



## WITH UP-TO-DATE SOYBEAN PRODUCTION INFORMATION

### MISSISSIPPI SOYBEAN PROMOTION BOARD PROJECT NO. 46-2017 (YEAR 1) 2017 ANNUAL REPORT

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

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#### **OBJECTIVES AND PROGRESS/ACTIVITY**

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 in regards to management of the soil weed seed bank. Cover crops planted earlier in the previous year (for example inter-seeded into a soybean canopy or post-harvest) could aid in the prevention of late-season weed emergence. Additionally, Brachiaria species used as cover crops in South America could be a good fall cover crop option.

The company that produces the Brachiaria species paid for Justin and me to visit Brazil to see first-hand how they are utilized there with the hopes of being able to adapt them to our production system. During that visit, several additional questions have arisen, so we will initiate additional experiments in 2018 to try to better understand how they may be incorporated into a system for Mississippi. Additionally, this Brazilian company is working with producer and USB member Annie Dees to field-test these species on her farm in Alabama. We have and will continue visiting this farm to observe the results.

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

The first objective of this research is just to see what (if any) Brachiaria species can survive in the Mississippi environment. This is a two-year study where six cultivars, ranging over three different species, will be planted in small plots to evaluate the growth habits of the Brachiaria. Evaluations will be made on stand counts, ground cover, and percent termination after first frost. It is important that these species die during winter so they do not become weedy in nature. Trials done this past year showed that all species would emerge and some showed very aggressive growth habits that would prove ideal for a good fall cover crop.

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

The second objective of this research will be to determine if these Brachiaria species and other species already being used as winter cover crops possess the ability to serve as fall cover crops. This objective will test these cover crops for the ability to be broadcast into a soybean canopy and serve as a sufficient cover crop while not effecting crop yield. Different cover crop species will be broadcast into the soybean canopy at three different timings as well as a post-harvest timing with two different planting methods. Results from the past growing season indicate that Brachiaria inter-seeded into soybean

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canopies at R3 soybean growth stage may result in enough ground cover to prevent weed emergence after harvest. Additionally, cereal rye broadcast and drilled immediately after harvest may provide sufficient ground coverage as well.

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

The third objective of this research is to evaluate the shade tolerance of multiple cover crop species. If we are to consider inter-seeding cover crops into soybean canopies, we must first know which species have the ability to survive in low light situations similar to those found in the bottom of a soybean canopy. Trials will be initiated this coming summer where multiple cover crop species, including *Brachiaria*, will be planted in plots and then covered with varying levels of shade cloth. Each species will be evaluated on their growth habits and ability to live and produce sufficient vegetation.

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

The last objective will be to evaluate the effects residual herbicides have on earlier-planted cover crops. If our suggested residual herbicides for soybean production systems had an adverse effect on our potential fall cover crops, then it would not be economically feasible to recommend planting them. The goal of this study is to essentially find a plant-back interval for fall cover crops following the application of a residual herbicide. This study is to be done in a green house where trays filled with field soil will be sprayed at different timing intervals ranging from 0-90 days before planting. Five cover crops species will then be planted into the trays and evaluated weekly for percent emergence, growth habits, and general herbicide injury.