GOLDENROD CONTROL

PURDUE UNIVERSITY
Extension

FNR-643-W

Do's

- Understand management is about reducing goldenrod, not eliminating it, and most treatments provide temporary reduction.
- Consider use of mowing to control goldenrod during appropriate timeframes.
- Utilize mowing as a control method over multiple years on the same area to increase effectiveness.
- Treat goldenrod with recommended herbicides during recommended application periods.
- Avoid "recreational mowing" or mowing for aesthetic purposes. Only mow problem areas.

Don'ts

- Use dormant season prescribed fire as a standalone practice to control goldenrod.
- Use tillage as a form of goldenrod control, unless the tillage is intense enough expose the entirety of the plant root to freezing weather.
- Mow goldenrod after seed production.
- Mow portions of the field when goldenrod control is ineffective (before mid-May).

Goldenrods (*Solidago spp.*) can be great for pollinators and provide benefits to wildlife. However, many goldenrods reproduce by underground root, or rhizome, making the plant aggressive – especially tall (Solidago altissima) and Canada goldenrod (*Solidago canadensis*). A sparse amount of goldenrod in any conservation planting is highly desirable and beneficial to a variety of wildlife, but goldenrod can outcompete other herbaceous plants, which reduces overall herbaceous/plant diversity.

Plant Facts

- Herbaceous broadleaf, typically 3-5 feet tall (can range from 1 to 7 feet)
- Perennial warm-season forb
- Growing period: April to October
- Flowering: late July through October
- Reproduction: by seed and rhizome

EXPERT REVIEWED

Control Options

The goal for controlling goldenrod within a conservation planting should focus on reducing goldenrod density, not complete eradication. Goldenrod is easy to "top kill" (i.e., kill above ground growth), but can be very difficult to control due to its extensive rhizomatous root system. Successful control will require multiple treatments spanning several years. Combining methods, such as mowing and herbicide, or fire and herbicide can help improve control.

Mowing

Mowing is often the least desirable and least effective form of management or maintenance practice for many types of native plantings. However, strategically timed and repeated mowing has been shown to be effective in reducing goldenrod to a desirable density. Mowing twice during the growing season has been shown to reduce goldenrod. Strategic and repeated mowing of goldenrod can be conducted in two ways:

1) First mowing when goldenrod is 8-10 inches tall (~mid-May) and a second mowing 3-4 weeks after the first mowing.
2) First mowing when goldenrod is 8-10 inches tall (~mid-May) and second mowing in the late summer (Aug-Sep) prior to or during flowering.

Strategically timed mowing over at least two growing seasons may be needed to reduce goldenrod. However, mowing during the growing season may unintentionally release problematic cool-season species such as birdsfoot trefoil. Mowing can also be used to prepare the site for herbicide application. It should be noted that mowing during the growing season will have adverse effects on nesting wildlife, such as gamebirds and songbirds, as well as insect species. Therefore, mowing should only target the densest areas of goldenrod. Slow operating speeds and/or the use of a flushing bar is highly recommended to help reduce wildlife mortality.

Prescribed Fire

Prescribed fire during the dormant season (Feb-Mar) can increase goldenrod cover. Burning during the late growing season (Aug-Oct) has had mixed success at controlling goldenrod. Prescribed fire can be used to prepare a site for another treatment such as mowing or herbicide application.

Herbicide

Herbicides containing the active ingredients clopyralid, glyphosate, metsulfuron-methyl, and the combination of aminopyralid and metsulfuron methyl or 2,4-D are effective for controlling goldenrod. Most herbicides should be applied when goldenrod is 8-12 inches tall (~May). However, metsulfuron-methyl applied later in the growing season (Jul-Aug) has shown success at controlling goldenrod. Spot-spraying areas of a field where goldenrod density is highest is often the best application method. Wick applicators can also be used to target plants by height, which can limit damage to non-target plants. In fields where goldenrod is excessive throughout the field and few desirable plants are present, broadcast applications of herbicides may be warranted.

