



Brendon Panke, Ryan deRegnier,
and Mark Renz

Invasive plants can thrive and aggressively spread beyond their natural range, disrupting ecosystems. The *Management of Invasive Plants in Wisconsin* series explains how to identify invasive plants and provides common management options. Management methods recommend specific timings for treatment, as well as expected effectiveness. For more information, go to: fyi.uwex.edu/weedsci/category/invasive-plants-of-wisconsin.

UW
Extension
Cooperative Extension

NPM 

Leafy spurge

(*Euphorbia esula*)

Leafty spurge is an herbaceous, creeping perennial, 6–36" tall. Stems are smooth and often grow in clusters from an extensive, deep root system. A white, milky latex is present in all parts of the plant.

Legal classification in Wisconsin:
Restricted

Leaves: Leaves are linear, alternate, and have slightly wavy, smooth margins with a bluish green color. Leaves are 0.25–0.5" wide and 1–4" long.

Flowers: Late spring to summer. The flowers are small, green, and are borne in clustered yellow-green bracts. These bracts develop in late spring, and the flowers develop within the bracts by early summer.

Fruits and seeds: Seeds are 0.08" long, oblong, gray to purple, and are borne in pods which contain three seeds. When mature, seed capsules shatter, scattering seeds.

Roots: Brown, woody roots with pinkish buds. Plants have a taproot, which may extend to the water table, and lateral roots that can extend to 15' beyond the main taproot.

Similar species: A number of native species also have white, milky sap (e.g., milkweed species and flowering spurge), but milkweed species have a distinct long seedpod, and flowering spurge is distinguished by white flowers. Cypress spurge (*Euphorbia cyparissias*) is another non-native species that is often confused with leafy spurge. Cypress spurge has a similar flower, but is a shorter plant (6–15" tall) with needle-like leaves.

Ecological threat:

- Invades grasslands, pastures, prairies, and old fields.
- Can drastically reduce (50–75%) productivity of grasslands.

Non-chemical control Removal

Effectiveness in season: 50–70%
Season after treatment: < 50%

Pulling is only appropriate for suppression of very small populations or populations in their first year of growth. Older populations do not respond well to pulling because it is difficult to remove the entire root. If the root is not removed, it will resprout.

Cultivation

Effectiveness in season: 50–70%
Season after treatment: < 50%

Intensive cultivation can eradicate populations. Cultivate 4" deep 2–4 weeks after leafy spurge emerges in the spring; for 1–2 years, continue to cultivate at three-week intervals until the ground freezes. Success has also been documented if leafy spurge is cultivated twice each fall for three years. Cultivation can spread roots into previously uninfested areas.



Mowing

Effectiveness in season: 50–70%
Season after treatment: < 50%

Mowing does not eradicate leafy spurge, but if repeated at 2–4-week intervals during the growing season, it can suppress populations and reduce seed production. Mowing can also provide uniform regrowth, which can improve herbicide effectiveness. After mowing, populations should be allowed to grow for 3–5 weeks before an herbicide is applied.

Prescribed burning

Effectiveness in season: 50–70%
Season after treatment: < 50%

Spring burns can kill germinating seedlings and suppress above-ground growth of established plants, depending on fire intensity. Fire may benefit other species well-adapted to this management (e.g., prairie grasses), resulting in improved competition with leafy spurge. A handheld propane torch can be effective for treating seedlings. A combination of burning and herbicide applications typically takes 4–5 years to provide > 95% suppression of a leafy spurge population.

Grazing

Effectiveness in season: < 50%
Season after treatment: < 50%

Grazing with sheep or goats can be used to suppress populations. Grazing when bracts are present, but before seeds are produced, has shown the greatest reduction in spurge biomass. If mature seeds are consumed, animals must be isolated until the seeds pass through the digestive system to prevent further spread of seed. Grazing in conjunction with a fall chemical treatment is very effective. This combination of methods typically takes 4–5 years to provide > 95% suppression of a leafy spurge population.

