

Cover Crop Tolerance to Winter Wheat Herbicides

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Planting cover crops after wheat harvest provides farmers with an excellent opportunity to include cover crops into their crop rotation. However, several factors can affect cover crop establishment, including the potential for carryover from spring-applied winter wheat herbicides or from herbicides applied postharvest to manage weeds following winter wheat harvest.

Cover crop tolerance to spring-applied winter wheat herbicides:

Field experiments were conducted from 2021-2023 at three Michigan locations to determine cover crop sensitivity to carryover from spring-applied winter wheat herbicides (8 site-years). Nine different herbicides were applied to winter wheat (prior to Feekes stage 6) ranging from mid-April to the 1st week of May. Soil types at these locations ranged from loam to clay loam with 1.5-3.1% organic matter and pH levels of 6.5-7.8. Two weeks after wheat harvest nine different cover crops were drilled perpendicular to the herbicide treatments. The days between herbicide application and cover crop planting ranged from 84-113 days and precipitation ranged from 4.7-11.4 inches for the 8 site-years.

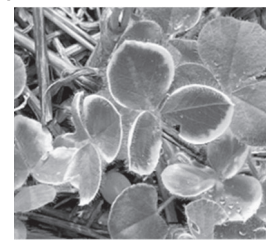


Figure 1. Huskie injury to clover species.

Overall, cover crop establishment was not affected by spring-applied herbicides. However, Huskie caused some bleaching or whitening around the outer leaf edges of red clover and crimson clover (Figure 1), but this injury did not result in any reductions in stand or final biomass. Table 1 provides our current recommendations for planting cover crops after spring-applied herbicides. In conclusion, there are several different cover crops that can be seeded after winter wheat harvest when herbicides are used for weed control in the spring. Keep in mind these cover crops can only be used for conservation purposes, such as soil erosion control, soil health and water quality improvement, and weed control. Cover crops should not be grazed or fed to livestock, unless crop rotation intervals are met or it is specified on the herbicide label.

Table 1. Cover crops that can be safely planted after wheat harvest following spring-applied herbicides.

Herbicide ¹	Annual ryegrass	Cereal rye	Oats	Crimson clover	Red clover	Oilseed radish	Mustard Caliente	Dwarf Essex rapeseed	Austrian winter pea
Axial Bold	Y ²	Y	Y	Y	Y	Y	Y	Y	Y
Talinor	Y	Y	Y	Y	Y	Y	Y	Y	Y
Huskie	Y	Y	Y	C	C	Y	Y	Y	Y
Affinity BroadSpec	Y	Y	Y	Y	Y	Y	Y	Y	Y
Osprey	Y	Y	Y	Y	Y	Y	Y	Y	Y
Osprey Xtra	Y	Y	Y	Y	Y	Y	Y	Y	Y
PowerFlex HL	Y	Y	Y	Y	Y	Y	Y	Y	Y
Quelex	Y	Y	Y	Y	Y	Y	Y	Y	Y
Stinger	Y	Y	Y	Y	Y	Y	Y	Y	Y

¹ Herbicides were applied at label rates prior to winter wheat reaching the Feekes 6 stage of growth.

² Y = Yes cover crop can be seeded with injury less than 10% and no impact on counts or biomass; C = Caution should be taken with seeding (early season injury between 10-50%; but no impact on biomass); N = No do not seed.

Cover Crop Tolerance to Winter Wheat Herbicides

Cover crop tolerance to postharvest herbicide applications:

Additional field experiments were conducted in 2022-2023 at three Michigan locations to determine cover crop establishment following postharvest/burndown herbicide applications (5 site-years). Five different herbicide treatments were applied two weeks after winter wheat harvest and just prior to the nine different cover crops being drilled. Soil characteristics were similar to the spring-applied cover crop experiment previously described.

