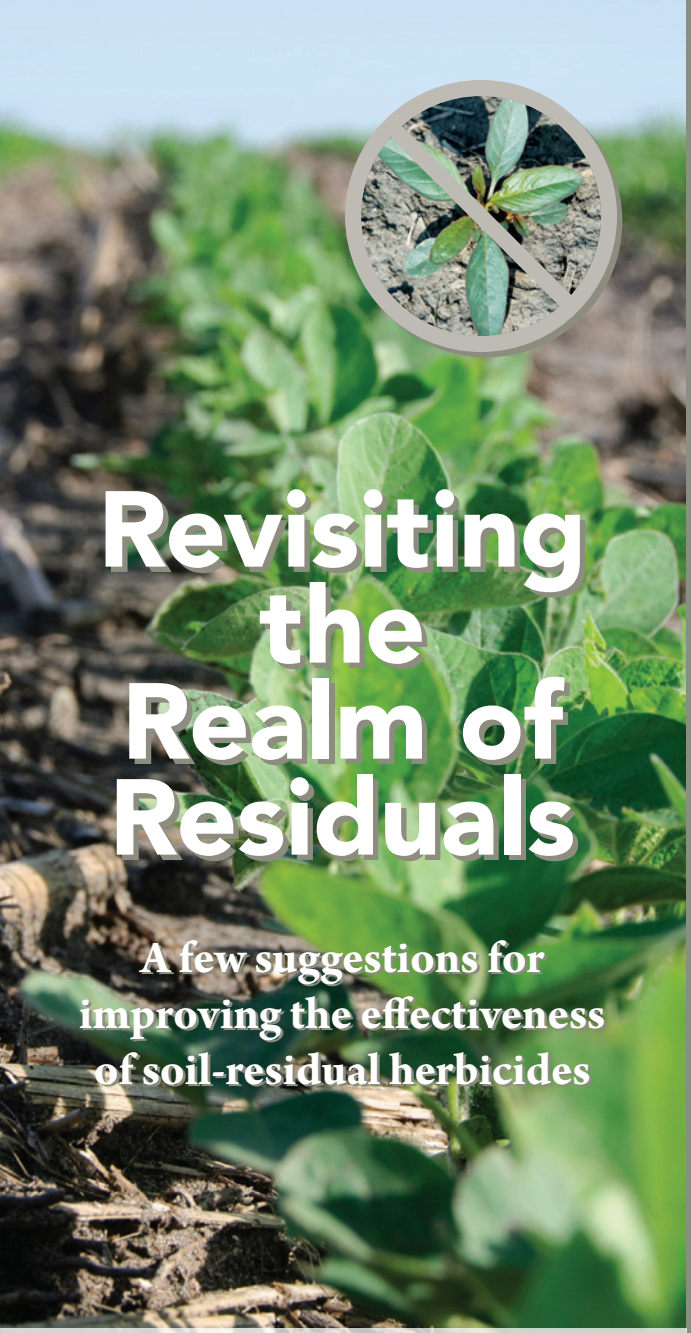

Revisiting the Realm of Residuals

A few suggestions for improving the effectiveness of soil-residual herbicides

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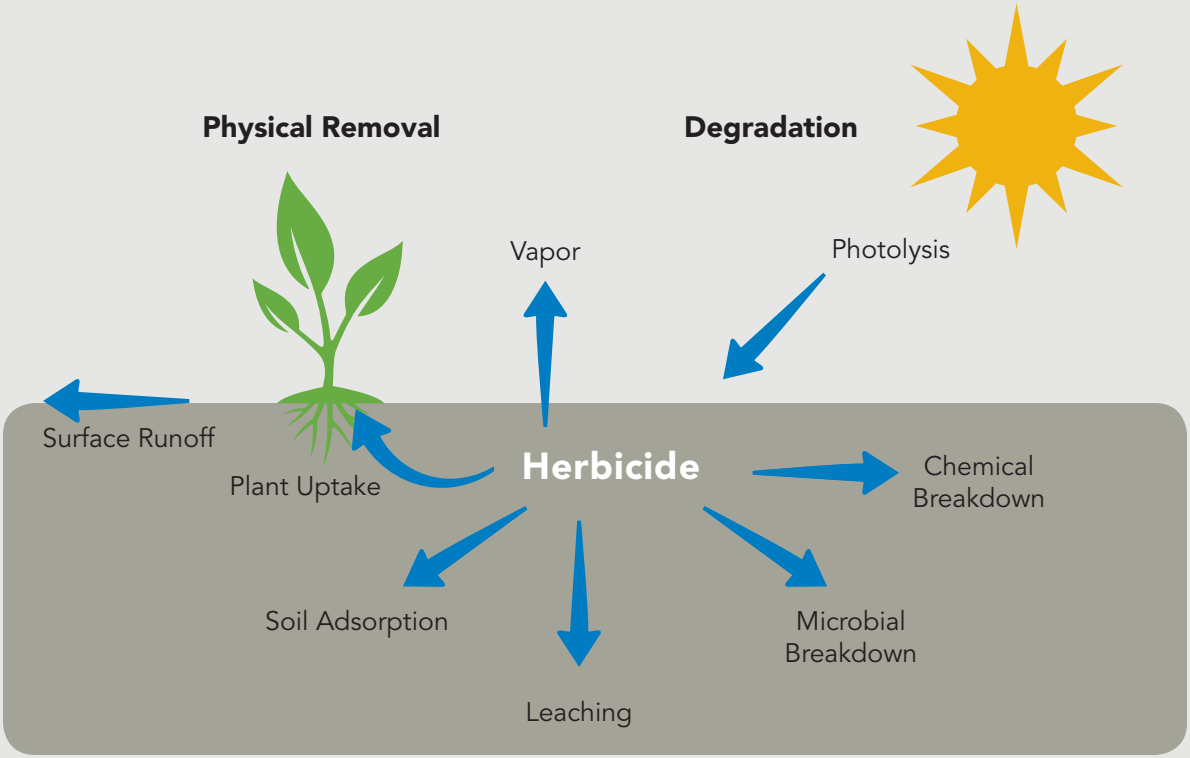
Soil-residual herbicides provide many weed management benefits, but several factors influence their effectiveness. Product selection, application rate, and when the herbicide is applied in relation to crop planting are largely under the control of the farmer. In contrast, soil moisture content at application and the interval between application and the first precipitation event are factors largely beyond the farmer's control. A few considerations and suggestions for improving the effectiveness of soil-residual herbicides are provided.

