

KANSAS DEPARTMENT OF AGRICULTURE

OFFICIAL CONTROL METHODS FOR
FIELD BINDWEED

Convolvulus arvensis L.

Revised May 20, 2020

DESCRIPTION

Field bindweed is a twining perennial forb native to Europe and Asia. It reproduces by seeds and rootstocks. The root system is extensive, extending to a depth of 20-30 feet. The smooth, slender stems twine or spread over the soil and vegetation. Leaves up to 2 inches long are alternate, simple, petioled, and highly variable in shape and size. The leaf blade may be oblong to elliptical or may be rounded to pointed with spreading basal lobes. Flowers are white, pink, or white with pink, funnel-shaped, about 1 inch across, and usually borne singly in the axils of leaves. Each flower stalk has two tiny, scale-like bracts ½-2 inches below the flower; the bracts, along with leaf shape and small flower size, distinguish field bindweed from hedge bindweed. Seeds are dark, brownish-gray, about 1/8-inch-long, and have one rounded and two flattened sides. Flowering from June-August; fruiting from August-October.

PREVENTION OF SPREAD

The Noxious Weed Law (K.S.A. 2-1313a et. seq.) requires all people to control the spread of and to eradicate field bindweed on all lands owned or supervised by them. Methods used for control must prevent both the production of viable seed and destroy the plant's ability to reproduce by vegetative means. Because field bindweed is a perennial, with the exception of herbicide applications, two or more of the following methods must be used together to control field bindweed. Infestation sites must be monitored after control methods have been accomplished to ensure that dormant seeds in the seedbank do not germinate and establish new infestations.

FIELD BINDWEED CONTROL PRACTICES

Field bindweed control means that both the roots and the flowers must be destroyed. The seeds of field bindweed will remain viable in the soil for up to 50 years so even repeated control practices may not deplete the seedbank resulting in the re-establishment of the infestation. Contact your county noxious weed director for more information.

Cultural Control

Cultural weed control involves land and vegetation management techniques used to prevent the establishment or control the spread of noxious weeds.

Using the combination of no-till farming methods, good crop rotation to break weed cycles, and keeping the soil covered to decrease weed seed germination are practices that minimize the establishment of new bindweed populations.

Planting a dense cover crop in the spring, after a period of intensive cultivation, may provide effective competition for field bindweed. The effectiveness of all competitive crops depends on intensive cultivation during the field bindweed growing season when land is not in crop.

Frequent surveys of fence lines, roadway, ditches and other susceptible areas for new infestations and the quick removal of any new plants will prevent field bindweed from becoming established.

Mechanical Control

Mechanical weed control involves the physical removal of all parts or just the reproductive parts of weeds.

As a perennial species, field bindweed is difficult to control mechanically.

Deep, repeated cultivation has been shown to reduce field bindweed infestations.

Once cultivated, the plant will regenerate its root system in about three weeks and any piece of a root that was broken during cultivation may establish a new plant. Therefore, to be effective, cultivation should occur every two to three weeks annually. Such repetitive cultivation throughout the growing season will deplete the root system and provide control. It is important to clean roots and root fragments from equipment before entering uninfested areas of the field or other fields to prevent the spread of field bindweed. This is not financially practical for most agricultural production systems and may also increase erosion of the topsoil. In general, mechanical control is not a good option because field bindweed is able to reproduce from roots, and its seed remains viable in the soil for up to 50 years.

Chemical Control

The following herbicides may be used for cost-share with landowners. Other products labeled and registered for use on this noxious weed in Kansas may be used in accordance with label directions but are not available for cost-share. Be sure to read and follow all label directions and precautions. For additional information consult the most recent edition of the KSU publication of “Chemical Weed Control for Field Crops, Pastures, Rangeland, and Noncropland”.

The use of tank mixes or pre-mixes of two or more of the following herbicides may be available for cost share if approved by your county Weed Director and allowed in accordance with the appropriate labels. Contact your county weed program for availability of these herbicides.

It is highly recommended that you switch between herbicides with different modes of action often.

Herbicide	Mode of Action
2,4-D	4
dicamba	4
diflufenzopyr	19
diquat	22
glyphosate	9
imazapic	2
imazapyr	2
picloram	4
quinclorac	4

Biological Control

Biological control refers to the deliberate application of a living organism to control the spread of weeds. These agents will not eradicate their host plant, therefore other control methods must be used in addition to the use of biological control agents as part of an integrated pest management strategy. The importation of biological control agents is regulated by USDA-APHIS and is allowed by permit only.

While the following biological control agents are available for field bindweed, they have proven to be ineffective in the state of Kansas and therefore the Kansas Department of Agriculture will not be able to provide any for use. Other agents may be available for use if the appropriate permit is obtained.

Aceria malherbae
Tyta luctuosa

gall mite
leaf-feeding moth

KANSAS DEPARTMENT OF AGRICULTURE

OFFICIAL CONTROL METHODS FOR
MUSK THISTLE

Carduus nutans L.

Revised May 20, 2020

DESCRIPTION

Musk thistle is primarily a biennial, winter annual or short-lived perennial forb that was introduced from Eurasia. The leaves are deeply lobed, hairless, and dark green with a light green mid-rib. A silver-gray leaf margin is characteristic of each spine tipped lobe, giving the leaf a frosted appearance. The stems grow from a rosette of leaves that grow flat to the ground and are present year-round. The leaf base extends down the stem as wing-like flaps. Musk thistle is the first of the thistles to bloom in the spring. Each head is 2 to 3 inches in diameter, terminal, solitary, usually nodding or bent over slightly at the ends of branches, and consisting of many, tiny, purple (rarely white) flowers. The seed-like fruits are straw-colored, oblong, and 1/8-inch-long topped by numerous 1/2-1-inch, white, capillary bristles that aid in dispersal of the seeds and detach as a unit. Fruit dispersal begins 7-10 days after blooming. Flowering May-September (occasionally until frost); fruiting May-frost.

PREVENTION OF SPREAD

The Noxious Weed Law (K.S.A. 2-1313a et. seq.) requires all people to control the spread of and to eradicate musk thistle on all lands owned or supervised by them. Methods used for control must prevent both the production of viable seed and destroy the plant's ability to reproduce by vegetative means. Infestation sites must be monitored after control methods have been accomplished to ensure that dormant seeds in the seedbank do not germinate and establish new infestations.

