

SCSB Final Report

General Information

Principal Investigator(s) Name(s): Michael W. Marshall and Matthew Cutulle

Organization: Clemson University

Date: 1/17/19

Quarter: Final Report

Proposal Information

Title: Determining volatility potential of Xtendimax and Engenia herbicides

Amount Expended to Date: \$4500

Project Summary

The new formulations of dicamba herbicides, Xtendimax and Engenia, were registered and released for use in dicamba tolerant cotton and soybean across most of the United States in 2017. Dicamba is an effective herbicide for control of small Palmer amaranth and was used extensively on dicamba-tolerant soybean the last two growing seasons. Although these new formulations were developed to minimize volatility potential compared older formulations, off-target injury to non-dicamba tolerant crops were observed. Therefore, research is needed to evaluate the volatility potential of these new dicamba formulations under controlled growth chamber conditions which simulate conditions during typical South Carolina growing season (high temps and humidity). Representative coastal plain soil (sandy loam) was collected from the Edisto Research and Education Center for this project. The volatility experiments were conducted at the Coastal Research and Education Center growth chamber facilities. Soil was placed in a 26 x 52 x 6 cm plastic flat and treated with the 1x rate of Xtendimax (22 oz/A), Banvel (1.0 pt/A), Engenia (12.8 fl oz/A), and Clarity (1.0 pt/A) herbicides. All dicamba product application rates were an equivalent of 0.5 lb ae dicamba acid/A. A clear plastic humidome (25 x 50 x 25 cm) was placed on top of the flat after herbicide application. A 2-cm hole was cut in the both ends of the dome to allow air to enter and to withdraw air samples using a vacuum pump. A 4-cm PUF filter was placed on the suction side of the humidome to capture any dicamba vapors that volatilize from the soil in the flat. Polyvinyl chloride clear tubing was used to connect the PUF filter to the mass flow controller and Gaast vacuum pump. Air flow velocity was determined using an air meter (approximately 2 liters per at the flow meter). The treated soil tray/humidome experimental setup was placed in a growth chamber for 24 hours at 86 F and 45% humidity environmental conditions for 24 hours. An untreated soil tray/humidome was included as a check. After the 24 hours period, the PUF filters were carefully removed to avoid cross-contamination and sent to Brooks Laboratories (New Bremen, OH) for extraction of the dicamba residue. Based on the results from these studies, the Banvel formulation of dicamba was the only dicamba product with detectable vapor (4.18 mg dicamba acid/kg) in the PUF cartridges. Based on the high volatility potential of Banvel (DMA salt), these results were expected. Clarity (DGA salt), Xtendimax (DGA salt + VaporGrip), and Engenia (BAMPA salt) herbicides showed no-detectable vapors in our trials (Non-detectable according to the lab

analysis). These results demonstrated that the new formulations of dicamba (Xtendimax and Engenia) showed little to no observable volatility under typical summer temperatures and humidity in South Carolina. The injuries observed from the use of these products are most likely attributed to particle movement not volatility as thought during application of these new products. More education is needed on minimizing particle movement to sensitive areas/crops.

Key Performance Indicators

- *Preliminary results from this study showed minimal (non-detectable) volatility potential of Engenia and Xtendimax herbicides compared to the older formulation of dicamba under typical summer conditions.*
- *Submitted 4 quarterly and final report to the SC soybean board.*

Next Steps

Continue testing for volatility of these new herbicide formulation as they become available from the herbicide manufactures (BASF and Bayer CropScience).

Additional Information

None to report

Prior to submission, reports should be saved as a pdf document using the following naming convention; 2019Date(yrmoday)_(PI Last Name)_(Abbreviated Proposal Title)_Final.