

Number 226 January 15, 2010

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1. Liberty Link soybeans

Liberty Link soybeans were introduced in 2009, and will be more widely available in 2010. These soybeans allow the use of Ignite herbicide as a postemergence treatment. Ignite is a newer, more concentrated formulation of Liberty herbicide.

This gives soybean producers an option to Roundy Ready soybeans, and could help in the control of glyphosate-resistant marestail, and other weeds that are hard to control with glyphosate – such as velvetleaf and morningglory.

Timing of the postemergence herbicide application is critical when using Ignite on Liberty Link soybeans. Ignite is similar to glyphosate in that it is a nonselective herbicide with no residual activity. However, Ignite is not as effective on larger weeds and grasses as glyphosate, and so is a little less "forgiving" of untimely late applications.

The best approaches for weed control in Liberty Link soybeans include:

* Sequential programs, with a residual preemergence herbicide application followed by a timely postemergence application of Ignite; or

* A two-pass program with Ignite, with the first application about 3 weeks after planting followed by a second application 1 to 2 weeks later.

Ignite can be applied at a rate of 29 to 36 oz/acre when using single applications. If sequential applications are made, the rate should be 22 oz/acre for each application. The total maximum amount of Ignite allowed per season is 44 oz/acre. Ignite can be applied anytime from emergence to the bloom stage of soybeans. For best weed control, it should be applied early when weeds are small. Ammonium sulfate must be used as an adjuvant.

At K-State, we have tested Liberty Link soybean herbicide programs in 2009 and 2008 near Manhattan. Weed control in 2009 with Ignite was very good. In part this was because humidity levels were high, and weeds were growing well at the time of application. Weed control in 2008 was not as good as in 2009, especially for the Ignite-only treatments, but was still pretty good for the preemegence followed by Ignite programs.

2009 Weed control and soybean yields in Liberty Link soybeans									
			Percent control						
Herbicide	Applica- tion rate (oz/acre)	Tim- ing	Large crab- grass	Palmer amaranth	Velvet- leaf	lvyleaf morning- glory	Sorghum	RR corn	Soybean yield (bu/acre)
Ignite	22	Post	53	53	78	88	99	100	50
Ignite / Ignite	22/22	Early Post / Seq	98	99	100	100	100	100	67
Valor / Ignite	2/22	Pre / Post	96	98	100	92	100	98	67
Authority Assist / Ignite	8/22	Pre / Post	99	100	100	100	100	100	72
Prefix / Ignite / Ignite	3/22/22	Pre / Early Post / Seq	100	100	96	97	100	100	70
Untreated									33
LSD (.05)			4	2	3	4	1	2	7

The 2009 results are shown below:

Some comments on this trial:

* The Early Post treatments were made at 21 days after planting. The Post treatments were made 32 days after planting. Sequential (Seq) treatments were applied 20 days after the previous treatment.

* Where just a single application of Ignite is used, 29 oz/acre would probably be the preferred rate to maximize weed control.

* The sequential treatment of Ignite, with an Early Post and Seq treatment, and the combinations of a preemergence residual herbicide with a single Post application of Ignite, gave very good weed control.

* Weed pressure was heavy, and caused significant yield loss in the untreated plots.

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2. Cost comparisons of Roundup Ready and conventional soybean programs

Conventional soybean varieties have been generating a little more interest recently as the price of Roundup Ready (RR) and Roundup Ready 2 Yield (RR2Y) soybean seed has increased. If conventional soybean varieties are used, farmers can save significantly on seed costs. However, they must use a different set of herbicides for weed control.

How do the overall costs of the two programs compare, how effective are conventional herbicide programs with current herbicide options, and how risky is it to use a conventional soybean program.

2009 Soybean weed control programs with glyphosate and conventional herbicides								
Herbicide	Applica- tion rate (oz/acre)	Tim- ing	Large crab- grass	Palmer amaranth	Velvetleaf	Ivy leaf morning- glory	Soybean yield (bu/acre)	
Roundup PowerMax	22	Post	96	97	96	55	85	
Touchdown Total / Touchdown Total	24/24	Early Post / Post	100	100	100	94	86	
Valor / Roundup PowerMax	3/22	Pre / Post	100	100	100	89	87	
Prefix + Sonic	32 + 4.5	Pre	96	97	85	53	84	
Boundary / Flexstar + FirstRate	32/16 + 0.3	Pre / Early Post	100	100	100	98	83	
Flexstar + FirstRate + Fusion	16 + 0.3 + 8	Early Post	97	99	100	96	86	
LSD (.05)			3	3	6	10	7	

At K-State, we have conducted tests near Manhattan in 2009 to test the effectiveness of conventional vs. glyphosate-based herbicide programs on soybeans.

