Plant Protection Programs University of Missouri

Integrated Pest & Crop Management

The Importance of Preemergence Soybean Herbicides

By Kevin Bradley

There are several reasons why you may want to consider the use of a preemergence residual herbicide in soybeans. First, residual herbicides may be a good option for you simply from an "insurance" or yield protection standpoint. Often, a properly timed early postemergence glyphosate application to weeds that are 4- to 6-inches tall turns into an application where the weeds have reached 12-inches tall or more and the soybeans are barely noticeable. Without fail, I see this in some Missouri fields each year. Regardless of the reason, when this type of situation occurs some yield has already been lost. To see the effects of increasing weed sizes and weed competition on soybean yield loss for yourself, go to http://www.weedsoft.org and use the WeedSOFT yield loss calculator. This is a tool developed by a number of university weed scientists that enables you to estimate the season-long yield loss, as well as the yield loss that has already occurred, for soybeans that are at a particular stage of growth and infested with a specific density and population of weeds. It will also estimate the additional yield loss that may occur if you delay treatment further.

Another reason you should consider the use of a residual herbicide in soybeans is due to the increasing number of glyphosate-resistant weeds that are being identified in Missouri each year. As I have documented in many previous newsletter articles and presentations (http://weedscience.missouri.edu/extension/2009Survey/2009Survey.html), a high percentage of soybean acres in Missouri are now infested with glyphosate-resistant waterhemp. More recently, we have also identified several populations of glyphosate-resistant giant ragweed around the state. Almost exclusively, these weeds have been discovered in continuous Roundup Ready cropping systems where glyphosate has been used as one of the only herbicides for weed control.

I'll put it as plainly as I can; one of the best ways to manage a glyphosate-resistant weed population after you have discovered it is to apply a preemergence residual herbicide at or near soybean planting. Make sure the preemergence residual herbicide you choose is effective on your weed in question, and if so you will see a dramatic reduction in the number of glyphosate-resistant weeds that ever get exposed to a postemergence application of glyphosate.

In the case of glyphosate-resistant waterhemp, we have shown in several presentations and publications (http://extension.missouri.edu/publications/DisplayPub.aspx?P=IPM1030) that applying a preemergence residual herbicide is a much more effective way of dealing with this weed than trying to control it with a postemergence tank-mix partner. In some instances we reduced the glyphosate-resistant waterhemp population by 97% with a preemergence herbicide application when compared to the waterhemp population that existed at the time of the postemergence tank-mix application. In the case of glyphosate-resistant giant ragweed, there are fewer preemergence residual herbicides that are effective on this species, but preemergence herbicides with good activity on giant ragweed like Gangster, FirstRate, Boundary, and Authority First can still reduce the population of this weed dramatically.

If there is some of the resistant weed population that escapes the preemergence herbicide application (and there usually will be), then it is still a good idea to apply an alternative herbicide as a postemergence tank-

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mix partner with glyphosate. Assuming that these weeds aren't resistant to PPO-inhibiting herbicides, some of the products that have good activity on both glyphosate-resistant giant ragweed and waterhemp include Cobra and Flexstar. FirstRate also has good activity on giant ragweed, assuming the population is not resistant to the ALS-inhibiting herbicides.

If you do not have herbicide-resistant weeds as a problem or concern in your fields and you are trying to decide which preemergence residual herbicide might be best for you, I think there are two primary factors to consider. The first is obviously price. The products shown in Figure 1 range in price from about $9 to about $15 per acre, so the product you choose can have a big impact on net income. The second consideration is whether the preemergence residual herbicide you choose will match the spectrum of weeds that you have in your field. As illustrated in Figure 1, many of the preemergence residual herbicides available provide good suppression and/or control of broadleaf weeds, but little control of grass weeds. If you have heavy grass weed pressure, you may need a product that provides suppression of both grass and broadleaf weeds prior to the planned postemergence glyphosate application.

