Garlic Mustard - *Alliaria petiolata*

Identification

Garlic mustard is an herbaceous biennial forb that is an aggressive invader of wooded areas throughout the eastern and middle United States. First-year plants are basal rosettes with green heart-shaped leaves (1-6 inches tall) (Figure 68). Second-year plants produce a 1-4 feet tall flowering stalk with small, white flowers (Figure 69). Fruits are long seeds pods (siliques) with small, hard, black seeds (Figure 70). Just below the surface, the root system often has a characteristic S-curve. Garlic mustard is most easily recognized by a garlic odor present on actively growing parts of the plant when crushed and the strongly toothed, triangular leaves in the second-year plants (Figure 71).

Habitat and Distribution

Garlic mustard invades hardwood forests, savannas, woodlots, forest edges, and roadsides. It has been reported as invading coniferous forest, but infrequently. Disturbed forests are most often invaded, but high-quality, undisturbed forests can also be invaded. Stream sides and bottomland forest are the most common habitat invaded, but slope and upland sites are also vulnerable. Garlic mustard does best in partial light but can tolerate deep shade and full sun. It grows in a variety of soils with limestone or sandstone substrates and neutral to basic pH. Infestations usually start along an edge, trail or stream and spread throughout the remaining forest.

Garlic mustard is a major invasive of northeastern and midwestern United States and southeastern Canada. It is also found in areas of the Rocky Mountains and the Pacific Northwest, from Oregon to Alaska. In the South, it occurs mostly along the major river systems, and has been recorded as far south as Marietta, Georgia.

Impact

Once introduced, garlic mustard can form dense stands that shade and compete with native understory flora, lowering native species diversity. It can quickly become the dominate vegetation once introduced. It emerges early in the growing season, competing with and shading the spring ephemerals. Garlic mustard is notable because a high shade tolerance allows it to invade high-quality mature forests, once thought to be relatively resistant to invasion. It has little or no value as a wildlife food and white-tailed deer preferentially avoid garlic mustard to feed upon the other species, possibly aiding in the dominance of garlic mustard in the landscape. It may also interfere with the larval development of two rare butterflies. Once established, garlic mustard is very difficult to remove and spreads rapidly.

Figure 68

Figure 69

Response to Disturbance
Discouraged by high light environments
Promoted by soil disturbance
Promoted by deer as they forage on its competition
Does not re-sprout well
Establishes well after disturbance
Can establish in undisturbed sites
Unpalatable to most wildlife
Rapid growth in early spring/late fall

Reproduction
Primary means – seed
Time to maturity – 2 years
No vegetative reproduction
Early spring emergence (Especially for 2nd year plants)
Abundant but variable seed production (>10,000 seeds/sq. ft. or up to 7,900 seeds/plant)
Seed bank 4-6 years, but most (88%) germinate in 1st year
Seed drop in late summer/early fall
Germinates in February or March after 50 to 105 days of cold stratification
High seedling mortality in first winter
Can self-pollinate
Insect pollinated


Figure 70

Seed Dispersal
Animal, human, and water dispersed

Growth Habits
Herbaceous forb
Flood tolerant
Shade tolerant
Sun tolerant
Grows best in 50% full sun
Drought intolerant
Prefers shaded forests
Alleopathic
Obligate Biennial

Response to Prescribed Fire
Can be a control option
Fire (growing season) reduces density of existing stand
Not a fire hazard
Potential for rapid colonization following fire

Figure 71


Figure 72

Control Recommendations

To control two generations, thoroughly wet all leaves with a glyphosate herbicide as a 2-percent solution in water (8 ounces per 3-gallon mix) during flowering (April through June). Include a surfactant unless plants are near surface waters.

In locations where herbicides cannot be used, pull plants before seed formation. Repeated annual prescribed burns in fall or early spring will control this plant, while "flaming" individual plants with propane torches has also shown preliminary success (Figure 72).

(See Herbicide Quick Reference page 40-42)