Biological control

Effectiveness in season: < 50%
Season after treatment: < 50%

The three commonly recommended agents for biological control of leafy spurge are *Aphthona nigriscutis*, *A. lacertosa*, and *A. czwalinae*. The larvae of these agents are root borers and feed on foliage as adults. Grazing in conjunction with biological control has been shown to be very effective. This combination of methods typically takes 4–5 years to reduce leafy spurge cover to < 10%. To release biocontrol agents in your state, contact the Department of Agriculture for the required permit.

Manipulation of the environment

Effectiveness in season: < 50%
Season after treatment: < 50%

Interseeding with competitive grass can suppress leafy spurge populations up to 80% once the grasses become established. This treatment will rarely eliminate leafy spurge; therefore, integrating this method with another control method is recommended.

Chemical control

Foliar

Apply directly to individual plants or broadcast across an infested area. Broadcasted foliar applications are typically the most-cost effective treatment in dense infestations. Use lower rates on smaller plants and less dense populations and higher rates on larger plants and denser populations. Absorption of herbicide can be limited with this species, resulting in reduced effectiveness. Including a recommended surfactant can alleviate any potential reduction in effectiveness. When using residual herbicides (e.g., picloram, aminocyclopyrachlor), treat 15' outside the edge of a population to reduce resprouting from roots in subsequent years. No single treatment will eradicate this plant. An annual treatment program provides the

best long-term control. Do not skip a year until control reaches 90% or more; otherwise leafy spurge will reinfest rapidly.

2,4-D*

Effectiveness in season: 50–70%
Season after treatment: < 50%

Common name: Many

Rate:

broadcast: 1.0–1.5 lb a.e./A

spot: For a 3.8 lb a.e./gal product. 1–2% (0.04–0.08 lb a.e./gal)

Timing: Apply twice a year: once during late bud stage when bracts begin to yellow and again in the fall when regrowth is 4–6" tall.

Remarks: This herbicide will not eliminate a population when used as the only control method, but it can be useful when paired with other control methods. The use of 2,4-D in the spring will eliminate the production of seed.

Caution: Use aquatically labeled product if potential exists for solution to contact surface water. Use of this chemical in areas where soils are permeable, particularly where the water table is shallow, may result in groundwater contamination. Overspray or drift to desirable plants should be avoided since even minute quantities of the spray may cause severe injury to plants.

aminocyclopyrachlor + chlorsulfuron*

Effectiveness in season: 90–100%
Season after treatment: 70–90%

Common name: Perspective

Rate:

broadcast: 4.75–8.0 oz/A

(aminocyclopyrachlor: 1.9–3.15 oz a.i./A + chlorsulfuron: 0.75–1.25 oz a.i./A)

spot: 0.2–0.3 oz/gal

(aminocyclopyrachlor: 0.08–0.12 oz a.i./gal + chlorsulfuron: 0.03–0.05 oz a.i./gal)

Timing: Apply to flowering plants or in fall before a killing frost. Fall applications show the most consistent results.

*Active ingredient (a.i.)

Caution: Do not apply directly to water or to areas where surface water is present. Avoid using Perspective in areas where soils are permeable, particularly where the water table is shallow, since groundwater contamination may result. Perspective remains in the soil for months, depending on application rate, and has the potential to contaminate surface runoff water, especially on poorly draining soils or areas with shallow groundwater. Maintenance of a vegetative buffer strip is recommended between the areas Perspective is applied and surface water features. Overspray or drift to desirable plants should be avoided since even minute quantities of the spray may cause severe injury to plants. Do not compost treated plants since herbicide can persist through composting process.

aminocyclopyrachlor + metsulfuron*

Effectiveness in season: 90–100%
Season after treatment: 70–90%

Common name: Streamline

Rate:

broadcast: 4.75–7.6 oz/A
(aminocyclopyrachlor: 1.9–3.0 oz a.i./A +
metsulfuron: 0.6–1.0 oz a.i./A)
spot: 0.2–0.4 oz/gal
(aminocyclopyrachlor: 0.08–0.16 oz a.i./
gal + metsulfuron: 0.03–0.05 oz a.i./gal)

Timing: Apply to flowering plants or in fall before a killing frost. Fall applications show the most consistent results.

