

Managing Cover Crops Prior to Planting Corn

Cover crops can provide many benefits including weed suppression, reduction of soil erosion, improvement of soil quality, and—depending on the species of cover crop—provision of nitrogen for subsequent crops. Cover crops include grasses, legumes, brassicas, and even mixtures of all three. However, cover crops that compete with the growth of the primary crop, like corn, may defeat their purpose. Effective control or termination of the cover crop generally is necessary before the emergence of the primary crop. Commonly used cover crop termination methods include:

- Tillage
- Crimping
- Mowing
- Herbicides
- Selection of species that winterkill or have a short life cycle

Q – Is timing critical when terminating a cover crop?

A – While it depends on the crop, it is important to terminate the cover crop at the correct time. For a field going to corn, the best management practice is to terminate 10 to 14 days ahead of corn planting. Timing is less critical when planting to soybean; however, killing the cover crop prior to emergence reduces the risk of lowered yield potential.

Q – What are the advantages of using tillage to terminate cover crops?

A – Tillage not only terminates most cover crops but also incorporates them into the soil, allowing them to break down quickly and add nutrients to the corn crop. Chisel plowing is often necessary if large amounts of cover crop biomass are present. Chisel plowing followed by disking may be inadequate for certain cover crops such as cereal rye if large amounts of residue are present. Terminating cereal rye early is critical for managing the amount of residue that will need to be incorporated with tillage. Tillage, however, will break soil aggregates, reducing soil organic matter by accelerating its decomposition and releasing carbon into the atmosphere.

Q – What are the advantages of using a crimper or roller to terminate cover crops?

A – Crop rolling or “crimping” is becoming a common way to mechanically terminate cover crops. Crimpers are rolling steel drums with blunt steel blades, which are either pulled by or front mounted on a tractor. As the crimper rolls through a cover crop, the blunt blade “crimps” or injures plant stems. The blades are usually curved or positioned in a chevron pattern at a 7-degree to 100-degree angle to reduce bouncing and soil movement, and to increase the maximum pressure placed on plant stems. If crimping is done properly, a 90 to 100% kill rate is possible without the use of herbicides. This method can be used to kill grass cover crops, vetches, annual clovers, buckwheat, and multi-species cover crops. However, crimpers do not work well with perennial cover crops like red clover, alfalfa, or annual ryegrass.

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Crimping provides the best results when used on annual cover crops, when the heads or flowers are in the “boot” or head stage, near the end of the plant growth cycle. Advantages of crimping include the ability to kill cover crops mechanically while suppressing weeds by forming a mulch, which also decreases summer soil temperatures. A disadvantage of crimping is that the cover crop has to be crimped at the right stage (boot or head stage) for this termination method to be effective. Crimping cover crops works well when planting to corn or soybean but does not work well when planting to small-seeded crops.

Q – Can mowing be effective in terminating cover crops prior to planting corn?

A – Mowing can be used to successfully terminate certain cover crops prior to planting the primary corn crop. Producers should mow hairy vetch when the first purple flowers are visible. Mowing vetch prior to flowering can fail to provide adequate control and can result in both crop competition and the production of vetch seed if the cover crop is allowed to flower after regrowth, which could affect future crop production. Mowing vetch after pod formation may result in seeds being deposited into the soil, which may impact subsequent crops.

Where cereal grain is used for cover crops, producers should mow after heading to ensure successful termination. Mowing prior to head emergence will likely result in regrowth from tillers. Regrowth from cereal grains harvested for forage in the boot stage of growth is a common problem for producers who do not use an appropriate herbicide program or tillage.

Q – Which cover crop plants can be either mechanically incorporated or mowed prior to planting corn?

A – Certain cereal crops such as oats, wheat, and triticale can be mechanically incorporated, mowed after heading, or used as a forage crop.

Q – Can herbicides be used to successfully terminate cover crops prior to planting corn?

