

## TERMINATING COVER CROPS

# Successful Annual Ryegrass Termination with Herbicides

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Annual ryegrass has become a popular cover crop choice for growers in Indiana and many other states. Annual ryegrass has many attributes that make it a favorable cover crop including quick establishment across a wide range of environments, the ability to survive Midwest winters, a vigorous and aggressive vegetative growth habit, and a high biomass potential both above and below the soil line. Annual ryegrass is also valued for its ability to sequester and release nitrogen for corn production.

Unfortunately, its adaptability, quick establishment, and aggressive growth are also considered to be characteristics of a weed. The annual ryegrass we know as a cover crop is the same species (*Lolium multiflorum*) as Italian ryegrass, which has become a major pest in both the southern Mississippi Delta and Pacific Northwest. Italian ryegrass is not only tough to control, it also has been confirmed resistant to four herbicide sites of action in the United States: ACCase inhibitors (Group 1), ALS inhibitors (Group 2), glyphosate (Group 9), and glufosinate (Group 10).

This species' aggressive growth aspects and its ability to adapt to herbicides has made many weed scientists cautious about recommending it as a cover crop. While annual ryegrass has shown to be an excellent cover crop it is also the most difficult grass cover crop to terminate, so should only be grown by experienced cover crop users.

Many farmers without previous cover crop experience have failed to terminate annual

ryegrass and allowed the intended beneficial cover crop become a major weed in their cash grain crop. Once the annual ryegrass escapes management all the way to reproduction, the seed can remain viable, yet dormant, in the soil for several years — another weedy characteristic that you would not associate with cultivated crops.

This publication provides general guidelines for successful termination of annual ryegrass with herbicides using data acquired at Purdue University. We also will consider seed varieties, termination timing, and herbicide adjuvants.

## Things to Consider Before Planting

There are a few things you should consider before planting annual ryegrass as a cover crop. First, as with any cover crop you should remember that it is still a “crop” and it requires management. Anybody who has the mentality of “I’ll throw some seed out there and collect the government check,” is likely going to have a bad experience with any cover crop, especially when using annual ryegrass.

The ease with which you are able to terminate annual ryegrass begins when you buy the seed. There are limited seed quality regulations for cover crops, so be careful about what genetics you are buying and planting.

You can buy certified “Blue Tag” seed that is certified by the Oregon Seed Certification Service. This ensures you are buying a pure ryegrass variety, although it can be tough to find this certification on

seed due to the stringent policies governing the certification process.

There are plenty of uncertified annual ryegrass varieties available, but be aware of what you are buying. If you buy uncertified seed, make sure that the bag contains a single variety and does not contain seeds of multiple maturities, perennial ryegrass varieties, or any weedy ryegrass varieties.

It is best to purchase annual ryegrass seed from a cover crop dealer rather than from whatever is on the pallet in the back at the local farm store. If you purchase and plant seed that contains multiple varieties with varying seed dormancies, then it is possible that even after a successful termination, more ryegrass will continue to emerge and become a pest rather than a favorable crop.

A more common challenge associated with multiple variety seed mixtures is that they can result in a spring stand of annual ryegrass with various growth stages or heights, which makes it very difficult to select a single herbicide application timing that is ideal for all the varieties that are present.

### Herbicide Application Timing

Without argument, the most difficult part of using herbicides to terminate an annual ryegrass cover crop is application timing. The goal of a successful cover crop is to cover the field during fallow times between cash crops and to be absent when the cash crop is being grown.

With annual ryegrass, this not only means successfully killing the plants that exist, but also not allowing those plants to produce any seed that will become weeds in the future. While it may sound easy enough to make an application before seed production, there are many factors that can complicate the timing.

Annual ryegrass can begin producing flowers and seed heads in early May. In some springs (especially in Indiana), it can be very difficult to get into fields before early May to apply herbicides because the soils are saturated. Also, many of the herbicides we rely on for cover crop termination (namely glyphosate) are translocated, so they require warm air temperatures that favor active plant growth.

That makes it difficult to find the “sweet spot” of making applications in the limited application window constraints, which include:

- Field soil moisture conditions that allow for equipment to enter and pass over
- Air temperatures that consistently remain above 45°F for three to five days
- Spraying before annual ryegrass reaches 8 inches tall and prior to seed head production

At our research site in Tippecanoe County, Indiana, the timing for annual ryegrass termination has typically occurred between April 15 and May 1. In our research trials, we are able to walk on our herbicides with backpack sprayers even when soils were highly saturated (which often occur at this time). Of course, backpack sprayers are not an option for farmers with large equipment.

The timing of the herbicide application is so critical that some cover crop experts have recommended using a pull-type ATV sprayer when field conditions prevent a timely application from a heavier commercial sprayer.

### Herbicide Rates and Combinations

The purity of the seed variety, the timing of the termination application, and the herbicide program used to terminate the ryegrass are important in the success of terminating annual ryegrass. Most termination applications will rely solely on glyphosate or a tank mix that includes glyphosate.

