COMMON HERBICIDES FOR INVASIVE CONTROL

This handout is intended to assist landowners in finding products for use in invasive plant control activities. It includes examples of specific herbicide products, sorted by active ingredient. **Always follow the label instructions of any herbicide product you use,** including instructions on mixing and applying the product. Different products are labeled for different sites and application methods, **products labeled for Aquatic Sites are listed in Blue.**

It is illegal to use these products in a manner inconsistent with their labeling, and you as the applicator are responsible for reading and following the label.

Many herbicide products and application equipment can be purchased at local hardware and farm stores. Find a wider selection at farm co-ops or online retailers such as forestry-suppliers.com, forestrydistributing.com, or Amazon.

Handout created by Emily Finch (Martin County Soil & Water Conservation District), Emily.Finch@in.nacdnet.net, 812-329-0048, with funding from a Clean Water Indiana Grant. **This list is not comprehensive, and inclusion does not constitute an endorsement of any herbicide product, brand, or vendor.** *Last updated February 2026*

Surfactants/Adjuvants

Adjuvants do not contain herbicide active ingredients, but labels often recommend adding them to help foliar herbicide be absorbed by plants. They are particularly useful when spraying leaves that are waxy, hairy, or have thick cuticles. Look for these products in the same places you would buy herbicide. Check both the Herbicide and Adjuvant product labels for details on when, where, and how to use them (**some are aquatic labeled**, others are not).

- **Non-ionic Surfactants:** The most common adjuvant, these break the surface tension of water and improve spray coverage/uptake on the leaves. Sometimes called NIS or 80/20 Surfactant, common rates are 0.25-0.5%.
- **Crop Oils/Seed Oils:** An alternative to non-ionic surfactants, often preferred for spraying grassy weeds or plants with thick cuticles. Common names include Methylated Seed Oil, MSO, or Bean Oil. Rates range from 0.25-1%.
- **Water Conditioner - Ammonium Sulfate (AMS):** Water hardness and pH can interfere with herbicide in solution. In particular, hard water binds to glyphosate and requires applicators to first add AMS to prevent this.

Non-selective, or mostly non-selective

Glyphosate

Non-selective, no residual activity in soil, regular & aquatic-labeled formulations. Multiple formulations and strengths make it important to compare labels for % active ingredient and acid equivalent (41% a.i. with 3 lb a.e./gal is common)

- **Roundup Pro** (note, homeowner Roundup products no longer contain glyphosate)
- **Compare N Save Concentrate Grass & Weed Killer 41% Glyphosate**
- **Accord XRT**
- **Farm General Grass & Weed Killer 41% Glyphosate**
- **Farm Works 41% Glyphosate Grass & Weed Killer**
- **Drexel Imitator Plus**
- **Razor Pro**
- **Ranger Pro**
- **GlyStar Plus**
- **Rodeo**
- **AquaNeat**
- **AquaMaster**
- **Drexel Imitator Aquatic Herbicide**
- **Farm General Aquatic Herbicide, 53.8% Glyphosate**

Imazapyr

Non-selective, pre or post emergent, prolonged soil residual activity (months to years), nearby trees can be damaged by root uptake (including oaks & walnuts)

- **Arsenal**
- **Polaris AC**
- **Stalker**
- **Chopper Generation II**
- **Habitat – Aquatic Formula**

Imazamox

Mostly non-selective, has residual activity in soil

- **Raptor**
- **Clearcast**

Sulfometuron

Non-selective, pre or post emergent, more mobile in soil than imazapyr, has persistant soil residual activity

- **Oust XP**
- **Spyder**

Broadleaf Specific (generally do not harm established grasses)

Triclopyr

Broadleaf specific, often used for woody invasive control, may have some residual soil activity. Multiple formulations, most common are **Ester (Oil Based)** or **Amine (water based).** Amine formulations can be labeled for aquatic sites, but have a Danger signal word due to corrosiveness and risk of irreversible eye damage. Ester formulations can be used for basal bark treatments, but must be mixed in an oil carrier, and are more likely to volatilize on hot days. Some formulations may be less volatile, see label for details.