Tillage

Light or moderate tillage is ineffective for controlling goldenrod as it assists in the spread of goldenrod rhizomes and can encourage other undesirable invasive species that benefit from soil disturbance, such as Canada thistle or sericea lespedeza. Heavy tillage (exposing >70% of the soil) in the late summer or fall may allow for the goldenrod rhizomes to be exposed to extreme cold and freezing conditions over winter, stunting growth and providing temporary control. Additionally, rototilling stands of goldenrod at least 2 times during the growing season has shown to be effective for goldenrod control. However, this treatment will set back, if not kill, most perennial vegetation and should only be used in rare circumstances or as a site preparation method for reseeding.

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Additional Resources

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Conservation Program Disclaimer: *The management practices in this publication may conflict with cost-share program (e.g., CRP) rules and regulations (e.g., primary nesting season). If you are enrolled in a conservation program, please consult with an agency representative before utilizing a prescribed practice.*

Control Scenarios

Below are only a few examples of common scenarios in the field. Many other scenarios exist. For your specific conditions, please consult a biologist.

Native grassland with high-forb diversity and/or low goldenrod infestation

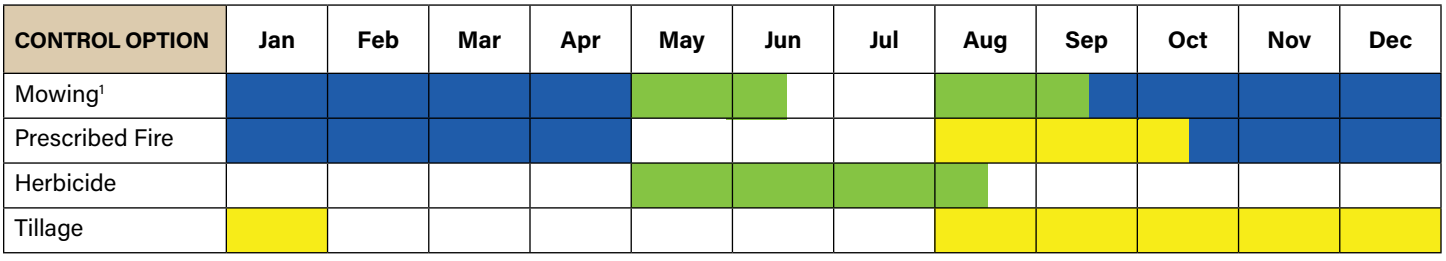
OPTION 1. MOWING	OPTION 2. HERBICIDE
Year 1 ▪ Utilize strategically targeted mowing (less than 50% of the field, unless necessary) during the early-growing season (mid-May for most of Indiana) ▪ Repeat spot mowing of any goldenrod in areas previously mowed in May, prior to flowering (Aug-Sep) **Year 2** ▪ Repeat timed mowing strategy of year 1. **Year 3+** ▪ Repeat mowing treatments as needed in areas with heavy goldenrod	**Year 1** ▪ If possible, prepare the site with an early season mowing (Apr) or dormant season prescribed fire. ▪ Spot treat goldenrod in May (mid to late May preferred for most of Indiana) with appropriate herbicide (see table) or Jul-Aug with metsulfuron methyl ▪ Spot treat any remaining goldenrod with appropriate herbicide during the growing season **Year 2+** ▪ Spot treat areas with dense goldenrod as needed.

Old field, native grass pasture, or CRP field with low forb-diversity and heavy goldenrod infestation[1]

OPTION 1. MOWING	OPTION 2. HERBICIDE
Year 1 ▪ Utilize strategically targeted mowing (less than 50% of the field, unless necessary) during the early-growing season (mid-May for most of Indiana) ▪ Repeat spot mowing of any goldenrod in areas previously mowed in May, prior to flowering (Aug-Sep) **Year 2** ▪ Repeat timed mowing strategy of year 1. **Year 3+** ▪ Repeat mowing treatments as needed in areas with heavy goldenrod	**Year 1** ▪ If possible, prepare the site with an early season mowing (Apr), or alternatively a late summer or even a dormant season prescribed fire. ▪ Broadcast or spot treat goldenrod in August with metsulfuron methyl **Year 2+** ▪ Spot treat goldenrod in May (mid to late May preferred for most of Indiana) as needed based upon infestation density with appropriate herbicides (see table).

[1] Of note, with extremely heavy goldenrod infestation or in instances where rhizomatic (root) development is extensive, herbicide application may be necessary as the primary option to control Goldenrod. A mowing regime (option 1) can then be employed as needed once initial goldenrod density has been reduced.

