

# GARLIC MUSTARD



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Infested forest.



UNIVERSITY OF WISCONSIN-EXTENSION

First-year plant in autumn.



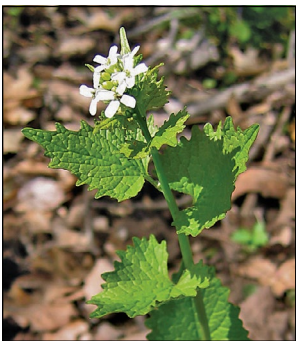
E. PADLEY, USDA-NRCS

Leaf surfaces appear crinkled.



L. MERRHAFF, UDONR, BUGWOOD.ORG

Second-year flower stalk with seed capsules.



E. PADLEY, USDA-NRCS

Second-year flower stalk.



L. MERRHAFF, UDONR, BUGWOOD.ORG

Plants die and seeds are dispersed in July or August. Dry stalks often remain standing through winter.



L. MERRHAFF, UDONR, BUGWOOD.ORG



F. GARDNER, BUGWOOD.ORG

Each flower has four petals.

## IMPACTS ON FORESTS

- Garlic mustard outcompetes many tree seedlings and other native vegetation.
- It adversely affects native insects and other wildlife.

## FIRST-YEAR PLANTS

Garlic mustard is biennial – it has a two-year life cycle. Seeds germinate in April. Seedlings are shown below. **Note the oak leaves, which can be used to gauge size.**

**LEAVES:** Clusters of 3-8 rounded to kidney-shaped leaves develop at ground level during the first growing season. They have scalloped edges and a wrinkled appearance. They remain green all winter.



E. PADLEY, USDA-NRCS

## SECOND-YEAR PLANTS

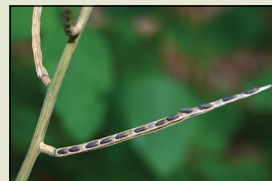
**FLOWERS:** Appear in the second year. Small - about 1/4 inch wide – with four petals. Found on the end of the main stem and side branches. Present from April through June.

**LEAVES:** Heart-shaped to triangle. About 1-3 inches wide. Coarsely toothed on edges, alternating on the stem. Distinct garlic odor when crushed.

**HEIGHT:** Flowering stalks grow 1-4 feet tall.

**ROOTS:** Taproot is slender, white, and often has an S-shaped bend.

**SEEDS:** Seed capsules appear soon after flowering and quickly elongate. Seeds, which are small, appear in a row inside the seed capsule. Black when ripe. Each plant can produce about 100 seeds.



L. MERRHAFF, UDONR, BUGWOOD.ORG



D. EAGAN, WISCONSIN DNR

## LOOK-ALIKES

**Violet** leaves resemble first-year garlic mustard plants, but flowers bloom low to the ground and contain five petals. Leaf surfaces are less crinkly, and there is no taproot.

**Ground Ivy** (creeping Charlie) spreads along the ground as a vine and has tiny purple flowers.

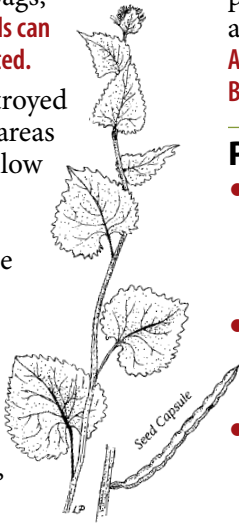
# CONTROL METHODS FOR GARLIC MUSTARD

Control strategies must be applied for eight or more consecutive years until the garlic mustard seed bank in the soil is depleted. Methods used may vary over this period, depending on the extent and condition of the invasion. Vulnerable areas, especially woodlands, should be diligently monitored each spring for new invasions and to prevent reoccurrence. Mark areas where plants have been found to make future monitoring easier.

## HAND PULLING

For smaller infestations or where large groups of people are available to help with control, hand-pulling or digging the plants out may be effective.

- Plants that are pulled out by the roots or dug out before they begin budding may be left in the area in single layers to dry out and die, preferably in places where they have no contact with the ground. Avoid placing pulled plants in piles, where enough moisture may be present for roots to continue developing.
- Once budding and flowering begins, removed plants must be bagged in large plastic or paper bags; this is important because **garlic mustard seeds can still complete development after plants are uprooted.**
- Paper bags containing plants must be destroyed by burning or by burying them deeply in areas that will not be disturbed in the future. Allow plants collected in paper bags to dry thoroughly before burning. Burning plastic bags is not recommended – they should be buried.
- Never compost garlic mustard plants. Most compost piles do not produce enough heat to completely destroy all seeds.
- To send bagged plants to landfill facilities, clearly label the bags as **“INVASIVE PLANTS – APPROVED BY WI DNR FOR LANDFILL.”**



## CUTTING

Cutting garlic mustard plants a few inches above the soil surface **just after the flower stalks have elongated but before the flowers have opened** may prevent seed production and might kill the plants. However, some plants may send out new flower stalks for which additional cutting may be required. If this method is used, the site must be monitored and managed on a regular basis.

## HERBICIDES

- **Extensive infestations:** If an infestation is too large to be managed with manual methods, a 1 or 2% solution of **glyphosate** may be used. There are many commercial brands of this product available – always strictly follow label directions. Apply to the foliage of individual plants and dense patches in fall and/or very early spring. At these times, most native plants are dormant, but garlic mustard will still be green and vulnerable. Glyphosate is a non-selective herbicide that will kill or injure all green plants, even non-target ones. Use caution when applying glyphosate so that the spray doesn't drift or drip from garlic mustard leaves onto nearby vegetation.

- **Use herbicides only when necessary.**
- **Always read the entire herbicide label completely and carefully,** strictly following all mixing and application instructions. Wear recommended protective gear and clothing.

## WEED TORCH (for use in wet conditions only)

Another method for spot-killing patches of newly germinated garlic mustard seedlings in spring is to “flame” them with a propane weed torch. Flames quickly kill young seedlings, usually without permanently damaging nearby perennial plants. Use weed torches with extreme caution and only when conditions are wet to avoid setting a fire. **ALWAYS contact your local fire control agency prior to using this method. Burning permits may be required – find out beforehand.**

## PREVENT FURTHER SPREAD

- Clean shoes, pockets, gloves, pants cuffs and equipment thoroughly after walking or working in garlic mustard-infested areas. Garlic mustard's tiny seeds often move to new areas in mud and on footwear and clothing.
- Survey your area for green mustard garlic plants regularly. Plants are visible any time when not covered by fallen leaves or snow.
- When an infestation is found, remove plants that are producing seeds first, working from the least infested area to the most infested area. Then remove other plants, again starting with the least infested area.
- Monitor uninfested woodlands carefully and frequently. Removing a few plants before they seed is much easier than removing hundreds or thousands of them later.

## WEBSITES

<https://dnr.wi.gov> (Keywords “garlic mustard”)

Photos and information about garlic mustard in Wisconsin.

<http://ipcm.wisc.edu/download/weeds/garlic-mustard-2010.pdf>

Information about garlic mustard and its control from the University of Wisconsin's Extension Service.

## CREDITS

This factsheet is based on the brochure “Garlic mustard – a major threat to Wisconsin's woodlands” by Paul Hartman and Sharon Morrisey, University of Wisconsin-Extension, 2002. It was revised by Colin Kelly, Eunice Padley, Kelly Kearns, and Colleen Matula of the Wisconsin DNR in 2006, and by Bernadette Williams and Jodie Ellis of the Wisconsin DNR in 2018.

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