

Weed Control in Soybeans Needs Good Residual Herbicide Performance

Effective weed control in soybeans is often dependent on good performance from soil residual or preemergence (PRE) herbicides. Understanding the reasons why PRE herbicides can work effectively or “fail” helps when implementing a weed management program and diagnosing performance problems in the field.

Factors Affecting Performance

To be effective, a residual herbicide must be present in the soil profile where weed seeds germinate. These herbicides require moisture for activation, and without rainfall or irrigation after application, they can be less effective and allow weeds to become established. Factors that can affect the performance of soil residual herbicides are:

- **Weather** – Too little rainfall can reduce the activation of residual herbicides; however, too much rain can cause leaching below the weed seed germination zone. A common question is how much rain and when is it needed for activation of a soil residual herbicide. Typically a 0.5 inch of rain received within 7 to 10 days after a PRE herbicide treatment is sufficient for good activation. However, the amount can vary depending on the soil type and moisture content prior to the rainfall event. A dry soil can require more rain because moisture is needed to wet the soil before significant movement of the herbicide can occur. Weed control failures, due to the reduction in PRE herbicide that is available, often occurs when soil moisture is limited during the first several weeks after planting.
- **Soil Properties** – Recommended rates for most soil-applied herbicides are based on soil type. Residual herbicide rates need to be adjusted based on soil organic matter and clay content. Soil pH can also influence the persistence of many residual herbicides, especially ALS inhibitors. Cloddy soils can reduce weed control since herbicides must come in contact with the developing weed seedling.
- **Surface Residue** – Excessive residue and plant material on the soil surface can tie up residual herbicides.



Waterhemp seedlings can emerge early and late into the soybean growing season, often requiring a PRE soil-applied herbicide at planting followed by an in-crop application of a residual herbicide to extend control.

- **Weed Pressure** – Heavy weed pressure can lead to weed escapes with soil-applied herbicide applications.
- **Herbicide Choice** – The residual herbicide needs to be selected to match the weed spectrum in the field. Soil residual herbicides that are short-lived may not provide full-season weed control. Herbicides begin to break down as soon as they are applied, and a high enough concentration of the chemical needs to be available to kill weeds when they germinate.
- **Timing of Application** – Spraying soil applied herbicides too early in the spring can result in a shorter residual period for weed control and later weed escapes. Spraying too late, after the weeds have emerged, can also reduce the level of weed control.

Management Considerations

Starting clean with tillage or a burndown herbicide application to reduce surface residue or eliminate weed escapes helps residual herbicides perform effectively. Multiple residual herbicide applications to control weeds that germinate throughout the growing season may be necessary for effective weed control. Using multiple modes-of-action and rotating herbicides is important to help prevent herbicide resistance. Good weed control requires careful management and being conscious of the amount of weed seed being added to the soil seedbank.

to pg. 2 

Weed Control in Soybeans Needs Good Residual Herbicide Performance

from previous page

Four hypothetical situations for weed control in soybeans where glyphosate-resistant waterhemp is present, and preplant or preemergence (PRE) applications of a PPO (protoporphyrinogen oxidase inhibitor) herbicide like Valor® and an in-crop application of Warrant™ Herbicide (mitosis inhibitor) are applied for residual weed control (assuming that rainfall events occurred on May 1, May 16, May 29, and June 6 prior to and after residual herbicide applications).

Situation	Week - Beginning Date											
	1 4/18	2 4/25	3 5/2	4 5/9	5 5/16	6 5/23	7 5/30	8 6/6	9 6/13	10 6/20	11 6/27	12 7/4
A Till/Plant/PRE Plant May 5	Tillage		Waterhemp can emerge, Tillage		Good activity/control from PRE herbicide			PRE herbicide activity/control weakening		Waterhemp escapes can emerge		
B Till/Plant/PRE Plant May 13	Tillage		Waterhemp can emerge, Tillage		Good activity/control from PRE herbicide				PRE herbicide activity/control weakening		Waterhemp escapes can emerge	
C EPP Burndown Plant May 5	Burndown with residual herbicide		Good activity/control from PRE herbicide				PRE herbicide activity/control weakening		Waterhemp escapes can emerge			
D EPP Burndown Plant May 5	Burndown with residual herbicide		Good activity/control from PRE herbicide			Warrant™ Herbicide application		Good activity/control of waterhemp escapes from Warrant™ Herbicide				

Situation A – Starts clean with tillage, plants soybeans, and applies a PPO herbicide PRE on May 5. There is adequate soil moisture at planting from rainfall on May 1, but with more than 10 days of no rainfall after the PRE herbicide application, residual weed control could be reduced leading to weed escapes that can be more difficult to control with a postemergence (POST) herbicide treatment in-crop.

Situation B – Starts clean with tillage, but planting is delayed until May 13 which could allow some waterhemp plants to emerge prior to a PRE application of a PPO herbicide on the same day. It is critical in this situation to completely destroy any emerged waterhemp plants with tillage prior to planting and the PRE herbicide treatment. The soil is dry, but rainfall for activation occurs within 3 days following the PRE herbicide treatment.

Situation C – Starts clean with early preplant (EPP) burndown and PPO soil-applied product. The residual product is activated, and does a good job of controlling weeds early, but control weakens allowing weed escapes before crop canopy.

Situation D – Starts clean with EPP burndown and PPO soil-applied product. As control with the PRE residual product begins to weaken, Warrant™ Herbicide is applied in-crop in the last week of May when soybeans are in the V2-V3 stage. Rainfall is received for good activation of Warrant Herbicide, and control of waterhemp is extended through crop canopy closure.



Monsanto Company is a member of Excellence Through Stewardship® (ETS). Monsanto products are commercialized in accordance with ETS Product Launch Stewardship Guidance, and in compliance with Monsanto's Policy for Commercialization of Biotechnology-Derived Plant Products in Commodity Crops. This product has been approved for import into key export markets with functioning regulatory systems. Any crop or material produced from this product can only be exported to, or used, processed or sold in countries where all necessary regulatory approvals have been granted. It is a violation of national and international law to move material containing biotech traits across boundaries into nations where import is not permitted. Growers should talk to their grain handler or product purchaser to confirm their buying position for this product. Excellence Through Stewardship® is a registered trademark of Biotechnology Industry Organization.

Individual results may vary, and performance may vary from location to location and from year to year. This result may not be an indicator of results you may obtain as local growing, soil and weather conditions may vary. Growers should evaluate data from multiple locations and years whenever possible.

ALWAYS READ AND FOLLOW PESTICIDE LABEL DIRECTIONS. Roundup Ready® crops contain genes that confer tolerance to glyphosate, the active ingredient in Roundup® brand agricultural herbicides. Roundup® brand agricultural herbicides will kill crops that are not tolerant to glyphosate. Warrant™ Herbicide is not registered in all states. Warrant™ Herbicide may be subject to use restrictions in some states. The distribution, sale, or use of an unregistered pesticide is a violation of federal and/or state law and is strictly prohibited. Check with your local Monsanto dealer or representative for the product registration status in your state. Roundup Ready PLUS™, Roundup Ready®, Roundup®, Technology Development by Monsanto and Design®, and Warrant™ are trademarks of Monsanto Technology LLC. Valor® is a registered trademark of Valent U.S.A. Corporation. ©2011 Monsanto Company. 04252011TED

