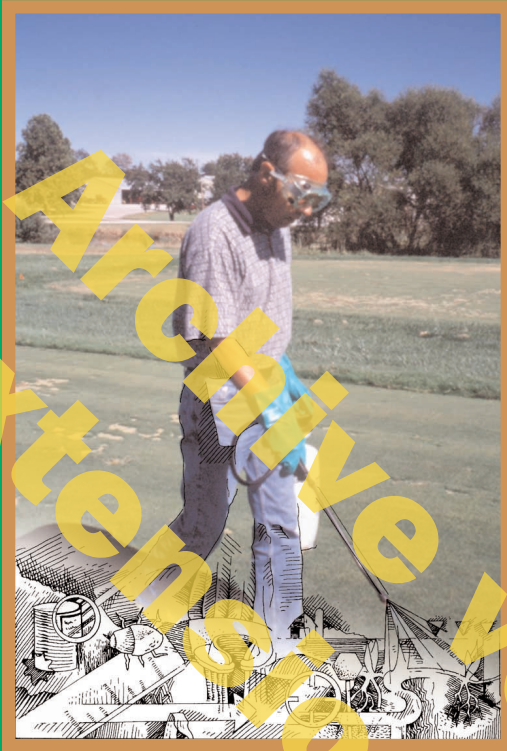


Integrated
Pest
Management



NOXIOUS WEEDS OF MISSOURI

Plant Protection Programs
College of Agriculture, Food
and Natural Resources

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Multiflora rose — provided by James R. Allison from the Georgia Department of Natural Resources.

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NOXIOUS WEEDS OF MISSOURI

Noxious weeds are those for which control measures, to some extent, are required by law. Most states have a designated regulatory agency to oversee a noxious weed control program. Noxious weed species usually are those that interfere with agriculture, cause human health problems or invade and degrade the environment. Across the United States, more than 500 weeds have been designated as noxious by either weed or seed laws. In Missouri, the director of the Missouri Department of Agriculture is responsible for administering the johnsongrass statute through a county weed control board. The county prosecuting attorney is responsible for prosecution of all weed statutes, so designated.

WEEDS CONSIDERED NOXIOUS

This guide provides general information about invasive weeds and a reference to the weeds considered noxious in Missouri. Control recommendations are provided for each noxious weed. Before using any herbicide, always read and follow the manufacturer's label. The label contains specific information regarding crop species for which the product can be used, its application rates and timing, and recommended adjuvants. Restrictions on the label are legally enforceable and are presented for the benefit of the user to minimize inadvertent damage and movement to nontarget sites.

Without exception, all species on the Missouri noxious weed list are invasive plants; that is, they have been introduced into an environment in which they did not evolve and thus usually have no natural enemies to limit their reproduction or spread. No matter how they were introduced, across an ocean or a mountain

range, they quickly "invade" because of their rapid growth rates and high reproductive capabilities. Of the more than 2,500 plant species in Missouri, about 25 percent are considered as nonnative. While most of these may be considered beneficial, primarily for agricultural or ornamental purposes, some have become invasive. Often by the time an invasive species is recognized as a major problem in a new area, it is well established and difficult or impossible to eliminate.

Noxious weeds in Missouri croplands

- **Fact: Weeds limit the choice of crop rotation sequences and cultural practices.** Serious infestations of johnsongrass are nearly impossible to control in grain sorghum fields. The crop and weed are closely related; thus, herbicides that are safe for use in the crop do not harm the weed.

- **Fact: Weeds act as vectors of other pests.** Weeds can harbor other crop pests such as plant pathogens, nematodes and insects. Overwintering rhizomes of johnsongrass harbor viruses that are responsible for causing diseases in corn.

- **Fact: Weeds interfere with crop harvesting.** Vining weeds, such as field bindweed, directly interfere with mechanical harvesting by wrapping around rollers or cylinders.

- **Fact: Weeds are superior competitors.** Weeds interfere with crop growth through direct competition for light, water, nutrients and space.



About 25 percent of Missouri's plant species are nonnative.

- **Fact: Herbicides make up the vast majority of pesticide inputs in Missouri agronomic production.** The Missouri Department of Agriculture estimates that corn producers in 1999 applied about 97 percent of their pesticide inputs, by weight, in herbicides.