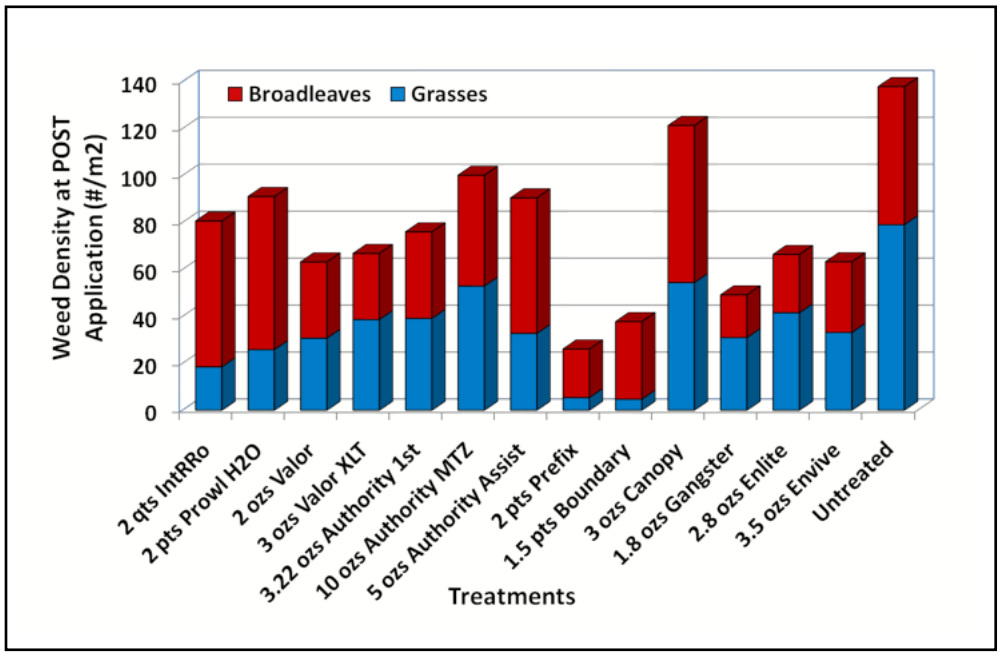

Figure 1. Influence of preemergence herbicide treatments on grass and broadleaf weed density at the time of the postemergence glyphosate application (2007-2009).

Another thing that the results in Figure 1 illustrate is that few, if any, of the preemergence residual herbicides applied at these "foundation rates" provide season-long control of the common weeds we encounter in soybean production systems in Missouri. Keep in mind that the results shown in this figure are the combined results from an experiment conducted for the past three growing seasons. These foundation rates are designed to buy you time and eliminate the need for the first pass of glyphosate in a traditional 2-pass glyphosate program. Our research indicates that following these preemergence residual herbicide treatments with a postemergence glyphosate treatment will provide excellent season-long weed control and optimize soybean yields.

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Field Crop Disease Update - June 1, 2010

By Laura Sweets

Wheat: Most wheat in the state is flowering or past flowering so the time for foliar fungicide applications is also past. Susceptible varieties are showing moderate to high levels of Septoria leaf blotch, leaf rust and stripe rust with resistant varieties showing much lower levels of these diseases. Scab or Fusarium head blight has shown up in some fields in southeast and southwest Missouri and is beginning to show up in fields in central Missouri.

Corn: Anthracnose leaf blight continues to be the most common foliage disease on corn, especially in fields that are corn on corn. Seed decay and seedling blight have contributed to stand loss and uneven stands in many fields, especially in central and northern Missouri. The leaf blight phase of Stewart's might be developing in fields that have any corn flea beetles- see accompanying article on Stewart's wilt.

Soybean: Fields in which plants emerged prior to the last round of rains might be showing Phytophthora seed decay and seedling blight. Overall, soybean disease questions haven't really started yet this season.

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Stewart's Bacterial Wilt of Corn

By Laura Sweets

The variations in weather conditions this spring have put stress on young corn plants. In some fields seedlings have been showing yellowing and/or stunting from cool, wet soils immediately after planting and saturated soils since planting. However, with the more recent warm weather, corn in many parts of the state has really taken off and is now 12 to 18 inches tall. So symptoms of Stewart's bacterial wilt are beginning to develop on these rapidly growing young corn plants.