Caution: Do not apply directly to water or to areas where surface water is present. Avoid using Streamline in areas where soils are permeable, particularly where the water table is shallow, since groundwater contamination may result. Streamline remains in the soil for months, depending on application rate, and has the potential to contaminate surface runoff water, especially on poorly draining soils or areas with shallow groundwater. Maintenance of a vegetative buffer strip is recommended between the areas Streamline is applied and surface water features. Overspray or drift to desirable plants should be

avoided since even minute quantities of the spray may cause severe injury to plants. Do not compost treated plants since herbicide can persist through composting process.

dicamba*

Effectiveness in season: 50–70%
Season after treatment: < 50%

Common name: Banvel

Rate:

broadcast: 64–128 fl oz/A (2–4 lb a.e./A)
spot: Equivalent to broadcast rates.

Timing: Apply to flowering plants or in fall before a killing frost. Fall applications show the most consistent results.

Remarks: Two to three years of repeated applications are typically needed. If repeated, this treatment can achieve more than 80% suppression.

Caution: Do not apply directly to water or to areas where surface water is present. Use of this chemical in areas where soils are permeable, particularly where the water table is shallow, may result in groundwater contamination. Overspray or drift to desirable plants should be avoided since even minute quantities of the spray may cause severe injury to plants. Rates > 16oz/A (0.5 lb a.e./A) may cause stunting and discoloration of sensitive grasses, such as smooth brome.

glyphosate*

Effectiveness in season: 50–70%
Season after treatment: 50–70%

Common name: Roundup

Rate:

broadcast: 1.0–1.5 lb a.e./A
spot: For a 3 lb a.e./gal product.
2% (0.06 lb a.e./gal)

Timing: Apply twice a year: first, to plants when seeds are forming and then again in the fall during regrowth before a killing frost.

Caution: Use product labeled for aquatic use if potential exists for solution to contact surface waters. Applications can result in bare ground since glyphosate is not selective. Overspray or drift to

desirable plants should be avoided since even minute quantities of the spray may cause severe injury to plants.

imazapic*

Effectiveness in season: 90–100%
Season after treatment: 50–70%

Common name: Plateau

Rate:

broadcast: 6–12 fl oz/A
(0.1–0.2 lb a.e./A)
spot: 0.25–1.0% (0.005–0.02 lb a.e./gal)

Timing: Apply in fall before a killing frost.

Remarks: Add methylated seed oil (MSO) to the mixture as per label instructions.

Caution: Do not apply directly to water or to areas where surface water is present. Use of this chemical in areas where soils are permeable, particularly where the water table is shallow, may result in groundwater contamination. Imazapic can remain in the soil for months, depending on application rate, and has the potential to contaminate surface runoff water during this timeframe. Maintenance of a vegetative buffer strip is recommended between the areas imazapic is applied and surface water features. Overspray or drift to desirable plants should be avoided since even minute quantities of the spray may cause severe injury to plants.

picloram*

Effectiveness in season: 70–90%
Season after treatment: 50–70%

Common name: Tordon K

Some products containing picloram are restricted-use in Wisconsin.

Rate:

broadcast: 32–64 fl oz/A
(0.5–1.0 lb a.e./A)
spot: Equivalent to broadcast rates.

Timing: Apply to flowering plants or in fall before a killing frost.

Remarks: Two to four years of repeated applications may be needed.