- **Remedy Ultra –** Ester, non-petroleum
- **Garlon 4 –** Ester
- **Element 4 –** Ester
- **Triclopyr 4 –** Ester
- **Brushtox (Brush Killer)** – Ester
- **Garlon 3A –** Amine
- **Element 3A–** Amine
- **Renovate 3–** Amine
- **Vastlan –** Choline Salt formula
- **Pathfinder II RTU** – Ester, Ready to use formula for cut-stump & Basal Bark (no mixing)

Triclopyr + Fluroxypyr

Broadleaf specific, ester formulation that can be applied as a foliar, cut-stump, or basal bark application. Often used to control Sericea Lespedeza.

- **Pasturegard HL**
- **Cleargraze**

Triclopyr + 2,4-D

Broadleaf specific, take care to avoid volatization drift, particularly around oak trees which are sensitive to 2,4-D.

- **Crossbow**
- **Crossroads**

Clopyralid

Broadleaf specific, modest residual activity, often used on legumes, thistles, and other sunflower family plants

- **Transline**
- **Curtail**
- **Clopyralid 3**
- **Stinger**
- **Reclaim**

Picloram + 2,4-D

Only sold unrestricted as ready-to-use formula (RTU) for cut-stump or tree injections. Very effective on woody plants, however may move through tree roots into soil and damage other nearby sensitive tree species (such as Tulip Poplar, Hackberry, Walnut, and Oak).

- **Pathway Herbicide RTU**
- **Tordon RTU**

Metsulfuron methyl

Mainly broadleaf specific (most grasses are tolerant, see label for details), some residual activity in soil but primarily taken up by leaves

- **Escort XP**
- **MSM 60**
- **Opensight (Aminopyralid + Metsulfuron methyl)**

Grass Specific

Clethodim

Selective to grasses, no soil residual activity

- **Agri Star Clethodim 2E**
- **Intensity**
- **Arrest Max**
- **Arrow**

Fluazifop

Selective to grasses, binds to soil, no soil residual activity, not effective during drought conditions

- **Fusilade**

Sethoxydim

Selective to grasses, no soil residual activity

- **Poast**
- **Southern Ag Vantage Grass Killer**
- **Hi-Yield Grass Killer**

Other Specificity

Aminopyralid

Partially selective, effective on some annual grasses (stiltgrass) and many broadleafs (particularly legumes and thistles) but not perennial grasses. Long lasting residual activity in soil, do not spray near desirable legume species, including trees like redbud. NOT labeled for use in landscaped areas such as turf grass, comes with pasture warning concerning manure use.

- **Milestone**
- **Opensight (Aminopyralid + Metsulfuron methyl)**
- **Terravue (Aminopyralid + Florpyrauxifen-benzyl)**

Imazapic

Partially selective (see label for tolerant species), pre or post emergent, less soil residual activity compared to others, but still may damage sensitive trees (such as oak & hickory)

- **Plateau**
- **Panoramic 2SL**

Pre-Emergent Herbicides

Pre-emergent herbicides prevent germination of seeds in the area where they are applied. They are typically used on known locations of annual or biennial invasives, such as Japanese Stiltgrass. **Timing is critical!** Pre emergent only products must be applied BEFORE target seed germination, and usually require rain after application. Not all products or rates provide season-long control, and some may impact established plants. Read labels closely for details.

Pendimethalin

Pre emergent for most annual grasses and some small seeded broadleaf weeds

- **Pendulum Aquacap**
- **Prowl**

Prodiamine

Pre emergent control of grass and broadleaf weeds in turf & other sites.

- **Barricade 4FL**
- **Quali-Pro Prodiamine 4L**

Oryzalin

Applications can result in bare ground since it is not selective if applied at higher rates, and can remain active for several months. *(May be hard to find, supply issues)*

- **Surflan AS**
- **Quali-Pro Oryzalin 4**

Pre & Post Emergent Active Ingredients

Some active ingredients can be applied as a pre or post emergent treatment. See pages 1-2 for product names.

