

MN NWAC Risk Assessment Worksheet (04-2011)	Common Name	Latin Name
	Leafy Spurge (Also called green spurge, Esels-Wolfsmilch, faitours-grass, Heksenmelk, Hungarian spurge, Scharfe Wolfsmilch, spurge, vargtoerel, and wolf's milk)	<i>Euphorbia esula L.</i> <i>Euphorbia esula var. esula</i> <i>Euphornia esula var. uralensis</i> (Russian Leafy Spurge) (Synonyms: <i>Euphorbe feuillue</i>)
Reviewer	Affiliation/Organization	Date (mm/dd/yyyy)
James Calkins	Minnehaha Creek Watershed District	05/1/2013

Leafy spurge (*Euphorbia esula*) is an erect, branched, long-lived herbaceous perennial and a member of the Spurge Family (Euphorbiaceae). It is native to Europe and Asia and was introduced to the United States where it was first documented in Newbury, Massachusetts in 1827. It is believed to have been introduced as a seed contaminant. Plants produce a milky latex that can be toxic to livestock and cause skin irritation (dermatitis) in humans.

The leaves are oval to lance-shaped with wavy margins. The flowers are inconspicuous and are surrounded by a pair of greenish-yellow bracts which are often mistaken as the petals. Seeds are produced in capsules that open explosively when mature and can scatter seeds up to 15 feet from the parent plant. Seeds can also be transported to new areas by water and wildlife. Roots can grow 15 feet or more deep and may have numerous buds. Leafy spurge can spread vegetatively at a rate of several feet per year.

Leafy spurge is highly adaptable and can grow in almost any environment. It tolerates a wide variety of soils and is drought tolerant once established, but performs best on coarse, fertile to poor soils in full sun. Plants can also tolerate saline soils and flooding. Plants are hardy to USDA Cold Hardiness Zone 2 and require chilling to overcome dormancy and resume growth each spring.

Leafy spurge is listed as one of the top 100 invasive species in the world.

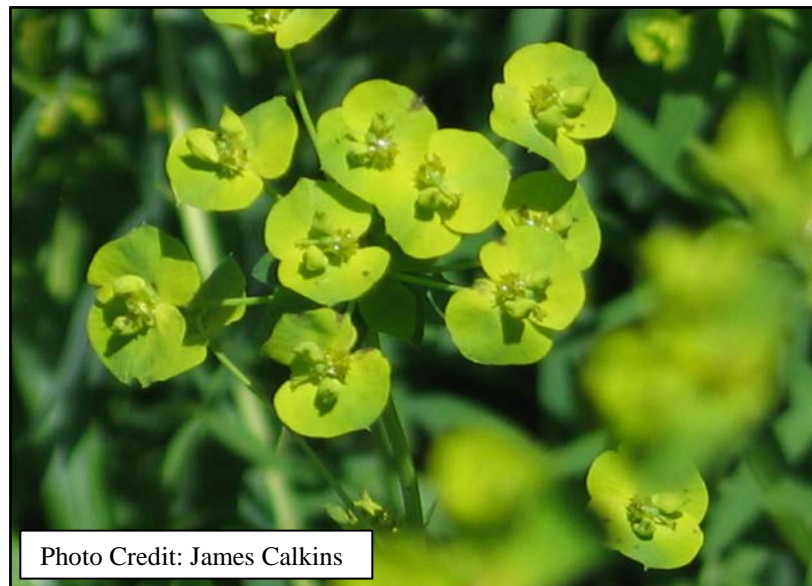


Photo Credit: James Calkins

Box	Question	Answer	Outcome (i.e., Go to box:?)
1	Is the plant species or genotype non-native?	Yes; native to Europe and Asia.	Go to Box 3

