

Garlic Mustard Fact Sheet

The Plant: Garlic Mustard is a cool-season, biennial (i.e. two-year growth cycle) herb with stalked, triangular to heart-shaped, coarsely toothed leaves that give off an odor of garlic when crushed (particularly new leaves). First-year plants appear only as a cluster of green leaves close to the ground. Clusters remain green through the winter and develop into flowering plants the following spring. Flowering plants of Garlic Mustard reach from 0.6 to 1 m in height and produce button like clusters of small white flowers, each with four petals in the shape of a cross. Flowers are either self-pollinated, or pollinated by insects.

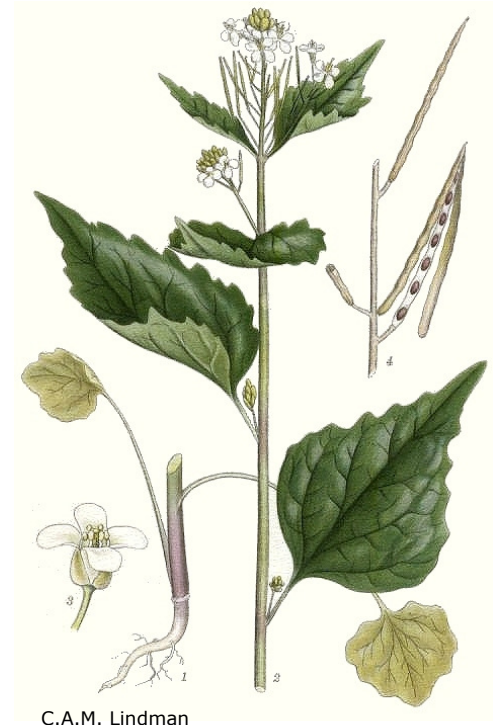
Beginning in May, tiny seeds are produced in erect, slender seed pods, and become shiny black when mature. Seedpods may hold fertile seed through the summer. In dense woodland stands, seed production can range from 9,500 to over 100,000 seeds per square metre per year.

When mature, the capsules burst open and can throw seeds several metres. Further distribution is mostly by humans and other animals accidentally carrying seeds, or mud containing seeds. Seeds aren't easily blown around, and do not float well. Populations spread an average of 5.4 m/year, which may not sound like a lot until you add it up: 6,400 km²/year in North America! Because it's primarily carried by humans and animals, natural or human-made roads and trails become prime corridors for invasion. Seeds quickly sprout in disturbed soil, and disturbing soil with seeds in it will cause more seeds to sprout. Seeds can remain alive in the soil for five years or more.

The Threat: Garlic Mustard is one of the few non-native herbs able to invade and dominate both disturbed and undisturbed forest understory communities. Its ability to grow in low light, high seed production, and relatively rapid spread make Garlic Mustard a strong competitor, dominating forest groundcover within 5-7 years of introduction. It takes resources away from native spring woodland plants such as Spring Beauty, White Trillium, Trout Lily, Sweet Cicely and many others. Because it begins growing very early in the spring, Garlic Mustard has a head start on other flowering plants and tree seedlings.

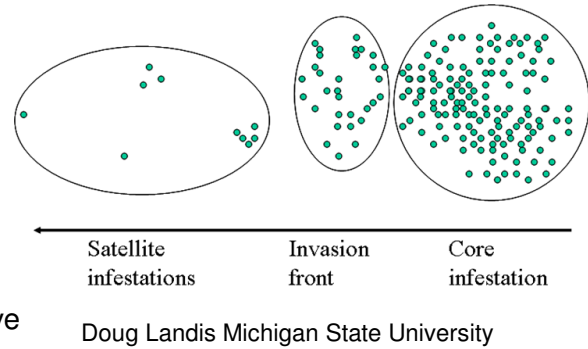
It also changes the soil, impacts natural associations between plants and fungi by destroying the fungi, and changes the forest ecosystem. Several chemicals produced by Garlic Mustard reduce the growth of grasses, herbs and tree seedlings, including Sugar Maples. Researchers in Ohio removed Garlic Mustard from a forest understory and found that the richness and abundance of annuals and woody perennials, including tree seedlings, increased.

Garlic Mustard appears to reduce habitat quality for several species of salamanders and molluscs through changes in forest litter layer depth and composition. Insect communities are also impacted by the presence of Garlic Mustard. The impacts of Garlic Mustard on vertebrates are largely unknown. Deer do not eat it, but encourage its spread by grazing on native competitors, disturbing the soil, and carrying seed from one location to another.



Garlic Mustard, showing first and second year leaves, flowers, seedpod, seeds and root.

Management Efforts: Garlic Mustard spreads from established (core) infestations along an invasion front. Satellite infestations occur when seeds are transported to new areas. This often occurs along trails, roads or forest edges. Priority should be given to annual removal of all satellite infestations to prevent further spread.



In addition, satellite areas and invasion fronts nearest to or within prime native habitat should have top priority. After these areas are treated, begin working back through the invasion front.

Monitoring should focus on areas where Garlic Mustard seeds are likely to be dispersed and find disturbed areas suitable for germination. Trails, parking areas, transportation corridors and recreation sites in suitable habitats are known sites of early infestation.

There are a number of approaches to removal:

1. **Cutting** flowering plants near ground level by hand will kill a high percentage of Garlic Mustard plants. The lower the cut, the more effectively the plant will be killed. Because cutting does not remove the root crown, it may be necessary to cut multiple times in a season to prevent seeds from developing on secondary stems. If cut precisely after flowering and before seed maturation (when the stem becomes tough and fibrous), resprouting is less likely. Even though cutting does not disturb the soil, it may still be necessary to cut for at least five consecutive years or until the seed bank is exhausted, but less regrowth might be expected than with pulling.
2. **Pulling** individual Garlic Mustard plants by hand is a simple and effective approach to managing small or isolated infestations. However, Garlic Mustard prefers and can rapidly spread in disturbed areas. Because pulling disturbs the soil, seeds remain alive in the soil for **at least five years**, and root fragments may regenerate plants, it is important to pull **all** Garlic Mustard plants in an area every year until the seed bank is exhausted and seedlings no longer appear. This may require multiple efforts each year as rosettes can continue to grow and produce flowers over an extended period (April-June).
3. **Pulling, treating and transplanting.** If you combine pulling with soil treatment, for example the use of clean mulch, and the transplanting of native species back into the area, you may be able to reduce the number of years it takes to exhaust the seed bank and re-establish native species.
4. **Other methods.** In limited, very controlled situations, fire or herbicides may be used by experts in the use of these methods.

Of course, the best approach would be to limit the spread of Garlic Mustard in the first place. People should be told about the plant and how it's spread, asked to restrain dogs in invaded areas, and encouraged to brush off any bits of mud or vegetation from clothing, boots or paws before leaving the area.

