

# BROADLEAF PLANTAIN

*Plantago major*



This Best Management Practice (BMP) document provides guidance for managing Broadleaf Plantain in the Oak Openings Region of Northwest Ohio and Southeast Michigan. This BMP was developed by the Green Ribbon Initiative and its partners and uses available research and local experience to recommend environmentally safe control practices.

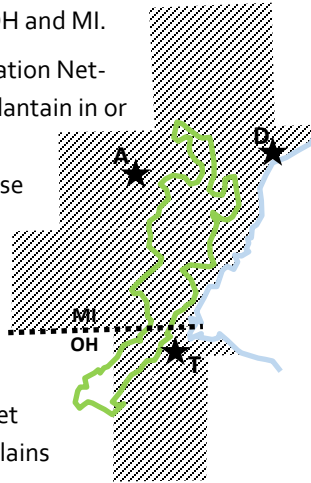
**INTRODUCTION AND IMPACTS**— Broadleaf Plantain (*Plantago major*) is native to Eurasia, but naturalized in many places worldwide. Broadleaf Plantain (or B. Plantain) was brought to North America with European settlement. It is a popular natural remedy for a variety of conditions and has also been grown as fodder. B. Plantain is now widespread in North America, as well as OH and MI.

While the Midwest Invasive Species Information Network (MISIN) has no specific reports of B. Plantain in or within 5 miles of the Oak Openings Region (OOR, green line), the USDA Plants Database reports B. Plantain in 5 of the 7 counties of the OOR and most neighboring counties (black stripes). B. Plantain is ubiquitous in the OOR. It has demonstrated the ability to establish and spread in healthy and disturbed habitats of the OOR and both the wet nutrient rich soils of wet prairies and floodplains as well as sandy dunes and oak savannas. B. Plantain has naturalized in the OOR.

B. Plantain has several characteristics that contribute to its success as an invader. It tolerates a wide range of growing conditions and limits the light and nutrients available to native species. B. Plantain also reproduces prolifically, and its seeds can remain viable for many years. Through its competition with native plants, B. Plantain degrades the quality of the habitats in which it becomes established.

**SIMILAR SPECIES**—B. Plantain is similar in appearance and habit to several members of the *Plantago* genus. Narrowleaf Plantain (*Plantago lanceolata*) has long, lance-shaped leaves and shorter flower spikes. Narrowleaf Plantain is not native to the United States and can be treated with the control methods outlined here.

In the OOR, several native plantains may be mistaken for B. Plantain. Heartleaf Plantain (*Plantago cordata*) is semi-aquatic and, in the summer, produces heart-shaped leaves with distinct venation. Blackseed Plantain (*Plantago rugelii*) has petioles with red/purple bases, whereas those of B. Plantain are green. Virginia Plantain (*Plantago virginica*) is hairy to woolly on its leaves and stalks.



**HABITAT**—B. Plantain prefers full sunlight and moist soils, but tolerates drought, flooding, and heavy compaction. It is a frequent invader of disturbed areas and spreads into more intact habitats by way of roads and trails. B. Plantain is a frequent pest in agriculture and turfgrass systems. In the OOR B. Plantain has been found on sand dunes, in and at the top of floodplains, near vernal pools and ponds, and along roads, ditches, and streams.

**IDENTIFICATION**—**Habit:** Cool-season, rosette-forming perennial. Low-growing and herbaceous.



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**Leaves:** Lance-shaped to broadly ovate, with smooth to weakly toothed margins. Blades are 2-8" long and petioles may be up to 5" long. Dark green to blue-green with 5-7 parallel veins. Generally hairless, but may be sparsely short-haired on one or both surfaces. Arranged in a whorled rosette. Petioles are broad and resemble celery.

**Flowers:** Tiny (1-3 mm) and green-white with protruding white stamens. Leafless flower stalks grow from the center of the rosette and can reach 20" in height. Flowers grow densely on the stalks, forming slender spikes up to 8" long.



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**Fruits:** Egg-shaped capsules, 3-5 mm long. May contain up to 36 seeds per capsule in some subspecies.

**Seeds:** Oval to angled or triangular with thread-like ridges. 0.5-1 mm long. Orange to dark brown with a light-colored hilum.

