Herbicidal Control of Invasive Tree, Shrub, and Vine Species in Mississippi

MISSISSIPPI STATE UNIVERSITY EXTENSION

As of May 2020, 634 invasive plant species have been documented in Mississippi (EDDMaps). Of these, 169 are invasive tree, shrub, or vine species. An invasive plant species is an aggressive, fast-growing species capable of outcompeting most vegetation at a given locale. Typically, these species are nonnative and have been introduced into the area. However, some native species can become problematic under certain scenarios and may require similar control methods.

Invasive species may cause economic and/or environmental damage by outcompeting and displacing desirable native plant and animal species. Consequently, they may be a severe threat to proper forest management and are often targeted for control using herbicides. While these species may be removed using mechanical means ranging from bulldozers to hand-pulling, mechanical removal is typically cost prohibitive and inefficient.

This publication provides appropriate herbicide options to control a number of tree, shrub, and vine species occurring in Mississippi. It is not an effort to list all invasive species or control options, nor is it an identification guide. Rather, it lists the more common species and appropriate herbicidal control options.

Note: Volume/volume (vol/vol) indicates the percentage of spray solution that should be herbicide with the remainder of the mixture being water (or other herbicides/surfactants).

Table 1. Percent volume/volume (vol/vol) = herbicide per 1 gallon of spray mixture.

1% vol/vol	2% vol/vol	3% vol/vol	4% vol/vol	5% vol/vol
1.28 oz herbicide + 126.72 oz water	2.56 oz herbicide + 125.44 oz water	3.84 oz herbicide + 124.16 oz water	5.12 oz herbicide + 122.88 oz water	6.40 oz herbicide + 121.60 oz water

Surfactants

- Nonionic surfactants should be added at a rate of 0.5% vol/vol.
- Methylated seed oil (MSO) should be added at a rate of 1% vol/vol.

Invasive Tree and Shrub Species

- Amur honeysuckle (*Lonicera maackii*). Forms dense stands that limit light availability to regenerating native species.
  - 2–3% vol/vol of a 4 lb glyphosate product + an appropriate surfactant as a foliar spray
- Blackberry (nonnative) (*Rubus* spp.). Forms dense thickets, displacing native species by limiting light and water.
  - 3% vol/vol of a 4 lb glyphosate product + an appropriate surfactant as a foliar spray
  - 3% vol/vol Garlon 3A + an appropriate surfactant as a foliar spray
  - 1 oz/acre Escort XP as a pre-emergent broadcast application **or** with an appropriate surfactant as a post-emergent foliar spray
- Black locust (*Robinia pseudoacacia*). Encroaches and displaces prairie plant species.
  - 3% vol/vol Garlon 3A + an appropriate surfactant as a foliar spray
  - 21 oz/ac Transline + an appropriate surfactant as a foliar spray
  - 2 oz/ac Escort XP + an appropriate surfactant as a foliar spray
  - 50% vol/vol Garlon 3A **or** undiluted glyphosate product for cut stump application
  - 20% vol/vol Garlon 4 + 80% basal oil for basal bark treatment
- Bradford/Callery pear (*Pyrus calleryana*). Outcompetes native species for light, water, and nutrients.
  - 3% vol/vol of a 4 lb glyphosate product + an appropriate surfactant as a foliar spray
  - 3% vol/vol Garlon 3A + an appropriate surfactant as a foliar spray
  - 50% vol/vol Garlon 3A **or** undiluted glyphosate product for cut stump application
  - 20% vol/vol Garlon 4 + 80% basal oil for basal bark treatment
- Butterfly bush (*Buddleja davidii*). Forms dense stands that may block light to native plants in riparian areas. Grows in riparian or wet areas; consequently, aquatic-