MUSK THISTLE CONTROL PRACTICES

Because musk thistle is a biennial or short-lived perennial, you may be able to use mechanical controls alone as a control option because only the flower needs to be destroyed for control. Contact your county noxious weed director for more information.

Cultural Control

Cultural weed control involves land and vegetation management techniques used to prevent the establishment or control the spread of noxious weeds.

The use of sheep, goats and cattle to graze musk thistle may be used during the rosette to bolting stage then repeated as necessary to prevent the production of flowers. Repeat grazing each year to deplete the seedbank and provide control.

Frequent surveys of fence lines, roadway, ditches and other susceptible areas for new infestations and the quick removal of any new plants will prevent musk thistle from becoming established.

Mechanical Control

Mechanical weed control involves the physical removal of all parts or just the reproductive parts of weeds.

Any mechanical controls that prevent the plant from producing flowers, including mowing and burning, may be used to control musk thistle as long as that control takes place before any flowers are produced. Care must be taken to ensure that a new stem does not sprout from the root crown. Removal of the root crown is preferable, therefore mechanical controls such as digging, hoeing, disking or tilling are more effective and preferred.

Mechanical controls can be used throughout the year when they target the rosette.

Chemical Control

The following herbicides may be used for cost-share with landowners. Other products labeled and registered for use on this noxious weed in Kansas may also be used in accordance with label directions but are not available for cost-share. Be sure to follow all label directions and precautions. For additional information consult the most recent edition of the KSU publication of "Chemical Weed Control for Field Crops, Pastures, Rangeland, and Noncropland".

Any two or more of the herbicides listed below may be available for cost-share as a pre-mix or a tank mix if allowed on the respective labels. Contact your county weed program for availability.

Herbicide	Mode of Action
2,4-D	4
aminopyralid	4
chlorsulfuron	2
clopyralid	4
dicamba	4
diflufenzopyr	19
imazapic	2
metsulfuron methyl	2
picloram	4
triasulfuron	2

Biological Control

Biological control refers to the deliberate application of a living organism to control the spread of weeds. These agents will not eradicate their host plant, therefore other control methods must be used in addition to the use of biological control agents as part of an integrated pest management strategy. The importation of biological control agents is regulated by USDA-APHIS and is allowed by permit only. The following agent is permitted for use on musk thistle in Kansas. Other agents may be available for use if the appropriate permit is obtained.

Cheilosia corydon

flower fly

The below species are available for use within the state of Kansas though neither of these insects may be transported across state lines either into or out of Kansas. Consult with your County Noxious Weed Director for more information.

Rhinocyllus conicus

head weevil

Trichosirocalus horridus

crown weevil

KANSAS DEPARTMENT OF AGRICULTURE**OFFICIAL CONTROL METHODS FOR
JOHNSONGRASS**

Sorghum halepense (L.) Pers.

Revised May 20, 2020

DESCRIPTION

Johnsongrass is a warm-season, perennial grass native to Asia and northern Africa. It reproduces by long rhizomes and seeds. It is well adapted to hold its own in competition with crop plants. Stems grow up to 6-12 feet tall, from freely branching, stout, fleshy rhizomes bearing, fibrous roots. Leaves are alternate, simple, and relatively wide and long with a prominent white midvein. Spikelets are paired (1 sessile and perfect, 1 stalked and anther-bearing) and borne in large open panicles. The fruits are reddish-brown grains about 2 mm long, . Flowering from May – frost; fruiting June – frost.

PREVENTION OF SPREAD

The Noxious Weed Law (K.S.A. 2-1313a et. seq.) requires all landowners to control the spread of and to eradicate Johnsongrass on all lands owned or supervised by them. Methods used for control must prevent both the production of viable seed and destroy the plant's ability to reproduce by vegetative means. Infestation sites must be monitored after control methods have been accomplished to ensure that dormant seeds in the seedbank do not germinate and establish new infestations.

JOHNSONGRASS CONTROL PRACTICES

Johnsongrass control means that both the roots, rhizomes and the flowers must be destroyed. The rhizomes, which are horizontal underground stems, can extend for more than 6 feet from the original plant and can sprout new plants every few inches. Because Johnsongrass is a perennial, with the exception of herbicide applications, one or more of the following control methods must be used together to control Johnsongrass. Contact your county noxious weed director for more information.

Cultural Control

Cultural weed control involves land and vegetation management techniques used to prevent the establishment or control the spread of noxious weeds.

Johnsongrass is generally a good forage grass, especially when young and healthy, and is intolerant of heavy grazing. However, plants at certain developmental stages (when leaves and stems are actively growing) or when stressed (especially due to drought, extreme heat, or frost) can become toxic to livestock due to the production of cyanogenic glycosides. Also, prolonged consumption of fresh Johnsongrass can cause nitrate poisoning in ungulates. Consequently, grazing as a control method must be carried out with extreme caution.

Planting a dense cover crop in the spring, after a period of intensive cultivation, may provide effective competition for Johnsongrass. The effectiveness of all competitive crops depends on intensive cultivation during the Johnsongrass growing season when land is not in crop.

Frequent surveys of fence lines, roadway, ditches and other susceptible areas for new infestations and the quick removal of any new plants will prevent Johnsongrass from becoming established.

Mechanical Control

Mechanical weed control involves the physical removal of all parts or just the reproductive parts of weeds.

As a perennial species, Johnsongrass is difficult to control mechanically.

Hand-pulling or hoeing may work for small, recently established populations, they are too time-consuming and laborious to be economical on a large scale. Mowing or harvesting prevents weed seed production but does not prevent the plant from reproducing vegetatively.

Fall plowing may bring Johnsongrass rhizomes closer to the surface, exposing them to killing temperatures. Cultivation reduces carbohydrate reserves in Johnsongrass, making it less competitive. Once cultivated, the system of rhizomes can quickly produce new plants and cultivation can spread the pieces of rhizome, ultimately increasing the extent of the infestation. It is important to clean roots and root fragments from equipment before entering uninfested areas of the field or other fields to prevent the spread of Johnsongrass. This is not financially practical for most agricultural production systems and may also increase erosion of the topsoil. In general, mechanical control is not a good option because plants are able to reproduce from both rhizomes and seed.

