota. For more information, see page 21.



Field bindweed

Field bindweed (*Convolvulus arvensis*), also known as creeping jenny or morning glory, grows prostrate (along the ground), and can climb on nearby objects. The plants can spread two to seven feet. The leaves are arrow shaped with two basal lobes. The flowers are white to pink and funnel shaped. Field bindweed is found in most cultivated fields, gardens, lawns, waste areas and along roadsides throughout Minnesota.



Garlic mustard

Garlic mustard (*Alliaria petiolata*) grows to a height of three to four feet. Lower leaves are heart or kidney shaped, while upper leaves are toothed and triangular in shape. Flowers are white and clustered on the top of the stem. Young plants smell like garlic. Garlic mustard is found in the forest understory, at the edges of wooded areas, near trails, along roadsides and in areas where trees have been removed.



Hemp

Hemp (*Cannabis sativa*) is also known as marijuana. The plant is two to ten feet tall and has rough, hairy stems. The leaves are divided into 5 to 11 hairy leaflets (divisions within a leaf) with notched edges. Flowers are green. Hemp is found in rich, low, wet areas, but can also be found in waste areas, farm sites, ditches, pastures and fields throughout Minnesota.



Leafy spurge

Leafy spurge (*Euphorbia esula*) grows to a height of two to three feet. The stems contain a milky juice called latex. The leaves are bluish-green, narrow and linear in shape. Leafy spurge produces a flat-topped cluster of yellowish-green flower-like structures called bracts. Leafy spurge grows primarily in pastures, waste areas, and along roadsides throughout Minnesota. For more information, see page 25.



Musk thistle flower

Musk thistle (*Carduus nutans*), also called nodding thistle, grows to a height of three to six feet. The leaves are dark bluish-green with light green midribs (central vein in the leaf) and white margins that end in a white to yellowish spine. The leaves are coarsely lobed and slightly wavy. The leaves have little or no hair. Flowers are large, purplish, surrounded by spines and often droop. Musk thistle is primarily found in southern Minnesota in pastures, waste areas, and along roadsides, and prefers moist soils. For more information, see page 14.

Perennial sowthistle (*Sonchus arvensis*) grows to a height of three to seven feet. The stems contain a milky juice called latex. The basal leaves are narrow and deeply lobed. The leaves attached to the stem are toothed, lobed, and have spiny edges. Flowers are yellow. Perennial sowthistle is found in cultivated fields, pastures, waste areas, and along roadsides throughout Minnesota. For more information, see page 27.



Perennial sowthistle

Plumeless thistle (*Carduus acanthoides*) grows to a height of three to six feet. The leaves are narrow and deeply divided, with scattered hair on the upper surface and dense white hair on the lower surface. Lobes on the leaves end in white to yellowish spines. Flowers are reddish-purple with spines. Plumeless thistle is found primarily in pastures, waste areas, and along roadsides, however, it prefers sandy, well-drained soils. For more information, see page 14.



Plumeless thistle flower

Poison ivy (*Toxicodendron radicans*) primarily grows as a woody vine, but if growing in full sunlight it may grow as a shrub up to several feet tall. The leaf contains three shiny leaflets that are pointed at the tip. Flowers are yellowish-green and produce a grayish cluster of fruit. All parts of the plant contain a chemical that causes blistering of the skin. Poison ivy grows along stream banks, edges of paths and roadsides, fencerows, woodlands and other non-cultivated sites. For more information, see page 34.



Poison ivy leaves

Purple loosestrife (*Lythrum salicaria*) is an aquatic weed that can reach heights of seven feet. Leaves are linear (long and narrow) in shape, hairy and have smooth edges. Flowers are purple and found at the top of the plant. Purple loosestrife grows in wet soils, including meadows, pastures, cattail marshes, streams, river banks, lake shores and ditches.