labeled herbicides may be required depending on site-specific conditions.
  - 3% vol/vol of a 4 lb glyphosate product + an appropriate surfactant as a foliar spray
  - 3% vol/vol Garlon 3A + an appropriate surfactant as a foliar spray
- Camphor tree (*Cinnamomum camphora*). Forms dense stands, causing problems with regenerating desirable species.
  - 3% vol/vol Garlon 3A + an appropriate surfactant as a foliar spray on small trees
  - 50% vol/vol Garlon 3A for cut stump application
  - 20% vol/vol Garlon 4 + 80% basal oil for basal bark treatment
- Chinaberry (*Melia azedarach*). Can form dense stands that may outcompete native species.
  - 3% vol/vol Garlon 3A + an appropriate surfactant as a foliar spray on small trees
  - 50% vol/vol Garlon 3A for cut stump application
  - 20% vol/vol Garlon 4 + 80% basal oil for basal bark treatment
  - 20% vol/vol Arsenal AC for stem injection
- Chinese tallow (*Triadica sebifera*). Forms dense stands that outcompete and displace other plant species.
  - 2% vol/vol Clearcast (hand) **or** 64 oz/acre Clearcast (aerially) + methylated seed oil (MSO) in either treatment for foliar sprays
  - 30% vol/vol Krenite S + an appropriate surfactant as a foliar spray
  - 3% vol/vol Garlon 4 + an appropriate surfactant as a foliar spray
  - 50% vol/vol Garlon 3A for cut stump application
  - 20% vol/vol Garlon 4 + 80% basal oil for basal bark treatment
- Eastern baccharis (*Baccharis halimifolia*). Forms dense stands that limit light, water, and nutrients to native vegetation.
  - 5% vol/vol of a 4 lb glyphosate product + an appropriate surfactant as a foliar spray
  - 5% vol/vol Garlon 3A **or** 4% vol/vol Garlon 4 3A (both applications should include an appropriate surfactant as foliar sprays)
  - 16 oz/ac Method + an appropriate surfactant as a foliar spray
  - 2–3% vol/vol Forestry Garlon XRT + an appropriate surfactant as a foliar spray
- Elaeagnus (autumn olive; *Elaeagnus umbellate*) (Russian olive; *Elaeagnus angustifolia*). Forms dense stands that outcompete native species.
  - 3–4% vol/vol of a 4 lb glyphosate product + an appropriate surfactant as a foliar spray
  - 3% vol/vol Garlon 3A + an appropriate surfactant as a foliar spray
  - 50% vol/vol Garlon 3A **or** a 4 lb glyphosate product for cut stump application
  - 20% vol/vol Garlon 4 + 80% basal oil for basal bark treatment
- Mahonia (*Mahonia* spp.). Can form dense stands with potential to cause regeneration problems in other parts of the U.S.
  - 5% vol/vol of a 4 lb glyphosate product + an appropriate surfactant as a foliar spray
  - 3% vol/vol Garlon 3A + an appropriate surfactant as a foliar spray
  - 50% vol/vol Garlon 3A for cut stump application
- Mimosa (*Albizia julibrissin*). Can form dense stands that compete with native species for light and water.
  - 4–5% vol/vol of a 4 lb glyphosate product + an appropriate surfactant as a foliar spray
  - 3% vol/vol Garlon 3A + an appropriate surfactant as a foliar spray
  - 2 oz/ac Escort XP + an appropriate surfactant as a foliar spray
  - 50% vol/vol Garlon 3A for cut stump application
- Mulberries (nonnative) (white mulberry; *Morus alba*) (paper mulberry; *Broussonetia papyrifera*). Outcompetes native vegetation and hybridizes with native mulberries to the detriment of the species.
  - 3% vol/vol of a 4 lb glyphosate product + an appropriate surfactant as a foliar spray
  - 50% vol/vol Garlon 3A for cut stump application
  - 20% vol/vol Garlon 4 + 80% basal oil for basal bark treatment
  - 20% vol/vol Arsenal AC for stem injection
- Multiflora rose (*Rosa multiflora*). Climbs into trees, increasing vulnerability to breakage.
  - 4–5% vol/vol of a 4 lb glyphosate product + an appropriate surfactant as a foliar spray
  - 30% vol/vol Krenite S + an appropriate surfactant for foliar sprays
  - 1 oz/ac Escort XP + an appropriate surfactant as a foliar spray
  - 50% vol/vol Garlon 3A **or** a 4 lb glyphosate product for cut stump application
- Nandina (*Nandina domestica*). Displaces native species through root competition and limiting light to ground-level vegetation.
  - 3% vol/vol Garlon 3A + an appropriate surfactant as a foliar spray
  - 50% vol/vol Garlon 3A for cut stump application
- Privet species (*Ligustrum* spp.). Form dense stands, causing problems with sufficient light, water, and nutrient availability for native plant species.

