



## Mississippi Corn Promotion Board 2013 Progress Report

Project Title: Corn Hybrid Evaluation to Optimize Early-season Planting

PI: Brien Henry, Raja Reddy, Erick Larson, Normie Buehring, Grady Dixon, and Steve Martin

Department: Plant & Soil Sciences, NMS R&E Center, and Geoscience

### Project Summary (Issue/Response)

Excessive heat and drought during June and July often negatively influence corn yields for Mississippi producers. Corn is very sensitive to drought during its reproductive phase of development and water availability during this time dramatically influences yield. It takes about 1400+ GDD ~ 60 days from planting for corn to tassel (enter the reproductive phase). By moving the planting window from April to the start of March, if not the end of February, corn may tassel in May, a month in Mississippi with cooler nights, excellent solar radiation, and most importantly consistent and plentiful rainfall. Increasing the probability of rainfall and lower temperatures during tasseling may stabilize corn yields, especially on non-irrigated acres. Planting earlier reduces the risk of exposure to heat and drought, but increases the risk of wet soils, cold temperatures, and frost. The ultimate decision to plant early depends upon a producer's soil type, equipment, and especially upon personal risk/reward tolerance; however, little information is presently available for insurance companies to set policy or for producers to base their management decisions.

### Project Results/Outcomes

Farm sizes are increasing and because producers are faced with planting larger acreages, starting sooner and thereby covering more ground as quickly as possible is advantageous. Early planting will not be the best option across all soil types, especially heavy, poorly drained soils. However, if a producer can identify certain fields that are sandy, well drained, and more likely to warm up in the spring, these fields will be a logical target for early-planted corn acres. By increasing his planting window, a producer might be able to get his planting done with a single planter instead of having to buy a second planter with additional labor expenses. The sooner a producer completes corn planting, the sooner he can begin planting soybeans. By planting corn and other crops earlier, a producer increases the likelihood of avoiding the hottest and driest parts of the summer. Corn in the Mississippi Delta and the central region of Mississippi is typically planted between 15 March and 20 April (MSUCares). Planting is often based upon soil temperatures warming to between 50 and 55 deg F. Because the overall stress tolerance and germination at cool temperatures of newly available commercial corn hybrids has steadily improved over the past 5 to 10 years (Lloyd pers. comm., 2012), we propose research to investigate moving the planting window of corn by 2 to 3 weeks earlier than typical planting. It is possible that because of increases in corn hybrid stress tolerance and seedling vigor, uneven germination is less of a problem than it used to be as recently as 10 years ago. Corn hybrids typically grown in this region reach tasseling approximately 1400 GDD50 ~60 to 65 days after planting. Corn planted in early March may initiate tasseling in May. Temperatures during May are historically cooler than in June and July and more favorable to the reproductive phase of corn development. Rainfall in May is slightly greater in amount and less variable in frequency than June and July and this, coupled with lowered evaporative demands, results in increased moisture availability for corn production. More water available for corn production during this critical time should result in higher yields with less variability.

MISSISSIPPI STATE  
UNIVERSITY™



## Project Impacts/Benefits

---

By adopting an early planting strategy for corn, a producer would be trading the certain risk of hot and/or probable risk of dry summer months for the risk of cool soils, uneven germination, and late frost. The ultimate decision to plant early depends upon a producer's soil type, equipment, and especially upon personal risk/reward tolerance; however, little information is presently available for insurance companies to set policy or for producers to base their decisions.

Our first year of data suggests that even in a wet, cold spring like this past season, there was an advantage to planting early. Not only is there an opportunity to market grain in July at a premium, planting corn early allows producers to complete corn planting and then focus equipment and resources on planting beans.

Our dryland yields at Starkville, MS ranged from approximately 180 to 215 bu/A. At Verona, MS, yields ranged from 150 to 225 bu/A. Both locations received 200 lb of N applied in split applications. Even though it was a wet, cold spring, the trend was that earlier planting dates resulted in better yields. This trend appears to hold true across hybrids and locations for the 2013 growing season. In summary, for each week we delayed planting, we lost 7 bushels in yield. This study needs to be repeated across locations and site years to determine the impact of a warm spring or a dry growing season, both of which could favor early planting and increase yield loss as planting is delayed. Additional funding requested will support a location at Stoneville.