A – Herbicide use for terminating cover crops prior to planting corn is dictated by the cover crop being used, any weed species present, and the stage of growth of both the cover crop and weeds. Large plants that are bolting, jointing, or in the reproductive stage of growth may need greater rates of herbicide or additional control methods such as crimping, mowing, or tilling.

Non-selective herbicides and systemic herbicides are the primary classes of herbicides that should be used for best control. Actively growing crops in warm environmental temperatures have higher metabolic rates that move systemic herbicides to their site of action more quickly. Applications should be made after three to four days of daytime temperatures in the high 50 to 60 °F (10 to 15.5 °C) range and with nighttime temperatures greater than 40 °F (4 °C).

When using herbicides for terminating cover crops, use the correct rate. With certain herbicides, like glyphosate, the addition of ammonium sulfate (AMS) will help the activity of the herbicide. If broadleaf weeds are present, consider a tank mixture with a growth regulator at the recommended rate.

To ensure good coverage, spray volumes should be 10 to 15 gallons per acre (94 to 140 liters/hectare), with nozzles that produce medium to coarse droplets. Additional herbicides may be necessary if weed species are present; herbicides used to terminate cover crops should be selected to avoid carryover to emerging corn plants. Check with your herbicide provider for specific herbicide recommendations and treatment rates for your area.

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Q – What is the best control measure for terminating annual ryegrass?

A – Glyphosate should be used at a full labeled rate for ryegrass control. Cereal rye and annual ryegrass are commonly used as cover crops, and each species has distinct characteristics. Both species have nitrogen scavenging abilities, though annual ryegrass may take up and store more nitrogen compared to cereal rye. Generally, cereal rye is more sensitive to glyphosate compared to annual ryegrass. Avoid tank mixes of glyphosate with atrazine or HPPD inhibitor herbicides. Termination of annual ryegrass is most effective when herbicides are applied before the formation 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. Growers should scout fields to confirm complete death of all rye plants and to demine if additional control methods are needed. An additional herbicide application with an alternative site of action could be considered when going to corn. Avoid applications of systemic herbicides three to four hours before sunset.

Q – Which cover crops are controlled by winter kill?

A – Winter kill can be an effective termination method but is only possible in northern climates. Certain cover crops that are susceptible to the first hard frost (temperatures below 25 °F) can be terminated by winter kill. Examples of cover crops that will winter kill are turnips, radishes, field peas, and oats.

Q – What is the nitrogen credit for cover crops?

A – There is a short video from the University of Minnesota that provides information on how to assess the nitrogen credit for various cover crops⁸, see https://www.youtube.com/watch?v=zumgLm_6HKY.

Q – Does the Risk Management Agency have an incentive plan for the use of cover crops?

A – Yes. Contact your local Risk Management Agency Office for details.

Q – What should be considered if planting corn into a “green” cover crop?

A – If planting into a living or green cover crop, adequate nitrogen should be applied at planting, the opener discs on the planter should be sharp and well-maintained, planting depth must be correct, and the seed slot should be properly closed.

Q – What other considerations are there for controlling cover crops prior to planting corn?

A – The Midwest Cover Crop Council has specific information on controlling cover crops for many states and provinces. See, <https://www.midwestcovercrops.org/>.

The USDA agencies—Farm Service Agency (FSA), Natural Resources Conservation Service (NRCS), and Risk Management Agency (RMA)—have updated their cover crop termination requirements. To maintain farm program eligibility for federal crop insurance on spring-planted crops and other programs, check with you local FSA for specific cover crop termination dates for your area.

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Sources

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Performance may vary, from location to location and from year to year, as local growing, soil and environmental conditions may vary. Growers should evaluate data from multiple locations and years whenever possible and should consider the impacts of these conditions on their growing environment.

The recommendations in this material are based upon trial observations and feedback received from a limited number of growers and growing environments. These recommendations should be considered as one reference point and should not be substituted for the professional opinion of agronomists, entomologists or other relevant experts evaluating specific conditions.

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