- **Fact: Weeds reduce land values.** Perennial weeds such as field bindweed and johnsongrass can cause land purchasers to discount offers to buy and bankers to reduce the amount of a loan, because each recognizes a loss of productive potential on weed-dominated land. They also recognize the costs required to restore otherwise valuable land to full productivity.

Noxious weeds in Missouri rights-of-way

- **Fact: Weeds increase road maintenance costs.** Invasive plants, such as johnsongrass, grow up through cracks in concrete and asphalt, causing increased maintenance costs.

- **Fact: Weeds can obscure visibility.** Tall plants, such as cutleaf and common teasel and johnsongrass obscure vision along transportation routes. Vining noxious weeds, such as field bindweed and kudzu, can grow up and over roadside signs, making them hard for drivers to see.

- **Fact: Weeds can obstruct access to utility lines.** Utility rights-of-way are heavily disturbed but minimally maintained. Therefore, they serve as prime sites for invasive weeds to become established and spread.



Noxious weeds in Missouri pastures

- **Fact: Weeds can have a serious impact on grazing.** Spiny and thorny plants such as thistles and multiflora rose can pose a serious problem in Missouri pastures. They can cause physical injuries to grazing animals and restrict their access to forage and water.

Noxious weeds in Missouri forests

- **Fact: Weeds can overrun forest nurseries and trees.** In infested clearcut areas and forest nurseries, introduced vines such as kudzu quickly cover the ground and can prevent the growth of seedling trees. Left unchecked, kudzu can engulf and choke out mature trees, threatening the health of the trees and understory plants as well as animals.

Noxious weeds in Missouri wetlands

- **Fact: Weeds can destroy wildlife habitat.** In marginal areas purple loosestrife is a noxious weed that can choke out native vegetation. Wetlands infested with purple loosestrife often lose 50 percent of native plant biomass. Because of changes in food and cover, the result is a populations reduction in vertebrate and invertebrates.



NOXIOUS WEEDS: PERENNIALS

Canada thistle (*Cirsium arvense*)

Growth habit: Perennial.

Origin: Europe. Early immigrants transported contaminated crop seed into the United States.

Description: Most other thistles are biennials; however, Canada thistle is a rhizomatous, colony-forming perennial. It also reproduces by seed that can be blown great distances by wind currents. The leaves are alternate and lack petioles. They are irregularly lobed and have spines along the margins. The upper leaf surface has a waxy appearance as it lacks hair. A key feature of Canada thistle is the base of the leaf, as it clasps completely around the stem. The flower heads are produced in clusters and may range in color from pink to purple, and occasionally, white.

Habitat: Reduced-tillage cropland.

Control in row crops: In corn 2,4-D, dicamba (Banvel/Clarity, Distinct), Stinger, Hornet and glyphosate (in glyphosate-resistant or Roundup Ready corn) will suppress Canada thistle. In grain sorghum, one can use 2,4-D or Banvel/Clarity for suppression. In soybeans or cotton, glyphosate (in glyphosate-resistant or

Roundup Ready soybeans or cotton) is the only product that will provide adequate activity. The most effective timing of control measures will be when the thistles are in the early bud stage in the spring or in the fall before a killing frost.

Control in alfalfa or legume forages: There are no effective herbicides that can be used in forage legumes without damaging the crop.

Control in grass pastures and rangeland: Foliar sprays of dicamba (Clarity/Vanquish), Grazon P+D, Weedmaster, and 2,4-D can be applied when the thistles are in the early bud to bloom stage in the spring or in the fall before a killing frost. Apply clopyralid products (Stinger/Transline, Curtail), Crossbow, and Redeem in the spring to thistles in the bud stage for best results.

Control in non-cropland (rights-of-way, fencerows, industrial sites): Foliar sprays of dicamba (Clarity/Vanquish), Telar, Tordon, Weedmaster, and 2,4-D can be applied when the thistles are in the early bud to bloom stage in the spring or in the fall before a killing frost. Apply clopyralid products (Stinger/Transline, Curtail), Crossbow and Redeem in the spring for best results.