On young corn plants the symptoms of Stewart's bacterial wilt include linear, pale green to yellow streaks that tend to follow the veins of leaves and originate from feeding marks of the corn flea beetle. Lesions may extend the length of the leaf. Plants may appear stunted or somewhat distorted. If the bacteria become systemic within the plant, the entire plant wilts and may die prematurely. Cavities of a brown, soft rot can develop in the stalk pith.

On field corn the disease tends to be limited to the leaf blight phase of the disease in which foliage symptoms develop but the pathogen does not become systemic within the plant. With the leaf blight phase of Stewart's bacterial wilt, the linear, pale green to yellow lesions develop on the leaves. These lesions tend to parallel the leaf veins and to have wavy, irregular margins. These streaks soon become dry and brown.

The bacterium which causes Stewart's bacterial wilt overwinters in the guts of some species of adult corn flea beetles. Adult beetles feeding on corn seedlings in late spring and early summer can contaminate the feeding wounds with the causal bacterium. Flea beetles can continue to spread the bacterium throughout the season by feeding on infected plants and then healthy plants. The potential for Stewart's bacterial wilt to develop on young corn plants is greater after mild winters when higher levels of the corn flea beetle may be present.

Most field corn hybrids have enough resistance to Stewart's bacterial wilt that additional management is not necessary.

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Insect Update for Late May 2010

By Wayne Bailey

In general insect problems have been low in number during the past two weeks. Insect problems reported during this time period have often been limited to small areas of the state with most fields not requiring rescue applications of insecticides. In general, bean leaf beetles are present in many early planted soybean fields where feeding damage is seen as small oval to round hole in foliage. This damage is generally minor if plants are actively growing and insect numbers remain below the economic threshold of 5 or more beetles present per foot of row and seedling plant mortality is not occurring. In corn, several minor pests have been found in higher numbers than most years. These include the southern corn rootworm, true armyworm, and the variegated cutworm. Southern corn rootworms (also called the spotted cucumber beetle) have been reported in relative high numbers in the southern third of the state. Although this beetle can feed on corn, it prefers to feed on a wide variety of vegetable crops. True armyworm can be a major problem in Missouri in some years with most damage occurring to fescue, wheat, and corn in this order. True armyworm is a relative rare pest of field corn in Missouri, although defoliation can be severe if true armyworm numbers are elevated in a field. Larvae of true armyworm are generally greenish-brown in color with a thin line running down the back and two orange lines running along each side of the body. A similar pest is variegated cutworm, a somewhat rare pest of seedling corn in the state. Variegated cutworm larvae are more common pests of alfalfa and white clover. Large larvae remaining in plant litter on the soil surface will devour newly emerging plant foliage of alfalfa and clover, often limiting plant regrowth and allowing for the establishment of broadleaf weed species. When they do attack corn seedling, they can cause severe defoliation and even cut plants similar to black cutworm. The larvae of variegated cutworm are brownish-gray to black with the identifying characteristic of 4 or more circular to diamond shaped yellowish-white spots running down the center of the back. Cool, wet spring weather favors the development of both true armyworm and variegated cutworm populations and may explain why they are present in higher than normal numbers this year.

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Nitrogen Watch 2010

By Peter Scharf

Excessive rainfall can result in loss of fertilizer and soil nitrogen. This spring, as in 2008 and 2009, large swaths of the U.S. corn belt have received rainfall in sufficient amounts to put nitrogen at risk of loss. This is a serious production and environmental problem that I estimate cost Midwestern corn producers a billion bushels total in 2008 and 2009. Whether N loss occurs in June will be an important component of whether this situation costs producers yield and money again this year, but now is the time to assess your risk level. If your risk level is high, it is the time to plan the logistics for possible rescue applications of N.

I have created a web page that tracks spring precipitation totals and highlights areas that are most at risk. This page is updated weekly and may be found at: http://plantsci.missouri.edu/nutrientmanagement/Nitrogen/Nitrogen%20watch%202010/nitrogen%20watch%202010.htm.