Purple loosestrife

Chemical Control Table: Recommendations for Minnesota Grass Pastures*

**Note: G=Good, F=Fair, P=Poor control, N=No control, --=No data available

Chemical control options Chemical/product name (active ingredient)	2,4-D/ MCPA	Banvel (dicamba)	Crossbow (triclopyr + 2,4-D)	Curtail (clopyralid + 2,4-D)	Escort (metsulfuron methyl)	ForeFront (aminopyralid + 2,4-D)	Grazeon P+D (picloram + 2,4-D)	Milestone (aminopyralid)	Overdrive (dicamba + diflufenzopyr)	Redeem (triclopyr + clopyralid)	Remedy (triclopyr)	***Roundup (glyphosate)	Spike (tebuthiuron)	Weed Master (dicamba + 2,4-D)
ANNUALS														
Common chickweed	P**	F	G	--	G	--	G	--	F	--	--	G	--	F
Horseweed	F	G	F	G	--	G	G	G	G	G	--	F	--	G
Russian thistle	F	F	F	G	F	--	G	--	F	--	--	G	--	F
Shepherd's purse	G	P	G	G	G	G	G	--	P	--	F	G	--	G
Wild mustard	G	P	G	G	G	G	G	--	P	--	F	G	--	G
BIENNIALS														
Common burdock	G	P	--	G	--	G	G	--	P	--	--	G	--	G
Common mullein	F	G	F	F	G	--	G	--	G	--	--	--	--	G
Musk, plumeless & bull thistle	F	F	P	G	F	G	G	G	F	--	P	G	--	G
Prickly lettuce	G	G	--	G	--	G	G	P	G	G	--	G	--	G
Spotted knapweed	G	G	G	G	F	G	G	G	G	G	--	G	--	G
PERENNIALS														
Absinth wormwood	F	G	F	F	--	G	G	G	G	G	--	F	--	G
Aster	F	F	F	F	F	F	G	P	F	F	F	G	-	G
Canada thistle	F	F	P	G	P	G	G	G	F	--	P	F	--	F
Curly dock	P	G	P	P	P	P	G	P	G	--	P	--	--	G
Dandelion	G	G	G	G	P	G	G	P	G	--	P	F	--	G
Field bindweed	F	P	F	F	P	F	G	P	P	--	P	G	F	F
Garlic mustard	F	F	F	F	G	--	--	--	F	P	P	G	--	F
Goldenrod	F	F	F	F	F	F	G	P	F	F	P	G	--	F
Leafy spurge	F	F	F	F	P	F	G	P	F	P	P	F	--	F
Milkweed	F	F	F	F	P	F	G	P	F	--	P	G	--	G
Mouse-ear chickweed	P	F	G	--	G	--	G	--	F	--	--	F	--	F
Oxeye daisy	F	F	F	G	F	G	G	G	F	G	F	F	--	F
Plantain	F	F	--	F	--	--	G	--	F	--	--	F	--	G
Purple loosestrife	P	P	F	P	--	P	G	--	P	--	F	G	--	P
Sowthistle	F	G	--	F	F	--	G	--	G	--	--	F	--	G
Stinging nettle	G	G	G	G	--	G	G	--	G	--	--	G	--	G
Tansy	P	F	--	P	--	--	G	--	F	--	--	F	--	F
White cockle	F	F	--	--	--	--	--	F	F	--	--	F	--	--
VINES, SHRUBS, TREES														
Buckthorns	F	F	G	F	F	--	G	--	F	G	G	F	F	F
Poison ivy	F	F	G	F	--	--	G	--	F	G	G	F	--	F
Prickly ash	P	P	F	P	F	--	F	--	F	F	F	P	F	F
Virginia creeper	P	F	P	P	--	--	F	--	F	--	P	F	--	F
GRASSES														
Annual grasses	N	N	N	N	G	N	N	N	N	N	N	G	F	N
Quackgrass	N	N	N	N	P	N	N	N	N	N	N	G	P	N
Wirestem muhly	N	N	N	N	P	N	N	N	N	N	N	G	P	N

* Herbicide recommendations are for grass pastures only and not for legume/grass mixed pastures. There are no herbicides available for broadleaf weed control in a legume/grass mixed pasture that will not harm desirable legumes. Brush control products will also suppress or control many broadleaves.

