



WEED CONTROL IN SOYBEANS NEEDS RESIDUAL HERBICIDE PERFORMANCE

What You'll Learn...

- Applications of soil residual herbicides, both preemergence (PRE) and postemergence (POST), are essential for effective soybean weed management.
- Factors that may influence the effectiveness of a PRE residual herbicide include: scouting, proper weed identification, weather conditions, soil properties, weed pressure, and product selection.
- Multiple residual herbicide applications may be necessary to control weeds that germinate throughout the growing season.

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:

1. **Weather** – Sufficient moisture is required to activate residual herbicides; however, too much rain can hasten herbicide breakdown and cause leaching below the weed seed germination zone. A common question is, how much moisture and when is it needed for the activation of a soil residual herbicide? Typically, a 0.5 inch of moisture received within 7 to 10 days after a PRE herbicide treatment is sufficient for good activation. However, the amount required can vary depending on the soil type and soil moisture content at application. Dry soil can require more moisture as it is needed to wet the soil before any significant herbicide movement can occur. Weed control failures, due to the reduction in PRE herbicide availability, often occurs when soil moisture is limited during the first several weeks after herbicide application.
2. **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.

3. **Surface Residue** – Excessive residue and plant material on the soil surface can tie up residual herbicides and prevent them from reaching the soil where weed seed germinate.
4. **Weed Pressure** – Heavy weed pressure can lead to weed escapes with soil-applied herbicide applications.
5. **Herbicide Choice** – A 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. An additional residual herbicide may be needed for full-season control.
6. **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. Rotating and using multiple sites-of-action herbicides is important to help prevent herbicide resistance. Good weed control requires careful management and prevention of weed seed from being added to the soil seedbank.



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Four Hypothetical Weed Management Situations (Table 1)

Situation A – Starts clean with tillage, soybean crop planted, and a PPO herbicide applied PRE on May 5. There is adequate soil moisture at planting from rainfall on May 1st, but with more than 10 days of no rainfall after the PRE herbicide application, residual weed control could be reduced leading to tough-to-control weed escapes.

Situation B – Starts clean with tillage, but planting is delayed until May 13 which could allow waterhemp plants to emerge prior to a PRE at-plant application of a PPO herbicide. In this situation, it is critical 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 after the PRE herbicide treatment.

Situation C – Starts clean with an 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 during the last week of May when soybean plants 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. This strategy is the best option for weed control.

Table 1. 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 Rowel® Herbicide or Rowel® FX Herbicide 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 may emerge, tillage		PRE herbicide activity/good control			PRE herbicide activity/control weakening		Waterhemp may emerge		
B Till/Plant/PRE Plant May 13	Tillage		Waterhemp may emerge, tillage		PRE herbicide activity/good control				PRE herbicide activity/control weakening		Waterhemp may emerge	
C EPP Burndown Plant May 5	Burndown with residual herbicide		PRE herbicide activity/good control				PRE herbicide activity/control weakening		Waterhemp may emerge			
D EPP Burndown Plant May 5	Burndown with residual herbicide		PRE herbicide activity/good control			Warrant® Herbicide application		Warrant® Herbicide activity/good control of waterhemp				

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