Box	Question	Answer	Outcome (i.e., Go to box:?)
2	Does the plant species pose significant human or livestock concerns or have the potential to significantly harm agricultural production?	Yes.	
	A. Does the plant have toxic qualities that pose a significant risk to livestock, wildlife, or people?	Can be toxic, but usually avoided and not a significant concern for people.	
	B. Does the plant cause significant financial losses associated with decreased yields, reduced quality, or increased production costs?	Yes.	
3	Is the plant species, or a related species, documented as being a problem elsewhere?	Yes; listed as a noxious weed in 35 states and 10 Canadian provinces.	Go to Box 4
4	Are the plant's life history & growth requirements sufficiently understood?	Yes.	Go to Box 6
5	Gather and evaluate further information:	(Comments/Notes)	
6	Does the plant species have the capacity to establish and survive in Minnesota?	Yes; found throughout the northern United States, including Minnesota, and central and southern Canada; hardy to USDA Zone ???.	
	A. Is the plant, or a close relative, currently established in Minnesota?	Yes.	Go to Box 7
	B. Has the plant become established in areas having a climate and growing conditions similar to those found in Minnesota?		
7	Does the plant species have the potential to reproduce and spread in Minnesota?	Yes; spreads by seed and vegetative means; new populations established by seed, but primarily spreads by vegetative means.	
	A. Does the plant reproduce by asexual/vegetative means?	Yes; spreads vegetatively by "rhizomes" (more correctly, roots with buds; a unique morphology); can spread up to 11 feet/year.	Go to Question B
	B. Are the asexual propagules effectively dispersed to new areas?	No; vegetative propagules (root pieces) are primarily dispersed by human activities.	Go to Question C

Box	Question	Answer	Outcome (i.e., Go to box:?)
	C. Does the plant produce large amounts of viable, cold-hardy seeds?	Yes; plants are monoecious with separate male and female flowers produced on the same plant; seeds have a high germination rate and can survive in the soil for at least seven or eight years or more.	Go to Question F
	D. If this species produces low numbers of viable seeds, does it have a high level of seed/seedling vigor or do the seeds remain viable for an extended period?		
	E. Is this species self-fertile?		
	F. Are sexual propagules – viable seeds – effectively dispersed to new areas?	Yes; seeds are forcibly expelled from the mature seed capsules of the parent plants (up to 15 feet) and are also dispersed by water, wildlife and livestock (significant numbers of seeds can survive passage through digestive systems), ants (feed on elaiosomes), and human activities (equipment and contaminated hay).	Go to Question I
	G. Can the species hybridize with native species (or other introduced species) and produce viable seed and fertile offspring in the absence of human intervention?	No for native species; Yes for the introduced Eurasian species <i>Euphorbia cyparissias</i> L. (cyperus spurge; present in MN); <i>Euphorbia × pseudoesula</i> Schur. is the name of the resulting hybrid species.	
	H. If the species is a woody (trees, shrubs, and woody vines) is the juvenile period less than or equal to 5 years for tree species or 3 years for shrubs and vines?	NA	
	I. Do natural controls exist, species native to Minnesota, that are documented to effectively prevent the spread of the plant in question?	No.	Go to Box 8
8	Does the plant species pose significant human or livestock concerns or has the potential to significantly harm agricultural production, native ecosystems, or managed landscapes?	Can be toxic to cattle and horses, but typically avoided; invades agricultural fields, roadsides, pasture, and disturbed sites; dense colonies can displace native species in prairie, savanna, riparian, and open woodland communities.	

Box	Question	Answer	Outcome (i.e., Go to box:?)
	A. Does the plant have toxic qualities, or other detrimental qualities, that pose a significant risk to livestock, wildlife, or people?	Yes, but No ; toxic to cattle and other native grazing animals, but typically avoided; sheep and goats can develop immunity and will seek out plants; can cause dermatitis in humans, but not a significant problem. If Yes, Go to Box 9.	Go to Question B
	B. Does, or could, the plant cause significant financial losses associated with decreased yields, reduced crop quality, or increased production costs?	Yes; displaces desirable vegetation and can reduce the carrying capacity of pastures.	Go to Box 9
	C. Can the plant aggressively displace native species through competition (including allelopathic effects)?	Yes; competes through shading, competition for water and nutrients, and allelopathic effects.	Go to Box 9
	D. Can the plant hybridize with native species resulting in a modified gene pool and potentially negative impacts on native populations?	No.	Go to Question E
	E. Does the plant have the potential to change native ecosystems (adds a vegetative layer, affects ground or surface water levels, etc.)?	Yes.	Go to Box 9
	F. Does the plant have the potential to introduce or harbor another pest or serve as an alternate host?	No; apparently not; no specific information found.	
9	Does the plant species have clearly defined benefits that outweigh associated negative impacts?	No; seeds are, however, eaten by a variety of birds including mourning doves and meadowlarks.	
	A. Is the plant currently being used or produced and/or sold in Minnesota or native to Minnesota?	No; has been planted in gardens, but not commercially produced or sold in Minnesota.	Go to Box 10
	B. Is the plant an introduced species and can its spread be effectively and easily prevented or controlled, or its negative impacts minimized through carefully designed and executed management practices?	???	