Figure 1 above shows my assessment of high-risk areas for well- and moderately well-drained soils through the end of May. Well-drained soils are vulnerable mainly to nitrogen loss from leaching. This process can start shortly after fertilizer application (with some delay for ammonia). I have used April 1 to represent a preplant N application date. For ammonia or for applications later than April 1, risk is lower; for applications before April 1, risk is higher.

Areas shown in cross-hatch are 'danger areas' that are on track to have 16 or more inches of rainfall from April 1 to June 30. This does not mean that significant loss of N has already happened, just that producers in these areas should be watchful and aware of the potential for N loss and deficiency.

Aerial photos can help to assess the need for additional N on corn between waist-high and tasseling. They can assess large areas quickly, identify fields where rescue N is likely needed, and help to prioritize which fields are most in need of treatment.

Figure 2 shows my assessment of high-risk areas for poorly- and somewhat poorly-drained soils through the end of May. Poorly-drained soils lose N mainly by denitrification, which is very temperature-sensitive. Normally my rule of thumb is that wet conditions in May and June cause denitrification losses, but losses in April are minimal. With warmer soil temperatures in

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Figure 1.

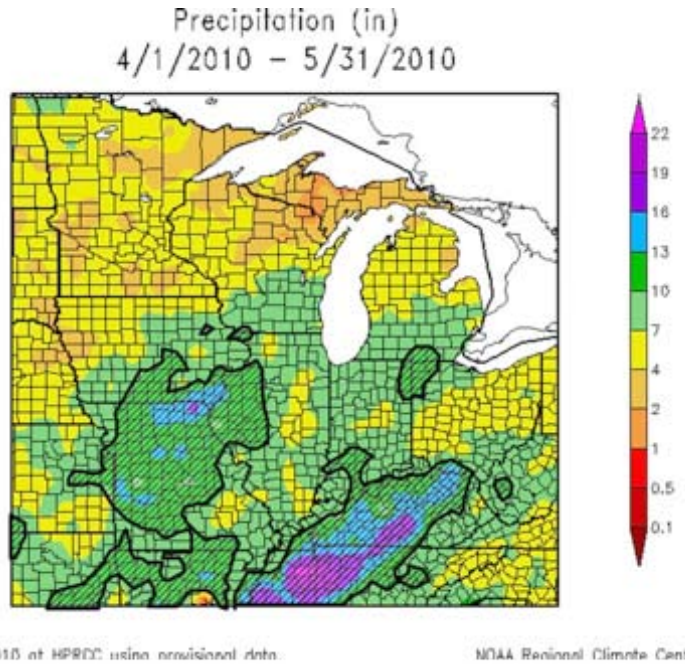
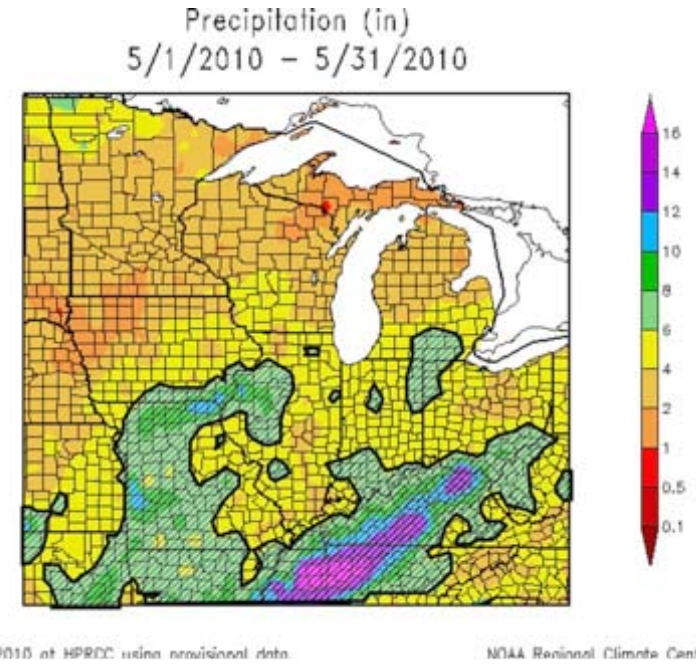


Figure 2.



