



## Controlling Cover Crops Prior to Planting

### Key Points

- If you planted a multi-species cover crop, evaluate the species that emerged.
- Timing is critical for removal.
- Control methods include winterkill, mechanical, and herbicide application.
- Use full labeled rates of herbicides and scout fields after application to evaluate if additional control is needed.
- Check with your local FSA Office concerning cover crop termination dates to maintain program eligibility.

Cover crops can offer many benefits including reducing soil erosion, improving soil quality, and depending on species, provide nitrogen for subsequent crops or reduce soil compaction. Cover crops include grasses, legumes, brassicas, and even mixtures of all three plant groups (Table 1). Controlling cover crops prior to spring planting can be a challenge under some circumstances. Start by reviewing the species that are present in your cover crop. Do you have both grasses and broadleaves? Do you have cereal rye or annual ryegrass? Planning ahead is critical for a successful control program.

### Timing

Removal of cover crops is influenced by the species that are present, their growth stage, temperature, and crop to be planted. Termination four to eight weeks prior to spring planting may allow for faster soil warming, residue drying, and decomposition.<sup>5</sup> However, when using a nitrogen source legume cover crop, termination less than four weeks prior to planting can be advantageous by allowing more biomass to be produced.

### Control Methods

Methods to control cover crops include winterkill, tilling, mowing, and applying herbicides. A survey of farmers, conducted in the winter of 2013-2014, indicated that approximately 48 percent of cover crop growers applied herbicides, 21 percent used tillage, 20 percent depended on winterkill, 10 percent used mowing, 1 percent used a roller-crimper, and 6 percent used some other method to control cover crops.<sup>1</sup>

**Winterkill.** Winterkill can be an effective control method but is only possible in northern climates and for certain cover crops that are susceptible to the first hard frost (temperatures below 25° F) such as turnip and radish.<sup>2</sup>

**Mechanical.** While tillage is the second most common method of terminating cover crops, tillage can be expensive and may reduce the soil conservation benefits of cover crops. Also, mechanical methods include the use of a roller-crimper or mower. Roller-crimpers (mechanical rollers) can be used to kill tall-growing cover crops by breaking or crimping the stem. This method can be effective when used on cover crops at the flowering stage or later.<sup>2</sup> Mow-kill is a method of cover crop removal that is effective on some species. Cover crop re-growth and residue distribution should be evaluated when mowing is used for termination.

**Herbicide Control.** Consider the following when selecting herbicides for cover crop control: the cover crop and weed species that are present, their growth stage, the crop to be planted, weather conditions at application, and whether the chosen herbicide has contact or systemic properties.<sup>3</sup> Also, note that cover crop mixtures of grasses and broadleaves have different plant heights and structures that require non-selective herbicides for control. Large plants that are bolting, jointing, or in reproductive stages may need greater herbicide rates or additional control methods.

**Table 1. Examples of Cover Crop Species**

Grasses	Legumes	Brassicas
Annual Ryegrass	Red Clover	Oilseed Radishes
Cereal Rye	Field Peas	Turnips
Wheat	Hairy Vetch	Mustard species
Oats	White Clover	Kale

Source: Midwest Cover Crop Council. [www.mccc.msu.edu/](http://www.mccc.msu.edu/)

Non-selective herbicides include contact herbicides (paraquat, glufosinate) and systemic herbicides (glyphosate). Additional systemic herbicides that are selective for broadleaves include 2,4-D and dicamba. Systemic herbicides translocate (move within the plant) to the plant's site of action, but the rate of translocation is influenced by plant metabolism. Actively growing crops under warm temperatures have higher metabolism rates that move systemic

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herbicides to their site of action more quickly. Therefore, applications should be made after three to four days of daytime temperatures in the high 50° to low 60° F range and nighttime temperatures greater than 40° F.<sup>4</sup>

Use the correct rate of Roundup PowerMAX® herbicide (4.5 lb ae/gal). Use at least 44 fl oz/acre for spring application and a minimum of 32 fl oz/acre for fall application. Add ammonium sulfate (AMS) at the rate of 8.5 lb to 17 lb (or 2.5 to 5 gal liquid AMS) per 100 gal spray solution. Consider tank mixing an additional herbicide such as 2,4-D (1 to 2 pt/acre) if broadleaf species are present. When filling the sprayer, follow the proper mixing order as follows: water, AMS, dry product, agitate, drift control agent, liquids, and lastly glyphosate. To ensure good coverage spray volumes should be 10 to 15 GPA, with nozzles that produce medium to coarse droplets. Other herbicides may be necessary if weed species are present; however, herbicides used to terminate cover crops should be selected to avoid carryover to spring-planted commercial crops.