Chemical Control

The following herbicides may be used for cost-share with landowners. Other products labeled and registered for use on this noxious weed in Kansas may be used in accordance with label directions but are not available for cost-share. Be sure to follow all label directions and precautions. For additional information consult the most recent edition of the KSU publication of "Chemical Weed Control for Field Crops, Pastures, Rangeland, and Noncropland".

Any two or more of the herbicides listed below may be available for cost-share as a pre-mix or a tank mix if allowed on the respective labels. Contact your county weed program for availability.

Herbicide	Mode of Action
fenoxaprop-ethyl	1
fluazifop-p-butyl	1
foramsulfuron	2
glyphosate	9
imazapic	2
metsulfuron methyl	2
nicosulfuron	2
primisulfuron	1
quizalofop-p	1
rimsulfuron	2
sethoxydim	1
sulfometuron	2
sulfosulfuron	2

Biological Control

Biological control refers to the deliberate application of a living organism to control the spread of weeds. These agents will not eradicate their host plant, therefore other control methods must be used in addition to the use of biological control agents as part of an integrated pest management strategy. The importation of biological control agents is regulated by USDA-APHIS and is allowed by permit only.

There are no biological control agents available for Johnsongrass.

KANSAS DEPARTMENT OF AGRICULTURE

OFFICIAL CONTROL METHODS FOR
SERICEA LESPEDEZA

Lespedeza cuneata (Dum. Cours.) G. Don
Revised May 20, 2020

DESCRIPTION

Sericea lespedeza is a shrubby-looking perennial forb, 2-5 feet tall with many branching stems from a stout, woody, branched taproot. It is native to Asia. The leaves, each with three ¼-1-inch long leaflets, are crowded along the stems. The leaflets are wedge- or club-shaped. Two types of flowers are produced individually or in small clusters along the stems: showy, mostly cross-pollinated flowers are ¼ inch long and cream-colored with purple markings; Self-pollinated flowers are smaller and less showy. Fruits from both types of flowers are tan to brown, one-seeded pods 1/8 - ¼ inches long. Flowering August-frost; fruiting September-frost.

PREVENTION OF SPREAD

The Noxious Weed Law (K.S.A. 2-1313a et. seq.) requires all landowners to control the spread of and to eradicate *sericea lespedeza* on all lands owned or supervised by them. Methods used for control must prevent both the production of viable seed and destroy the plant's ability to reproduce by vegetative means. Infestation sites must be monitored after control methods have been accomplished to ensure that dormant seeds in the seedbank do not germinate and establish new infestations.

SERICEA LESPEDEZA CONTROL PRACTICES

Sericea lespedeza control means that both the roots and the flowers must be destroyed. Because *sericea lespedeza* is a perennial, with the exception of herbicide applications, one or more of the following methods must be used together to control *sericea lespedeza*.

Cultural Control

Cultural weed control involves land and vegetation management techniques used to prevent the establishment or control the spread of noxious weeds.

The use of sheep or goats to graze *sericea lespedeza* may be used on young plants early in the season. Two or more treatments are necessary each season. Repeat grazing each year to deplete the seedbank and provide control.

Controlled burning of grasslands infested with *sericea lespedeza* in late August through September will kill the above-ground portion of the plant, including flowers and seeds which are produced at that time of year, preventing the plants from reproducing sexually. It will also encourage seed in the seedbank to germinate. Juvenile plants are susceptible to winter kill.

Frequent surveys of fence lines, roadway, ditches and other susceptible areas for new infestations and the quick removal of any new plants will prevent *sericea lespedeza* from becoming established.

Mechanical Control

Mechanical weed control involves the physical removal of all parts or just the reproductive parts of weeds.

As a perennial species, *sericea lespedeza* is difficult to control mechanically.

Although not as effective as late season burning, because the mown plants are not removed and the soil is not heated allowing for the dormant seeds in the seedbank to germinate, repeated mowing in the flower bud stage should reduce the vigor of *sericea lespedeza*.

Chemical Control

The following herbicides may be used for cost-share with landowners. Other products labeled and registered for use on this noxious weed in Kansas may be used in accordance with label directions but are not available for cost-share. Be sure to follow all label directions and precautions. For additional information consult the most recent edition of the KSU publication of "Chemical Weed Control for Field Crops, Pastures, Rangeland, and Noncropland".

Any two or more of the herbicides listed below may be available for cost-share as a pre-mix or a tank mix if allowed on the respective labels. Contact your county weed program for availability.

Herbicide	Mode of Action
aminopyralid	4
chlorsulfuron	2
fluroxypyr	4
metsulfuron methyl	2
picloram	4
triclopyr	4

Biological Control

Biological control refers to the deliberate application of a living organism to control the spread of weeds. These agents will not eradicate their host plant, therefore other control methods must be used in addition to the use of biological control agents as part of an integrated pest management strategy. The importation of biological control agents is regulated by USDA-APHIS and is allowed by permit only.

There are no biological control agents available for sericea lespedeza.

KANSAS DEPARTMENT OF AGRICULTURE

OFFICIAL CONTROL METHODS FOR
BUR RAGWEED

Ambrosia grayii (A. Nelson) Shinnery
Revised May 20, 2020

DESCRIPTION

Bur ragweed is a native, erect, perennial forb, 1-2 feet tall, that reproduces by underground root-stocks and seeds. Stems are usually branching from the base and covered with fine, woolly hairs that give the plant a silvery-gray to purplish-white appearance. The leaves are usually alternate rarely opposite toward the base of the stem), broadly ovate, pinnately 3-5-parted or entire, long-petioled, and dusty greenish-gray. The central lobe of the leaves is usually much larger than the lateral lobes. Male and female flowers are borne in separate heads, with male heads, drooping, about ¼ inch in diameter, and produced in terminal racemes, and female heads, mostly solitary in the leaf axils, 2-flowered, and less than ¼ inch in diameter. The 1-seeded fruits are bur-like, 1/8-1/4-inch-long, and bear stout, straight or hooked spines that are 1/16-1/8 inch long. Flowering and fruiting September-frost.