Cotyledons are the first true leaves.



Canada thistle is invading this cornfield.



Canada thistle:
Vegetative plant.



Canada thistle: Leaf bases clasp around stems.



Canada thistle: Early flower stage.

Field bindweed (*Convolvulus arvensis*)

Growth habit: Perennial.

Origin: Europe and Asia, probably in contaminated wheat around 1870.

Description: Field bindweed is a trailing perennial vine that grows from seed and

rhizomes. Field cultivation assists in implementing its spread from pieces of rhizomes. The first emerging cotyledon leaves are nearly square. The leaves are alternate and bell-shaped with pointed lobes at their bases. Both leaves and stems are smooth. The plant may trail along the ground or climb on any object in its path. Flowers are white, sometimes pink, and have a



Field bindweed:
Cotyledons are kidney shaped.



Field bindweed:
Vegetative plant beginning to vine.



Field bindweed: Flowers have a diameter about the size of a quarter.

diameter about the size of a quarter.

Habitat: Field bindweed is found throughout Missouri in practically every setting. It has been labeled as one of the most difficult and costly weeds in the United States to control.

Control in row crops: In corn, 2,4-D, dicamba (Banvel/Clarity, Distinct), and glyphosate (in glyphosate-resistant or Roundup Ready corn) will provide suppression. In grain sorghum, one can use Paramount, 2,4-D, or Banvel/Clarity for suppression. In soybean or cotton, glyphosate (in glyphosate-resistant or Roundup Ready soybean or cotton) is the only product that will provide adequate activity.

Control in alfalfa or legume forages: There are no effective herbicides that can be used in forage legumes without damaging the crop.

Control in grass pastures and rangeland: Foliar sprays of dicamba (Clarity/Vanquish), Crossbow, Grazon P + D, Tordon, Weedmaster, Redeem, Stinger/Transline, and 2,4-D can be used to control this weed. Apply clopyralid (Stinger/Transline) and picloram (Tordon, Redeem) products in the spring at or before the bud stage.

Control in non-cropland (rights-of-way, fencerows, industrial sites): Foliar sprays of Arsenal, dicamba (Clarity/Vanquish), Redeem, Tordon, Stinger/Transline, 2, 4-D, and Weedmaster can be used to control this weed.



Field bindweed: Vegetative growth begins from rhizomes.

Johnsongrass (*Sorghum halepense*)

Growth habit: Perennial.

Origin: Europe and Asia. Johnsongrass was introduced into the United States around 1840 as a forage species.

Description: Johnsongrass is a tall-growing, stout plant with thick, scaly rhizomes. It can grow into thick stands, spreading quickly through its seed and rhizomes. Leaf blades vary from about 1 to 2 inches in width and show a prominent white midvein near the base. Both top and bottom surfaces of the blade are smooth. The ligule is membranous but may develop a fringe of hairs across its top as it approaches maturity. The seed head is a large, open panicle.

Habitat: Johnsongrass may be encountered in cropland, along rights-of-way and in pastures.

Control in row crops: In corn, seedling and rhizome johnsongrass is controlled by post-

emergence herbicides that contain Accent, Beacon, Poast Plus (in sethoxydim-resistant or Poast Protected corn), or glyphosate (in glyphosate-resistant or Roundup Ready corn). Seedling johnsongrass is controlled by all of the above herbicides plus Liberty (in glufosinate-resistant or Liberty Link corn), Lightning (in



Johnsongrass: Membranous ligule.

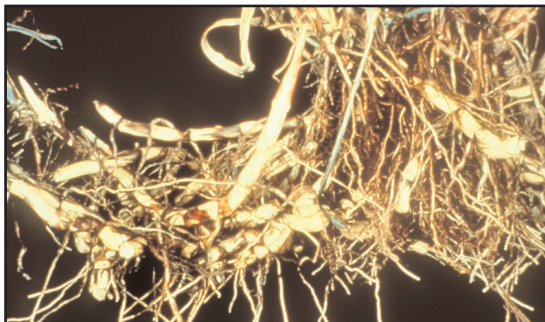
imidazolinone-resistant or Clearfield corn). The initial application should be made to seedling johnsongrass that is 4–10 inches tall or rhizome johnsongrass that is 8–14 inches tall. If regrowth occurs, a second application can be made when regrowth is 8–14 inches tall, provided the corn has not grown beyond the size limits stated on the label. In cotton and soybean fields, seedling and rhizome johnsongrass is controlled with postemergence applications of Assure II, Fusion, Poast/Poast Plus, Select and glyphosate (in glyphosate-resistant or Roundup Ready soybeans or cotton) when applications are made to johnsongrass that is 10–18 inches tall. Regrowth can be treated when it is 6–12 inches tall. There are no effective control methods for johnsongrass in grain or forage sorghum.

