Water use, drought-tolerant hybrids still key to dryland crop production

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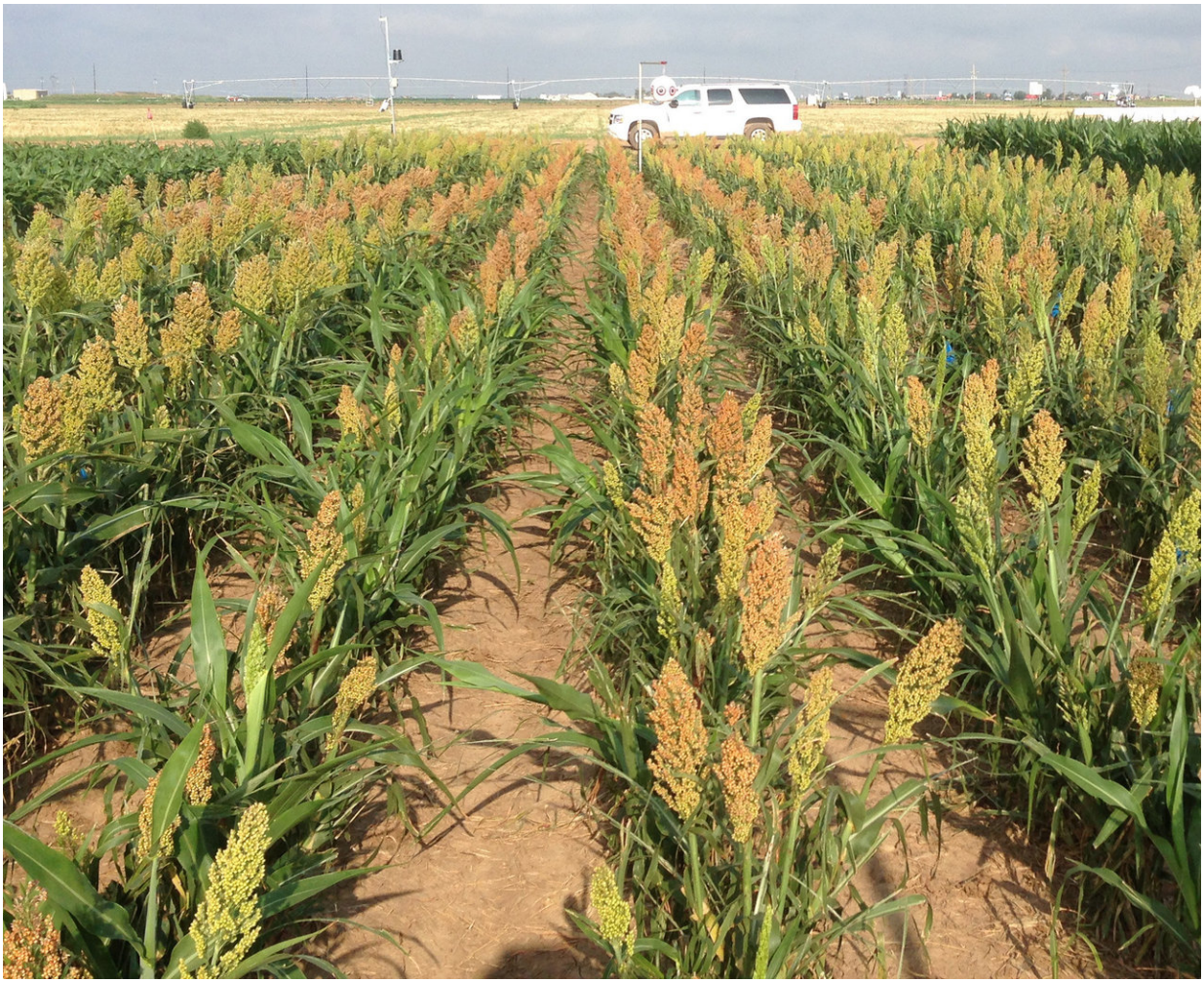

First planting of dryland sorghum in early August. Credit: Texas A&M AgriLife photo by Dr. Qingwu Xue

Risk management is the name of the game when it comes to growing dryland sorghum and corn, which both offer cropping alternatives "when and if" conditions are right, according to recent Texas A&M AgriLife studies.

Side-by-side dryland grain sorghum and dryland corn studies were planted this past season at the Texas A&M AgriLife Research station near Bushland by Dr. Qingwu Xue, Texas A&M AgriLife Research plant physiologist in Amarillo, and Dr. Jourdan Bell, Texas A&M AgriLife Extension Service agronomist in Amarillo.

First-year results indicate hybrids and planting date both make a difference in water use by the crops and thus, yields at the end of the season.