PREVENTION OF SPREAD

The Noxious Weed Law (K.S.A. 2-1313a et. seq.) requires all landowners to control the spread of and to eradicate bur ragweed on all lands owned or supervised by them. Methods used for control must prevent both the production of viable seed and destroy the plant's ability to reproduce by vegetative means. Infestation sites must be monitored after control methods have been accomplished to ensure that dormant seeds in the seedbank do not germinate and establish new infestations.

BUR RAGWEED CONTROL PRACTICES

Bur ragweed control means that both the roots and the flowers must be destroyed. Because bur ragweed is a perennial, with the exception of herbicide applications, one or more of the following methods must be used together to control bur ragweed.

Cultural Control

Cultural weed control involves land and vegetation management techniques used to prevent the establishment or control the spread of noxious weeds.

Frequent surveys of fence lines, roadway, ditches and other susceptible areas for new infestations and the quick removal of any new plants will prevent bur ragweed from becoming established.

Mechanical Control

Mechanical weed control involves the physical removal of all parts or just the reproductive parts of weeds.

As a perennial species, bur ragweed is difficult to control mechanically.

Controlling bur ragweed with cultivation would require tillage three to four inches deep every 14 to 21 days annually to deplete the seedbank. Following this time period, the area should be regularly policed for new seedlings which can be killed by further cultivation. When using this method, it is important to clean bur ragweed roots and root fragments from equipment before entering uninfested areas of the field or other fields to prevent the spread of bur ragweed.

Current residue requirements for cropland would not allow the excessive amounts of tillage needed to control bur ragweed. It is also not practical to clean cultivate over a two-year period because of the resulting wind and water erosion or loss of income due to no crop returns.

Chemical Control

The following herbicides may be used for cost-share with landowners. Other products labeled and registered for use on this noxious weed in Kansas may be used in accordance with label directions but are not available for cost-share. Be sure to follow all label directions and precautions. For additional information consult the most recent edition of the KSU publication of "Chemical Weed Control for Field Crops, Pastures, Rangeland, and Noncropland".

Any two or more of the herbicides listed below may be available for cost-share as a pre-mix or a tank mix if allowed on the respective labels. Contact your county weed program for availability.

Herbicide	Mode of Action
2,4-D LV Ester	4
aminopyralid	4
dicamba	4
florpyrauxifen-benzyl	4
picloram	4

Biological Control

Biological control refers to the deliberate application of a living organism to control the spread of weeds. These agents will not eradicate their host plant, therefore other control methods must be used in addition to the use of biological control agents as part of an integrated pest management strategy. The importation of biological control agents is regulated by USDA-APHIS and is allowed by permit only.

There are no biological control agents available for bur ragweed.

KANSAS DEPARTMENT OF AGRICULTURE

OFFICIAL CONTROL METHODS FOR
CANADA THISTLE*Cirsium arvense* (L.) Scop.

Revised May 20, 2020

DESCRIPTION

Canada thistle is a perennial forb native to Europe. It reproduces by seeds and whitish, creeping roots that send up new shoots every 8-12 inches. Stems are 2-4 feet tall, and usually branched above the middle. Leaves are alternate, oblong or lanceolate, irregularly lobed or toothed, spiny-margined, and hairless or white-haired. Flowers are pink to purple (rarely white) and borne in 0.5-1-inch-diameter heads clustered near the ends of branches. Male and female flowers are on different plants and can be difficult to tell apart without careful examination. For viable seed to be produced, plants bearing male flowers and plants bearing female flowers need to be in close proximity. The seed-like fruits are about 1/8-inch-long, smooth, light to dark brown, oblong, slightly flattened and slightly curved, and bear a terminal cluster of numerous white, 0.5-1 inch capillary bristles that aid in wind dispersal. Flowering June-August; fruiting July-frost.

PREVENTION OF SPREAD

The Noxious Weed Law (K.S.A. 2-1313a et. seq.) requires all landowners to control the spread of and to eradicate Canada thistle on all lands owned or supervised by them. Methods used for control must prevent both the production of viable seed and destroy the plant's ability to reproduce by vegetative means. Infestation sites must be monitored after control methods have been accomplished to ensure that dormant seeds in the seedbank do not germinate and establish new infestations.

CANADA THISTLE CONTROL PRACTICES

Canada thistle control means that both the roots and the flowers must be destroyed. Because Canada thistle is a perennial, with the exception of herbicide applications, one or more of the following methods must be used together to control Canada thistle.

Cultural Control

Cultural weed control involves land and vegetation management techniques used to prevent the establishment or control the spread of noxious weeds.

The use of sheep, goats and cattle to graze Canada thistle grazing when rosettes are green and begin to sprout. Remove animals when grazing shifts to desirable species and then re-graze new sprouts repeat often enough during the season to prevent flowering. Grazing treatment will need to be repeated annually to deplete the seedbank and provide control.

Frequent surveys of fence lines, roadway, ditches and other susceptible areas for new infestations and the quick removal of any new plants will prevent Canada thistle from becoming established.

Mechanical Control

Mechanical weed control involves the physical removal of all parts or just the reproductive parts of weeds.

As a perennial species, Canada thistle is difficult to control mechanically.

Repeated mowing of Canada thistle over a three-year period, timed for bud to early-bloom stage, should suppress infestations in forages. This mowing should be as low to the ground as practical.

Care must be taken to mow before any of the target plants sets seed; mowing after seed set will help disperse the seed.

Chemical Control

The following herbicides may be used for cost-share with landowners. Other products labeled and registered for use on this noxious weed in Kansas may be used in accordance with label directions but are not available for cost-share. Be sure to follow all label directions and precautions. For additional information consult the most recent edition of the KSU publication of "Chemical Weed Control for Field Crops, Pastures, Rangeland, and Noncropland".

Any two or more of the herbicides listed below may be available for cost-share as a pre-mix or a tank mix if allowed on the respective labels. Contact your county weed program for availability.