Select the Most Appropriate Soil-Applied Herbicide

Select a soil-residual herbicide or herbicide premix that offers the best solution for the problem weed species encountered in each field. For example, many products containing imazethapyr (Pursuit) provide excellent control of eastern black nightshade, but not all provide effective control of waterhemp. Much of the Illinois waterhemp population is resistant to ALS-inhibiting herbicides, so if you select a herbicide premix that contains an ALS inhibitor be sure the other premix component(s) has good activity on waterhemp. When selecting a herbicide premix, give careful attention to how much of each active ingredient will be applied at the rate you select. For example, several soybean herbicide premixes contain sulfentrazone, an active ingredient effective on waterhemp. However, the amount of sulfentrazone applied, and consequently the duration of waterhemp control, can vary by product.

Consider the Timing of Application

The duration of weed control provided by a soil-residual herbicide is influenced by when it is applied. Generally, herbicides applied close (within 14 days) to crop planting control weeds longer into the growing season compared with herbicides applied several weeks before planting. Be sure to consult the respective herbicide label to determine when a soil-residual herbicide may be applied. Application timings vary by product, and can range from several weeks before planting (early preplant) to after planting but before crop emergence



Fate of herbicides in the soil environment.

(preemergence). Carefully weigh the application flexibility of early preplant applications against the extended weed control provided when herbicides are applied closer to planting.

Give Careful Consideration to Application Rate

Application rates should be selected according to label recommendations for soil texture, organic matter content and application timing. Higher application rates generally provide a higher level of weed control longer into the growing season, which is an important advantage when managing waterhemp populations that are resistant to one or more postemergence herbicides. However, one should not necessarily assume that a higher application rate will always provide season-long weed control.

Moisture is Critical

Soil-applied herbicides require either mechanical incorporation or precipitation to move them into the soil solution where they are available for uptake. Herbicide effectiveness is reduced when a soil-applied herbicide is sprayed on a dry soil surface with no incorporation (mechanical or by precipitation) for several days following application. Surface-applied herbicides generally require 0.5 to 1.0 inch of precipitation within 7 to10 days after application for optimal incorporation. Soil condition, soil moisture content, residue cover, and the chemical properties of the herbicide influence how much and how soon after application precipitation is needed. If no precipitation is received between application and planting, mechanical incorporation, where feasible, can still help move the herbicide into the soil solution.

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Excellent control of herbicide-resistant waterhemp can be achieved by combining a soil-residual herbicide with a properly timed postemergence herbicide.

Be Aware of the Potential for Soybean Injury

Crop injury from soil-applied herbicides can be enhanced under certain conditions. The environment and herbicide application timing influence crop injury from soil-applied herbicides. Adequate soil moisture levels and low relative humidity can enhance uptake of soil-applied herbicides. Applications made immediately before or after crop planting result in a high concentration of herbicide near the emerging crop plants. Rapid herbicide absorption into the young crop plants may temporarily overwhelm the plant's ability to break down the herbicide, leading to injury symptoms.

Soybean injury caused by a soil-residual herbicide applied close to soybean emergence.

Control of glyphosate-resistant waterhemp 30 and 60 days after treatment (DAT) with soil-residual herbicides applied at planting

Treatment means (larger type) and ranges (numbers in parenthesis) are averaged over four years (2007–2010).

Product	Rate/A	% Waterhemp Control	
		30 DAT	60 DAT
Authority	5.33 ounces	95 (86–99)	91 (75–99)
Valor	2 ounces	95 (83–99)	92 (77–99)
IntRRo	2 quarts	82 (43–99)	76 (37–95)
Outlook	18 fluid ounces	87 (60–99)	77 (47–95)
Dual II Magnum	1.32 pints	81 (70–99)	70 (50–95)
Linex	24 fluid ounces	93 (88–99)	87 (77–98)
Sencor	8 ounces	76 (57–96)	67 (47–96)
Prowl H_2O	2.5 pints	76 (57–93)	72 (47–90)
atrazine	2 lb ai	75 (57–92)	57 (50–65)
Pursuit	4 fluid ounces	6 (0–13)	3 (0–10)

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