



United States Department of Agriculture

Natural Resources Conservation Service (NRCS)
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Terminating Cover Crops with a Roller Crimper

Cover crops are crops that are planted for soil improvement, not the direct production of food or fiber. Cover crops can solve resource concerns such as lack of soil organic matter, weed suppression, or erosion control. One of the most important considerations for integrating cover crops into a cropping system is how to effectively terminate the cover crops before planting the commodity crop.

Basic termination methods:

- 1) Chemical or herbicide burndown
 - a. Advantages: reliability, simplicity, no need to purchase new equipment
 - b. Disadvantages: cost of possible additional herbicides, tall plants can lodge and complicate planting, not suitable for organic operations
- 2) Mowing/chopping
 - a. Advantages: no need to purchase new equipment, suitable for organic operations
 - b. Disadvantages: Residue is unevenly distributed and may complicate planting of cash crop
- 3) Grazing
 - a. Advantages: can be profitable, contributes nutrients, may be suitable for organic operations
 - b. Disadvantages: labor-intensive operation for fence, water setup, utilization must be closely monitored to ensure the conservation purpose is not compromised, some producers may not have livestock
- 4) Roller-crimper
 - a. Advantages: cover crop residue is evenly distributed for planting, residue mat may discourage weed competition, may be suitable for organic operations, residue mat keeps crops like pumpkins from resting directly on soil surface
 - b. Disadvantages: new equipment must be purchased or fabricated, cover crop must be planted early and terminated at proper growth stage, herbicide may have to be used



Figure 1: Rear-mounted roller crimper

What is a roller-crimper?

The roller-crimper is a front (Figure 2) or rear-mounted (Figure 1) implement that crushes and creases plant stems so that growth is terminated. The implement is a hollow cylinder (that can be filled with water for weight) with welded blades in a chevron pattern that is mounted on a three-

point hitch or front-end loader. Roller-crimpers are effective in killing annual plants when crimping is performed at the correct growth stage. Cover crops treated with a roller crimper provide a flattened intact mat of mulch that is oriented in the same direction for planting.

How does the roller-crimper terminate growth?

- Annual plants like cereal rye only have enough energy to flower and then senesce (die). Roller crimping disrupts plant energy flow by breaking the stem and the plant dies.
- For grasses, crimping must be done at the soft dough stage (when seeds are filling but are not hard or ripe). For legumes and broadleaves, crimping must be done at early seed pod fill or at full flowering. Some studies have found that herbicide rates may be reduced if applied in conjunction with roller-crimping at the proper growth stage (Ashford and Reeves, 2003). However, always apply herbicides according to label instructions or seek assistance from county extension agents.
- Using the roller-crimper at grass boot stage (right before flowering) is not recommended.
- Plants should be greater than 14 inches in height to maximize crimping.

General recommendations for terminating a cover crop with a roller-crimper

- 1) Termination success is directly related to plant maturity: more mature cover crops are easier to kill.
- 2) Include a grass species with a climbing legume (such as vetch or Austrian winter pea) in cover crop seed mix if termination method is expected to include the roller crimper. The legume uses grass for support and reaches a greater height. Greater plant height is associated with more effective termination.
- 3) Be aware of potential issues associated with allowing cover crops to become mature: nitrogen immobilization for cash crop, dry seedbed for cash crop planting, the need for no-till equipment at planting, etc.



Figure 2: A front-mounted roller crimper allows simultaneous cover crop termination and cash crop planting.



Figure 3: The roller crimper has crimped (bent) the cereal rye stem so growth will be terminated. Note that the crimper does not break the stem, so all residue is crushed evenly in the same direction.

Ashford, D.L. and D.W. Reeves. 2003. Use of a mechanical roller-crimper as an alternative kill method for cover crops. Amer. J. Alt. Ag. 18:37-45.