Control in alfalfa or legume forages: A preplant incorporated treatment of Eptam, trifluralin (Treflan, others) or Balan can be used to control seedling johnsongrass. However, rhizome johnsongrass will not be controlled with

these herbicides. Poast/Poast Plus and Select can be used on new or established alfalfa seedlings. Apply these herbicides when johnsongrass is 10–25 inches tall. Regrowth can be treated when it is 12 inches tall. At this time there are no herbicides labeled for johnsongrass control in other legume forages.

Control in grass pastures and rangeland: No selective herbicides are available for this use. Spot treatments of glyphosate (Roundup, others) will be the best approach to suppressing johnsongrass but can also damage the nontarget vegetation it contacts. It is best to apply these treatments before johnsongrass seed heads are visible.

Control in non-cropland (rights-of-way, fencerows, industrial sites): Plateau can be applied as a broadcast spray. Glyphosate and imazapyr (Arsenal/Stalker) can be used as spot treatments but can also damage nontarget vegetation they contact. It is best to apply any of these treatments before johnsongrass seed heads are visible.



Johnsongrass: Vast rhizome system.



Johnsongrass: Shoots and roots begin from rhizomes.



Johnsongrass: Flowering stage.

Kudzu (*Pueraria lobata*)

Growth habit: Perennial.

Origin: Japan. In 1876 the Japanese government exhibited kudzu as an ornamental vine at an exposition in Philadelphia. It has since been used as a forage and to provide erosion control. The Soil Conservation Service planted Kudzu extensively in the 1930s.

Description: Kudzu is an aggressive, climbing or trailing leguminous vine. It has large irregularly lobed trifoliate leaves that are alternate along the stem. Stems have the characteristic bronze-colored hair. Mature vines become woody and lose the hair. The plant reproduces in Missouri's environment primarily by its exten-



Kudzu may grow up to 12 inches a day.



Kudzu: Trifoliate leaf.

continued on page 11

Table 1. Herbicides for control of noxious weeds in legumes, pastures and non-cropland.

Weed	Crop	HERBICIDE											
		Roundup /others	2,4-D	Clarity /Vanquish	Eptam/Treflan /Balan	Poast Plus /Select	Arsenal /Stalker	Plateau	Weedmaster	Grazon P+D	Crossbow		
Perennial	Canada thistle	Legumes											
		Pastures and rangeland		✓	✓					✓	✓	✓	
		Non-cropland		✓	✓					✓		✓	
	Field bindweed	Legumes											
		Pastures and rangeland		✓	✓					✓	✓	✓	
		Non-cropland		✓	✓			✓		✓			
	Johnsongrass	Legumes				✓	✓						
		Pastures and rangeland	✓										
		Non-cropland	✓					✓	✓				
Kudzu	Legumes												
	Pastures and rangeland	✓		✓						✓	✓		
	Non-cropland	✓		✓									
Multiflora rose	Legumes												
	Pastures and rangeland	✓		✓					✓	✓	✓		
	Non-cropland	✓		✓			✓		✓				
Purple loosestrife	Legumes												
	Pastures and rangeland	✓	✓									✓	
	Non-cropland	✓	✓									✓	
Biennial	Common/cutleaf teasel	Legumes											
		Pastures and rangeland	✓	✓	✓								
		Non-cropland	✓	✓	✓				✓				
	Musk thistle	Legumes											
		Pastures and rangeland		✓	✓					✓	✓	✓	
		Non-cropland		✓	✓					✓			
Scotch thistle	Legumes												
	Pastures and rangeland		✓	✓					✓	✓	✓		
	Non-cropland		✓	✓					✓				
Annual	Marijuana	Legumes											
		Pastures and rangeland		✓	✓					✓			
		Non-cropland		✓	✓					✓			