Xue and Bell scheduled planting of the two projects at two different dates to determine the viability of dryland diversification in the High Plains, and to gain understanding on the difference it made in water use. They also looked at how various hybrids of each crop performed under dryland conditions.

At Bushland, the sorghum project was funded by the Texas Grain Sorghum Producers Board and the corn study was funded by the Texas Corn Producers Board. Dr. Calvin Trostle, AgriLife Extension agronomist at Lubbock, also had a separate dryland corn versus dryland sorghum project at Lubbock, but not all the sorghum plots have been harvested.

"Dryland production systems in this region are becoming more important because irrigated agriculture is facing the challenge of declining water resources from the Ogallala Aquifer," Xue said.

"We've been dealing with this issue for decades, but if you look at the

future, I think dryland cropping systems will be more and more important," he said. "Our research goal is to improve water use and drought tolerance in crops under dryland systems."

With above average rainfall the last two years, many producers have inquired about hybrids and populations for dryland corn, Bell said. So it is important to conduct a multiyear trial to evaluate production trends of dryland corn in order to capture the yield potential under different environments.

Trostle said at this point, "We believe that unless a grower has substantial deep soil moisture in place, they should not plant dryland corn. This is partly due to the seed cost for dryland corn, which can run six to eight times of that for dryland sorghum."

At Bushland, the researchers wanted to determine the effect of planting date on the two crops under dryland conditions. Additionally, the study included different hybrids and planting densities, especially for corn.

"If we do not beat the heat during early vegetative stages, we have affected the ear formation, and if we do not beat the heat during pollination, we have essentially lost all our yield potential," Bell said. "Late season precipitation is also another component of the later date."

Xue said the first planting date targeted was late April or early May, which is relatively early for grain sorghum but not too early for corn. Both crops were planted May 5 at the same location.

First planting dryland corn in mid-August showed signs of struggling to recover from July hail damage. Credit: Texas A&M AgriLife photo by Dr. Jourdan Bell

May precipitation was fair, but "we experienced extremely hot and dry conditions in the middle of June through mid-July," Xue said. "We also had a hailstorm in early July. While the dryland sorghum survived it pretty well, the dryland corn was severely hit by the hail. Plus the drought and the heat on the first planting of dryland corn set it back."

The second planting was in late June, he said. Both crops did great and had very high yield potential for a dryland system due to the abundant

rainfall from the end of July to September. Unfortunately, the late-planted grain sorghum was infested by sugarcane aphids.

"So in terms of managing dryland sorghum here is a dilemma: if you planted early, then you didn't have any sugarcane aphid infestation because the sorghum matured before their arrival," Xue said. "But the yield potential was low because of the dry, hot conditions and some hail damage.

"The second planting, because of abundant rains in August, had a very high yield potential until the sugarcane aphids came around the middle of August. In our plots, the leaves were filled with aphids in September, but we still had good yield potential."

The June-planted corn was late in this region, but Xue said he saw great yield potential given the particular conditions this year.

Summarizing, he said this year the later planting date was best for both dryland sorghum and corn in terms of yields. Producers wanting to manage sugarcane aphid infestations without spraying would be advised to plant early. Those with late-planted sorghum should plan to scout the field and spray to protect yield potential and prevent difficulties during harvest.

This year's hot and dry conditions and physical damage from hail affected the yields in both early planted crops, Xue said, but also gave them a good opportunity to evaluate the differences in drought tolerance among sorghum and corn hybrids. The identification of drought-tolerant hybrids is very important to producers.

"Our early planted dryland sorghum yields averaged 25 bushels per acre, but late-planted sorghum averaged 70 bushels per acre," he said. "It is important to note neither the early or late-planted sorghum was sprayed

for sugarcane aphids. This data shows dryland production risks are magnified by not controlling sugarcane aphids; however, the early planted sorghum was not affected by aphids."

Preliminary data show the average yield for the first planting date of corn was 21 bushels per acre with no differences between hybrids or populations. Yields in the second planting date ranged from 54 to 99 bushels per acre.

With over 12 inches of rain primarily in August, it was a very good crop in terms of the dryland corn, Xue said.

"Ultimately, dryland crop production can be risky for all crops," he said. "The production potential is highly dependent on the management, although this may affect the profitability. In sorghum, the risk can be magnified by not controlling aphids in addition to seasonal variation. With corn, the risk is a higher crop water demand, which is often not met with in-season precipitation."

"This is just for 2017," Xue stressed. "We will repeat the same studies in 2018 and weather patterns could be very different. Nevertheless, it is really important for producers to understand and be able to manage risks. This field research is aimed at helping them do that."

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