

**Corn and Soybean Herbicides and Fall Cover Crop Establishment** - (*Bill Curran and Dwight Lingenfelter, Penn State Weed Specialists*) September 2, 2011

One of the more common questions that I have been asked recently is whether the corn or soybean herbicide program will pose a problem for seeding fall cover crops. If you look at the rotation crop restrictions for corn and soybean herbicides in the Agronomy Guide (Tables 2.2-17 and 2.4-15), you will see that many products limit rotation to alfalfa and/or clover as well as some of the small grains (and certainly vegetables). This is a good place to start when thinking about rotation to fall cover crops, but these tables are inadequate and these cash crop rotation restrictions may be due to the concern for herbicide residues accumulating in forage or feed rather than carryover injury, the focus of this article.

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. Although few cover crops are listed in these Agronomy Guide tables or on herbicide labels, look for close relatives to get an idea of how certain species may succeed. For example, there is no listing for the legumes hairy vetch or winter pea in the Agronomy Guide or on most labels, but by looking at the alfalfa or clover restrictions you can "guesstimate" which herbicides may cause potential injury to related legumes. Covers such as tillage or daikon radish can be difficult to determine if herbicide residues will cause a problem. If herbicide labels list canola or other annual mustards as rotation crops, these might substitute well for radish. 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.

Some general guidelines.

Avoid atrazine or simazine use if at all possible in corn if sensitive crops species and particularly legumes or annual ryegrass will follow. If 1 lb./acre (1 qt) or less of atrazine or simazine has been spring applied, cereal rye and other cereals will likely be OK to establish in the fall for cover. For legumes and mustards like canola and daikon radish, 0.75 lb/acre (1.5 pt) or less may be OK. Atrazine and simazine will persist longer on higher pH soils (pH 7 or greater) or soils recently limed, so watch surface pH in particular.

Table 1 provides some persistence information for some commonly used corn and soybean herbicides. Not only is herbicide half-life important (the time it takes for 50% of the active ingredient to dissipate), but also soil availability. Herbicides with shorter half-lives are always less of a concern. In addition, species sensitivity can play a role if only a small amount of residue is necessary to cause injury. Until more research has been conducted on herbicide carryover and cover crop establishment, rely on cash crop rotation restrictions along with what we know about herbicide persistence and availability.

Table 1. Typical herbicide rates, sensitive species, half-life, and potential for carryover injury to sensitive crops (carryover potential based on half-lives and soil availability).

<b>Herbicide</b>	<b>Normal Rate/Acre</b>	<b>Sensitive Species</b>	<b>Half Life (Days)<sup>1</sup></b>	<b>Carryover Potential</b>
Accent	2/3 oz	broadleafs + grass	21	Low
Assure/Targa	8 oz	grass	60	Low
Atrazine	1 lb	broadleafs + grass	60	Moderate
Authority	4 oz	broadleafs	32-302	Moderate
Balance Pro	2 fl oz	broadleafs + grass	50-150	Moderate
Callisto	6 fl oz	broadleafs	5-32	Moderate
Classic	2 oz	broadleafs	40	Moderate
Dual II Mag	1.67 pt	broadleafs + grass	15-50	Low
FirstRate	0.33 oz	broadleafs	8-33	Low
Harmony	1/8 oz	broadleafs	12	Low
Harness	2 pt	broadleafs + grass	10-20	Low
Impact	0.75 fl oz	broadleafs + grass	14	Low
Laudis	3 fl oz	broadleafs + grass	14	Low
Outlook	16 fl oz	broadleafs + grass	20	Low
Peak	1 oz	broadleafs	9-152	Moderate
Permit	2/3 oz	broadleafs	9-27	Low
Prowl H2O	3 pt	broadleafs + grass	44	Low
Pursuit	4 fl oz	broadleafs + grass	60-90	Moderate
Raptor	5 fl oz	broadleafs + grass	20-30	Low
Reflex	1.5 pt	broadleafs	100	Moderate
Resolve	2 oz	broadleafs + grass	2-4	Low
Select	10 oz	broadleafs	3 d	Low
Sencor	0.33 lb	broadleafs + grass	14-60	Low
Sharpen	3 fl oz	broadleafs	7-35	Low
Simazine	1 lb	broadleafs + grass	60 d	Moderate
Stinger	5 oz	broadleafs	40	Moderate
Valor	2.5 oz	broadleafs	12-20	Low

<sup>1</sup>Herbicide half-life estimates derived from the WSSA Herbicide Handbook, 2007 or other scientific literature.