**Roots:** Short, fleshy taproot with shallow fibrous roots. Able to penetrate compacted soil. Mature B. Plantain can develop root crowns 6-10" across.



*P. cordata* © MissouriPlants.com  
*P. lanceolata* © Lynn Sosnoskie  
*P. rugelii* © Peter M. Dziuk  
*P. virginica* © John Hilty

B. Plantain Timeline	J	F	M	A	M	J	J	A	S	O	N	D
Life History	Dieback/Dormant		Growth		Flowering/Fruiting						Dieback/Dormant	
			Dispersal		Seedlings emerge							
Mech. Removal	Pull/dig if soil conditions permit, best before seed dispersal											
Foliar Spray	Spray											
Cover	Can begin any time, leave in place at least 1 growing season											

**REPRODUCTION AND DISPERSAL**—Reproduction of B. Plantain is primarily by seed. B. Plantain is wind or self-pollinated and may produce up to 14,000 seeds per plant per year. Seed sets quickly after fertilization but may not be dispersed until the next year. Wildlife and human activity are the main vectors for seed dispersal. When wet, seeds become mucilaginous and sticky, aiding in transport on bodies and equipment. Seeds can survive passage through animal digestive tracts and may remain viable in the soil for several decades. B. Plantain does not multiply vegetatively, but can regrow from root crowns beneath the soil's surface. **Thoroughly cleaning equipment is a critical prevention measure for B. Plantain in the OOR. Land managers should consider incorporating pre- and post-project equipment cleaning into contracts.**

**REPORTING**—Reporting B. Plantain at [www.misin.msu.edu](http://www.misin.msu.edu) is essential for its control, easiest to identify during growing season.

**CONTROL**—The best control is integrated control. Management plans should focus on the prevention of seeding followed by the removal of mature plants. Annual follow-up is essential, and monitoring should include everything within 20' of the original patch.

**Cultural:** The best defense against B. Plantain is a healthy, competitive landscape, with dense stands of plants. The shade created at the soil surface will make it more difficult for B. Plantain to become established. Overseeding, especially in restorations or disturbed sites, may prevent the spread of B. Plantain.

**Chemical:** The following recommendations have been compiled from groups working in PA, NY, MA, and IN. It is your responsibility to ensure you are in compliance with herbicide labels and regulations when planning chemical treatment.

**Foliar Spraying**—Effective control for B. Plantain seedlings but may only reduce the vigor of established plants. Herbicides should be used with 0.5-1% of an appropriate non-ionic surfactant (e.g. Cygnat Plus®, LI-700, etc.).

**Mechanical:** Pulling or digging can be an effective control for B. Plantain. Care must be taken to remove the entire root crown. Mowing does not control B. Plantain and will not prevent seed dispersal. Covering the infested area in thick plastic or geotextiles is

Herbicide	Trade Names	Concentration
Glyphosate	Aquamaster®, Rodeo®, Roundup®	Not listed
2,4-D		Not listed
Triclopyr	Garlon 3A® or 4 Ultra®, Pathfinder®	Not listed
Also mentioned: MCPA, Mecoprop-p, Fluroxypyr, Bispyribac Sodium, Chlorsulfuron, Chlorflurenol, Quinclorac, Clopyralid, Dicamba, Glufosinate and various combinations of the above.		

labor and cost intensive, but can effectively control B. Plantain if left in place for at least one growing season. Applying 3-6" of coarse mulch may control seedlings, but mulch must be weeded to prevent additional B. Plantain establishment. In all mechanical removal scenarios, ensure you clean your equipment and dispose of all plant material appropriately (see Disposal below).

**Biological:** No biological controls have been tested and approved for use on B. Plantain in the USA. Sheep will graze B. Plantain, but it is highly tolerant to grazing and trampling.

**Prescribed Fire:** No information is available on B. Plantain's response to fire.

#### DISPOSAL

- If no flowers/seeds are present: pulled or dug plants can be left on site if roots are not in contact with the soil.
- If flowers/seeds are present: plants should be incinerated, or sealed in plastic bags and disposed of in a landfill.
- Ensure all plant parts are dead before composting, either by drying completely or liquefying in plastic bags.



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