



IOWA DEPARTEMENT OF
NATURAL RESOURCES
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FORESTRY BUREAU

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RESOURCES

www.iowadnr.gov/invasive
www.invasivespecies.gov/
www.nps.gov/plants/alien
www.mipn.org/
www.driftlesslandstewardship.com/id71.htm

CREDITS

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A YEAR’S CYCLE OF GARLIC MUSTARD GROWTH AND CONTROL TECHNIQUES

JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEPT	OCT	NOV	DEC
		Germination of last year's (or earlier) seeds.							First year seedlings overwinter as rosettes.		
First year seedlings become second year plants.			and bolt		Second year plants grow flower		plants grow shed seeds		plants die		
CONTROL TECHNIQUES											
1										1	
		2A		2B							
		3									
						4					
		5									

1	HERBICIDES*
November through March: Spray with 1% to 2% glyphosate from late fall until early spring, whenever temperatures are above freezing and native plants are dormant. Garlic Mustard photosynthesizes through the winter; dormant native plants will not be injured. Garlic Mustard may die very slowly during these cold months; be patient. Spraying is most effective in early spring, when plants are actively growing. Other seasons: Glyphosate may be used on large infestations in low-quality sites throughout the year. Other faster acting broadleaf herbicides will be more effective once plants start flowering (Mid-late spring). Spraying during the growing season will kill non-target plants.	
2	PRESCRIBED FIRE AND TORCHING
2A Early Spring: Spring burns may be useful in attacking large infestations. Burns ideally are timed to kill newly-emerged seedlings and simultaneously set back bolting second-year plants; April is often ideal. Follow-up is imperative to remove resprouts and unburned Garlic Mustard. Continue with annual burns. NOTE: Fire produces a bared seedbed that stimulates germination of Garlic Mustard seeds; do not be fooled if infestations appear to worsen - the seedbank is being rapidly depleted. 2B April-May, into October (if germination continues): Propane torches with a long wand rapidly kill blankets of newly emerged seedlings. Such torching is not effective on older plants.	
3	HAND PULLING AND MECHANICAL CONTROL
April through June (or until seeds start shedding): Any remaining second-year plants must be removed to prevent seeding and further spread. Hand pulling is labor intensive but very effective. Try to pull the entire root. Once flowers have opened, flowering spikes (or the entire plant) must be removed from the site; seedpods will continue to mature and spread seeds from pulled plants. Burn, bury or landfill removed plants and torch first-year seedlings. An alternative is to use a powerful weed whip before seeds mature, and to shred the plants from the top down, through the base, to remove the root crown. First-year seedlings can be pulverized at the same time.	
4	AVOID SPREADING SEEDS
July to autumn leaf-fall: Once seeds start shedding, stay away from Garlic Mustard; keep hikers and vehicles away. All are likely to spread seeds and worsen infestations.	
5	MONITOR SITES
April until seeds start shedding: Return to treated sites every few weeks to catch new growth. Throughout the year: Walk deer trails, streams, and other paths to locate and treat new infestations. Flag, map or GPS infestations and monitor them annually.	

*ALWAYS READ AND FOLLOW PESTICIDE LABELS. Applicators must be certified to apply restricted pesticides.



IOWA DEPARTEMENT OF
NATURAL RESOURCES

GARLIC
MUSTARD

A SERIOUS THREAT TO
IOWA’S WOODLANDS



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GARLIC MUSTARD is a rapidly spreading, highly invasive non-native plant. It was introduced from Europe in mid-1800s for medicinal and herbal uses and came to the U.S. without predatory beetles or other natural controls. Garlic Mustard threatens to rob Iowa of healthy, diverse native woodlands.

WHAT ARE GARLIC MUSTARD’S THREATS TO IOWA?

- Has no natural growth controls.
- Spreads rapidly, grows tall, becomes extremely dense.
- Within a few years, dominates woodland understory.
- Crowds out understory wildflowers, ferns and tree seedlings.
- Seriously degrades or destroys high quality woodlands.
- Destroys wildlife habitat.
- Single plant produces hundreds of seeds, which remain viable 5 years or more.

WHERE IS GARLIC MUSTARD FOUND?

- Prefers shaded or semi-shaded areas (upland and floodplain forests, shrublands, shaded yards...).



- Spreads rapidly along trails, streams, forest edges, and roadsides, and from these sites enters interior woodlands.
- By 2004, Garlic Mustard pread to 30 states and 80 counties in Iowa, with especially heavy concentrations in eastern Iowa forests.

HOW ARE SEEDS SPREAD?

- Deer and other animals (on fur, feet)
- Flowing water
- People (on shoes, clothing, gear)
- Bicycle and car tires, mowers, ORVs

Limit spread by staying out of Garlic Mustard in mid-summer when seeds are shedding. Rigorously clean tires, shoes, clothing, and mowing machinery that may carry seeds.

HOW CAN GARLIC MUSTARD BE CONTROLLED?

Successful control depends on:

- Routine monitoring, early detection.
- Removing new infestations immediately and thoroughly.
- Attacking established invasions with multiple techniques.
- Careful, continued follow-up.

By doing the right thing at the right time, this aggressive invader **CAN** be controlled. Delaying control efforts will lead to rapidly expanding invasions that are far more difficult to control.

Infestations are likely to require multiple control techniques. Control may begin with any of the recommended techniques (see reverse), and at any

WHAT DOES GARLIC MUSTARD LOOK LIKE?

Identifying traits include white flowers with four petals; plant parts have garlic-like odor when crushed. Young plants may resemble creeping charlie or violets.



First-year plants: Seedlings appear late spring to early summer, and throughout growing season as weather permits, either as scattered individuals or as dense ground layer. Rounded or heart-shaped leaves with scalloped edges form low rosettes that stay green through the following winter.



Second-year plants: April into June, rosettes become more robust and send up flowering stalks with triangular to heart-shaped, coarsely toothed leaves. Stems 1’ to 3’ tall. Clusters of small, white, four-petaled flowers at tips of stems.



Seed pods begin forming soon after the plant starts flowering. Green, thin, elongated pods enlarge and turn grayish-brown. Seeds are shed mid-summer. Plants die.

time of year. In general, the younger the plants, the easier the treatment. Work from the outer edges of infestation inward.

Once control commences, continued efforts are required for several years while seedbank is depleted; skipping a year will create a new crop of seeds, setting efforts back significantly.

Control techniques must be correctly executed. Search the internet or talk with experienced land managers for more information.

DON’T GIVE UP! Continued efforts bring success. Biological controls are now in the testing state.

FOR MORE INFORMATION

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