HERBICIDE										Crop	Weed	
Velpar	Spike	Tordon	Stinger /Transline	Curtail	Redeem	Telar	Ally/Escort	Garlon				
										Legumes	Canada thistle	Perennial
			✓	✓	✓					Pastures		
		✓	✓	✓	✓	✓				Non-cropland		
										Legumes	Field bindweed	
		✓	✓		✓					Pastures		
		✓	✓		✓					Non-cropland		
										Legumes	Johnsongrass	
										Pastures		
										Non-cropland		
										Legumes	Kudzu	
			✓					✓		Pastures		
		✓	✓		✓		✓	✓		Non-cropland		
										Legumes	Multiflora rose	
✓	✓									Pastures		
✓	✓	✓								Non-cropland		
										Legumes	Purple loosestrife	
								✓		Pastures		
								✓	✓	Non-cropland		
										Legumes	Common/cutleaf teasel	
						✓				Pastures		
						✓	✓	✓		Non-cropland		
										Legumes	Musk thistle	Biennial
		✓	✓	✓	✓			✓		Pastures		
		✓	✓	✓	✓	✓		✓		Non-cropland		
										Legumes	Scotch thistle	
		✓	✓	✓	✓			✓		Pastures		
		✓	✓	✓	✓	✓		✓		Non-cropland		
										Legumes	Marijuana	Annual
										Pastures		
										Non-cropland		

Table 2. Herbicides for control of noxious weeds in row crop fields.

Weed	Crop	HERBICIDE										
		Accent, Beacon	Liberty in Liberty Link corn	Lightning in Clearfield corn	Assure II, Fusion, Select Poast/Poast Plus	2,4-D	Banvel/Clarity	Distinct	Roundup/others in Roundup Ready corn, soybeans or cotton	Stinger, Hornet	Paramount	
Perennial	Canada thistle	Corn					✓	✓	✓	✓	✓	
		Grain sorghum					✓	✓				
		Soybeans								✓		
		Cotton								✓		
	Field bindweed	Corn					✓	✓	✓	✓		
		Grain sorghum					✓	✓				✓
		Soybeans								✓		
		Cotton								✓		
	Johnsongrass	Corn	✓	✓	✓					✓		
		Grain sorghum										
		Soybeans				✓				✓		
		Cotton				✓				✓		
	Kudzu	Corn						✓	✓	✓		
		Grain sorghum						✓				
		Soybeans								✓		
		Cotton								✓		
Multiflora rose	Corn					✓	✓	✓	✓			
	Grain sorghum					✓	✓					
	Soybeans								✓			
	Cotton								✓			
Biennial	Musk thistle	Corn					✓	✓	✓	✓	✓	
		Grain sorghum					✓	✓				
		Soybeans								✓		
		Cotton								✓		
	Scotch thistle	Corn					✓	✓	✓	✓	✓	
		Grain sorghum					✓	✓				
		Soybeans								✓		
		Cotton								✓		
Annual	Marijuana	Corn					✓	✓	✓	✓		
		Grain sorghum					✓	✓				
		Soybeans								✓		
		Cotton								✓		

Note: Purple loosestrife and the teasels are not commonly found in row crop areas.

Kudzu, continued from page 7

sive root system. If flowers occur, they are reddish purple and resemble a small cluster of wisteria flowers. Under suitable growing conditions, kudzu may grow at a rate of one foot per day. Kudzu is very sensitive to frost and the foliage dies back in the fall, leaving only the woody vines.

Habitat: Primarily found in the southern-most tier of Missouri's counties, it is encountered along rights-of-way, forests and non-crop areas.



Kudzu: Lower leaf surfaces have prominent veins.

Control in row crops: Through it is not typically found in this habitat; dicamba (Banvel/Clarity/Distinct) can be used for suppression in corn, and glyphosate (Roundup/others) in glyphosate-resistant (Roundup Ready) crops will also provide suppression.