Herbicide	Mode of Action
2,4-D	4
aminopyralid	4
chlorsulfuron	2
clopyralid	4
dicamba	4
diflufenzopyr	19
glyphosate	9
imazapyr	2
metsulfuron-methyl	2
picloram	4

Biological Control

Biological control refers to the deliberate application of a living organism to control the spread of weeds. These agents will not eradicate their host plant, therefore other control methods must be used in addition to the use of biological control agents as part of an integrated pest management strategy. The importation of biological control agents is regulated by USDA-APHIS and is allowed by permit only.

The following agents are permitted for use on Canada thistle. Other agents may be available for use if the appropriate permit is obtained.

Ceutorhynchus litura
Urophora cardui

stem weevil
stem gall fly

KANSAS DEPARTMENT OF AGRICULTURE

OFFICIAL CONTROL METHODS FOR
LEAFY SPURGE

Euphorbia virgata Waldst. & Kit.

Revised May 20, 2020

DESCRIPTION

Leafy spurge is a perennial forb introduced from Europe and Asia. It reproduces by seed and creeping roots that give rise to new roots and shoots every few inches. Stems are bright green, 2/3-2 feet tall branched above the middle, stiff and woody when mature, and usually grow in bunches. Stems are branched at top, very stiff and woody when mature. The stems and leaves emit a milky sap when broken. Leaves are alternate, oblong 1½-3½ inches long, and entire.. Male and female flowers are tiny and borne together in small cup-like structures surrounded by broad greenish-yellow bracts. Groups of flower-bearing cups and their bracts are produced in umbel-like clusters at the ends of the stems. Seeds are borne in three-lobed capsules with 3 seeds per capsule, and are ejected explosively from the capsule to distances up to 20 feet. Flowering May -September and; fruiting June-October.

PREVENTION OF SPREAD

The Noxious Weed Law (K.S.A. 2-1313a et. seq.) requires all landowners to control the spread of and to eradicate leafy spurge on all lands owned or supervised by them. Methods used for control must prevent both the production of viable seed and destroy the plant's ability to reproduce by vegetative means. Infestation sites must be monitored after control methods have been accomplished to ensure that dormant seeds in the seedbank do not germinate and establish new infestations.

LEAFY SPURGE CONTROL PRACTICES

Leafy spurge control means that both the roots and the flowers must be destroyed. Because leafy spurge is a perennial, with the exception of herbicide applications, one or more of the following methods must be used together to control leafy spurge.

Cultural Control

Cultural weed control involves land and vegetation management techniques used to prevent the establishment or control the spread of noxious weeds.

The use of sheep or goats to graze leafy spurge may be used during the vegetative to flowering stage then repeated as necessary to prevent the production of flowers. Repeat grazing each year to deplete the seedbank and provide control.

Frequent surveys of fence lines, roadway, ditches and other susceptible areas for new infestations and the quick removal of any new plants will prevent leafy spurge from becoming established.

Mechanical Control

Mechanical weed control involves the physical removal of all parts or just the reproductive parts of weeds.

As a perennial species, leafy spurge is difficult to control mechanically.

An intensive cultivation program should begin in the spring, two to four weeks after leafy spurge emerges, tilling four inches deep. Cultivation should continue every three weeks until the soil freezes in the fall for at least two growing seasons. The tillage schedule cannot be interrupted because leafy spurge recovers quickly from the effects of cultivation. Pieces of roots as small as 0.5-inch-long and 0.1-inch diameter can produce new shoots and can survive two or three hours of drying in the hot sun.

It is important to clean leafy spurge roots and root fragments from equipment before entering uninfested areas of the field or other fields to prevent the spread of leafy spurge.

Because of the resulting wind and water erosion or loss of income due to no crop returns, it is not practical to cultivate over a two to four-year period.

Chemical Control

The following herbicides may be used for cost-share with landowners. Other products labeled and registered for use on this noxious weed in Kansas may be used in accordance with label directions but are not available for cost-share. Be sure to follow all label directions and precautions. For additional information consult the most recent edition of the KSU publication of "Chemical Weed Control for Field Crops, Pastures, Rangeland, and Noncropland".

Any two or more of the herbicides listed below may be available for cost-share as a pre-mix or a tank mix if allowed on the respective labels. Contact your county weed program for availability.

Herbicide	Mode of Action
2,4-D LV Ester	4
dicamba	4
diflufenzopyr	19
glyphosate	9
imazapic	2
picloram	4

Biological Control

Biological control refers to the deliberate application of a living organism to control the spread of weeds. These agents will not eradicate their host plant, therefore other control methods must be used in addition to the use of biological control agents as part of an integrated pest management strategy. The importation of biological control agents is regulated by USDA-APHIS and is allowed by permit only.

The following agents are permitted for use on Leafy Spurge. Other agents may be available for use if the appropriate permit is obtained.

Aphthona abdominalis	minute spurge flea beetle
Aphthona czwalinae	black leafy spurge flea beetle
Aphthona flava	copper leafy spurge flea beetle
Aphthona lacertosa	brown-legged spurge flea beetle
Aphthona nigriscutis	black dot leafy spurge flea beetle
Hyles euphorbiae	spurge hawk-moth
Oberea erythrocephala	red-headed leafy spurge stem borer
Spurgia esulae	shoot tip gall midge

KANSAS DEPARTMENT OF AGRICULTURE

OFFICIAL CONTROL METHODS FOR
HOARY CRESS

Lepidium draba L.

Revised May 20, 2020

DESCRIPTION

Hoary Cress is a perennial forb introduced from Eurasia. It reproduces by extensive root systems, rhizomes, and seeds. Stems are 0.5-3 feet tall and nearly hairless to moderately hairy. Leaves are alternate, oblong, 1-3 inches long, and grayish-green with toothed margins. The upper leaves are attached directly to the stem with a broad, forked base that appears to clasp the stem. The flowers are white, 4-petaled, 1/8 inch across, and borne in showy, compact racemes. The fruits are flattened, heart-shaped pods about 1/8-inch long. One granular, reddish brown seed is produced in each half of the pods. Flowering May-July; fruiting June-August.

PREVENTION OF SPREAD

The Noxious Weed Law (K.S.A. 2-1313a et. seq.) requires all landowners to control the spread of and to eradicate hoary cress on all lands owned or supervised by them. Methods used for control must prevent both the production of viable seed and destroy the plant's ability to reproduce by vegetative means. Infestation sites must be monitored after control methods have been accomplished to ensure that dormant seeds in the seedbank do not germinate and establish new infestations.