Caution: Do not apply directly to water or to areas where surface water is present. Use of this chemical in areas where soils are permeable, particularly where the water table is shallow, may result in groundwater contamination. Remains in the soil for more than one year, depending on application rate, and has the potential to contaminate surface runoff water during this timeframe. Maintenance of a vegetative buffer strip is recommended between the areas picloram is applied and surface water features. Overspray or drift to desirable plants should be avoided since even minute quantities of the spray may cause severe injury to plants. Do not compost treated plants since herbicide can persist through composting process.

picloram + 2,4-D*
Effectiveness in season: 90–100%
Season after treatment: 70–90%

Common name: Grazon
 Some products containing picloram are restricted-use in Wisconsin.
Rate:
broadcast: 128 fl oz/A (picloram: 0.5 lb a.e./A + 2,4-D: 2 lb a.e./A)
spot: 0.5–1% (picloram: 0.003–0.006 lb a.e./gal + 2,4-D: 0.01–0.02 lb a.e./gal)
Timing: Apply to flowering plants or in fall before a killing frost.
Remarks: Two to three years of repeated applications may be needed.
Caution: Do not apply directly to water or to areas where surface water is present. Use of this chemical in areas where soils are permeable, particularly where the water table is shallow, may result in groundwater contamination. Remains in the soil for more than one year, depending on application rate, and has the potential to contaminate surface runoff water during this timeframe. Maintenance of a vegetative buffer strip is recommended between the areas this product is applied and surface water features. Overspray or drift to desirable plants should be avoided since even minute quantities of the spray may cause severe injury to plants. Do not compost treated plants since herbicide can persist through composting process.

quinclorac*
Effectiveness in season: 70–90%
Season after treatment: 50–70%

Common name: Paramount
Rate:
broadcast: 8.0–16.0 oz/A (6.0–12 oz a.i./A)
spot: Equivalent to broadcast rates.
Timing: Apply to flowering plants or in fall before a killing frost.
Remarks: Add methylated seed oil (MSO) to the mixture as per label instructions. Three to four years of repeated applications may be needed.
Caution: Do not apply directly to water or to areas where surface water is present. Remains in soil for up to one year, depending on application rate, and has the potential to contaminate surface runoff water during this timeframe. Use of this chemical in areas where soils are permeable, particularly where the water table is shallow, may result in groundwater contamination. Overspray or drift to desirable plants should be avoided since even minute quantities of the spray may cause severe injury to plants. Do not compost treated plants since herbicide can persist through composting process.

Herbicide information is based on label rates and reports by researchers and land managers. Products known to provide effective control or in common use are included. Those that do not provide sufficient control or lack information for effectiveness on target species have been omitted. References to pesticide products in this publication are for your convenience and not an endorsement of one product instead of a similar product. You are responsible for using pesticides in accordance with the label directions. *Read the label before any application.*



This series of fact sheets was created in cooperation with University of Wisconsin-Extension Team Horticulture. This material is based upon work supported by the Cooperative State Research, Education, and Extension Service, U.S. Department of Agriculture, under Award No. 2009-45060-06000.
Copyright © 2013 by the Board of Regents of the University of Wisconsin System doing business as the division of Cooperative Extension of the University of Wisconsin-Extension. All rights reserved. Send copyright inquiries to: Cooperative Extension Publishing, 432 N. Lake St., Rm. 227, Madison, WI 53706, pubs@uwex.edu.
Authors: Brendon Panke is an associate research specialist, Ryan deRegnier is a research assistant and Mark Renz is an assistant professor of agronomy, College of Agricultural and Life Sciences, University of Wisconsin-Madison, and Cooperative Extension, University of Wisconsin-Extension. Cooperative Extension publications are subject to peer review.
University of Wisconsin-Extension, Cooperative Extension, in cooperation with the U.S. Department of Agriculture and Wisconsin counties, publishes this information to further the purpose of the May 8 and June 30, 1914, Acts of Congress. An EEO/AA employer, the University of Wisconsin-Extension, Cooperative Extension provides equal opportunities in employment and programming, including Title IX and ADA requirements. If you need this information in an alternative format, contact Equal Opportunity and Diversity Programs, University of Wisconsin-Extension, 432 N. Lake St., Rm. 501, Madison, WI 53706, diversity@uwex.edu, phone: (608) 262-0277, fax: (608) 262-8404, TTY: 711 Wisconsin Relay.
This publication is available from your county UW-Extension office (www.uwex.edu/ces/cty) or from Cooperative Extension Publishing. To order, call toll-free: 1-877-947-7827 (WIS-PUBS) or visit our website: learningstore.uwex.edu.