Can Overlapping Residuals Improve Weed Control in No-Till Pumpkins

Final Report for 2019

Submitted to:

Pennsylvania Vegetable Marketing and Research Program
Pennsylvania Vegetable Growers Association

Submitted by:

Dwight D. Lingenfelter
Penn State Dept. of Plant Science
116 Ag Sciences & Industries Bldg.
University Park, PA 16802
Ph: 814-865-2242
Email: DXL18@psu.edu

John M. Wallace
Penn State Dept. of Plant Science
116 Ag Sciences & Industries Bldg.
University Park, PA 16802
Ph: 814-863-1014
Email: jmw309@psu.edu

Kelly Nichols
Ag Agent Associate
University of Maryland Extension,
Frederick County
330 Montevue Lane
Frederick, MD 21702
301-600-3577
Email: kellyn@umd.edu

Mark J. VanGessel
University of Delaware, Carvel Center
16483 County Seat Highway
Georgetown, DE 19947
Ph: 302-856-2585 ext 510
Fax: 302-856-1845
Email: mjv@udel.edu

Introduction:
Weed control in pumpkins is challenging for many reasons, including the production practices of wide rows, no-till which excludes use of cultivation, long growing season and 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, so novel uses of soil-applied herbicides need to be explored. One approach used in soybeans to improve overall weed control is applying a second residual herbicide over the top of the emerged crop, but before the weeds have begun to emerge. This approach is referred to as overlapping residuals.

Dual Magnum is a common residual herbicide labeled for numerous crops, but not labeled preemergence in pumpkins (note, Dual Magnum is only labeled for between pumpkin row applications, not as a broadcast spray). Greenhouse trials at the University of Delaware (UD) have demonstrated very good crop safety if Dual is applied to pumpkins after they have emerged, while Prowl caused significant injury. Field trials at University of Delaware with soybeans have found Dual to provide better residual control in this approach compared to similar herbicides.

Dual Magnum will not control emerged weeds but weed control efficacy may be extended if it is applied sequentially, before the first herbicide dissipates. Preliminary UD studies found sequential applications made 4 to 5 weeks apart allowed too many pigweeds to emerge, so shorter time intervals need to be explored.

Objectives:
Evaluate potential of Dual Magnum as an overlapping residual approach for pumpkin production throughout the Mid-Atlantic Region.

Procedures:
The field study evaluated weed control efficacy and pumpkin ('Gladiator') response to Dual Magnum (s-metolachlor) applied POST at different rates and application timings. The study was repeated at 3 locations in Delaware, Maryland, and Pennsylvania. Curbit (ethafluralin) was applied at 48 fl oz/A over the entire study immediately after planting. Dual Magnum (s-metolachlor) was applied as a broadcast treatment at two rates (0.75 and 1.5 pints/A) – 2, 3, or 4 weeks after planting. An untreated control and a weed-free check was used for comparison.

Treatments for field trial:
Table 1. Herbicide programs for pumpkins.

Trt	Treatment			
No.	Name	Rate	Unit	Timing*
1	Curbit	48	fl oz/A	PRE
2	Curbit	48	fl oz/A	PRE
	Dual Magnum	0.75	pt/A	2 WAP
3	Curbit	48	fl oz/A	PRE
	Dual Magnum	0.75	pt/A	3 WAP
4	Curbit	48	fl oz/A	PRE
	Dual Magnum	0.75	pt/A	4 WAP
5	Curbit	48	fl oz/A	PRE
	Dual Magnum	1.5	pt/A	2 WAP
6	Curbit	48	fl oz/A	PRE
	Dual Magnum	1.5	pt/A	3 WAP
7	Curbit	48	fl oz/A	PRE
	Dual Magnum	1.5	pt/A	4 WAP
8	Weed Free			
9	Untreated			

*PRE=preemergence; WAP=weeks after planting

To obtain a wider range of weeds, soil types, and growing conditions, the studies was conducted at the Penn State research farm in Centre County, Western Maryland Research & Education Center in Keedysville MD, and at the University of Delaware Research and Education Center, Georgetown DE. Benefits to state and regional pumpkin growers will include potential

to petition for local needs label (24c) for Pennsylvania and well as more experience on how best to extend residual weed control. This research will also offer an approach to integrate other effective herbicide modes of action into the program to reduce the potential for resistance.