HOARY CRESS CONTROL PRACTICES

Hoary cress control means that both the roots and the flowers must be destroyed. Because hoary cress is a perennial, with the exception of herbicide applications, one or more of the following methods must be used together to control hoary cress.

Cultural Control

Cultural weed control involves land and vegetation management techniques used to prevent the establishment or control the spread of noxious weeds.

The use of sheep or goats to graze hoary cress may be used before flowering when the palatability of hoary cress decreases. Repeat at least two times per year to deplete the seedbank and provide control. Grazing hoary cress is considered impractical because of low acceptance by livestock and the potential for poisoning, especially in cattle.

Frequent surveys of fence lines, roadway, ditches and other susceptible areas for new infestations and the quick removal of any new plants will prevent hoary cress from becoming established.

Mechanical Control

Mechanical weed control involves the physical removal of all parts or just the reproductive parts of weeds.

As a perennial species, hoary cress is difficult to control mechanically.

The root system of hoary cress can be exhausted through repeated cultivation. This cultivation must be at least six inches deep and repeated within 10 days of weed emergence throughout the growing season each year to deplete the seedbank. It is important that no green leaves be allowed to develop between cultivations.

It is important to clean hoary cress roots and root fragments from equipment before entering uninfested areas of the field or other fields to prevent the spread of hoary cress.

Because of the resulting wind and water erosion or loss of income due to no crop returns, it is not practical to cultivate over a two to four-year period.

A second option is to cultivate when the plants are three to six inches tall post-harvest. Research has shown that cultivating hoary cress twice each fall after harvest annually provided complete control. The fall cultivation program has an advantage over the season-long program because it allows crops to be grown during the season and limits soil exposure to erosion. Two fall cultivations will reduce hoary cress infestations faster than one cultivation. However, a single cultivation may be a more practical management option when minimal tillage is desired, or soil erosion is a concern. It is important to clean hoary cress roots and root fragments from equipment before entering uninfested areas of the field or other fields to prevent the spread of hoary cress.

Chemical Control

The following herbicides may be used for cost-share with landowners. Other products labeled and registered for use on this noxious weed in Kansas may be used in accordance with label directions but are not available for cost-share. Be sure to follow all label directions and precautions. For additional information consult the most recent edition of the KSU publication of “Chemical Weed Control for Field Crops, Pastures, Rangeland, and Noncropland”.

Any two or more of the herbicides listed below may be available for cost-share as a pre-mix or a tank mix if allowed on the respective labels. Contact your county weed program for availability.

Herbicide	Mode of Action
2,4-D LV Ester	4
chlorsulfuron	2
dicamba	4
imazapyr	2
metsulfuron methyl	2

Biological Control

Biological control refers to the deliberate application of a living organism to control the spread of weeds. These agents will not eradicate their host plant, therefore other control methods must be used in addition to the use of biological control agents as part of an integrated pest management strategy. The importation of biological control agents is regulated by USDA-APHIS and is allowed by permit only.

There are no biological control agents available for hoary cress.

KANSAS DEPARTMENT OF AGRICULTURE

OFFICIAL CONTROL METHODS FOR
PIGNUTHoffmannseggia glauca (Ortega) Eifert
Revised May 20, 2020**DESCRIPTION**

Pignut, also known as hogpotato and Indian rushpea, is a native, perennial legume. The stems, petioles, flowers, and fruits are covered with tiny, distinctive, tack-shaped glands. Pignut has deep roots on which develop nut-like tubers 10-15 inches below the surface that are difficult to remove from the soil. The stems are 8-12 inches tall. The leaves are mostly at the base of the stem, are 3-5 inches long, and twice compound with 3-15 pairs of primary leaflets and 12-22 pairs of secondary leaflets on each primary leaflet. The secondary leaflets are oblong and 1/12-1/4 inch long. The flowers are of the pea-type, yellow or orange-red, and about one half inch long. The seed pods are flat, 1-1 1/2 inches long, and typically contain 1-6 seeds. Flowering from May-September; fruiting from June-October.

PREVENTION OF SPREAD

The Noxious Weed Law (K.S.A. 2-1313a et. seq.) requires all people to control the spread of and to eradicate pignut on all lands owned or supervised by them. Methods used for control must prevent both the production of viable seed and destroy the plant's ability to reproduce by vegetative means. With the exception of herbicide applications, two or more of the following methods must be used together to control pignut.

PIGNUT CONTROL PRACTICES

Pignut control means that both the roots and the flowers must be destroyed. As pignut is a perennial species, no one of the following methods of control may be used alone, with the exception of chemical controls, and your county weed supervisor must approve of any non-chemical control methods.

Cultural Control

Cultural weed control involves land and vegetation management techniques used to prevent the establishment or control the spread of noxious weeds.

Frequent surveys of fence lines, roadway, ditches and other susceptible areas for new infestations and the quick removal of any new plants will prevent bur ragweed from becoming established.

Mechanical Control

Mechanical weed control refers to any technique that involves the use of mechanical or manual equipment to control weeds. Unless the entire root of a perennial plant species is removed as part of a mechanical control, the control is not likely to be successful. As a perennial species, quackgrass is difficult to control mechanically. Mechanical control methods approved for pignut are:

Cultivation - Cultivate three to five inches deep at intervals so as to permit the weeds to grow not more than 10 days after each emergence of first plants, but not to exceed intervals of three weeks. Cultivation shall be continued until the plants have been eradicated or have been suppressed to such an extent that remaining plants may be more economically destroyed by other treatment, as the application of approved chemicals to individual plants or by hand cultivation.

Grubbing - Small infestations should be grubbed out, taking care to remove all the tuberous nut-like roots. This grubbing must be repeated for at least two years annually for good control. It is important to clean roots and root fragments from equipment before entering uninfested areas of the field or other fields to prevent the spread of pignut.