- **Imazapic**
- **Imazapyr**
- **Sulfometuron**

Quick Reference Guide for Mixing Herbicides*

**Adapted from the River to River CWMA handout*

How to use this reference guide: The chart below shows the amount of herbicide concentrate needed to obtain different commonly used solution strengths for many of the standard sprayer sizes. Each row represents a different mix volume (in gallons) with each column representing different solution strengths (given in volume/volume % solution).

Mixing the herbicide: Be sure to wear proper safety gear when handling, mixing, and applying herbicide. This usually includes eye protection, chemically resistant gloves, and long sleeves, but read the label instructions of your specific product for exact safety gear requirements. Only use dedicated measuring cups when mixing herbicde.

To mix, add one-third to one-half of the total water needed for the mix, then add the amount of herbicide denoted in the chart, followed by the remaining amount of water needed to reach desired mix amount. Read the label for information on necessity and rates for additives, such as surfactants and penetrants.

Fluid ounces of herbicide needed for desired solution								
Mix Amount	**0.5%**	**1%**	**2%**	**3%**	**5%**	**10%**	**15%**	**20%**
1 gallon	0.625	1.25	2.5	4	6.5	13	19	26
2 gallons	1.25	2.5	5	8	13	26	38	51
3 gallons	2	4	8	12	19	38	58	77
4 gallons	2.5	5	10	15	26	50	77	102
5 gallons	3.25	6.5	13	19	32	64	96	128
10 gallons	6.5	13	25	38	64 (2 qt)	128 (1 gal)	192 (1.5 gal)	263 (2 gal)
15 gallons	9.5	19	38	58	96 (3 qt)	192 (1.5 gal)	288 (1.75 gal)	384 (3 gal)
30 gallons	19	38	77	115	192 (1.5 gal)	384 (3 gal)	576 (4.5 gal)	768 (3.6 gal)
100 gallons	64	128 (1 gal)	256 (2 gal)	384 (3 gal)	640 (5 gal)	1280 (10 gal)	1920 (15 gal)	2560 (20 gal)

Conversion: 1 gallon = 128 ounces, 1 quart = 32 ounces, 1 pint = 16 ounces, 1 cup = 8 ounces

The Herbicide Label

It is important to read the label of any herbicide product before using to ensure user safety, environmental safety, efficacy, and to comply with legal requirements. **It is a violation of federal law to use these products in a manner inconsistent with their labeling**, and you as the applicator are responsible for this. Here are just some of the things to look for.