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April this year, there was some potential for denitrification, but soil temperatures were still well cooler than a normal May. Early May turned out to be much cooler than normal, so denitrification losses may still be slow even in saturated soils. I have decided to still consider precipitation total from May 1 as the best indicator of denitrification loss potential.

Areas shown in cross-hatch are 'danger areas' that are on track to have 12 or more inches of rainfall from May 1 to June 30. This does not mean that significant loss of N has already happened, just that producers in these areas should be watchful and aware of the potential for N loss and deficiency.

Again, aerial photos are the quickest and most accurate way to assess the severity of N loss and deficiency quickly.

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Weather Data for the Week Ending May 31, 2010

By Pat Guinan

Station	County	Weekly Temperature (°F)						Monthly Precipitation (in.)		Growing Degree Days‡	
		Avg. Max.	Avg. Min.	Extreme High	Extreme Low	Mean	Departure from long term avg.	May 1-May 31	Departure from long term avg.	Accumulated Since Apr. 1	Departure from long term avg.
Corning	Atchison	87	62	89	55	74	+7	3.71	-0.72	711	+208
St. Joseph	Buchanan	84	63	87	60	73	+7	6.55	+1.73	678	+157
Brunswick	Carroll	85	64	88	58	75	+8	6.08	+0.82	734	+190
Albany	Gentry	86	61	89	56	73	+7	6.36	+1.77	653	+163
Auxvasse	Audrain	86	63	88	57	75	+8	4.52	-0.49	760	+212
Vandalia	Audrain	86	64	89	57	75	+9	4.86	-0.15	743	+229
Columbia-Bradford Research and Extension Center	Boone	87	62	89	55	75	+8	4.24	-0.77	730	+147
Columbia-Sanborn Field	Boone	87	65	88	58	76	+8	5.41	+0.40	837	+226
Williamsburg	Callaway	87	64	89	58	75	+9	3.82	-1.12	787	+258
Novelty	Knox	84	62	89	55	73	+7	6.29	+1.34	655	+144
Linneus	Linn	85	61	89	54	73	+7	6.93	+1.91	656	+161
Monroe City	Monroe	86	64	88	59	75	+9	5.07	+0.24	710	+172
Versailles	Morgan	87	63	89	54	75	+7	5.40	+0.13	822	+187
Green Ridge	Pettis	86	64	87	57	75	+8	6.78	+1.98	762	+200
Lamar	Barton	86	65	88	63	75	+6	6.58	+0.75	836	+183
Cook Station	Crawford	87	58	89	51	72	+4	4.89	-0.02	767	+115
Round Spring	Shannon	88	60	89	53	73	+6	4.96	-0.25	782	+178
Mountain Grove	Wright	85	59	88	51	72	+5	6.23	+1.34	763	+197
Delta	Cape Girardeau	87	66	89	65	76	+5	4.13	-0.98	945	+177
Cardwell	Dunklin	89	68	91	64	77	+4	3.12	-1.79	1110	+220
Clarkton	Dunklin	88	66	90	64	77	+5	5.03	+0.65	1042	+182
Glennonville	Dunklin	87	67	88	65	76	+4	5.08	+0.68	1058	+196
Charleston	Mississippi	87	67	89	65	76	+5	4.90	+0.14	1035	+273
Portageville-Delta Center	Pemiscot	88	69	90	67	78	+6	7.03	+2.43	1126	+254
Portageville-Lee Farm	Pemiscot	*	*	*	*	*	*	*	*	*	*
Steele	Pemiscot	89	69	90	66	78	+5	7.83	+2.73	1166	+285

* Complete data not available for report

‡Growing degree days are calculated by subtracting a 50 degree (Fahrenheit) base temperature from the average daily temperature. Thus, if the average temperature for the day is 75 degrees, then 25 growing degree days will have been accumulated.

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