- 5% vol/vol of a 4 lb glyphosate product (by hand) **or** 4 qt/acre of a 4 lb glyphosate product (aerially) (both applications should include an appropriate surfactant)
- 3% vol/vol Garlon 3A + an appropriate surfactant as a foliar spray
- 50% vol/vol Garlon 3A **or** a 4 lb glyphosate product for cut stump application
- 20% vol/vol Garlon 4 + 80% basal oil for basal bark treatment

- Rattlebox (*Sesbania punicea*). Forms dense stands that outcompete native species. Highly toxic to wildlife and humans. Grows in riparian or wet areas; consequently, aquatic-labeled herbicides may be required depending on site-specific conditions.
  - 2–3% vol/vol of a 4 lb glyphosate product + an appropriate surfactant as a foliar spray
  - 3% vol/vol Garlon 3A + an appropriate surfactant as a foliar spray
  - 50% vol/vol Garlon 3A or a 4 lb glyphosate product for cut stump application
- Royal paulownia (*Paulownia tomentosa*). Can form dense stands with potential to cause regeneration problems in other parts of the U.S.
  - 3% vol/vol of a 4 lb glyphosate product **or** 3% vol/vol Garlon 3A (both applications should include an appropriate surfactant)
  - 50% vol/vol Garlon 3A **or** a 4 lb glyphosate product for cut stump application
  - 20% vol/vol Garlon 4 + 80% basal oil for basal bark treatment
  - 20% vol/vol Arsenal AC for stem injection
- Siberian elm (*Ulmus pumila*). Forms dense stands and outcompetes other species for light.
  - 4–5% vol/vol of a 4 lb glyphosate product + an appropriate surfactant as a foliar spray
  - undiluted glyphosate for cut stump application
- Tree of Heaven (*Ailanthus altissima*). Forms dense stands that result in light, water, and nutrient deficiencies for native vegetation. Also is allelopathic (releases chemicals that hinder growth of other plant species).
  - 3–5% vol/vol of a 4 lb glyphosate product + an appropriate surfactant as a foliar spray
  - 3% vol/vol Garlon 3A + an appropriate surfactant as a foliar spray
  - 50% vol/vol Garlon 3A **or** a 4 lb glyphosate product for cut stump application
  - 1–2oz/ac Escort XP + an appropriate surfactant as a foliar spray
  - 25% vol/vol Garlon 4 + 75% basal oil for basal bark treatment
  - 20% vol/vol Arsenal AC for stem injection
- White poplar (*Populus alba*). Forms dense stands that outcompete native vegetation.
  - 3% vol/vol of a 4 lb glyphosate product + an appropriate surfactant as a foliar spray
  - 3% vol/vol Garlon 3A + an appropriate surfactant as a foliar spray
  - 50% vol/vol Garlon 3A **or** a 4 lb glyphosate product for cut stump application
  - 20% vol/vol Garlon 4 + 80% basal oil for basal bark treatment
  - 20% vol/vol Arsenal AC for stem injection
- Yaupon holly (*Ilex vomitoria*). Forms dense stands that limit regeneration of other species.
  - 6 qt/ac of a glyphosate product + 2 qt/ac Garlon 4 + an appropriate surfactant
    - Control is not complete.
  - 48–64 oz/ac Chopper Gen2 + 48 oz/ac Garlon 4 + an appropriate surfactant as a foliar spray
    - Control is not complete.