Purdue research has shown, and we strongly recommend, that you use at least 1.25 lbs. ae/A of glyphosate (36 fl. oz. Roundup PowerMax®) to terminate annual ryegrass. Under less-than-ideal conditions, rates of 2.5 lbs. ae/A of glyphosate are preferred.

You may consider tank mixing herbicides to help control other weeds or cover crops present in the field. Purdue researchers evaluated a variety of tank mixes.

Our findings were:

- Mixing 1 oz./A of Sharpen® with 1.25 lbs./A of glyphosate provided the most consistent control of annual ryegrass at all application timings
- Adding 2,4-D, dicamba, and Basis Blend® did not increase or decrease termination efficacy compared to glyphosate alone
- Adding a PS-II inhibiting herbicide (atrazine and metribuzin) can result in antagonism of glyphosate and fail to terminate the annual ryegrass

# Successful Annual Ryegrass Termination with Herbicides

Figure 1. Annual ryegrass control provided by various products 14 days after application to 4- to 6-inch tall ryegrass in 2015 in Lafayette, Indiana.

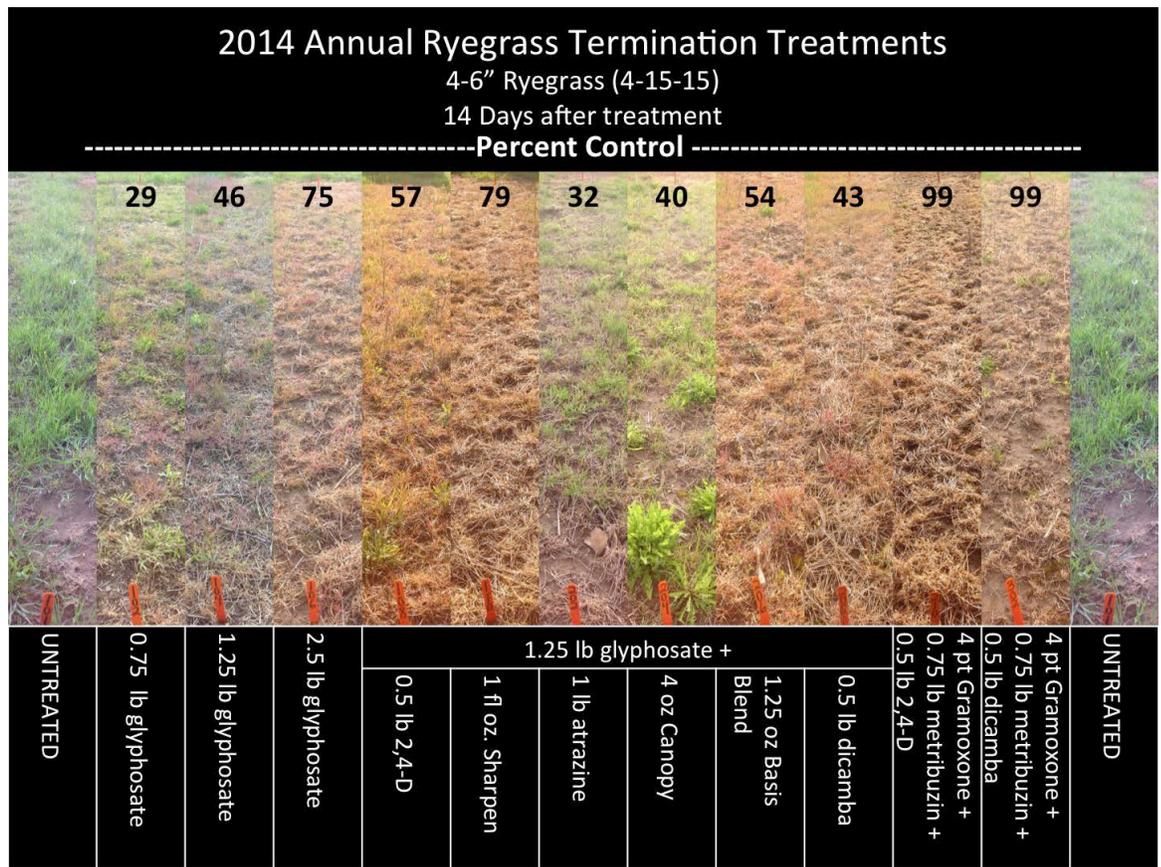
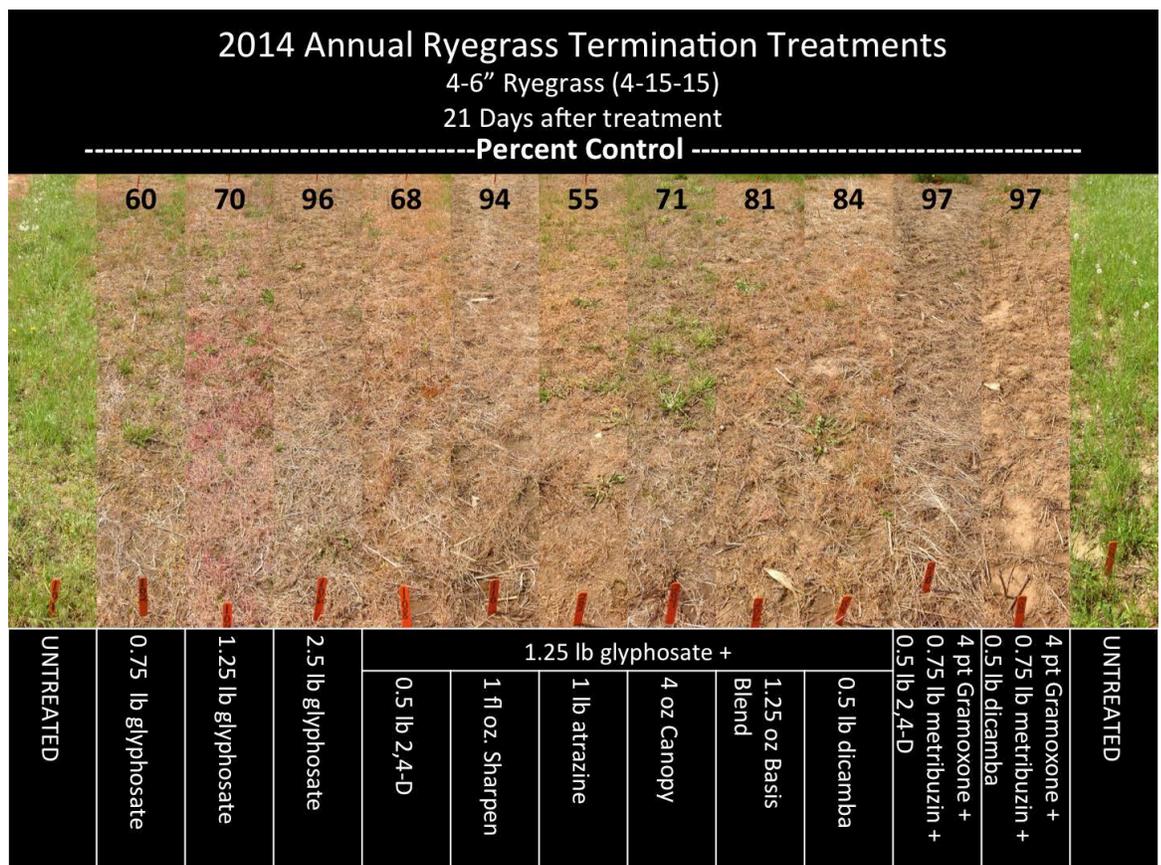