Chemical Control

Chemical weed control refers to any technique that involves the application of an herbicide to weeds or soil to control the germination or growth of the weed species. Cost share herbicides are available to landowners for the control of noxious weeds. While county weed departments may not carry all of the herbicides listed, the herbicides that are available for pignut are:

Herbicide	Mode of Action
2,4-D	4
picloram	2

Biological Control

Biological pest control refers to the deliberate application of a living organism to control the spread of weeds. These agents will not eradicate their host plant; other control methods must be used in addition to biological control agents. The importation of biological control agents is regulated by the USDA and is allowed by permit only. Biological control agents permitted for use with pignut in Kansas are:

There are no biological controls approved for use on Pignut at this time.

KANSAS DEPARTMENT OF AGRICULTURE

OFFICIAL CONTROL METHODS FOR
QUACKGRASS

Elymus repens (L.) Gould
Revised May 20, 2020

DESCRIPTION

Quackgrass is a cool-season perennial grass introduced from Eurasia. It reproduces by seed and rhizomes. Rhizomes are pale yellow or straw colored, cord-like about 1/8 inch in diameter and vary from 2-18 inches in depth, with new roots and plants emerging from nodes. Stems grow up to 3 feet tall with 3-6 joints. Leaves are 3-12 inches long, shiny, dark green, and bear two conspicuous, tooth-like projections where the blade joins the stem. The dry, lower sheaths, leaves, and stems are distinctly hairy; upper sheaths are hairless or nearly so. Tiny wind-pollinated flowers are borne in groups of 4-7 subtended by 2 unawned or short-awned glumes (each group is called a spikelet). Spikelets are flattened and mostly solitary at each node along a 2-4-inch long terminal spike. The grains are slender and about 1/4 inch long. Flowering June-August; fruiting July-October.

PREVENTION OF SPREAD

The Noxious Weed Law (K.S.A. 2-1313a et. seq.) requires all landowners to control the spread of and to eradicate quackgrass on all lands owned or supervised by them. Methods used for control must prevent both the production of viable seed and destroy the plant's ability to reproduce by vegetative means. Infestation sites must be monitored after control methods have been accomplished to ensure that dormant seeds in the seedbank do not germinate and establish new infestations.

QUACKGRASS CONTROL PRACTICES

Quackgrass control means that both the roots and the flowers must be destroyed. Because quackgrass is a perennial, with the exception of herbicide applications, one or more of the following methods must be used together to control quackgrass.

Cultural Control

Cultural weed control involves land and vegetation management techniques used to prevent the establishment or control the spread of noxious weeds.

Cattle and horses readily feed on quackgrass, but populations are only suppressed and rarely eradicated even with intensive grazing. Intensively grazing to 2 inches or less will reduce the dominance of quackgrass in an area. Horses and cattle enjoy eating rhizomes, and pigs will root through the soil to find them.

Frequent surveys of fence lines, roadway, ditches and other susceptible areas for new infestations and the quick removal of any new plants will prevent quackgrass from becoming established.

Mechanical Control

Mechanical weed control involves the physical removal of all parts or just the reproductive parts of weeds.

As a perennial species, quackgrass is difficult to control mechanically. Repeated four-inch-deep tillage beginning in the hottest, driest part of the summer should suppress infestations. The disruption will separate rhizome buds from their parent plants and cause them to sprout, so tillage must be repeated whenever the new plants put out three leaves, throughout the season, to prevent the development of any new rhizomes. This tillage must be repeated annually for good control. It is important to clean roots and root fragments from equipment before entering uninfested areas of the field or other fields to prevent the spread of quackgrass. It is also not

practical to clean cultivate over a two-year period because of the resulting wind and water erosion or loss of income due to no crop returns.

Following a sequence of repeated tillage throughout the summer, a fall cover crop should be planted at a seeding rate of 2 to 2.5 bushels per acre.

Chemical Control

The following herbicides may be used for cost-share with landowners. Other products labeled and registered for use on this noxious weed in Kansas may be used in accordance with label directions but are not available for cost-share. Be sure to follow all label directions and precautions. For additional information consult the most recent edition of the KSU publication of "Chemical Weed Control for Field Crops, Pastures, Rangeland, and Noncropland".

Any two or more of the herbicides listed below may be available for cost-share as a pre-mix or a tank mix if allowed on the respective labels. Contact your county weed program for availability.

Herbicide	Mode of Action
diquat	22
fluazifop-p-butyl	1
glyphosate	9
nicosulfuron	2
sethoxydim	1
sulfosulfuron	2

Biological Control

Biological control refers to the deliberate application of a living organism to control the spread of weeds. These agents will not eradicate their host plant, therefore other control methods must be used in addition to the use of biological control agents as part of an integrated pest management strategy. The importation of biological control agents is regulated by USDA-APHIS and is allowed by permit only.

There are no biological control agents available for quackgrass.

KANSAS DEPARTMENT OF AGRICULTURE

OFFICIAL CONTROL METHODS FOR
KUDZU

Pueraria montana var. *lobata* (Willd.) Maesen & S.M. Almeida ex Sanjapp & Predeep
Revised May 20, 2020

DESCRIPTION

Kudzu is a long-lived, semi-woody, vine with long runners that can cover the ground and climbing stems that can grow to 100 feet long and envelop nearby shrubs and trees. The long runners root at the nodes to form new plants. Older stems have a rough, bark-like covering and young stems bear abundant, spreading brown hairs. The leaves are alternate and compound with three leaflets; lower leaf surfaces are sparsely hairy while upper leaf surfaces are mostly hairless. Each leaflet is broadly ovate to triangular, 2-10 inches long and up to 6 inches wide, entire or 2-3 lobed and abruptly taper to a pointed tip. Showy, fragrant lavender to purple or reddish flowers up to ½ inch long are borne in short, dense racemes. Seed production is infrequent because of sparse blooming. The seed pods are 1½-3 inches long, papery and densely covered with fine brown hairs. Seeds are reddish-brown and hairy. Flowering and fruiting August-October.

PREVENTION OF SPREAD

The Noxious Weed Law (K.S.A. 2-1313a et. seq.) requires all landowners to control the spread of and to eradicate kudzu on all lands owned or supervised by them. Methods used for control must prevent both the production of viable seed and destroy the plant's ability to reproduce by vegetative means. Infestation sites must be monitored after control methods have been accomplished to ensure that dormant seeds in the seedbank do not germinate and establish new infestations.

