

## Southern Indiana Purdue Agricultural Center Forestry Research

**Title:** Managing garlic mustard

**Date Initiated:** 2010

**Location:** SIPAC and beyond

### Background

Garlic mustard (GM) is a biennial herb that is capable of producing large crops of tiny seeds that are readily transported and spread via vehicular and foot traffic, animals, and moving water. It seems to spread rapidly once established, at first going unnoticed in its 1<sup>st</sup> year low growing basal rosette stage and then bolting into our consciousness in its 2<sup>nd</sup> year with its flowering and seed set stage. Early establishment at SIPAC went unnoticed until 2010. Recent county road work (ditch cleaning and grading) had spread GM seed along several sections of county road that traverse SIPAC. Two years later, the dense stands of bolting flower stalks were alarming.

### Objectives

Suppress current populations of GM on SIPAC and surrounding buffer area to reduce and eliminate new seed production. Conduct yearly monitoring to locate and eradicate new infestations. Educate neighboring landowners and coordinate monitoring and suppression activities with them.

### Treatments

#### Equipment

- 50 gal., 3-point hitch mounted sprayer with PTO-driven 6-roller pump with 22 gal/min. flow rate all attached to a JD850 4x4 24 hp tractor. Herbicide was sprayed by the tractor operator using a gunjet type hand wand at ~50 psi pressure. The tractor was operated at ~ avg. 25'/min or 0.28 mile/hr.
- Solo piston pump backpack sprayer

April 20, 2010

- First recognition of GM infestation

April 21 – May 20, 2010

- Handpulled GM

Results – Most GM along county roads removed

February 22, 2011

- Sprayed GM basal rosettes with 2% glyphosate (41% a.i.)+ surfactant using backpack sprayer

Results – Fair control. Some had stunted, distorted growth, some may have been buried under leaf litter and went untreated.

April 27 – May 11, 2011

- Handpulled GM

Results – Most GM along county roads removed. Discovered GM patches beyond county roads.

December 5, 2011

- Sprayed GM basal rosettes with 4% glyphosate (41% a.i.) + surfactant using backpack sprayer

February 22 – March 1, 2012

- Sprayed GM basal rosettes with 2% glyphosate (41% a.i.) + surfactant using backpack sprayer

April 3, 2012

- Sprayed bolting GM with 2% 2,4-D amine + non-ionic surfactant.
- Started moving beyond SIPAC borders to spray GM along county roadsides

Results – excellent kill

April 26 – May 14, 2013

- Sprayed bolting GM with 2% 2,4-D amine + 1% Garlon 3A + 0.5% MSO
- Continued expanding treatment area to create a GM-free buffer zone around SIPAC

Results – excellent kill

#### **Cost**

2010 – 28 hr. (hand pulling)

2011 – 15 hr. (4 hr spraying, 11 hr hand pulling), 2.5 gal. spray

2012 - 4.4 hr. (spraying)

2013 – 19.8 hr. (spraying), 25.2 gal. spray

#### **Results**

GM requires at least 4 - 5 years of control to exhaust the soil seed bank. Consistent annual efforts have greatly reduced the abundance of GM along roadsides and in patches located in forest and riparian areas. Where dense infestations once occurred, only scattered individuals now appear. Even these scattered individuals must be located and killed to prevent new seed production and gradual increases in GM. This is time consuming.

#### **Planned Management**

Successfully managing GM requires accurately assessing current populations and the factors contributing to GM establishment and spread. A plan focused on preventing or reducing new seed production and early detection and rapid control of small remote populations needs to be consistently applied over a sustained number of years. Finally, coordinating management efforts with neighboring landowners and with highway departments to prevent the spread of seed is needed. In larger watersheds, upstream populations of GM need to be assessed and, working with landowners, controlled, beginning at the head and working downstream. With reasonable and sustained effort, GM populations can be reduced and native plant populations can be restored in high priority habitats.