

## **Increasing Seed of Two New Biomass Sorghum Inbreds in Iowa**

### **RFR-A20111**

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#### **Introduction**

In early 2020, the ISU sorghum breeding program led by Maria Salas-Fernandez, ISU Department of Agronomy, released two male inbred sorghum lines for use by the industry to produce photoperiod sensitive hybrids as lignocellulosic feedstock for biofuel production. The Committee for Agricultural Development (CAD) is the ISU affiliate corporation charged with providing Foundation seed developed at ISU. Therefore, in the 2020 growing season, CAD increased the two new biomass sorghum inbreds, IA100RPS and IA101RPS, from breeder seed. This was a new endeavor for CAD because its primary experience has been increasing soybean varieties. The objective was for CAD to gain experience with the biomass sorghum seed increase and increase seed of the lines.

#### **Materials and Methods**

Each inbred sorghum line needed to be grown at a location isolated by at least one mile from other sorghum. The sites selected in Story County were at Applied Science and South Woodruff farms. The ISU sorghum breeding program provided a minimum of 30,000 seeds for each line treated with a herbicide safener. On June 4, using a John Deere eight-row stack-fold planter, a half-acre plot for each of the two inbreds was planted. The planter was completely cleaned before, between, and after planting each inbred. IA100RPS was planted at Applied Science at about 60,000 seeds/acre.

IA101RPS was planted at South Woodruff at a much higher rate due to an error in planter settings.

The isolation plots were visited several times throughout the growing season. Hand weeding occurred in July. The area experienced a derecho windstorm in early August and no damage was observed in the sorghum plots. No rogueing was needed. On October 20, black layer was achieved. A hard freeze occurred soon after. Note: at maturity the inbred sorghum lines were approximately six ft tall.

Line IA100RPS was harvested October 29. An ALMACO plot combine was tried initially, but the material would not feed into the machine. Then a Case IH Axial flow model 2144 combine was used and 688 lb of seed was obtained. Line IA101RPS was harvested the next day, October 30, with the Case IH combine and 200 lb of seed was obtained.

#### **Results and Discussion**

This was a new experience for CAD with the following results:

- Set conventional corn planter at lower density than desired (perhaps half), double back over area if needed. Or use another planter, maybe one that is ground-driven (instead of hydraulically). Fully understand the monitor screen(s).
- For harvest, cutting off the top of the plants with the grain platform raised as high as possible (about four ft above the ground) worked better than anticipated. Even at that height there was a tremendous amount of green plant material running

though the combine. Nevertheless, the combine threshed the seed from the plant material well.

- Getting the very tiny seeds out of the grain tank was extremely difficult. Finally, a shop vacuum was used to remove the remaining seed.
- Cleaning out the combine after each inbred took at least a half day. There was a large amount of green plant material remaining in the combine. Normally this task takes less than two hours.
- A Case IH axial flow combine can be used to harvest biomass sorghum inbred seed. It would be helpful if the cutting edge could be raised even higher to minimize the amount of plant material running through the combine.
- The threshed seed needs to be captured before reaching the grain tank.

Finally, 688 lb of unconditioned seed of IA100RPS was harvested with an initial germination of 76 percent with 2 percent abnormal. And 200 lb of unconditioned seed of IA101RPS was harvested with an initial germination of 54 percent with 7 percent abnormal. Purity results are pending for both inbreds. The seed is in cold storage pending potential marketing.

### **Acknowledgements**

Thanks to Maria Salas-Fernandez and Joshua Kemp, Department of Agronomy; Carol Cornelious and Doan Schmitz, Iowa Crop Improvement Association; Gregory Gebhart, Department of Plant Pathology; Alex King, Foundation Seed Manager, Kansas State University; and Kent Berns, Mike Fiscus, Tim Goode, Nathan Meyers, and Karl Nicolaus, ISU Research Farms, for support of this seed increase experience.