



WWW.MSSOY.ORG → MSPB WEBSITE

WITH UP-TO-DATE SOYBEAN PRODUCTION INFORMATION

MISSISSIPPI SOYBEAN PROMOTION BOARD PROJECT NO. 67-2016 (YEAR 1) 2016 Annual Report

Title: Agronomic Evaluation of USDA Heat-Tolerant Maturity Group III Soybean Germplasm for Use in the Early Soybean Production System (ESPS)

Project leader: John Orlowski (john.orkowski@msstate.edu)

BACKGROUND

About half of the soybean in Mississippi are produced without irrigation, and yield of dryland soybean is significantly lower than that of irrigated soybean. The Early Soybean Production System (ESPS) has helped to increase yields of both irrigated and dryland soybean. However, there is opportunity to increase dryland soybean yield above current levels. Soybeans maturing in the summer heat tend to have issues with seed quality such as seed size because seed fill occurs with the onset of the annual summer drought.

Dryland soybean also exhibit increased heat damage and in some cases increased seed wrinkling and green seed, as well as poor germination. The use of Maturity Group (MG) III soybeans that have been bred to be heat tolerant could offer a solution to decreased yield and grain quality associated with dryland production. The proposed research is designed to agronomically and economically evaluate heat-tolerant MG III soybean genotypes that were recently developed by the USDA-ARS, as well as commercially available MG III soybeans.

OBJECTIVES

Objective 1: Compare productivity and grain quality of three newly-developed ARS late MG III soybean lines to three traditional late MG III soybean cultivars.

Objective 2: Compare narrow row to wide row soybean production for MG III varieties.

Objective 3: Examine the economic considerations of the using both commercially available and USDA bred maturity group III soybeans.

IMPACTS AND BENEFITS TO MISSISSIPPI SOYBEAN PRODUCERS

This effort will aid dryland soybean farmers in Mississippi by evaluating the performance of existing and new MG III soybean genetics under different agronomic management practices. If the use of MG III varieties at early planting dates could allow dryland farmers to harvest soybean before the onset of summer drought, yields can be significantly improved.

Using MG III varieties may also allow dryland producers to sell their soybean into the old crop market and therefore receive a premium for their crop. Also, if the yield of the USDA varieties is similar to that of commercial varieties, the resulting increase in seed quality can result in soybean growers receiving higher prices at elevators for their soybean which can help improve returns, which is especially important with depressed soybean prices. If the performance of USDA lines is satisfactory, the lines can be provided to seed companies that will have the ability to incorporate useful traits such as herbicide tolerance, eventually resulting in improved MG III soybean varieties available to producers.

WITH UP-TO-DATE SOYBEAN PRODUCTION INFORMATION

END PRODUCTS- COMPLETED OR FORTHCOMING

The results from 2016 should be considered preliminary and will need another growing season for verification. The study area was not rowed-up in the fall so we had to wait until it was dry enough to form beds. This delayed the first planting date until May 7th and the second planting date until June 10th. The commercial varieties performed better than the USDA varieties in terms of total seed yield (Table 1).

Table 1. Yield by variety.

Variety	Yield (bu/A)	Grouping
CZ3841*	41.0	A
AG3934*	38.8	A
AG3803*	33.9	B
8003-212	30.7	C
DS 34-1	30.0	C
DS 65-1	19.6	D

* denotes commercial variety

Yields were similar between planting dates, and this is likely due to delayed emergence for the May planting date due to very dry soil conditions at planting. When averaged across varieties, narrow row spacing (20-in.) increased soybean yield by 3.7 bu/acre compared to soybeans planted on wide rows (40- in.) (Table 2.).

Table 2. Yield by row spacing

Row spacing	Yield	Grouping
Narrow (20 in.)	34.2	A
Wide (40 in.)	30.5	B

Germination and seed quality tests are still being conducted on the seed collected at harvest. Preliminary seed pathogen tests have been completed. Fusarium and charcoal rot were not detected on seed from either the commercial or USDA varieties. Slightly more Cercospora and Phomopsis were found on seed of the commercial varieties; however, total levels of both pathogens were low likely due to dry conditions during seed fill for all varieties.

This study will be completed again in 2017. The first planting date for 2017 has been planted in early April with the next planting date targeted for early May. Thus, over the 2 years we should be able to examine a wide range of environmental conditions for their effects on yield and seed quality of MG III soybean in Mississippi.