Garlic Mustard
(*Alliaria petiolata*)
Mustard Family (Brassicaceae)

DESCRIPTION

Garlic mustard is a cool-season biennial herb that ranges from 6 to 48 inches in height as an adult flowering plant. Leaves and stems emit the distinctive odor of garlic when crushed (particularly in spring and early summer), and help distinguish the plant from all other woodland members of the mustard family and from violets which they resemble somewhat in the rosette stage.

flowering plants

Height - Flowering or fruiting plants can range from a few inches to 4 feet in height. The ability of garlic mustard to produce flowers and seeds even on very small, suppressed plants, is one of the reasons for its success.

winter rosette

Leaves - The first-year plant is in the form of a rosette with kidney-shaped leaves that remain green throughout the winter. The second year, a flowering stem is produced with triangular-shaped leaves that are sharply toothed. Crushed leaves emit a garlic-like odor.

stem leaf

Flowers - The flowers appear in a cluster at the end of an erect stem that elongates as more blossoms open at the top and fruits form toward the bottom. Each small flower has four white petals; the blooming period extends from April through June. Either self-pollination or cross-pollination by bees or flies may occur.

Fruits and Seeds - The fruits are long, slender capsules that become tan in color as the seeds mature. Garlic mustard seeds do not appear to have any specialized dispersal mechanisms, most seeds fall within a few yards of the parent plant. However, the seeds are likely carried a greater distance by adhering to peoples' feet and perhaps the exterior of dogs, deer, and other animals, especially when their fur is wet. Floodwaters also distribute seeds. The dry fruiting stalks often remain standing into the winter. Seed production has been observed to range from as few as 14 to several thousand per plant.

HABITAT

Garlic mustard generally prefers some shade but occasionally grows in full sun; it can be found in upland and floodplain forests, yards, and along roadsides. It requires moist, but well-drained soil conditions and does not grow in highly acidic sites. This plant invades forests first at the edge, but progresses into the interior along streams, trails, and other corridors of disturbance.

DISTRIBUTION

Garlic mustard originated in Europe and was introduced to the United States for herbal and medicinal purposes. It was first recorded in the United States in 1868 in Long Island, New York. By 1991, garlic mustard had invaded 28 midwestern and northeastern states. Today it can be found throughout Pennsylvania.

EFFECTS OF INVASION

Garlic mustard aggressively out-competes native species in the understory of forests and woodlands. The overwintering rosettes of this plant resume growth in early spring when many native forest wildflowers are also active. As a result, garlic mustard competes with native forest floor wildflowers for sunlight at a critical time before the trees leaf out. Deer appear to favor the proliferation of garlic mustard due to their preference for native forest floor species.

Garlic mustard also affects the development of several native butterflies. Cabbage whites normally feed on toothwort, a native early spring wildflower in the Mustard Family. The butterflies have been observed laying their eggs on garlic mustard when it is abundant in the forest understory. However, larvae of cabbage whites rarely survive on garlic mustard due to the presence of feeding deterrents. Thus the garlic mustard, which is taller than toothwort, is serving as a sink for these native butterflies.

REPRODUCTION AND METHOD OF DISPERSAL

Large quantities of seed are produced and can remain viable in the soil for 4 years. The seeds are dispersed by water, animals, or humans. Garlic mustard seeds germinate in the spring, following a dormancy period that ranges from 8 to 20 months. By fall they have formed a low rosette of evergreen leaves that is visible all winter; the following spring a flowering stem develops. After the seeds mature the plant dies.

CONTROL

Mechanical - Techniques for controlling of garlic mustard include hand pulling and cutting, and are most effective on smaller infestations. Hand pulling of plants can be very effective, although labor intensive. Care must be taken to insure that the entire plant is removed and that all plant materials are bagged and moved off-site. A flowering plant can continue to mature and produce seeds even if it has been pulled up. Hand pulling and removal must continue yearly until the seed bank is exhausted.

Cutting populations of garlic mustard is effective for medium to large concentrations of plants. Stems may be cut by mowing, brush cutting, or by hand when the plants are in flower. This can result in total mortality of the plants, however it does not affect the seed bank. Cutting must also continue every year until the seed bank is exhausted. Prescribed

fire can be an effective control agent in controlling garlic mustard given the proper location and fire intensity. Repeated burns over several years are necessary.

Chemical - Foliar application of herbicide can be used to control populations of garlic mustard where mechanical methods may not be effective, such as large infestations. Glyphosate is effective, however it is not selective, so non-target species in the vicinity of the application may be affected. To minimize impact on other species, herbicide should be applied to the first year rosettes during the late fall and early spring when other plants are dormant.

Biological - Currently there are no programs in use, however research is being conducted to find a potential biological control agent.

REFERENCES

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Internet resources - http://www.upenn.edu/paflora, http://www.invasivespecies.gov

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updated November 2011