Although the weed control ratings varied somewhat, especially for ivyleaf morningglory and velvetleaf, yields were unaffected by the level of weed control or herbicide programs used. Abundant rainfall throughout the growing season resulted in high soybean yields and minimized the impact of stunted and late emerging weeds on soybean yields.

How do the costs of the herbicide programs compare? To get a complete picture, we have to also consider the different seed costs involved. It should be noted that these are retail prices, and do not consider any potential discounts that may be offered. Also, the seed cost for the RR2Y varieties includes the cost of a seed treatment, which comes standard with all RR2Y seed.

Cost comparison of conventional vs. Roundup Ready and RR2Y soybean programs								
Herbicide	Applica- tion rate (oz/acre)	Tim- ing	Herbicide	Application	Seed*	Total	Estimated risk	
1. Roundup PowerMax	22	Post	\$6	\$4	\$45/70	\$55/90	Moderate	
2. Touchdown Total / Touchdown Total	24/24	Early Post / Post	\$12	\$8	\$45/70	\$65/90	Low	
3. Valor / Roundup PowerMax	3/22	Pre / Post	\$22	\$8	\$45/70	\$75/100	Low	
4. Prefix + Sonic	32 + 4.5	Pre	\$34	\$4	\$24	\$62	Moderate	
5. Boundary / Flexstar + FirstRate	32/16 + 0.3	Pre / Early Post	\$47	\$8	\$24	\$79	Low	
6. Flexstar + FirstRate + Fusion	16 + 0.3 + 8	Early Post	\$40	\$4	\$24	\$68	High	
* Estimated seed cost = \$24/unit for conventional seed (less if seed can be saved and replanted); \$45/unit for RR seed: \$70/unit for RR2Y seed								

The cost of the No. 1 treatment is the lowest, but a single application may not provide adequate weed control and yield protection in many situations. The estimated cost of some of the conventional programs (No. 4 and 6 in the table above) is similar to the cost of the RR program when glyphosate is applied twice (No. 2 in the table).

However, the risk level is higher when those conventional programs are used. In the case of treatment No. 4, that's because there is no postemergence herbicide included – although the preemergence herbicides Prefix + Sonic can do a good job of season-long weed control in many situations. There is also the option of using a postemergence herbicide if needed, but that would add to the cost of the program. In the case of treatment No. 6, the Early Post application of these three herbicides must be made when the weeds are very small to be effective. If this application cannot be made at the right time, weeds will become increasingly difficult to control and could result in trainwreck.

The cost of both RR and conventional programs is less than the total cost of the RR2Y programs. If the RR2Y varieties provide higher yields, that can make up the difference. This cost analysis does not try to account for any yield differences that may occur between conventional, RR, and RR2Y soybean varieties. A good assessment of yield potential for whichever soybean variety is chosen is an important consideration of the economic analysis.

In general, good management is especially critical in conventional soybean herbicide programs. Producers need good knowledge of the potential weed problems, and use herbicides that are effective against those weeds. It is best to use a preemergence residual herbicide in conventional soybean programs. Early timing of postemergence conventional herbicides in soybeans is usually more critical for good control than in glyphosate-based postemergence programs.

In all cases, two-pass herbicide programs are always the most consistent, and provide the lowest risk to producers. A preemergence application followed by a timely postemergence application is preferred in RR or RR2Y soybeans in order to get the best possible control of all weed populations and prevent the development of glyphosate-resistant weeds.

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3. Soybean cyst nematode and SDS ratings of varieties in K-State Performance Tests

The 2009 ratings for Soybean Cyst Nematode (SCN) and Sudden Death Syndrome (SDS) resistance of all varieties in the Soybean Performance Test are now available at: <u>http://www.agronomy.ksu.edu/DesktopModules/ViewDocument.aspx?DocumentID=2926</u>

The ratings are made by the research team at K-State. The following describes how the ratings were made and how to interpret them:

* Soybean Cyst Nematode. Three replications of each variety were grown in pots in the greenhouse and inoculated with SCN Race 3 and Race 4 populations collected from soils in Kansas. Each variety is rated separately for resistance to Race 3 and Race 4.