Control in alfalfa or legume forages: Not typically found in this habitat, however, there are no herbicides to control this weed that will not injure a forage legume.

Control in grass pastures and rangeland: Foliar sprays of glyphosate (Roundup, others) as a spot treatment and broadcast applications of Ally, Crossbow, Grazon, Stinger/Transline, or dicamba (Clarity/Vanquish) can be used to control or suppress this weed. Repeated treatments will be necessary.

Control in non-cropland (rights-of-way, fencerows, industrial sites): Foliar sprays of glyphosate (Roundup or Accord), Escort, Tordon, Garlon, Stinger/Transline, Redeem, and dicamba (Clarity/Vanquish) can be used to suppress this weed. Repeated treatments will be necessary.



Kudzu: Bronze hairs on stems.



Kudzu: Flowers are reddish purple.

Multiflora rose (*Rosa multiflora*)

Growth habit: Perennial.

Origin: Japan. Multiflora rose was introduced in the late 1800s as a rootstock for ornamental roses. It later was recommended for planting in Missouri and other midwestern states as a "living fence" to serve as a livestock barrier.

Description: Multiflora rose forms large clumps of arching canes 5 to 10 feet or more tall. Flowers are about an inch in diameter, white and very showy and from a distance may resemble blackberry bushes. It produces clusters of red fruit. The leaves are compound and arranged alternately along the prickly stems. A key feature of multiflora rose that distinguishes it from other roses is the presence of fringe-like stipules at the base of the leaf petiole.

Habitat: Primarily pastures and fencerows. It may also be found along rights-of-way.

Control in row crops: Woody brush species such as multiflora rose are rarely a problem in row crops, unless the ground was in the Conservation Reserve Program. In corn, 2,4-D, dicamba (Banvel/Clarity, Distinct), and

glyphosate (in glyphosate-resistant or Roundup Ready corn) will provide in-season suppression. In grain sorghum, one can use 2,4-D or Banvel/Clarity for in-season suppression. In soybeans or cotton, glyphosate (in glyphosate-resistant or Roundup Ready soybean or cotton) is the only product that will provide adequate



Multiflora rose flowers are white and about an inch in diameter.



Mutiflora rose: Cane.

activity. In-crop applications will be most successful if the weed is fully leafed out but not yet blooming. The best means of controlling these weeds in cropland is to treat in the fall at least two weeks before a killing frost, but while the weed is fully leafed out.

Control in alfalfa or legume forages:

There are no effective herbicides that can be used in forage legumes without damaging the crop.

Control in grass pastures and rangeland:

Foliar sprays of dicamba (Clarity/Vanquish), Weedmaster, Grazon P + D, and Crossbow are effective when the weed is fully leafed out and actively growing. Cut surface applications of glyphosate (Roundup, others), basal-bark sprays (on the lower 12–15 inches of stem) of Velpar, and soil treatments of Velpar or Spike can be

used for selective control of this weed where other desirable species are present.

Control in non-cropland (rights-of-way, fence rows, industrial sites): Foliar sprays of glyphosate (Roundup, others), imazapyr (Arsenal/Stalker), dicamba (Clarity/Vanquish), Weedmaster, picloram (Tordon), and soil treatments of Spike and Velpar can be used to control this weed.



Mutiflora rose: Spines and stipules.



Mutiflora rose: Compound leaf.

Purple loosestrife
(*Lythrum salicaria*)

Growth habit: Perennial.

Origin: Europe. Purple loosestrife entered the United States in ship ballast in the early 1800s. It was used as a medicinal herb and ornamental plant. Nurseries continue to sell purple loosestrife as an ornamental.

Description: Extensive colonies of purple loosestrife form from root crowns, adventitious shoots from fleshy roots and seed. When mowed, new plants can be initiated from stem fragments. The leaves don't have petioles and range in shape from lanceolate to linear. They may be arranged oppositely or in whorls of three along the square-shaped stems. The most obvious characteristic of purple loosestrife is the long, terminal spikes of flowers. The showy flowers have petals that range in color from magenta to purple. A single plant may produce several million seeds.

Habitat: Not found extensively in Missouri, purple loosestrife thrives in wet, marginal sites.