## Tips for Annual Ryegrass Removal

Roundup® brand glyphosate-only agricultural herbicides should be used at a full labeled rate. Cereal rye and annual ryegrass are commonly used for cover crops; however, each has distinct characteristics. Usually both are planted for their nitrogen scavenging ability; however, annual ryegrass may “take up and store” more nitrogen compared to cereal rye.<sup>6</sup> Generally, cereal rye is more sensitive to glyphosate application compared to annual ryegrass.<sup>6</sup> Avoid tank mixtures of Roundup® brand glyphosate-only agricultural herbicides with atrazine or HPPD inhibitor herbicides (mesotrione, tembotrione, isoxaflutole). Control of annual ryegrass is most effective when herbicides are applied prior to forming of the first node/joint and the plant is actively growing. Once the third node/joint appears, control is reduced because of limited translocation as active growth within the plant goes toward reproduction/seed formation. Scout fields to confirm complete death of all plants and to determine if additional control methods are needed. A second herbicide application with an alternate site of action, such as a tank mix of Gramoxone® brands + atrazine, (for going to corn only) should be considered. Herbicide applications late in the day, approximately three to four hours before sunset, should be avoided.

## Federal Crop Insurance Eligibility

USDA agencies (Farm Service Agency (FSA), Natural Resources Conservation Service (NRCS), Risk Management Agency (RMA)) have updated their cover crop termination requirements. In order to maintain farm program eligibility for federal crop insurance on spring planted crops and other programs, check with your local Farm Service Agency (FSA) concerning specific cover crop termination dates for your area.<sup>7</sup>

## Summary

- Cover crop species differ in their ability to survive winter conditions.
- Herbicides are often the preferred removal method compared to tillage for overwintered cover crops, as tillage can decrease some of the benefits of cover crops.
- If herbicides are used, control is improved when application occurs during active plant growth and not in the reproductive stage.
- To help manage the seed bank, cover crops should generally be removed prior to setting seed.
- Check with your local USDA Farm Service Agency (FSA) concerning cover crop termination requirements for your area.

## Sources

<sup>1</sup>2014. 2013-2014 Cover crop survey report. Conservation Technology Information Center and North Central Sustainable Agriculture Research and Education. [www.ctic.org](http://www.ctic.org). <sup>2</sup> Clark, A., Bowman, G., Cramer, C., and Shirley, C. 2007. Managing cover crops profitably, Third edition. Handbook series book 9. Sustainable Agriculture Network. [www.mccc.msu.edu](http://www.mccc.msu.edu). <sup>3</sup> Legleiter, T., Johnson, B., Jordan, T., and Gibson, K. 2012. Successful cover crop termination with herbicides. WS-50-W. Purdue University. [www.extension.purdue.edu](http://www.extension.purdue.edu). <sup>4</sup> Loux, M. 2007. Burndown herbicide activity—can we kill anything when it's this cold? C.O.R.N. Newsletter 2007-08. The Ohio State University. <http://agcrops.osu.edu/newsletters/2007/08>. <sup>5</sup> Schomberg, H. and Balkcom, K. 2009. Cover crops. Soil quality for environmental health. [http://soilquality.org/practices/cover\\_crops.html](http://soilquality.org/practices/cover_crops.html). <sup>6</sup> Plumer, M. 2013. Personal communication. <sup>7</sup> 2014. NRCS cover crop termination guidelines. USDA. <http://directives.sc.egov.usda.gov/OpenNonWebContent.aspx?content=36437.wba> <sup>8</sup> Cover crop species. Midwest cover crop council. [www.mccc.msu.edu](http://www.mccc.msu.edu). Web sources verified 02/16/16. 140210080215.

For additional agronomic information, please contact your local seed representative.

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