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I. Abstract

a. **Project Title:** Evaluation of imazapic soil persistence and carryover potential as affected by lime and cover crop

b. **Principal Investigator(s):**

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c. **Cooperating Personnel:** graduate students, staff, and members AU weed science and USDA-ARS-NSDL team.

d. **Summary:** Imazapic (Cadre) is a commonly used peanut herbicide that effectively controls many troublesome weeds such as sicklepod, FL beggerweed, nutsedge, morningglory and grasses. It has both PRE and POST activity. However, the persistence of imazapic in soil is usually long and can be highly variable among different soil types and locations. Imazapic carryover injury has been frequently reported in cotton and vegetable production in the Southeast. Many research studies have evaluated its injury potential on sensitive crop species. Nevertheless, the persistence of imazapic in soil and key factors affecting its persistence under field conditions are still not fully understood. Many field observations of imazapic carryover injury seemed to be random and weather dependent.

II. Main Body of the Report

a. **Project Title:** **Evaluation of imazapic soil persistence and carryover potential as affected by lime and cover crop**

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c. **Cooperating Personnel:** graduate students, staff, and members AU weed science and USDA-ARS-NSDL team.

d. **Objective:** The overall objective of this project is to evaluate the possibility of using lime and cover crop to enhance imazapic dissipation and mitigate imazapic carryover problem in peanut-cotton or peanut-vegetable-cotton rotation.

e. **Procedures:** A field was selected at Wiregrass Research and Extension Center in Headland, AL, summer of 2017, to begin the evaluation of the imazapic soil persistence and carryover as affected by lime treatments in a low pH field. The experiment was designed as a completely randomized block design with 4 replications and 6 row plots. On April 12, 2017 lime treatments were spread out in the field varying from rates of 2,000 lbs to 8,000 lbs an acre as well as an ammonium sulfate treatment at 476 lbs an acre. These treatments were then incorporated into the soil. Cadre treatments of 1X and 2X times the labeled rate were then applied at peanut planting, May 9th, 2017 and at the 4-5 leaf stage, May 31, 2017. No data was collected on the peanuts since we are concerned with carryover potential on cotton. The station harvested the peanuts in October, 2017. May 9, 2018 cotton was planted in the same plots the peanuts were grown, to evaluate the cadre carryover effect on low pH soil. Cotton was planted using a strip till so the ground would not be disturbed and effect the cadre within the plots. The station is managing the cotton with standard cotton production practices. Growth parameters including plant height and stand count were collected on June 4, 2018 and June 28th 2018. Yield will be collected at the end of October 2018 from the two center rows at the end of the growing season and data analysis will be conducted in SAS 9.4 in the fall.

This experiment is being replicated at EV Smith Research Center in Shorter, AL. In December 2017 the field at EV Smith was treated with sulfur to reduce the pH so that it will have similar pH field conditions to Wiregrass. On May 11, 2018 lime and ammonia sulfate treatments were applied to the field and incorporated. Cadre treatments were then applied on May 8, 2018 at planting and at the 4-5 leaf stage on May 29, 2018. The station will manage the site with standard peanut production practices but will not apply any additional cadre to the field. They will harvest the peanuts in the fall (2018) and next spring (2019) they will plant cotton in each of the plots. Growth parameters including plant height, stand count, and yield will be collected on the cotton during the growing season of 2019.

Furthermore, two fields were planted with cover crops at Wiregrass on October 26, 2017 and E.V Smith on November 6, 2017. The experiment was designed as a randomized split plot design with 4 replications with 6 row plots. Plots consisted of oats, crimson clover, a mix of

crimson clover and oats, and bare ground. The cover crops were sprayed with a Roundup burn down 3-4 weeks prior to planting. The cover crops were then rolled the week of planting. Wiregrass research station planted June 6, 2018 and cadre treatments of 1X and 2X times the labeled rate were then applied at peanut planting, May 4, 2018 and at the 4-5 leaf stage, May 25, 2018. EV Smith planted peanuts on May 8, 2018 and cadre treatments were applied May 8, 2018 and May 29, 2018. Similar to the other project, no data will be collected on the peanuts since we are only concerned with carryover to cotton. In the spring of 2019 cotton will be planted in each of these plots to evaluate carryover potential. Growth parameters including plant height, stand count, and yield will be collected throughout the growing season for the cotton. Both of these experiments will evaluate imazapic soil persistence and carryover potential as affected by lime and cover crop residue.

f. Results and Discussion:

Only one location, Wiregrass Research and Extension Station in Headland, has had data collected on cotton. Yield data will be collected at the end of October 2018 at this location. The remaining 3 locations will all have data collected on cotton in the summer of 2019 and have a yield collected in the fall of 2019. The pH in the field at Wiregrass ranged 4.6-4.8 prior to applying lime or ammonia sulfate. The ammonium sulfate treatment of 476 lbs per acre and two applications of imazapic consistently had the worse stand count and greatest height reductions when compared to all other treatments. Two of the plots in this treatment had no cotton stands by 49 days after planting. At 49 days after planting, the treatment of 8000 lb/a of lime and two applications of imazapic had the greatest stand count and heights compared to the NTC. There was an overall trend that as the amount of lime per acre was increased the stands and cotton heights improved. Treatments of the same amount of lime applied (2,000, and 4,000 lbs per acre) were not significantly different from each other regardless of one or two applications of imazapic. The soil PH is the deciding factor on imazapic carryover not the amount of imazapic sprayed based off this one location. We expect to see similar results at the EV Smith location in the summer of 2019. At this time, no results or conclusions can be determined for the cover crop carryover fields, as neither has been planted with cotton.

g. Discoveries

In the future, we hope to publish this data in a peer reviewed journal and present it at the South Weed Science Society Annual meeting in 2020.