Control in row crops: Not typically found in this habitat.

Control in alfalfa or legume forages: Not typically found in this habitat.

Control in grass pastures and rangeland: Spot foliar sprays of glyphosate can be used to control this weed. Broadcast applications of Crossbow, 2,4-D and Ally will also provide

control. Apply herbicides to actively growing plants in the bloom stage.

Control in non-cropland (rights-of-way, fencerows, industrial and aquatic sites): In terrestrial settings, foliar sprays of glyphosate (Roundup or Accord) as a spot treatment can be used to control this weed. Broadcast applications of Garlon, Crossbow, 2,4-D, and Escort will also provide control. In marginal and aquatic sites, special formulations of glyphosate (Rodeo and others) are registered for purple loosestrife control. Apply herbicides to actively growing plants in the bloom stage.



Purple loosestrife flowers are borne on long spikes.



Purple loosestrife grows in thick clumps that choke out desirable vegetation.

NOXIOUS WEEDS: BIENNIAL

Common (*Dipsacus fullonum*)
and
cutleaf teasel (*D. laciniatus*)

Growth habit: Biennial.

Origin: Europe. Both species were imported for their use in the textile industry, where their fruiting heads with spine-tipped bracts were used for raising the nap on woolen cloth. Dried fruiting heads have also been used extensively in dried flower arrangements, and their placement in cemeteries has facilitated its spread.

Description: Both teasel species are tall-growing erect plants, about 6 feet tall. Rosettes produced by seed grow large during the first year. The young leaves are egg-shaped, have teeth along the margins and appear to be wrinkled. The second year, deeply grooved flowering stems with small, stout spines emerge from the rosette. The flowering heads are cylindrical and have long, stiff spines at their base for bracts. A main distinguishing difference between the two species is the color of the flower petals: common teasel's are lavender while cutleaf teasel's are white. Both species may be distinguished from

thistles by the shape of the flower head.

Habitat: Rights-of-way and waste areas.

Control in row crops: Not typically found in this habitat.

Control in alfalfa or legume forages: Not typically found in this habitat, however, there are no herbicides to control this weed that won't injure a forage legume.

Control in grass pastures and rangeland: Foliar sprays of glyphosate (Roundup, others) as a spot treatment and broadcast applications of Redeem, 2,4-D, and dicamba (Clarity/Vanquish) can be used on actively growing teasel in the rosette stage.

Control in non-cropland (rights-of-way, fencerows, industrial sites): Foliar sprays of glyphosate (Roundup/others) as a spot treatment and broadcast applications of 2,4-D, Telar, Escort, Plateau, Redeem, and dicamba (Clarity/Vanquish) can be used to control this weed with applications to actively growing teasel in the rosette stage.



Cutleaf teasel has white flowers.



Cutleaf teasel: Seedlings will grow in a rosette during the first year.



Common teasel has lavender flowers.

Musk thistle (*Carduus nutans*)

Growth habit: Biennial.

Origin: Europe and Asia during the mid-1800s.

Description: During the first year of growth, a basal rosette of leaves is produced. Both the leaves and the stems of musk thistle are spiny. The leaves are waxy and usually hairless; on occasion, there may be a few hairs on the upper surface and on the main veins of the lower surface. During the second year of growth, the rosettes elongate and the leaves take on a deeply lobed appearance. The margins are tipped with sharp spines, and the leaf bases appear to extend down where they join the stem, creating small, spiny wings. The flowers are produced singly on terminal stems and may be up to 2 inches in diameter. They are usually pink to purple in color. The plant reproduces by seed.

Habitat: Pastures and rights-of-way.

Control in row crops: In corn, 2,4-D, dicamba (Banvel/Clarity, Distinct), Stinger, Hornet, and glyphosate (in glyphosate-resistant or Roundup Ready corn) will provide suppression. In grain sorghum, one can use 2,4-D or Banvel/Clarity for suppression. In soybeans or cotton, glyphosate (in glyphosate-resistant or Roundup Ready soybeans or cotton) is the only product that will provide adequate activity.

Control in alfalfa or legume forages:

There are no effective herbicides that can be used in forage legumes without damaging the crop.