Using our Soil-Plant-Atmosphere-Research (SPAR) facilities (i.e., large growth chambers) and partially supported by an SRI (Special Research Initiative) grant from MSU, we identified several commercially available hybrids (from among a group of 33 evaluated) that performed better (bigger shoots and superior root growth) grown in cold conditions. We need to repeat this trial and evaluate the hybrids exhibiting cold tolerance in the field. Proprietary Monsanto seed treatments (12) were evaluated in replicated trials at Brooksville, MS and Starkville, MS, and the untreated treatment suffered a 5 to 10% stand reduction that did affect yields.

From a marketing standpoint, a producer can benefit greatly from the ability to sell new-crop corn in the old-crop marketing year. There are two cycles in corn prices that take place throughout the year. The first is the seasonal cycle in corn futures, while the second is the seasonal cycle in basis. Nationally, corn futures are typically at their highest in early to mid-summer when corn supplies are at their lowest. Locally, Mississippi's basis is also at its smallest in early to mid-summer. Together, these two cycles present a tremendous opportunity for Mississippi producers who are able to sell their corn in the old-crop marketing year. The five-year average Greenville, MS cash basis for corn is around  $-\$0.17/\text{bu}$  in July compared to  $-\$0.25/\text{bu}$  in August and  $-\$0.38/\text{bu}$  in September. In the same time period, Greenville, MS cash corn prices averaged  $\$5.56/\text{bu}$  in July,  $\$5.31/\text{bu}$  in August, and  $\$5.04/\text{bu}$  in September. In other words, producers who can market their corn in July rather than August may potentially gain an extra  $\$0.25/\text{bu}$  or  $\$50/\text{acre}$  (assuming a yield of 200 bu/A).

In summary, for 2013, the earlier we planted, the better the yield. For this year and these environmental conditions every week we delayed planting beyond the initial planting date, yield was reduced by 7 bu/A. Additional funding requested will provide support for another location at Stoneville. Added funding will also provide technical support (MSU student worker) for our economist who will be evaluating risk/reward associated with replant, freeze damage and marketing grain as "last year's" crop. We thank MCPB for providing support.

---

## Project Deliverables

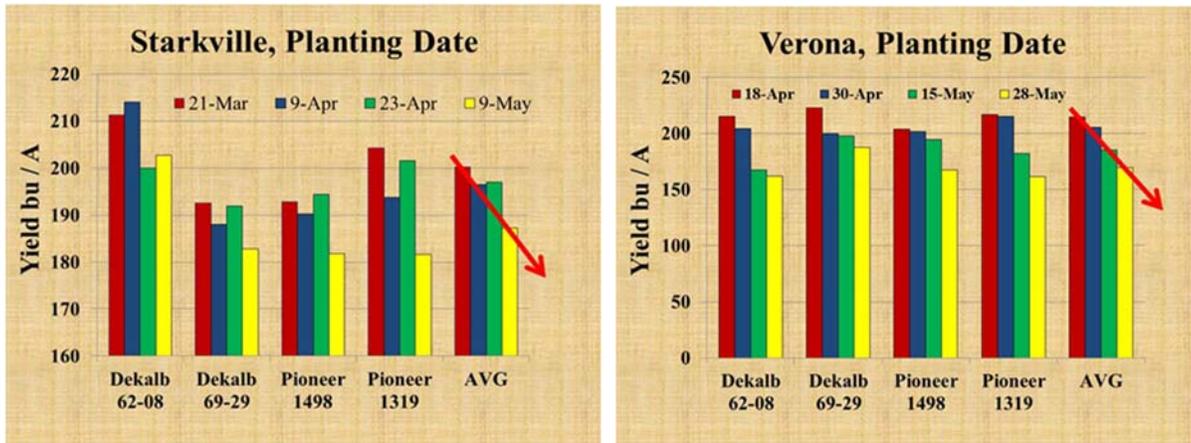
---

Field Day at MSU NE MS Verona Research Station, SAAS Poster/Presentation @ Southern Regional Agronomy Meeting + 2 graduate students attending with me with both of them presenting research funded by MCPB; thank you.



# Graphics

**Figure 1.** 2013 planting-date corn yield at Starkville, MS and Verona, MS.



**Table 1.** Historical weather data from Stoneville, MS indicating the probability of experiencing cold (temperatures 32 F or 28 F) or drought (number of consecutive days 15 or 20 without a rainfall)