The scores in the chart are the percentage of SCN production on the roots compared to that on standard susceptible varieties. The lower the score, the better the resistance. In general terms, a score of 1-10 is considered "Resistant." A score of 10-30 is considered "Moderately Resistant." Any score higher than 30 means that the variety may become infected with that race of SCN to a degree that it could reduce yields.

SCN Race 3 is the most prevalent race in Kansas. A variety that is R or MR to SCN Race 3 will have adequate resistance in most, but not all, cases in Kansas. SCN Race 4 is also present in Kansas, but it is not as widespread as Race 3. Race 4 is scattered throughout the SCN areas of Kansas in localized fields. Race 4 is more virulent than Race 3. If a field is infected with SCN Race 4, a variety will need to have resistance to that race. There are other "races" of SCN in Kansas. We use Race 4 in our testing program because it has the broadest virulence spectrum.

The bottom line is that the best way to make sure a soybean variety will not be injured severely by SCN is to select a variety that is R or MR to both Race 3 and Race 4. That will provide protection against both races of SCN. A variety that is R or MR only for Race 3 may be adequate in most cases, but not on fields where Race 4 is present. While Race 4 is not widespread in Kansas, it can cause significant injury in the localized areas where it occurs. Varieties with Race 4 resistance will be resistant to a broader range of SCN populations than varieties with only Race 3 resistance. However, varieties with Race 4 resistance are not as widely available.

* Sudden Death Syndrome. This disease affects water uptake in plants, and causes the plants to collapse and die during or just after periods of rapid water uptake – usually during early pod fill. SDS tends to occur most often in high-yield environments and in fields infested with SCN.

The SDS ratings in the 2009 K-State Soybean Performance Tests were made in the field, at Rossville and Morganville. These fields are also infested with SCN, so the ratings are somewhat impacted by the SCN resistance of the variety. Varieties that are susceptible to SCN tend to be more susceptible to SDS as well.

The lower the SDS score, the higher the level of resistance exhibited by the variety. A rating of 1 means that no disease was observed. A rating of 5 means that all plants were dead. Where SDS has been a problem in the past, producers should select varieties with a SDS score of 1 to 2.

This work is supported by the Kansas Soybean Commission.

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4. Soil testing for soybean cyst nematode

Soybean cyst nematode (SCN) can be at levels high enough to reduce soybean yields, yet produce no obvious symptoms on the above-ground plants. In those cases, producers will be losing yield without even knowing it. Visual symptoms are not usually apparent until infestations are severe. Yield losses, on the other hand, are directly related to the number of nematodes feeding on the roots.

The only way soybean producers can know for sure whether their fields have SCN is to take a soil sample and have it tested by K-State, or another lab. This can be done at any time of year. Core samples should be taken from 6 to 8 inches deep. Take several cores per field and mix them together. Put the sample in a plastic bag before shipping. To have the sample analyzed by K-State, either contact the local Extension office or ship it to:

Plant Disease Diagnostic Lab Attn: Tim Todd Kansas State University 4032 Throckmorton Manhattan, Kansas 66506

If you have questions, call (785) 532-5810.

Winter is a good time to have soil samples analyzed for SCN, whenever the ground is not frozen. This will allow plenty of time to get the results and make decisions on varieties. The seed companies provide ratings of their varieties for SCN resistance, but producers should also consult the ratings made by K-State and listed on the 2009 Soybean Performance Test web site (see the article above).

SCN has been found in most counties of eastern and central Kansas, as far west as Ford County. To control SCN, rotation combined with resistant varieties can provide effective management. The field should be planted to a non-host crop every other year at least. Poor hosts and non-hosts for SCN include alfalfa, barley, canola, corn, cotton, forage grasses, grain sorghum, oats, red clover, sweet sorghum, switchgrass, and wheat. When the field is planted to soybeans, a different SCN-resistant variety should be planted each year, if possible, to provide different genetics.

Another management practice is to clean all equipment thoroughly after doing any kind of field work in fields infested with SCN. Anything that can move even small amounts of infested soil can spread SCN.

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These e-Updates are a regular weekly item from K-State Extension Agronomy and Steve Watson, Agronomy e-Update Editor. All of the Research and Extension faculty in Agronomy will be involved as sources from time to time. If you have any questions or suggestions for topics you'd like to have us address in this weekly update, contact Steve Watson, 785-532-7105 <u>swatson@ksu.edu</u>, or Jim Shroyer, Research and Extension Crop Production Specialist and State Extension Agronomy Leader 785-532-0397 <u>jshroyer@ksu.edu</u>