KUDZU CONTROL PRACTICES

Kudzu control means that both the roots and the flowers must be destroyed. Because kudzu is a perennial, with the exception of herbicide applications, one or more of the following methods must be used together to control kudzu.

Cultural Control

Cultural weed control involves land and vegetation management techniques used to prevent the establishment or control the spread of noxious weeds.

The use of sheep, goats and especially cattle to graze kudzu may be used throughout the growing season. Repeat grazing each year to suppress the plant.

Frequent surveys of fence lines, roadway, ditches and other susceptible areas for new infestations and the quick removal of any new plants will prevent kudzu from becoming established.

Mechanical Control

Mechanical weed control involves the physical removal of all parts or just the reproductive parts of weeds.

As a perennial species, kudzu is difficult to control mechanically.

The only mechanical option for the control of kudzu would be to physically dig out the root crown and all vines in contact with the soil as these will resprout new plants. In larger, well established sites, this would be physically difficult and potentially hazardous. If an area of infestation is cleared, care must be taken to replant desirable species to prevent erosion and provide competition against re-infestation.

Chemical Control

The following herbicides may be used for cost-share with landowners. Other products labeled and registered for use on this noxious weed in Kansas may be used in accordance with label directions but are not available for cost-share. Be sure to follow all label directions and precautions. For additional information consult the most recent edition of the KSU publication of "Chemical Weed Control for Field Crops, Pastures, Rangeland, and Noncropland".

Any two or more of the herbicides listed below may be available for cost-share as a pre-mix or a tank mix if allowed on the respective labels. Contact your county weed program for availability.

Herbicide	Mode of Action
aminopyralid	4
dicamba	4
glyphosate	9
tebuthiuron	7
triclopyr	4

Biological Control

Biological control refers to the deliberate application of a living organism to control the spread of weeds. These agents will not eradicate their host plant, therefore other control methods must be used in addition to the use of biological control agents as part of an integrated pest management strategy. The importation of biological control agents is regulated by USDA-APHIS and is allowed by permit only.

There are no biological control agents available for kudzu.

KANSAS DEPARTMENT OF AGRICULTURE

OFFICIAL CONTROL METHODS FOR
RUSSIAN KNAPWEED

Rhaponticum repens (L.) Hidalgo

Revised May 20, 2020

DESCRIPTION

Russian knapweed is a perennial forb that was introduced from Asia. It reproduces by roots, rhizomes and seeds. Stems are up to 3 feet tall, often branched near the base, ridged, covered with soft white or gray hairs, and develop, from a particularly well-developed branching root system. Leaves are alternate and nearly hairless to moderately hairy: rosette and lower stem leaves are oblanceolate to broadly lanceolate or oblong, up to 4 inches long, and deeply lobed to nearly entire; upper stem leaves are progressively smaller, oblong, and toothed or entire. Flowers are all tubular, rose to purple or blue, and borne in flask-shaped heads, about 0.5-0.75 inch long. The heads are solitary on the ends of leafy branches. The seed-like fruits are an ivory to light brown, about 1/8 inch long, flattened, ovate, longitudinally-ridged, and topped with numerous capillary bristles 1/4-1/2 inch long. Flowering from June-August fruiting from August-September.

PREVENTION OF SPREAD

The Noxious Weed Law (K.S.A. 2-1313a et. seq.) requires all landowners to control the spread of and to eradicate Russian knapweed on all lands owned or supervised by them. Methods used for control must prevent both the production of viable seed and destroy the plant's ability to reproduce by vegetative means. Infestation sites must be monitored after control methods have been accomplished to ensure that dormant seeds in the seedbank do not germinate and establish new infestations.

RUSSIAN KNAPWEED CONTROL PRACTICES

Russian knapweed control means that both the roots and the flowers must be destroyed. Because Russian knapweed is a perennial, with the exception of herbicide applications, one or more of the following methods must be used together to control Russian knapweed.

Cultural Control

Cultural weed control involves land and vegetation management techniques used to prevent the establishment or control the spread of noxious weeds.

While palatability is considered low, the use of sheep or goats to graze Russian knapweed may be used during the early vegetative to flowering stage then repeated as necessary, after 8 to 10 inches of regrowth, to prevent the production of flowers. Repeat grazing each year to deplete the seedbank and provide control.

Frequent surveys of fence lines, roadway, ditches and other susceptible areas for new infestations and the quick removal of any new plants will prevent Russian knapweed from becoming established.

Mechanical Control

Mechanical weed control involves the physical removal of all parts or just the reproductive parts of weeds.

As a perennial species, Russian knapweed is difficult to control mechanically.

Hand pulling or hoeing can be effective for small, less established infestations of Russian knapweed if repeated whenever the plant emerges during the growing season, over multiple years. Removal is generally easier and more effective in late spring when soil is moist and plants are beginning to bolt (but before seed set). It is very important to pull up all parts of the plant, especially the roots.

Chemical Control

The following herbicides may be used for cost-share with landowners. Other products labeled and registered for use on this noxious weed in Kansas may be used in accordance with label directions but are not available for cost-share. Be sure to follow all label directions and precautions. For additional information consult the most recent edition of the KSU publication of "Chemical Weed Control for Field Crops, Pastures, Rangeland, and Noncropland".

Any two or more of the herbicides listed below may be available for cost-share as a pre-mix or a tank mix if allowed on the respective labels. Contact your county weed program for availability.

Herbicide	Mode of Action
2,4-D LV Ester	4
aminopyralid	4
chlorsulfuron	2
dicamba	4
glyphosate	9
imazapic	2
imazapyr	2
picloram	4

Biological Control

Biological control refers to the deliberate application of a living organism to control the spread of weeds. These agents will not eradicate their host plant, therefore other control methods must be used in addition to the use of biological control agents as part of an integrated pest management strategy. The importation of biological control agents is regulated by USDA-APHIS and is allowed by permit only. The following agents are permitted for use on Russian knapweed. Other agents may be available for use if the appropriate permit is obtained.

Aulacidea acroptilonica
Jaapiella ivannikovi
Subanguina picridis

bud gall wasp
bud gall midge
leaf stem gall nematode