



Southeast Exotic Pest Plant Council Invasive Plant Manual

Common Name: Garlic Mustard

Scientific Name: *Alliaria petiolata* (M. Bieb.) Cavara & Grande

Garlic mustard gets its name from its characteristic odor of garlic when the plant is crushed and its mustard-like appearance. It is a naturalized European biennial herb that poses a significant threat to lowland natural areas as well as gardens and field crops. It belongs to the Brassicaceae (Mustard) family.

Height: First-year rosettes extend to 10 cm (4 in) high. Flowering stems may reach 0.6-1.1 m (2.0-3.5 ft).

Leaves: First-year leaves (which remain the second year) are round to kidney-shaped and are on stems approximately 5.0-6.5 cm (2-3 in) tall. Leaves on flowering plants are alternate and are larger near the base of the stem. They are large-toothed, triangular in shape, and approximately 2.54 cm (1 in) long and 5.0-7.5 cm (2-3 in) wide.

Flowers: Flowers grow in clusters at the end of the stems. Each flower has four white petals (0.5 cm or 0.2 in long). Blooms in spring, usually in late April to May. Occasionally, some plants will bloom again in July-August.

Fruit: Fruit is a long 2.5-6.3 cm (1.0-2.5 in) green capsule called a silique, and contains many seeds. Siliques are produced summer to early fall. The capsules burst open when mature and ballistically disperse seeds several meters.

Seeds: Small, black seeds grow in a row inside the silique. Seeds may remain viable for up to 5 years. Plants can produce up to 868 seeds depending on habitat and population density. Seeds are dispersed by human/animal vectors or by water in riparian areas.

Life History

Garlic mustard is a cool-season obligate biennial herb. Seeds germinate in early spring (April-May) of the first year resulting in initially high seedling densities. Natural mortality during the first year results in only 2%-4% of the plants surviving to flower the following spring. Garlic mustard is self- or cross-pollinated and a single plant can populate an entire site. Adult plants set and disperse



Photo by Victoria Nuzzo

seed in late spring (May-June) the second year and produce an average of 165-868 seeds. The seeds are dormant for 20 months germinating in early spring of year four.

Origin and Distribution

Garlic mustard was introduced from Europe as food or a medicinal herb. It was first recorded in the U.S. in 1868 in Long Island, New York. By 1991, this exotic plant had spread to 28 midwestern and northeastern states. As of 1995, garlic mustard is found throughout Tennessee, although no formal statewide weed surveys have been conducted.



Photo by Jil M. Swearingen



Photo by Victoria Nuzzo

Similar Species

Garlic mustard is distinguished from other woodland herb species by its characteristic garlic odor. As the odor gradually dissipates by autumn, first-year rosettes may be mistaken for violets (*Viola* spp.) or immature white avens (*Geum canadense* [Jacquin]). Garlic mustard can be distinguished by its slender white taproot with a crook or "S" shape just below the base of the stem.

Habitat

Garlic mustard occurs most frequently in forested communities under partial shade. However, plants will grow on sites ranging from full shade to full sun, moist floodplains to dry, sandy forests, and in a wide variety of soils. Garlic mustard is associated with calcareous soils and is intolerant of acidic substrates. Disturbed forest and riparian communities are most susceptible to garlic mustard invasion and may dominate the herb strata within ten years. Garlic mustard will spread from disturbed areas to colonize undisturbed sites. Floodplain areas are particularly vulnerable since seeds are easily transported in water.

Management Recommendations

Mechanical Control

Hand Pull: This method of control is effective for small populations of garlic mustard, since plants pull up easily in most forested habitats. Hand-pulling is an extremely effective method of reducing population and seed productivity. Hand-pulling of plants can be done during most of the year. If plants have seed capsules present, they should be bagged and disposed of to prevent seed dispersal. Care should be taken to minimize soil disturbance. Resprouts are uncommon but may appear from mature plants not entirely removed.

Cutting: This method is effective for medium- to large- sized populations depending on available time and labor resources. Cut stems when in flower (late spring/early summer) at ground level either manually or with a mechanical brush-cutter. This technique will result in almost total mortality of existing plants. Dormant seeds in the soil are unaffected by this technique. Treatments should be continued annually until the seedbank is exhausted.

Herbicidal Controls

Glyphosate Foliar Spray: This method is effective on populations where mechanical control

measures are not feasible or are impractical. Apply a 2% solution of glyphosate and water plus a non-ionic surfactant using a tank or backpack sprayer to thoroughly cover all leaves. Do not apply so heavily that herbicide drips off the leaf surface. Glyphosate is a non-selective herbicide requiring caution not to spray non-target species. Treatments should be done in the early spring when most other non-target vegetation is dormant. Refer to manufacturer's label for specific information and restrictions regarding use.

Prescribed Fire

In fire-tolerant communities, prescribed burning can be effective either alone or in conjunction with herbicide. Mid-intensity spring burns appear to reduce density of adult plants somewhat more effectively than fall burns. A program of repeated seasonal burning over several years is most effective in deterring garlic mustard and enhancing growth of native ground-layer vegetation.

Bibliography

Anderson, R. C.; Dhillion, S. S. Acclimatization of garlic mustard (*Alliaria petiolata*) to varied levels of irradiance. *American Journal of Botany*: 78 (Supplement to No. 6):129- 130; 1991.

Babonjo, A.; Dhillion, S. S.; Anderson, R. C. Flora biology and breeding system of garlic mustard (*Alliaria petiolata*). *Transactions from the Illinois State Academy of Science*:83 (suppl.):32; 1990.

Byers, D. L.; Quinn, J. A. Plant size as a factor in determining flowering time and reproductive output in *Alliaria petiolata*. *American Journal of Botany* 75:71; 1988.

Byers, D. L. The effect of habitat variation in *Alliaria petiolata* on life history characteristics. *American Journal of Botany* 74:647; 1987.

Cavers, P. B.; Heagy, M. I.; Kokron, R. F. The biology of Canadian weeds. 35. *Alliaria petiolata* (M. Bieb.) Cavara and Grande. *Canadian Journal of Plant Science* 59:217-229; 1979.

Kelley, T.; Anderson, R. C. Examination of the allelopathic properties of garlic mustard (*Alliaria petiolata*). *Transactions from the Illinois State Academy of Science* 83 (suppl.): 31-32; 1990.

Lhotska, M. Notes on the ecology of germination of *Alliaria petiolata*. *Folia Geobotanica Phytotaxonomica* 10:179-183; 1975.

Nuzzo, V. A. Current and historic distribution of garlic mustard (*Alliaria petiolata*) in Illinois. *The Michigan Botanist* 32:23-33; 1993.

Nuzzo, V. A. 1991. Experimental control of garlic mustard in northern Illinois using fire, herbicides, and cutting. *Natural Areas Journal* 11(3):158-167.

[[Home](#)] [[Contents](#)]



Invasive.org is a joint project of
The Bugwood Network, USDA Forest Service & USDA APHIS PPQ.
The University of Georgia - Warnell School of Forest Resources and
College of Agricultural and Environmental Sciences - Dept. of Entomology
Last updated on Wednesday, November 05, 2003 at 01:20 PM
Questions and/or comments to the [Bugwood Webmaster](#)