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Herbicides Persistence and Rotation to Cash and Cover Crops

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Review corn herbicide persistence before planting cover crops.

With the interest in cover crops and/or looking to establish additional forage late summer, we have been getting a number of questions about corn or soybean herbicide programs and how they might impact establishing late summer or fall crops. If you look at the rotation crop restrictions for corn and soybean herbicides in the Penn State [Agronomy Guide Tables 2.2-17](#) and [2.4-15](#) you will see that many products limit rotation to alfalfa and/or the clovers as well as some of the small grains. This is a good place to start when thinking about rotation to fall cover crops. However, these tables are inadequate because these cash crop rotation restrictions may be due to the concern for herbicide residues accumulating in forage or feed rather than carryover injury. If the crop is not going to be harvested and consumed by livestock or humans, then the primary concern is carryover injury and achieving an acceptable stand that provides the benefits of a fall or winter cover. Cover crops that are not harvested can be planted after any herbicide program, but the grower assumes the risk of crop failure.

Two factors become important when trying to predict the potential for carryover injury to rotational crops: 1.) How long does the herbicide last or persist in the soil assuming that it has soil activity? and 2.) How sensitive is the rotational crop to potential herbicide residues? Herbicides with shorter half-lives (the time it takes for 50% of the active ingredient to dissipate) are always less of a concern. Of course several factors influence the rate of dissipation such as rainfall, soil texture and soil pH, etc., however, most guidelines generally are for "normal" conditions (e.g. not severe drought). In general, products with a 4 month or less rotation restriction for the species of interest, close relative, or sensitive species (i.e. clovers) should pose little problem. These products typically have half-lives of less than 30 days. Species sensitivity can play a role if only a small amount of residue is necessary to cause injury and the herbicide persists. Quite

often, small seeded legumes and grasses like the clovers and ryegrass and mustard species like canola are very sensitive to some herbicides.

The following table provides some persistence and carryover information for some commonly used corn herbicides. Some of this information is our **best guess** and only pertains to the eastern US, not heavy Midwest soils or the western US where soils have high soil pH and rainfall is lower. In next week’s Field Crop News, we will address soybean herbicides.

Table 1. Common corn herbicides, estimated half-lives, cash crop restrictions and their potential fall cover crops.

Herbicide	Active ingredient	Normal Rate/A	Half life (days)*	Cash crop restrictions	Fall cover crops (OK to Plant)	Fall cover crops (Concern for)	Other
2,4-D 4S	2,4-D	1-2 pt	7	Plant anything 30 days after application	All grasses	Wait 30 days before planting sensitive broadleaves	Amine formulations more water soluble and can leach into seed zone
Accent 75DF or	nicosulfuron/ nicosulfuron+ rimsulfuron	0.66 oz/	21	Sensitive crops have 10-18 month restriction	Fall cereal grains, ryegrass	Small seeded legumes, mustards, sorghum	More persistent in high pH soils (>7)
Steadfast75DF		0.75 oz					
Atrazine 4L	atrazine	1-2 qt	60	Can plant corn, sorghum, and soybean the following year (some products allow others)	Sorghum species	Cereals, ryegrass, legumes, and mustards	More persistent in high pH soils (>7). Rates < 1 lb/acre can allow more flexibility

