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To: [Bill Rooney](#)
Subject: ASA Poster
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Attachments: [2009 CSSA Heterosis Poster.pptx](#)

Dr. Rooney, I've attached a copy my ASA poster, could you give me some feedback?

Thanks,

Dan

Heterosis for Biomass Yield in Photoperiod-Sensitive Hybrid Sorghum

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Introduction

- Photoperiod-sensitive (PS) sorghums (*Sorghum bicolor*) that accumulate high-biomass yields have been identified as potential feedstocks for cellulosic biofuels
- Temperate latitude seed production uses two photoperiod-insensitive parents that yield PS F1 progeny:
 - A short, low-biomass grain-type female amenable to mechanical seed harvest
 - A tall, high-biomass male
- But the use of grain-type females may preclude the availability of biomass high-parent heterosis in the resulting hybrids

Objective

- To determine whether high-parent heterosis for biomass yield is available in F1 PS sorghums created using short, grain-type females and tall, high-biomass males
- Identifying high-parent heterosis would further validate the use of hybrid PS sorghums as cellulosic biofuel feedstocks and the use of grain-type females in the seed production system

Materials & Methods

- Parental lines and their respective hybrids were harvested for biomass yield in 2007 and 2008 in College Station, TX and Halfway, TX
 - 34 different hybrids were evaluated
- Parental lines were high-biomass inbred lines as males and single-cross and inbred line grain-type females
- Plots were 5.5 meters in length and were either one row or two
- In 2007, plots were hand harvested taking 1.5 meters from the middle of the plot. In 2008 the entire plot length was mechanically harvested with a forage harvester

Results & Discussion

- 60% of the hybrid entries had positive high-parent heterosis
- The average high-parent heterosis across years and locations was 20% with a range from 155% to -50%
- Average high-parent heterosis for the top 3 hybrids was 62% in 2007 College Station, 63% in 2008 College Station, and 58% in 2008 Halfway
- Mean hybrid yields were consistently higher than the mean male parent yields, but were not always statistically different

Biomass high-parent heterosis is available in PS hybrid sorghums derived from crosses of high-biomass males with low-biomass grain sorghum females. However this availability is cross-specific as many entries exhibited negative high-parent heterosis and the amount of positive heterosis varied greatly. These results further validate the use of hybrid PS sorghums created with low-biomass grain sorghum females as high-biomass feedstocks for cellulosic biofuels.



Figure 1. Average high-parent heterosis levels for biomass yield in photoperiod-sensitive hybrid sorghums developed for biomass production. The extreme high and low values are also displayed. Results are given across environments and for College Station, TX in 2007 & 2008 as well as Halfway, TX in 2008.

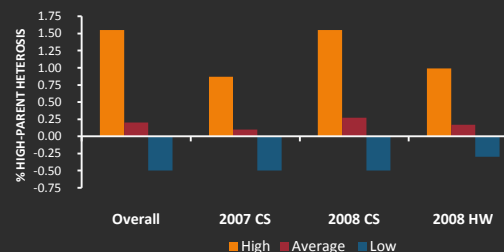


Figure 2. Average biomass yields of photoperiod-sensitive hybrid sorghums developed for biomass production along with their male and female parents. Results are given across environments and for College Station, TX in 2007 & 2008 as well as Halfway, TX in 2008.

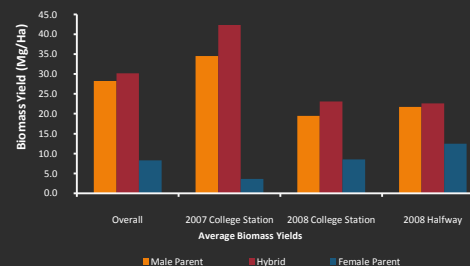


Table 1. Mean biomass yields of photoperiod-sensitive hybrid sorghums developed for high-biomass production and their male and female parents. Results are presented across environments and individually for College Station, TX in 2007 and 2008 and Halfway, TX in 2008.

	Male Parent	Hybrid	Female Parent
Overall	28.2 a	30.2 a	8.3 b
2007 College Station	34.5 a	42.3 b	3.6 c
2008 College Station	19.5 a	23.1 b	8.5 c
2008 Halfway	21.7 a	22.6 a	12.5 b

† Means sharing the same letter across rows are not significantly different at the 0.05 level per a LSD mean separation test