



## Mississippi Corn Promotion Board 2016 Progress Report

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Project Title: Fertility, Hybrid Selection, and Input Strategies to Optimize Yield and Early Harvest

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### Project Summary (Issue/Response)

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Heat and drought limit corn productivity in MS; yet the last several springs have been wet and cool making it difficult to get planted and pushing corn maturity into a hotter, drier time of the summer. One way to avoid the negative consequences of summer heat and drought this is to plant earlier so that a plant's environment is more like what we experienced last summer. We have generated (2) years of data at multiple sites that suggests that if done correctly, planting early is a good thing for producers to consider. However, planting earlier may expose corn to additional risks like freeze and flood, which were both issues this past growing season (2014). Another way to avoid the heat and drought is to select a shorter season corn hybrid. In other words, get the crop in *and out* faster. For instance, most commercial hybrids in MS are in the 115 to 120 RM range. DKC62-08 is a 112 day RM hybrid that was cited in multiple categories as a winner in the NCGA yield competition; in fact it resulted in a 503 bu/A champion yield in Georgia (2014 NCGA). Conventional wisdom suggests that yield has the potential to increase with increasing maturity, but if a limiting factor to yield is high temperatures, drought, or both, we may be better off going with a shorter season hybrid? DKC62-08's performance as a 112 RM hybrid suggests that yield may not be as tightly linked to maturity as we have always thought. We propose a trial to evaluate the highest yielding commercially available hybrids in the 100-110 RM group. We also propose a trial to examine starter fertilizer, Zn application, and the extremes of RM (100 vs 120) to determine exactly how early can we push our harvest window forward in MS with a combination of these factors.

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### Project Results/Outcomes

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2016 was an outstanding growing season for us because at both locations we got planted in a timely (early) manner in mid-March. Few growers near us were so fortunate because weather was challenging early. Yields in the early hybrid trail ranged from 152-237 bu/A at Starkville and 140 to 214 bu/A at Verona. On average, we gained 1.7 to 2.1 bu/A per additional day of relative maturity; this agrees with the literature which suggests a 1.5 bu/A gain for each additional day of RM. We had a nice year of data in 2016 even though we experienced and unusually dry May. These data suggest that the most recently released early RM hybrids tolerate the heat stress in our environment with several of our entries yielding in the same ballpark compared to our standard full season hybrids.

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## Project Impacts/Benefits

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There were no obvious treatment effects in responses to fertilizer or hormone application so data were pooled by hybrid and by location. This was likely because we planted late and the plants grew rapidly as soon as they emerged; moisture and heat units were non-limiting. The short season hybrid performed well at MSU but the full season hybrid was 18 bu better at Verona. The short season hybrid was 5% drier at harvest than the full season at MSU and they were about the same at Verona. This suggests that planted late, under hot conditions the short season might provide a 1 week earlier harvest, but this might be larger if our planting date were as scheduled two months earlier at the beginning of March. The difference between the 2016 short season and full season hybrid in the fertility trial was too much; the 120 RM hybrid outyielded the 105 RM hybrid by 30 bu/A. This was at a standardized population of 30K plants per acre. If we increased the population I feel like this would favor the shorter season hybrid.

A local producer who observed our research plots at a field day and at the MSU research station planted several production scale fields nearby to evaluate the early in, early out concept on a large scale. Pioneer has also come to us with additional early hybrids to evaluate in this manner as well as planting date and density trials that incorporate this early germplasm. The early hybrids performed well in a droughty year. The fit is not in a fully irrigated field rather as a defensive fit in a rainfed situation.

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## Project Deliverables

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MS ASA Grenada, MS Nov. 2016 *Invited*

Ultra-Early Corn Varieties.

**W. Brien Henry**, Bryan Whittenton, Normie Buehring, Erick Larson, Jack Varco, and Joey Williams

MS ASA Agronomy Field Day Black Belt Experiment Station, Brooksville, MS July 2016 *Invited*

Graduate Students and undergraduate workers attended and **Dr. W. Brien Henry** presented our data to a group of local producers and industry representatives.

*Invited* Presentation NCGA Meeting (St. Louis, MO) June 2016. Presented: Short Season Corn Hybrids to Avoid Heat and Drought: Potential for Aflatoxin. **W. Brien Henry**

Southern ASA 2016 San Antonio, TX (Poster) In-Field Uav Corn Phenotyping: A High Throughput Model. William Brien Henry\*, Amelia A. Fox, Robert Moorhead, Sathish Samiappan, Joseph Bryan Whittenton, Matthew W. Hock, and Joby M. Prince Czarniecki

Mississippi State University (Poster) Evaluating Texture Modelling Techniques to Determine Stand Establishment and Plant Populations in Corn. Matthew Hock\*, **W. Brien Henry**, Sathish Samiappan, Robert Moorhead, Normie W. Buehring, and J. Bryan Whittenton

Mississippi State University (Poster) Yield Response to Plant Maturity Rating in Corn on Rain-Fed Systems. J. Bryan Whittenton\*, and **W. Brien Henry**

Fertility, Hybrid Selection, and Input Strategies to Optimize Yield and Early Harvest in the Mid-South. Omar Ali\*, Joseph Whittenton, **W. Brien Henry**, Normie W. Buehring, and Jac J. Varco



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**EXTENSION**

# Graphics

**Figure 1.** Graduate students and Dr. Henry supported by MCPB research presenting our 2016 Early hybrid research data to producers and agriculture professionals at the Black Prairie Research Station in Brooksville, MS.



**Figure 2.** 2016 Early maturing hybrid yield at Mississippi State and Verona.