Herbicide	Active ingredient	Normal Rate/A	Half life (days)*	Cash crop restrictions	Fall cover crops (OK to Plant)	Fall cover crops (Concern for)	Other
Balance Pro 4L or	isoxaflutole	3 fl. oz	50-120	Small seeded legumes and vegetables have a 10 to 18 month restriction	Fall cereals grains	Cereals, Ryegrass, legumes, and mustards	15 inches of cumulative precipitation required from application to planting rotation crops except soybean, barely, wheat, sorghum, and sunflower
Balance Flexx 2L		6 fl. oz					
Callisto (includes Lumax, Lexar, Halex GT, etc.)	mesotrione	3-6 fl. oz	5-32	10 to 18 months for legumes and vegetables	All grasses	Small seeded legumes, mustards	Sequential applications (PRE fb POST) increase the potential for injury
Clarity/ Banvel 4S (Distinct/Status)	dicamba	16 to 24 fl. oz	5-14	15 days per 8 fl. oz/acre for small grains	All crops	Only at high rates or less than 120 days after application	Anything can be planted after 120 days with 24 fl. oz/acre or less
Dual II Mag 7.62E/Cinch	metolachlor	1.67 pt	15-50	Labeled for use on many crops	Almost anything	Annual ryegrass or other small seeded grasses	Higher rates and later applications more of a potential problem
Capreno 3.45SC	tembotrione + thiencazozone	3 fl. oz	15	Four mo. for wheat, 10 mo. for barley, sorghum, oats and	Wheat, triticale, rye	Small seeded legumes, mustards, sorghum	15 inches of cumulative precipitation required from application to planting

Herbicide	Active ingredient	Normal Rate/A	Half life (days)*	Cash crop restrictions	Fall cover crops (OK to Plant)	Fall cover crops (Concern for)	Other
Corvus 2.63SC	isoxaflutole+ thiencarbazone	5.6 fl. oz	50-120	alfalfa Four mo. for wheat, 9 mo. for barley and 17 mo. For alfalfa, oats, sorghum, and canola	Wheat, triticale, rye	Small seeded legumes, mustards, sorghum	rotation crops except wheat 15 to 30 inches of cumulative precipitation from application to planting for sensitive crops
Harness 7E (Degree, Warrant)	acetochlor	2 pt	10-20	Four mo. for wheat and 9 mo. for alfalfa and clovers	Most crops should be fine	Food or feed residues rather than crop injury may be a concern	Nonfood/feed winter cover crops are allowed after corn harvest
Impact/Armezon 2.8SC	topromesone	0.75 fl. oz	14	Alfalfa, canola, soybean and sunflower have a 9 mo. restriction	Wheat, barley, oats, and rye are allowed after 3 mo. Ryegrass should also be OK	Although many broadleaves are restricted, Impact does not have much soil activity	We have not seen this herbicide carryover in PA.
Laudis 3.5SC	tembotrione	3 fl. oz	14	Four mo. for cereal grains, 10 mo. for sorghum, canola, and alfalfa	Cereal grains after 4 mo.	Unknown - Small seeded legumes, mustards could be a problem	Other crops may be seeded after a successful field bioassay.
Peak 57WG (Spirit)	prosulfuron	1 oz	9-152	Cash crop restrictions ranged from 10 mo. for soybean and tobacco to	Cereal grains and sorghum are labeled, other	Small seeded legumes, mustards	More persistent in high pH soils

Herbicide	Active ingredient	Normal Rate/A	Half life (days)*	Cash crop restrictions	Fall cover crops (OK to Plant)	Fall cover crops (Concern for)	Other
Permit/Sandea 75DF	halosulfuron	2/3 oz	9-27	22 mo. for alfalfa and canola Nine mo. for alfalfa, clovers, soybean and 15 mo. for canola	grasses Cereal grains and sorghum after 2 mo. and other grasses	Small seeded legumes, mustards	Halosulfuron also an ingredient in Yukon
Resolve 25DF (Resolve Q)	rimsulfuron	2 oz	2-4	Winter cereals have a 3 mo. restriction and many crops are restricted for 10 mo.	Based on the short half-life, most fall cover crops should be OK in PA	None	More persistent in drought conditions
Simazine 4L (Princep)	simazine	1-2 qt	60	Can plant corn, sorghum, and soybean the following year (some products allow others)	Sorghum species	Cereals, Ryegrass, legumes, and mustards	Soil pH > 7
Stinger 3S (Hornet, Surestart)	clopyralid	5 oz	40	Recrop intervals 10.5 to 18 mo. for legumes.	All grasses	Small seeded legumes	

*Herbicide half-life estimates derived from the WSSA Herbicide Handbook, and from other scientific literature. Half-life ranges based on results from several different studies.

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