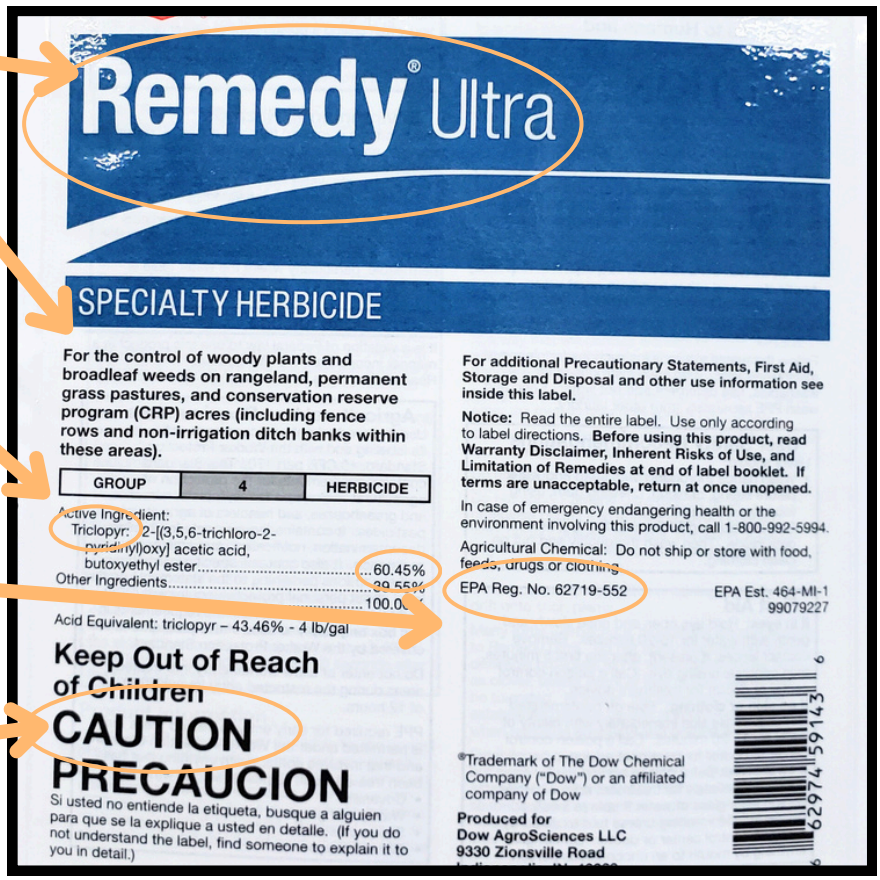
Product/Trade Name

Short description of product uses and labeled sites
(More details in full label)

Active Ingredient aka Chemical name, and concentration. *Glyphosate and Triclopyr herbicides in particular are often sold in multiple different strengths, marketed for different uses.*

EPA Registration Number
Use this to look up PDFs of the product Label and Safety Data Sheet online.

Signal Word
Indicates the potential hazard to humans unless used as instructed. Caution is the least toxic, followed by Warning, then Danger for the most toxic chemicals.



General Guidelines (Check label for more details specific to your product)

- **Personal Protective Equipment (PPE):** Wear long pants, long sleeves, shoes, safety glasses, and chemically resistant gloves when mixing or applying herbicides. After application wash your hands, and wash clothing with warm or hot water (separate from other laundry). Any clothing contaminated with concentrated herbicide should be discarded.
- **Weather Conditions:** When spraying, make sure the weather conditions are favorable with low winds, dry conditions, and no rain forecast (unless needed for pre-emergent application). Most applications require 2+ hours without rain, some may also have temperature restricts to avoid product volatilization in hot weather, or freezing in cold weather. Applications to drought stressed plants may not be effective.
- **Storage**: Product labels will detail storage requirements, including temperature. Some cannot be frozen, others may undergo freezing if reagitated once thawed (take care as frozen containers are more likely to leak).
- **Disposal & Cleaning**: Leftover herbicide sprays can be applied to a labeled site to empty the sprayer (do not exceed max use rates). **Triple-rinsing** is used to clean empty sprayers or containers. Fill the sprayer/container to at least 10% of its total volume, shake/circulate, then dispense through the entire container (including hoses/nozzles). Repeat 3 times. Capture rinse water to reuse in future herbicide mixing, or apply to a labeled site (do not dump in waterways or down the drain). Contact your local solid waste or recycling center for instructions on recycling or disposing of old herbicide (considered hazardous waste) or triple-rinsed containers.
- **Emergencies and First Aid:** If an herbicide spill has the potential to threaten any ground water or surface water in Indiana, it must be reported immediately to **IDEM at 1-888-233-7745.** If herbicide gets on skin, remove contaminated clothes and wash the herbicide off as soon as possible. If herbicide gets in eyes, wash out the affected eye as quickly but gently as possible with water. Consult the herbicide label for first aid directions and see a doctor if necessary.

State Pesticide Regulations: Each state has their own agency that works cooperatively with the U.S. EPA to enforce pesticide regulations, respond to potential complaints, and license private and for-hire applicators. In Indiana, this is the **Indiana State Chemist, https://oisc.purdue.edu/ or 765-494-1492.**
To find your state's contact details, go to https://npic.orst.edu/reg/state_agencies.html.

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