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MISSISSIPPI SOYBEAN PROMOTION BOARD

PROJECT NO. 46-2018

2018 ANNUAL REPORT

Title: Evaluation of Palmer Amaranth Control with Summer and Winter Annual Cover Crops Alone and Coupled with Herbicides

OBJECTIVES

The purpose of this research is to look at new potential cover crop options and also explore new ways to take advantage of cover crops already being used. Cover crops have already proven their benefit in regards to soil health, but they could potentially help to manage the soil weed seed bank. Cover crops planted earlier in the year (for example inter-seeded into a soybean canopy vs. post-harvest) could aid in the prevention of late season weed emergence. Additionally, *Brachiaria* species used as cover crops in South America could prove to be a good fall cover crop option.

We have met with the Brazilian company again and will be spraying some plots this fall that are located on Annie Dee's farm. The biggest concern is that we have determined that these species can in some instances produce seed and may become weeds. We also know that they are very sensitive to frost and likewise to low concentrations of glyphosate.

Objective A: Characterization of various species of *Brachiaria* cover crops for establishment, growth rate, biomass production, persistence, and termination.

Characterization studies evaluating growth habits of *Brachiaria* species in Mississippi are complete. Through these studies, we were able to identify that of the six species tested, two possess growth habits we consider suitable for a potential fall cover crop. One species, *Brachiaria ruziziensis*, seems to be more versatile in our environment and is the top candidate of these species to consider for a fall cover crop in our production systems.

Objective B: Evaluation of inner-seeded and post-harvest seeded summer and winter annual cover crops for *Amaranthus* species control in fall and spring.

All site year combinations of this objective have been completed. Results indicate that *Brachiaria* species do not have the ability to serve as an efficient fall cover crop to aid in weed suppression in a soybean production system. Ground cover and weed control for all *Brachiaria* species at multiple planting timings resulted in less than desirable outcomes. Cereal rye, however, has shown promising results with desirable levels of ground cover and weed suppression at all evaluation timings when inter-seeded at the R7 soybean growth stage.

Objective C: Evaluation of shade tolerance of summer and winter annual cover crops.

Two site years to evaluate the shade-tolerance of cereal rye and *brachiaria* species study are complete in the field and data have been processed. Results suggest that the three *brachiaria* species tested possess abilities to adapt to shaded environments. Survival of these planted species under varying



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levels of shade cloth suggests that these species can survive in a dormant-like state in 70%+ shade conditions. Additionally, it was determined that there is a positive response of these species in shaded environments. Plant growth evaluations decreased as shade level decreased below individual threshold levels. While, these species show indication of shade tolerance, it is hypothesized that their tolerance level required for germination and survival is not high enough for survival in soybeans at full canopy closure.

Objective D: Evaluation of the effects of residual herbicides on summer and winter annual cover crops.

Multiple runs of the herbicide tolerance of cover crop species conducted in a greenhouse environment are complete. Data are currently being compiled and analyzed. Preliminary results suggest that generally for most residual herbicides used in soybeans, an inter-seeding event must be at least 30 days after the herbicide application; however, there are exceptions where significant reductions were observed for application timings as distant as 60 days before planting. Each crop and herbicide combination resulted in unique individual responses; therefore, each combination is being examined and explored individually for effect of application timing.