

Cover Crop Termination



How to Integrate Herbicides with Roll-Crimping

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Delaying cereal rye termination until at or after cash crop planting, known as “planting green,” results in additional considerations for herbicide burndown programs. Depending on your cash crop planting date, planting green may allow cereal rye to advance to the stem elongation or anthesis (flowering) growth stages. In this scenario, many growers use roll-crimpers as a residue management tool to improve crop establishment, which may influence herbicide selection and application timing management decisions.

1. Know the limits of roll-crimping termination efficacy.

In the Mid-Atlantic region, targeted corn and soybean planting dates typically occur prior to cereal rye growth stages that permit high levels of control with a roll-crimper (Fig 2). Previous studies in this region have demonstrated that roll-crimping efficacy does not exceed 90% until late-anthesis. This work and previous cropping systems experiments have also demonstrated that even well-timed roll-crimping does not result in complete cereal rye control, which can result in volunteer cereal rye weed management challenges.

Therefore, we recommend that herbicide programs be used as the primary method for controlling cereal rye regardless of its growth stage at termination. Consider focusing on roll-crimping to create a surface mulch for improved crop establishment and weed control.

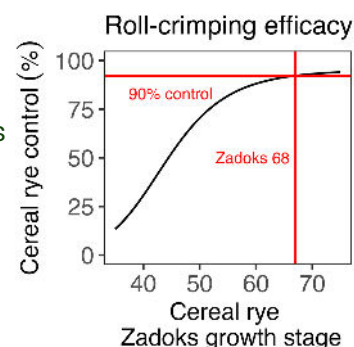


Fig. 2. Adapted from Mirsky et al. 2009

2. Optimize the roll-crimping & burndown sequence for cereal rye control.

In this region, glyphosate-based burndown programs are equally effective for controlling cereal rye whether applied before or after roll-crimping operations (see Table 5 - other side). Delaying cover crop termination likely results in warmer weather conditions at the time of burndown application, which improves the activity of systemic herbicides such as glyphosate. However, we also continue to see slower mortality and reduced efficacy when glyphosate is tank-mixed with atrazine at these later growth stages.

In contrast, the efficacy of paraquat decreases when cereal rye termination is delayed until later growth stages (Table 5). Tank-mixing paraquat with atrazine improves control of cereal rye at later growth stages, and our results indicate that the combination of roll-crimping and burndown applications results in better control compared to applications made to standing cereal rye stands.

3. Combine roll-crimping and burndown applications for legumes and brassicas.

Applying systemic herbicide combinations (glyphosate + 2,4-D LVE or glyphosate + dicamba) after roll-crimping operations is effective for controlling grass-legume mixtures such as cereal rye/hairy vetch or cereal rye/crimson clover. Research in the southern Mid-Atlantic region suggests that the combination of roll-crimping and glyphosate + 2,4-D LVE or glufosinate + 2,4-D LVE may be necessary for consistent control of rapeseed and other hard-to-control brassica species, especially at late flowering stages.



Table 5: Effectiveness of herbicides for cereal rye termination

Effectiveness of burndown herbicides and tank-mixtures for control of cereal rye 28 days after treatment (DAT) at various growth stages (flagleaf, boot, mid-heading, early-anthesis) and residue management strategies (roll-crimping).

Control ratings (1-10) based on Mid-Atlantic field trials.

Control ratings of 9 or greater should be selected to optimize control of cover crops.

Corn or soybean program*	Flagleaf to Boot Stage	Mid-heading to early-anthesis	
		Application into standing cover	Application after roll-crimping
glyphosate (0.75 lb ae; 15 gpa)	9+	9+	9+
paraquat (0.5 lb ai; 20 gpa)	9	8+	8+
Corn program			
glyphosate (0.75 lb ae) + atrazine (1 lb ai)	9+	8+	8+
paraquat (0.5 lb ai) + atrazine (1 lb ai)	9+	9	9+

*glyphosate at 0.75 lb ae is equivalent to Roundup PowerMax 3 at 19 fl oz; paraquat at 0.5 lb ai is equivalent to Gramoxone SL 3 at 1.3 pt

Citations

- Askew et al. (2019) Chemical termination of cover crop rapeseed. Weed Technology 33:686-692
- Mirsky et al. (2009) Control of cereal rye with a roller-crimper as influenced by cover crop phenology. Agronomy Journal 101:1589-1596
- Keene et al. (2017) Cover crop termination timing is critical in organic rotational no-till systems. Agronomy Journal 109:272-282
- Kumar et al. (2023) Cover crop termination options and application of remote sensing for evaluating termination efficiency. PLOS ONE.

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