# Can Overlapping Residuals Improve Weed Control in Pumpkins

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## Hypothesis

S-metolachlor is an option for an overlapping residual approach and extend weed control in pumpkin production.

## Background

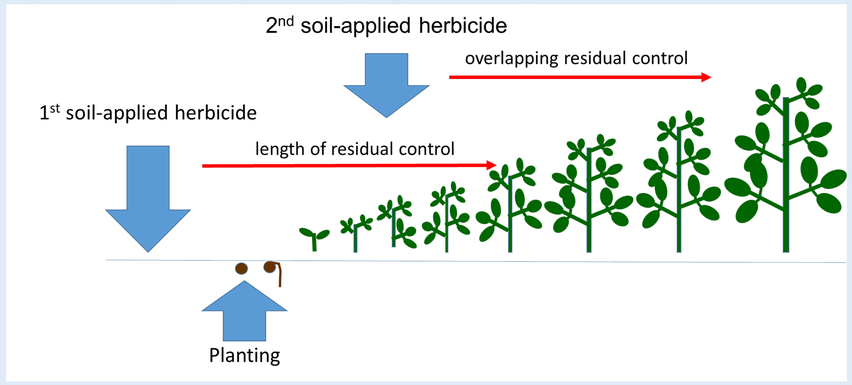
Weed control in pumpkins is challenging for many reasons, including:

- Wide rows
- No-till – excludes the use of cultivation
- Long growing season
- Limited number of herbicide options

These practices result in a greater reliance upon herbicides for weed control. Unfortunately, there are very few herbicides labeled for postemergence weed control in pumpkins. Therefore, novel uses of soil-applied herbicides need to be explored, including the approach of overlapping residuals.

S-metolachlor is a common residual herbicide labeled for numerous crops. In pumpkins, it is labeled for applications between rows, but not as a broadcast spray pre-emergence. Previous research at the University of Delaware in both the greenhouse and the field have indicated good crop safety if s-metolachlor is applied to pumpkins after emergence and better residual control compared to similar herbicides.

*Figure 1. A diagram of an overlapping residual approach.*




## Methods

In 2019, this research was conducted at three locations:

- Western Maryland Research & Education Center, Keedysville, Maryland
- Russell E. Larson Research & Education Center, Rock Springs, Pennsylvania
- Carvel Research & Education Center, Georgetown, Delaware

Pumpkins ('Gladiator') were direct-seeded into a rolled cover crop in early to mid June. Ethafluralin (1,262 g $ha^{-1}$) was applied as a broadcast treatment at planting. S-metolachlor was applied at a low (801 g $ha^{-1}$) or high (1,602 g $ha^{-1}$) rate at 2, 3, or 4 weeks after planting (WAP). An untreated control and a weed-free check were also included for comparison. Plots with ethafloralin only were monitored for weed emergence patterns. Visual crop injury, visual weed control, and yield data were collected. Plots were arranged in a randomized complete block design. Data were analyzed using ANOVA with the Fit Mixed Procedure in JMP PRO 14, and means separated using Fisher's LSD test at p = 0.05.

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## Results

### *Crop Injury*

No visual crop injury was seen at any of the three locations as a result of s-metolachlor applications 2, 3, or 4 WAP at the low or high rate.

### *Weed Emergence & Control*

At 4 WAP, there was a peak in the number of weeds that had emerged. Since s-metolachlor does not control emerged weeds, waiting to apply it at 4 WAP resulted in weed escapes. Applications at 2 and 3 WAP provided in better weed control.

Adding s-metolachlor as a second residual improved weed control compared to ethafloralin alone. In general, the higher rate resulted in greater weed control than the lower rate.

*Figure 2. Weed emergence pattern in Maryland.*

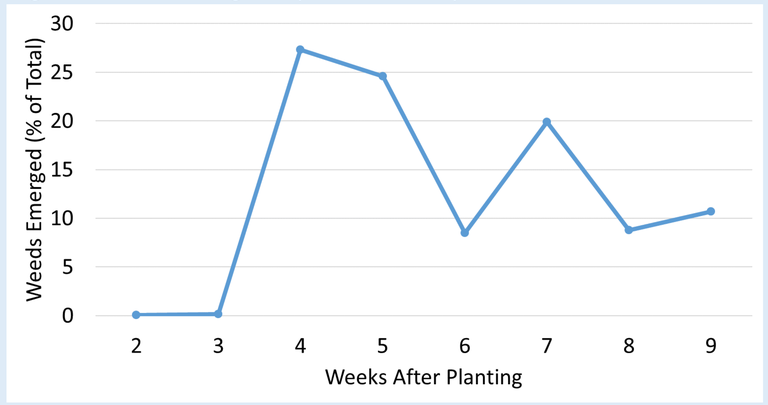
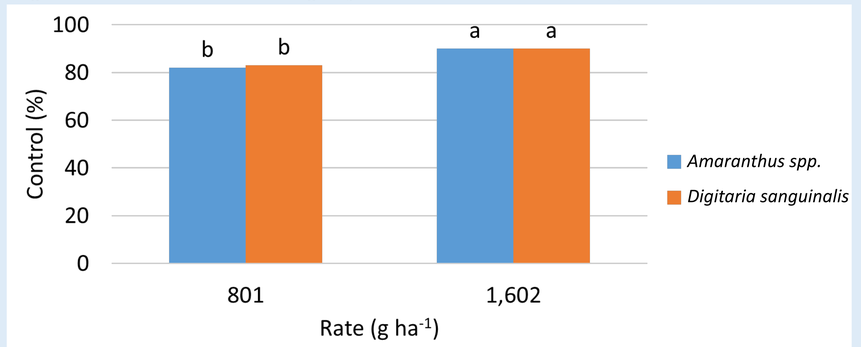



*Figure 3. Weed control ratings of the two most common species in PA and MD.*




### *Yield*

Applications of s-metolachlor at any of the application timings or rates did not decrease yield compared to the untreated check.

*Figure 4. Yield comparison of the two rates of s-metolachlor, weed free (WF), and untreated (UTC) plots for MD and DE.*