Control Timeline



Control[2]

Suppression[3]

Site Preparation[4]

[1] Must be mowed twice in a growing season to be effective

[2] Control = provides effective control of goldenrod

[3] Suppression = reduces vigor, dominance, or seed/rhizome production, but may not provide long-term control

[4] Site preparation = used prior to herbicide application to improve herbicide efficiency

Herbicide Recommendations

Active Ingredient	Trade Names[1]	Application rates[2]	Application Timing	Adjuvant Information[3]	Additional Information
aminopyralid + 2,4-D	GrazonNext HL, Forefront HL	**Broadcast:** 1.5–2.1 pints/ac (GrazonNext HL) **Spot Spray:** 3.6-5.1 oz per 3 gallon of water (GrazonNext HL)	Early to late May (variable statewide) when goldenrod is at least 8 inches tall and during early vegetative stage	Addition of NIS (0.25-0.5% v/v) recommended to improve efficacy on tough to control weeds.	Broad-spectrum selective herbicide. Applications will be residual limiting ability to re-seed treated area for extended time after application. Application will be selective and will treat all broadleaves (all grasses should remain unharmed).
aminopyralid + metsulfuron methyl	Chaparral, Opensight	**Broadcast:** 2-2.5 oz/ac (Chaparral) **Spot Spray:** equivalent to broadcast rate	Early to late May (variable statewide) when goldenrod is at least 8 inches tall and during early vegetative stage	Apply with COC/MSO (1% v/v), or NIS (0.25%). AMS (2 lb/A) or UAN (2 qts/A) can also be added for tough weeds.	Broad-spectrum selective herbicide. Will kill or damage many forbs in contacts. Many established native grasses are tolerant. Can suppress some grasses such as smooth brome. Does have soil residual activity.
clopyralid	Transline, Stinger	**Broadcast:** 0.33-0.66 pint/ac (Stinger) **Spot Spray:** 1/8-1/4 oz per gallon of water (Stinger)	Early to late May (variable statewide) when goldenrod is at least 8 inches tall and during early vegetative stage	Transline - For control of broadleaf weeds with broadcast applications, use a NIS at 1 to 2 qt per 100 gallons of spray solution. Stinger - Addition of adjuvants is not usually needed when applying Stinger, but a surfactant can increase effectiveness of the herbicide. However, it may also make non-target plants or crops more susceptible to injury.	Broadleaf selective herbicide. Will kill or damage other broadleaf plants (forbs) it contacts. However, some native forbs such as roundheaded lespedeza, showy goldenrod, and spiderwort have shown tolerance to clopyralid. Does have soil residual activity.
glyphosate	Roundup, Gly Star Plus, and others	**Broadcast:** 1.5–2 qt/ac **Spot Spray:** 2-3% solution by volume	Early to late May (variable statewide) when goldenrod is at least 8 inches tall and during early vegetative stage	Add AMS (2-3 lbs/A). Add NIS to improve control of tough to control species of if the formulation does not contain a spray adjuvant.	Broad-spectrum herbicide. Will kill or damage most plants (forbs or grasses) is contacts. Not soil active.
metsulfuron methyl	Escort XP	**Broadcast:** 1 oz/ac **Spot Spray:** 1 gram of Escort XP per gallon of water	Early to late May (variable statewide) when goldenrod is at least 8 inches tall and during early vegetative stage or July-August (prior to or during early flowering)	Apply with NIS at a minimum rate (concentration) of 0.25% v/v (1qt/100 gal of spray solution)	Many native grasses are tolerant to application. Provides control of problematic broadleaf species, including, sweetclover, wild carrot, curly dock, henbit, teasel, and poison hemlock.

[1] Product names are provided as examples and for educational purposes. Several other products with the same active ingredient may exist. Listing of the products does not constitute an endorsement.

[2] The rates for these applications are provided for one specific product as an example. These products are sold under several trade names with different concentrations (active ingredients per gallon). Be sure to read the label to determine application rates for specific products.

[3] Spray adjuvants, including surfactants, are supplemental products added to a spray mixture to improve the performance of the chemical. Please refer to the product labels for more information. AMS = ammonium sulfate, COC = Crop Oil Concentrate, MSO = Methylated Seed Oil, NIS = Nonionic Surfactant, v/v = volume/volume

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