Invasive Vines

- Air potato (*Dioscorea bulbifera*). Climbs over trees and shrubs, limiting light to native vegetation below.
  - 2–3% vol/vol of a 4 lb glyphosate product + an appropriate surfactant as a foliar spray
  - 2–3% vol/vol Garlon 3A + an appropriate surfactant as a foliar spray
- Climbing ferns (Japanese climbing fern; *Lygodium japonicum*) (old world climbing fern; *Lygodium microphyllum*). Climbs over trees and shrubs, limiting light, water, and nutrients to native vegetation below.
  - 1 oz/ac Escort XP + an appropriate surfactant as a preemergent
  - 5% vol/vol Clearcast + an appropriate surfactant as a preemergent spray
  - 2% vol/vol of a 4 lb glyphosate product + an appropriate surfactant as a foliar spray
- English ivy (*Hedera helix*). Climbs on native plants, blocking light and germination. Can add weight to tree branches, increasing the likelihood of breakage.
  - Herbicide applications early in the growing season are most effective.
  - 2–3% vol/vol of a 4 lb glyphosate product + an appropriate surfactant as a foliar spray
  - 2–5% vol/vol Garlon 3A + an appropriate surfactant as a foliar spray
  - 2,4-D amine will work as a foliar spray. Due to the availability of many different 2,4-D products, consult the product label for appropriate rates and surfactants.
- Japanese honeysuckle (*Lonicera japonica*). Outcompetes native vegetation by limiting light, water, and nutrients.

Climbs native plants and can girdle trees as vines thicken.
    - 2–3% vol/vol of a 4 lb glyphosate product + an appropriate surfactant as a foliar spray
    - 1 oz/ac Escort XP + an appropriate surfactant as a foliar spray
- Kudzu (*Pueraria montana*). Climbs along ground and over trees and shrubs while outcompeting native species for light, water, and nutrients.
    - 4 oz/acre Escort XP + an appropriate surfactant as a foliar spray
    - 21 oz/acre Transline + an appropriate surfactant as a foliar spray
    - 20 oz/ac of Viewpoint + an appropriate surfactant as a foliar spray
    - 10 oz/ac of Perspective + an appropriate surfactant as a foliar spray
- Peppervine (*Ampelopsis arborea*). Climbs along ground and into young trees, weighing down branches and pulling seedlings/saplings to the ground over time.
    - 1% vol/vol Arsenal AC + an appropriate surfactant as a foliar spray
    - 2% vol/vol Chopper Gen II + an appropriate surfactant as a foliar spray
- Periwinkle (common periwinkle; *Vinca minor*) (greater periwinkle; *Vinca major*). Crawls along the ground, shading out native species.
    - 2–3% vol/vol of a 4 lb glyphosate product + an appropriate surfactant as a foliar spray
- Redvine (*Brunnichia ovata*). Climbs on ground and into trees, blocking light, water, and nutrients to native vegetation. Adds weight to tree branches and can pull seedlings/saplings over.
    - 2 qt/ac Dicamba HD + an appropriate surfactant
- Trumpet creeper (*Campsis radicans*). Climbs along the ground and into young trees, adding weight to branches and sometimes pulling them to the ground.
    - 3–5% vol/vol of a 4 lb glyphosate product + an appropriate surfactant as a foliar spray
- Wisteria (*Wisteria* spp.). Climbs into trees and shrubs, adding weight to branches and limiting light availability to underlying native vegetation.
    - 3–5% vol/vol of a 4 lb glyphosate product + an appropriate surfactant as a foliar spray
    - 3% vol/vol Garlon 3A + an appropriate surfactant as a foliar spray
    - 21 oz/ac Transline + an appropriate surfactant as a foliar spray
- Winter creeper (*Euonymus fortunei*). Forms dense stands that limit light, water, and nutrients for native species.
    - 3% vol/vol of a 4 lb glyphosate product + an appropriate surfactant as a foliar spray
    - 3% vol/vol Garlon 3A + an appropriate surfactant as a foliar spray
    - 50% vol/vol Garlon 3A or a 4 lb glyphosate product for cut stump application

Reference

Invasive species status report by state. EDDMapS. ***https://www.eddmaps.org/tools/***

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By **Brady Self**, PhD, Associate Extension Professor, Forestry.

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