Results:

- Weeds were not present in significant quantities at the Delaware site; therefore, only weed control data from the Maryland and Pennsylvania could be analyzed.
- Emergence problems with pumpkins occurred at the Pennsylvania site; therefore, yields were only collected from the Delaware and Maryland sites.
- No injury was observed following POST Dual applications.
- Dual applied at 1.5 pints/A controlled both pigweed species and large crabgrass, 90%, compared to Dual at 0.75 pints (pigweed-82%, large crabgrass-83%) regardless of POST application timing (Figure 1).
- An average of 3,500 pumpkins/A were harvested, but there was no difference in location, Dual rate, or application timing among herbicide treated and weed-free plots. (Figure 2).
- Pumpkin weight averaged 11 lb, but there were no differences among treatments (Figure 3).
- Our results show that Dual does not cause any adverse crop injury when applied as a broadcast treatment in pumpkin.
- While this tactic did provide late season weed control, growers should be aware that Dual will not control emerged weeds. Therefore, additional strategies will need to be included to manage escaped weeds.
- Data will be shared with Syngenta in hopes of receiving a label for this utility.

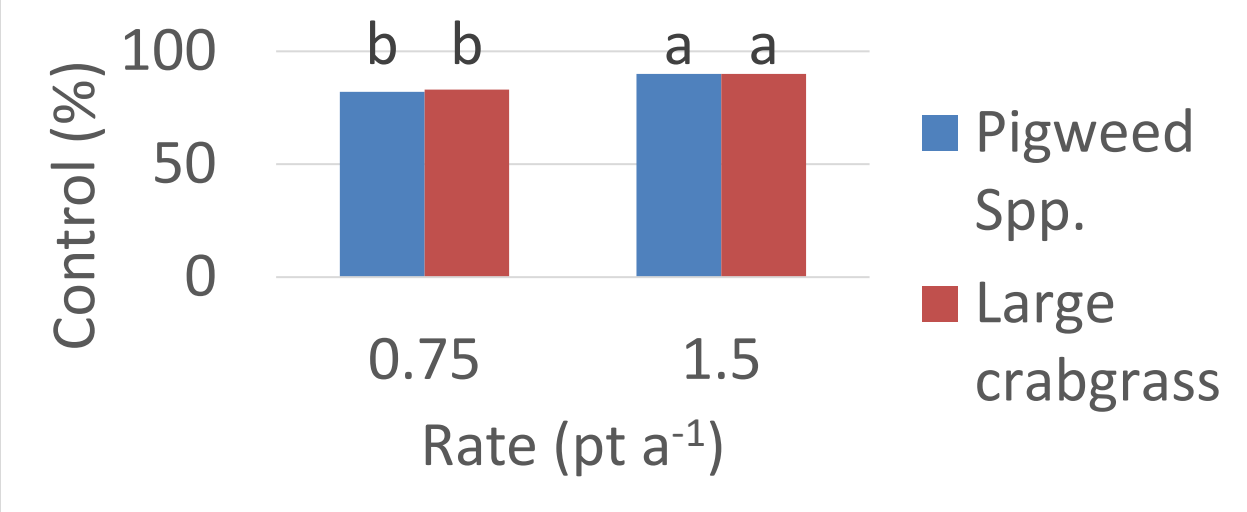

Figure 1. Pigweed and large crabgrass control with Dual 8 wk after planting

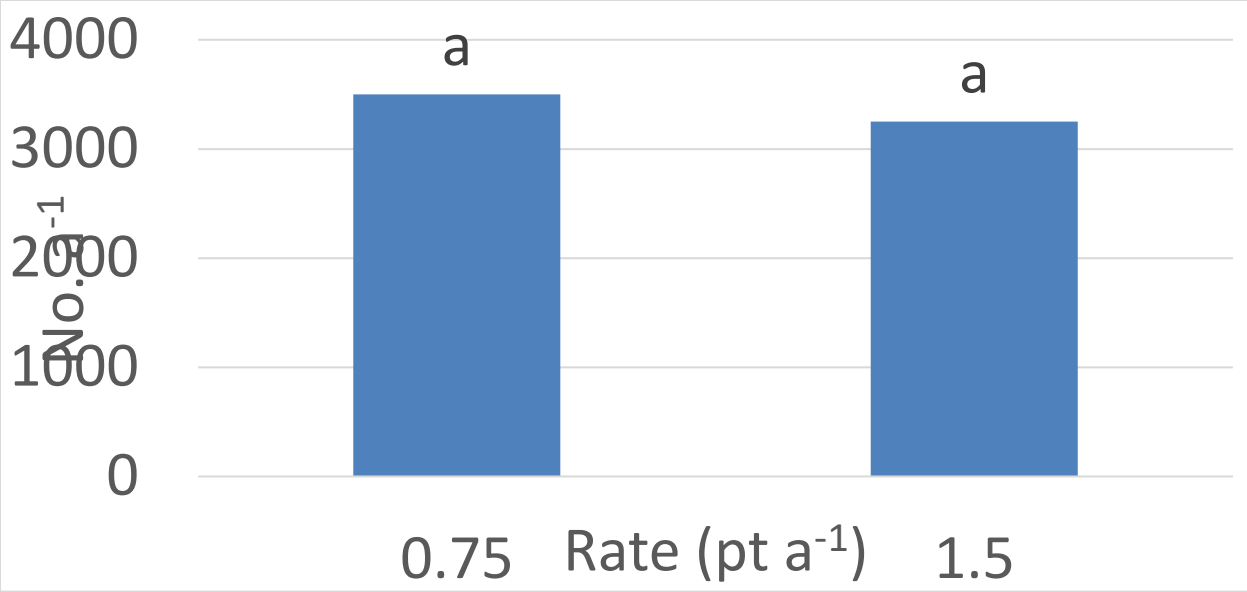

Figure 2. Total pumpkins per acre compared to Dual rate.

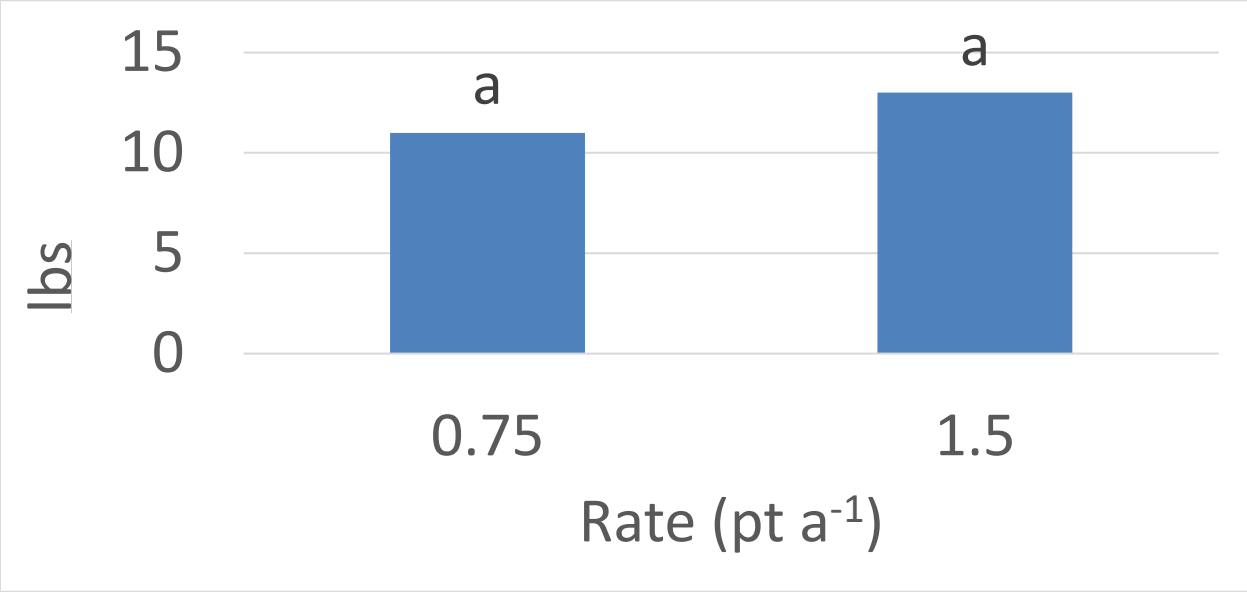

Figure 3. Average pumpkin weight (lbs) compared to Dual rate.

Special thanks to Kurt Vollmer, Univ. Maryland for summarizing this data.

Signature:

Dwight Lingenfelter