Improving Herbicide Efficacy and Residue Penetration of Herbicides Using Common Adjuvants for Weed Control in Soybean**, Project 64-2021**
Annual Report

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Rationale/Justification for Research: Adjuvants are a necessary part of making herbicide programs work effectively for the control of broadleaf weeds and grasses, the first time. With decreasing economic margins, improving the return-on-investment for anything purchased for the spray tank must improve for long-term viability. Herbicide resistant weeds have led to increased problems for weed management in soybean production, resulting in a greater investment of money and time to effectively manage these populations. Each time a weed population is not effectively controlled, it risks contributing to the persistence of herbicide resistant weeds. This proposed project would explore commonly available adjuvants from Mississippi retailers to evaluate overall herbicide efficacy and weed control. Results from this study will improve guidance for farmers as to which adjuvants are the most effective when required for use on the label. Furthermore, this study will evaluate new adjuvant types compared to older ones to assess if they stack up compared to accepted adjuvant types. Research will also be conducted to ensure that soil-applied herbicides are able to penetrate through dense cover crop residues by incorporating non-ionic surfactants or organosilicone adjuvants. Data from these studies will be made available with publication on-line and in Extension materials. Results from the study will be adapted for an easy-to-use guide to improve adjuvant purchases at the farm level.

Objective 1: <u>Evaluate herbicide efficacy and weed control of several commonly available adjuvants for control of Amaranthus spp., prickly sida (teaweed), and barnyardgrass.</u>

Quarter 1:

- Soybean AG47XF0 were planted April 21-22, 2021
- Herbicide applications were made June 16, 2021
- Data were collected from site 1 (Ramsey): 6/25, 7/1, 7/9, 7/16, 7/22
- Data were collected from site 2 (Brooksville): 6/24, 7/1, 7/8

Quarter 2:

- Research plots were maintained throughout quarter

Quarter 3:

- Initial data analyzed 1/13/22

Quarter 4:

- Data were compiled, analyzed, and presented at the Southern Weed Science Society Annual Meeting in Austin, TX.

Objective 2: <u>Research the effectiveness of non-ionic surfactants and silicone-based herbicides at penetrating through cover-crop and crop residues to improve soil contact and herbicide efficacy for soil-applied herbicides.</u>

Quarter 1:

- Ryegrass cover-crops were planted Nov 2020
- Ryegrass cover-crops were terminated June 16, 2021
- Soybean AG47XF0 were planted June 18, 2021
- Applications were made June 18, 2021
- Data were collected 7/1, 7/15, 7/28

Quarter 2:

- Research plots were maintained throughout quarter

Quarter 3:

- No data requirement during third quarter

Quarter 4:

- Cover crops were planted in Starkville, MS; Brooksville, MS; and Verona, MS for 2022 field trials
- Data were compiled and analyzed from 2021 field trials in preparation for data presentation.
- Data were presented at the Southern Weed Science Society Annual Meeting in Austin, TX.

Objective 3: <u>Develop an easy-to-use guide for soybean farmers to aid in making adjuvant purchases for specific herbicide programs in Mississippi.</u>

Quarter 1:

- Data collected above will be coalesced after year two of the project to address this objective

Quarters 2, 3, and 4:

- Objectives 1 & 2 must be completed in order to progess with Objective 3