**Note: G=Good, F=Fair, P=Poor control, N=No control. -- indicates no Minnesota or other applicable data available to determine a reliable control rating. Effectiveness ratings apply if herbicides are applied according to label recommendations and favorable temperature and moisture conditions prevail. Stunting of grasses can occur with Spike and Escort XP. Always read and follow the herbicide label. Recommendations pertain to Minnesota only.

***Roundup is a non-selective herbicide and will kill or injure any plant material it comes into contact with. Roundup should be used as a spot spray only or when renovating a grass pasture.

Grazing Restriction Table

When applying an herbicide, always read the herbicide label and follow all grazing restrictions. Prior to herbicide application, remove all animals from the pasture. Some herbicides may increase the palatability of weeds, including poisonous plants. If poisonous plants are present, restrict grazing for 10 days after herbicide application. Labeled information presented below pertains to product labels for use in Minnesota only. Labels do change. Be sure to obtain and follow current labels as data in print publications can become outdated.

Product name (active ingredient)	Grazing restriction*	Harvest (haying) restriction**	Other information
2,4-D & MCPA	0 to 7 days	30 days	Be sure to check individual product labels for restrictions and use rates due to the large number of formulations available.
Banvel (dicamba)	0	0	
Crossbow (triclopyr + 2,4-D)	0	0	Areas of non-cropland and forestry sites may be grazed if no more than 10% of the total grazable area is spot treated.
Curtail (clopyralid + 2,4-D)	0	7 days	Move animals to untreated grass pasture or feed untreated forage for 7 days before transferring livestock to broadleaf cropland or pastureland. See label for restrictions on manure applications from livestock fed herbicide treated forage and for mulch or compost applied to sensitive crops.
Escort (metsulfuron methyl)	0	0	
ForeFront (aminopyralid + 2,4-D)	0	7 days	Move animals to untreated grass pasture or feed untreated forage for 3 days before transferring livestock to broadleaf cropland or pastureland. See label for restrictions on manure applications from livestock fed herbicide treated forage and for mulch or compost applied to sensitive crops.
Grazon P+D (picloram + 2,4-D)	0	30 days	Move animals to untreated grass pasture or feed untreated forage for 7 days before transferring livestock to broadleaf cropland or pastureland. See label for restrictions on manure applications from livestock fed herbicide treated forage and for mulch or compost applied to sensitive crops.
Milestone (aminopyralid)	0	0	Move animals to untreated grass pasture or feed untreated forage for 3 days before transferring livestock to broadleaf cropland or pastureland. See label for restrictions on manure applications from livestock fed herbicide treated forage and for mulch or compost applied to sensitive crops.
Overdrive (dicamba + diflufenzopyr)	0	0	
Redeem (clopyralid + triclopyr)	0	14 days	Move animals to untreated grass pasture or feed untreated forage for 7 days before transferring livestock to broadleaf cropland or pastureland.
Remedy (triclopyr)	0	14 days	Areas of non-cropland and forestry sites may be grazed if no more than 10% of the total grazable area is spot treated.
Roundup (glyphosate)	14 days to 8 weeks	14 days to 8 weeks	Be sure to check individual product labels for restrictions and use rates due to the large number of formulations available.
Spike (tebuthiuron)	0	1 year	
Weed Master (2,4-D + dicamba)	0	0 to 37 days	

*Days before grazing can resume after an herbicide application. When used as directed on the label, herbicides do not harm grazing animals. Even if the label lists no grazing restrictions for horses, seven days of restricted grazing after herbicide application can be followed as an additional precaution. Some weeds, including poisonous plants, may become more palatable after an herbicide application.

**Days before harvesting forage for hay after an herbicide application.

Glossary

Active ingredient – Chemicals in a product (herbicide) that are responsible for the herbicidal effects and weed control

Annual – Germinates, emerges from seed, and completes life cycle in one growing season

Auricle – A pair of projections located at the juncture of the sheath and leaf blade of certain grasses

Biennial – Requires two growing seasons to complete life cycle. Biennials form a rosette (cluster of leaves close to the ground) the first year and during the second year they develop a flower stalk, flower, and produce seeds.

