Two Apps Are Better Than One
The value of split applications of preemergence herbicides

The loss of effective postemergence options for waterhemp due to herbicide resistance has led to resurgence in the use of preemergence (PRE) herbicides in soybean. Waterhemp’s extended emergence pattern requires that PRE herbicides remain at an toxic concentration later in the season than required for other weeds to provide effective control.

One approach to provide longer control is split applications, also referred to as layered residuals. At least 50% of the PRE is applied before or at planting, and then the remainder of the product is applied after the crop has established. Advantages of split applications compared to a single treatment near planting include: 1) they reduce the risk of crop injury, and 2) they may extend weed control later into the season. A disadvantage of the split application is that it typically involves an increase in herbicide used, thus increasing costs.

A second benefit of an early-season application is that more herbicide will reach the soil surface. As the crop canopy develops it intercepts more herbicide. Most PRE herbicides are lipophilic, therefore they are rapidly absorbed into the cuticle of plants. Once they move into the cuticle they will not be washed off with rain, and therefore will not contribute to weed control. Researchers found that eight hours after the application, only 8% of s-metolachlor was available to be washed off of soybean foliage (Table 1). There was a close relationship between percent canopy cover and percent herbicide intercepted by the canopy.

Table 1. Amount of s-metolachlor washed off of soybean foliage.

<table>
<thead>
<tr>
<th>Hour after application</th>
<th>1</th>
<th>2</th>
<th>4</th>
<th>8</th>
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<tbody>
<tr>
<td>% washed off</td>
<td>75</td>
<td>50</td>
<td>32</td>
<td>8</td>
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</tbody>
</table>


Split applications of PRE herbicides were a common practice at the dawn of conservation tillage systems, but the availability of effective postemergence options reduced their use. Today they provide an effective tool to diversify selection pressure and reduce the probability of herbicide resistance.

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