Control in grass pastures and rangeland:

Foliar sprays of Crossbow, Grazon P + D, metsulfuron (Ally/Escort), dicamba (Clarity/Vanquish), Tordon, Weedmaster, or 2,4-D can be used to control this weed. Apply these prod-

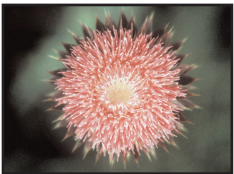
ucts in the spring or fall when weeds are in the seedling to rosette stage. Apply Redeem, Curtail, or Stinger in the spring to thistles in the rosette to early bolt stage.

Control in non-cropland (rights-of-way, fencerows, industrial sites): Foliar sprays of Escort, dicamba (Banvel/Clarity), Redeem, Tordon, Weedmaster, 2, 4-D, and Telar can be used to control this weed. Apply these products in the spring or fall when weeds are in the seedling to rosette stage. Apply Redeem, Curtail, or Stinger in the spring to thistles in the rosette to early bolt stage.

Biological control: Specific natural enemies, such as the musk thistle rosette weevil, musk thistle flower head weevil, and a musk thistle rust fungus, can aid in regulating the spread of this weed. Use of the weevils in areas of Missouri where they have been present for the longest periods of time has reduced musk thistle populations by 70–90 percent. For more complete information on these natural enemies, consult MU publication IPM 1010, *Biological and Integrated Control of Musk Thistle in Missouri*.



Musk thistle: First-year rosette.



Musk thistle: Flowers are usually pink.



Musk thistle: Flowers may be up to 2 inches in diameter.



Musk thistle poses a particular problem in pastures.



Musk thistle: Flowers are produced singly.

Scotch thistle
(*Onopordum acanthium*)

Growth habit: Biennial.

Origin: Europe and Asia.

Description: Basal rosettes of leaves are produced from seed during the first year of growth. The foliage has a soft grayish green appearance, similar to flannel cloth, because of its dense, short hair. The margins are coarsely lobed and armed with spines. An unusual feature of the plant is its stems. During the second year of growth, the flowering stems are formed and contain broad, wavy wings that are actually projections of the leaf bases. The wings are lined with spines and also densely hairy. Flowers may occur singly or in small clusters up to five on terminal branches and are usually pink to purple in color.

Habitat: Waste areas and rights-of-way, but seldom-encountered in Missouri.

Control: See herbicides listed under musk thistle for each crop.



A unique feature of Scotch thistle is the winged stems.

NOXIOUS WEEDS: ANNUAL

Marijuana (*Cannabis sativa*)

Growth habit: Annual.

Origin: Asia. Before World War II marijuana was used industrially in Missouri for its strong fiber in making paper, rope, sacks, twine and cloth.

Description: Its leaves are palmately lobed, like a hand, usually divided into five to nine leaflets. The middle leaflet is usually the longest. The margins of the leaflets are finely serrated. It is an erect-growing plant, occurring in large

stands and usually greater than 6 feet in height, similar in habit to giant ragweed. Flowers are of an inconspicuous, greenish yellow, and male and female flowers occur on separate plants.

Habitat: River-bottom areas containing rich, fertile soil. It is most commonly encountered in the northwest quarter of the state.

Control in row crops: In corn 2,4-D, dicamba (Banvel/Clarity, Distinct), and glyphosate (in glyphosate-resistant or Roundup Ready corn) will provide control. In grain sorghum, one can use 2,4-D or Banvel/Clarity for control. In soybeans or cotton, glyphosate (in glyphosate-resistant or Roundup Ready soybeans or cotton) is the only product that will provide adequate activity.

Control in alfalfa or legume forages: There are no effective herbicides that can be used in forage legumes without damaging the crop.

Control in grass pastures and rangeland: Foliar sprays of dicamba (Clarity/Vanquish), Weedmaster, and 2,4-D can be used to control this weed.

Control in non-cropland (rights-of-way, fencerows, industrial sites): Foliar sprays of dicamba (Clarity/Vanquish), Weedmaster, and 2,4-D can be used to control this weed.



Marijuana plants usually grow more than 6 feet tall.



Marijuana leaves are usually divided into five to nine leaflets.



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