Overall, certain herbicides applied postharvest prior to cover crop planting resulted in moderate to high injury, reduced stand, and lower cover crop biomass (Figure 2). Annual ryegrass, cereal rye, and oats were the most tolerant cover crops. Cover crop tolerance to herbicides varied within the legume and brassica cover crop species. All cover crops were safe to plant following Roundup PowerMax 3 (glyphosate) and Liberty (glufosinate) (Table 2). However, the Liberty label states **DO NOT** plant cover crops less than 7 days after application of Liberty nor before 1-inch of rain. Planting sooner may result in stand reduction. Annual ryegrass, cereal rye, and oats were safe to plant following Enlist One (2,4-D), and Sharpen (1 and 2 fl oz/A) applications. Sharpen (saflufenacil) should not be applied before seeding crimson clover, red clover, mustard, oilseed radish, or dwarf Essex rapeseed. Do not apply Enlist One prior to seeding Austrian winter pea, crimson clover, or red clover.

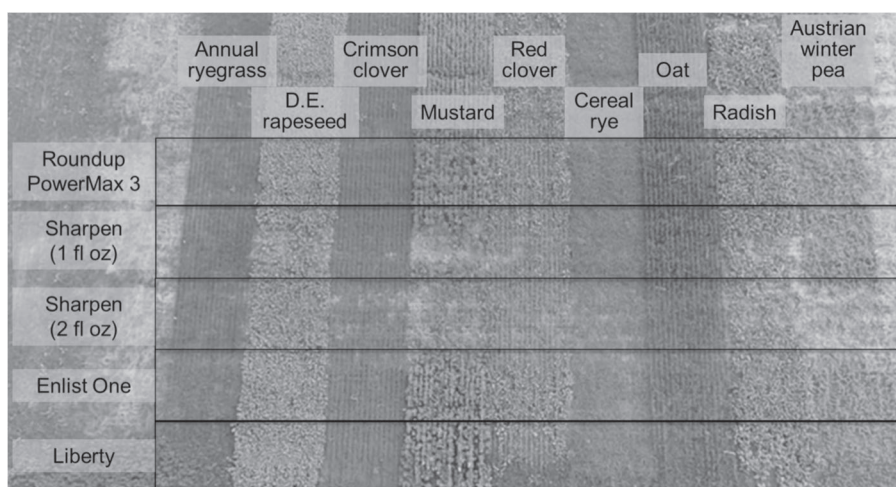


Figure 2. Overview photo of one location of cover crop tolerance from postharvest herbicide applications.

Keep in mind these cover crops can only be used for conservation purposes, such as soil erosion control, soil health and water quality improvement, and weed control. Cover crops should not be grazed or fed to livestock, unless crop rotation intervals are met or it is specified on the herbicide label.

Table 2. Cover crops that can be safely planted following postharvest herbicide applications for weed control.

Herbicide ¹	Annual ryegrass	Cereal rye	Oats	Crimson clover	Red clover	Oilseed radish	Mustard Caliente	Dwarf Essex rapeseed	Austrian winter pea
Roundup PowerMax 3 (30 fl oz/A)	Y ²	Y	Y	Y	Y	Y	Y	Y	Y
Liberty ³ (32 fl oz/A)	Y	Y	Y	Y	Y	Y	Y	Y	Y
Enlist One (32 fl oz/A)	Y	Y	Y	C	C	C	C	C	N
Sharpen (1 fl oz/A)	Y	Y	Y	C	C	N	N	N	C
Sharpen (2 fl oz/A)	Y	Y	Y	N	N	N	N	N	C

¹ Herbicides were applied just prior to seeding cover crops.

² Y = Yes cover crop can be seeded with injury less than 10% and no impact on counts or biomass; C = Caution should be taken with seeding (early season injury between 10-50%; but no impact on biomass);

N = No do not seed.

³ The Liberty label states **DO NOT** plant cover crops less than 7 days after application nor before 1-inch of rain. Planting sooner may result in stand reduction.

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