Box	Question	Answer	Outcome (i.e., Go to box:?)
	C. Is the plant native to Minnesota?	No.	
	D. Is a non-invasive, alternative plant material commercially available that could serve the same purpose as the plant of concern?	NA	
	E. Does the plant benefit Minnesota to a greater extent than the negative impacts identified at Box #8?	No.	
10	Should the plant species be enforced as a noxious weed to prevent introduction &/or dispersal; designate as prohibited or restricted?		
	A. Is the plant currently established in Minnesota?	Yes.	Go to Question B
	B. Does the plant pose a serious human health threat?	No.	Go to Question C
	C. Can the plant be reliably eradicated (entire plant) or controlled (top growth only to prevent pollen dispersal and seed production as appropriate) on a statewide basis using existing practices and available resources?	<p>Questionable; in general, it appears it is difficult, if not impossible, to control leafy spruce by cultural or physical methods (Gucker, 2010; Hansen et al, 2004), but some success has been reported for a combination of cultural and chemical methods. Early detection and treatment of new infestations is critical. Prescribed burning in the spring to reduce seed dispersal combined with herbicides applied in the fall, and herbicides applied in the spring (during flowering and seed development) or fall (when photosynthates are being transported to the roots) have been used with variable results.</p> <p>Biological control has also been used; six natural enemies of leafy spruce imported from Europe have been used as methods of biocontrol including a stem and root boring beetle (<i>Oberea erythrocephala</i>), four root-mining flea beetles (<i>Aphthona</i> spp.), and a shoot-tip gall midge (<i>Spurgia esulae</i>); large-scale rearing and</p>	Currently listed as a Prohibited/Control Noxious Weed

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		<p>release programs are carried out cooperatively by federal and state officials in several northern states. Sheep and goats have also been used.</p> <p>The success of biocontrol with flea beetles depends on a variety of factors and has been reported to not always be effective in reducing the abundance of leafy spurge in the northern Great Plains (Kirby et al., 2000), with control reportedly varying between 0% and 95% (Nelson and Lym, 2003).</p> <p>Herbicide treatments have been shown to have a negative effect on the efficacy of biocontrol with flea beetles while fire may have a positive effect.</p> <p>Large, persistent seed banks, lack of long-term control, detrimental effects on associated vegetation, and high treatment costs have been cited as significant barriers to successful control with herbicides.</p> <p>If Yes, list as a Prohibited/Control Noxious Weed If No, list as a Restricted Noxious Weed</p>	
11	Should the plant species be allowed in Minnesota via a species-specific management plan; designate as specially regulated?	No.	

Box	Question	Answer	Outcome (i.e., Go to box:?)
Final Results of Risk Assessment			
	Review Entity	Comments	Outcome
	NWAC Listing Subcommittee	First review – 06/20/2013, Final Review 08/12/2013 This species was discussed in great length as to the validity of continued listing as a Prohibited Noxious Weed. The issue of biological control agents was discussed and there was concern that moving to the Restricted List would decrease the efficacy of the biocontrol program statewide – which is believed to be a preferred method of control by counties and state and federal agencies when dealing with large stands. That said, the recommendation went through to the full committee to consider reclassifying as a Restricted Noxious Weed.	List as a Restricted Noxious Weed.
	NWAC Full-group	Reviewed 12/28/2013. Many members of the group voiced concern over reclassification of this species. Successful biocontrol releases and the advent of cost efficient and more effective herbicides. Several member representatives mentioned that they felt both biological controls and herbicide treatments effectively manage leafy spurge.	Vote 4 – 9 rejecting the Listing Subcommittee’s recommendation and keeping leafy spurge as a Prohibited-Control species
	MDA Commissioner	Reviewed 2/24/2014	Accepted NWAC’s recommendation to remain as a Prohibited-Control Noxious Weed
	FILE # MDARA00027LESP_2_24_2014	Prohibited-Control Noxious Weed	

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