Cover Crop Termination

Herbicide Application BMPs

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Developing a herbicide program for terminating cover crops requires careful consideration of cover crop and cash crop management goals. In this factsheet series, we share management tips for terminating cover crops in no-till corn and soybean production systems, where cover crops are left on the surface as a mulch.

1. Choose a Base Herbicide Program

Herbicide programs for cover crop termination typically start with either glyphosate or paraquat. Both herbicides have broad-spectrum activity that can provide control of grass and broadleaf cover crop species under the right conditions. However, glyphosate is a systemic herbicide, and paraquat is a contact herbicide, which requires different management practices (Table 1). Using full recommended rates and selecting the correct nozzle, carrier volume, and additives for these herbicides is necessary to ensure adequate coverage and uptake by cover crops.

Table 1. Herbicide application best management practices (BMPs) for glyphosate- and paraquat-based programs

Application considerations	Glyphosate	Paraquat
Nozzle Selection	fine/medium to coarse droplets	fine/medium droplets only
Carrier Volume	>10 gpa (gallons per acre)	>15 gpa minimum 20-40 gpa in dense canopies
Water Conditioner	ammonium sulfate (8.5 lb/100 gal)	optional
Adjuvants	NIS (2 pt/100 gal water) unless a full adjuvant load is included	crop oil concentrate (COC) (1 gal/100 gal water)
Tank-mix antagonism	atrazine and metribuzin 28% nitrogen carrier	--

2. Watch the Weather

Table 2: Weather factors that influence the efficacy of glyphosate and other foliar-active herbicides

Weather Factors	Influence on Herbicide Activity
Day/Night Temperatures	Weed control efficacy is generally greatest between 65 and 85°F. Target applications to a three-day period where daytime temperatures exceed 50-55°F, and night temperatures are close to or above 40°F.
Temperature Fluctuations	Wide temperature fluctuations (> 15°F) in the 1-2 days prior to application may reduce activity and control.
Relative Humidity	High humidity increases glyphosate absorption into the leaves.
Soil Moisture	Absorption, uptake and translocation increase when soil moisture is adequate for plant growth. Dry periods prior to or during termination may result in less adequate control
Dew	Though glyphosate absorption increases when leaves are well hydrated, excessive dew can decrease the rate of uptake.

2. Watch the Weather (con't.)

Spring temperatures (day/night) likely have the greatest impact on glyphosate efficacy for cover crop termination (Table 2). While we recommend using glyphosate-based programs when terminating cover crop stands that contain grass species, it's important to know that glyphosate activity in plants can be slow, particularly in cool springs. Glyphosate generally takes longer (7-10 days) than paraquat for complete kill. If killing winter cereal cover crops before stem elongation is the management goal, waiting for a warm stretch of weather in early spring (>55 F) is a good strategy. During this time, grasses will be greening up and resuming growth, which will optimize the efficacy of glyphosate applications.

3. Consider Tank-Mix Interactions

Herbicide tank mix partners can influence the efficacy of glyphosate and paraquat (Table 1). Atrazine and metribuzin are known to antagonize glyphosate activity, which can potentially reduce control levels under some scenarios. In comparison, atrazine and metribuzin are known to improve, or enhance, the activity of paraquat. In many cases, antagonistic or synergistic effects have only small effects on control levels (Fig 1). But understanding these interactions can help improve cover crop termination efficacy under more challenging scenarios, such as suboptimal weather conditions or for tough-to-control cover crop species.

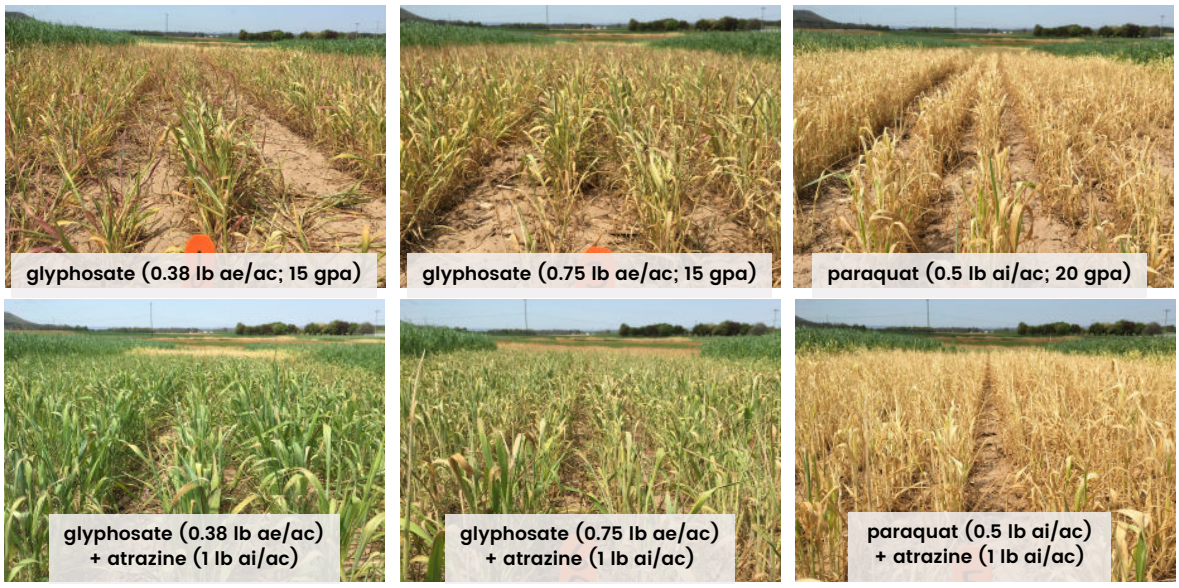

Fig 1. Effect of glyphosate and paraquat with and without atrazine on control of cereal rye seven days after termination (7 DAT) when targeting the cereal rye boot stage. (Penn State Field Trials, 2021-22; Wallace).

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