Figure 2. Annual ryegrass control provided by various products 21 days after application to 4- to 6-inch tall ryegrass in 2015 in Lafayette, Indiana.



Some farmers may desire to avoid terminations that rely on glyphosate. In such cases, combining Gramoxone® (paraquat) plus metribuzin plus 2,4-D or dicamba can be used to terminate annual ryegrass. This combination is only recommend to be used on ryegrass that is less than 6 inches tall. You can also consider this combination when temperatures have remained cool, because contact activity of paraquat and metribuzin products rely less on actively growing plants than the glyphosate-based programs.

### Adjuvants

Because the weather is often challenging at the time of termination, farmers are often tempted to try new adjuvant combinations with the hopes of overcoming those challenges. It is still recommended that you use adjuvants that are listed on manufacturer labels only.

In the case of glyphosate, it is always recommended to use ammonium sulfate (AMS) to condition hard water. Using citric acid has become a popular replacement for AMS, but we would warn that citric acid lacks some of the desired characteristics of AMS. Citric acid does condition hard water by binding to magnesium and calcium molecules, but it lacks the ammonium or nitrogen source that helps the glyphosate move efficiently

into the target plant and translocate to the grass meristem. Thus, using the full rate of AMS at 17 lbs./100 gals. of spray solution is still the best adjuvant recommendation for terminating annual ryegrass with glyphosate.

When you use the recommendation provided above of 1 oz. of Sharpen® plus glyphosate, always remember to use MSO at 1% v/v plus AMS for this herbicide combination.

### Conclusion/Summary

Midwestern farmers who are considering annual ryegrass as a cover crop should be aware that this species can be very difficult to terminate and has a high potential to become a weed. If you use annual ryegrass, you will need to buy seed from a trusted source that contains pure varieties and lacks weedy ryegrass varieties. When you plan herbicide applications to terminate annual ryegrass, you need to consider weather conditions, annual ryegrass growth stages, and the rates/combinations of the herbicides you will use to terminate the annual ryegrass cover crop.

Find more publications in the *Terminating Cover Crops* series at the Purdue Extension Education Store: [www.edustore.purdue.edu](http://www.edustore.purdue.edu).

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