Broadleaf – A plant with two seed leaves and broad leaves with net-like veins. Broadleaves are also known as dicots (having two seed leaves).

Bunch grass – A grass that tends to grow in bunches or clumps

Chemical weed control – One component in an integrated weed management system. An herbicide is an example of chemical weed control.

Cool season – Start growth early in the spring and continue growing as long as temperatures remain relatively cool. Cool season plants usually go dormant, or grow more slowly, during hot periods. Most pasture grasses in Minnesota are cool season.

Cultural weed control – One component in an integrated weed management system. Examples of cultural weed control include crop rotation and overseeding thin areas.

Erect – Vegetative and/or flowering stems that extend vertically

Herbicide – A chemical used for killing, controlling or inhibiting the growth of plants

Grass – A plant with one seed leaf and long, narrow leaves with parallel veins. Grasses are also known as monocots (having one seed leaf).

Inflorescence – The arrangement of flowers on the flowering stalk. Examples include spike, panicle, head and umbel.

Leaflet – A division of a compound (or multiple) leaf

Mechanical weed control – One component in an integrated weed management system. Examples of mechanical weed control include mowing and various types of tillage.

Native – Place of origin

Noxious weed – A plant that is defined by law as being especially undesirable, troublesome and difficult to control. Primary noxious weeds must be controlled on all private and public land in Minnesota.

Ochrea – A membranous sheath surrounding the stem immediately above the attachment of the leaf. A characteristic of the smartweed family.

Palatable – Easily eaten, tasteful or delicious

Panicle – A branched inflorescence

Perennial – A plant that lives for two or more years

Prostrate – Vegetative or flowering stems that extend horizontally along the ground

Rhizomes – Underground stems capable of sending out roots and leafy shoots

Rosette – Circular cluster of leaves formed around the stem at ground level

Sheath – The lower portion of a grass leaf that surrounds the stem

Sod-forming grass – A grass that forms a solid mat over the ground

Spot spray – Applying an herbicide to a selective area rather than the entire field or pasture

Summer annual – A plant that starts germination in the summer during warmer conditions. Measures to control summer annuals should be done when the plants are actively growing.

Tendrils – A slender, coiling structure common on vines

Warm season – Start growth in mid-summer and continue growing until early fall. Warm season plants tend to tolerate drought better than cool season plants. In Minnesota, most warm season plants tend to be native grass species.

Weed – A plant growing out of place or a plant that is objectionable or interferes with the activities and welfare of humans

Winter annual – A plant that starts germination in the early spring or late fall and usually completes its life cycle quickly (within 30 days). Measures to control winter annuals should be done when the plants are actively growing and should be avoided during the summer months when the plants are dormant and not growing.

Woody – Having a stem or trunk covered in bark. Woody plants are usually either trees or shrubs.

Whorl – Three or more structures (i.e. leaves, branches or flowers) originating from one node or growing point

References and Resources

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United States Department of Agriculture Natural Resources Conservation Service Plants Database. Available at plants.usda.gov.

Related University websites

University of Minnesota Horse Program:
extension.umn.edu/horse

University of Minnesota Applied Weed Science:
appliedweeds.cfans.umn.edu

Strand Memorial Herbarium:
appliedweeds.cfans.umn.edu/app/herbarium

University of Minnesota Extension Horse Program

This publication was produced by the University of Minnesota Extension Horse Program. The Horse Program provides research-based information to Minnesota horse owners through in-person and online workshops, publications and outreach. These offerings cover a wide range of topics, including general horse care, health, forage utilization and nutrition.

Related fact sheets

Martinson, Krishona, Beverly Durgan, and Roger Becker. 2007. *The Eleven Primary Noxious Weeds of Minnesota*. University of Minnesota Extension Fact Sheet 08489.

Martinson, Krishona, Lynn Hovda, and Mike Murphy. 2007. *Plants Poisonous or Harmful to Horses in the North Central United States*. University of Minnesota Extension Publication 08491.

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