Expert: Drought-tolerant corn advances beginning to show

December 27 2012

On the right, Dr. Qingwu Xue, Texas A&M AgriLife Research crop stress physiologist in Amarillo, and Jake Becker discuss the outcome of the drought-tolerant corn hybrid evaluation at different population and irrigation levels during a fall field day. (Texas A&M AgriLife Research photo by Kay Ledbetter)

There's nothing like a couple years of drought to help determine the advances being made in drought-tolerant corn. And Dr. Qingwu Xue, a

Texas A&M AgriLife Research scientist, says there are some significant differences starting to show up.

Xue, AgriLife Research crop stress physiologist in Amarillo, said drought and water issues have been very relevant in the last two years, especially the historic drought for Texas in 2011 and for the Corn Belt in 2012.

Some of the drought-tolerant corn hybrids introduced since 2011 include: AquaMax by Pioneer, AgriSure Artesian by Syngenta and DroughtGard by Monsanto.

"The question is, how have these drought-tolerant hybrids performed in our environment in the Texas Panhandle?" Xue said.

Xue and his team have been evaluating these drought-tolerant corn hybrids at the North Plains Research Field near Etter for the past two years. The hybrids were grown at three populations and at three irrigation levels, from full irrigation to limited irrigation

The irrigation levels were 100 percent evapotranspiration, 75 percent and 50 percent, he said. Evapotranspiration is the amount of water lost from plant transpiration and soil evaporation. The purpose of irrigation is to apply water to meet a plant's evapotranspiration demand.

With less than 6 inches of effective rainfall during the 2012 corn season, the irrigation for 100 percent, 75 percent and 50 percent evapotranspiration was 24 inches, 18 inches and 13 inches, respectively, Xue said.

Under these conditions, the corn yields were 180-220 bushels per acre for 100 percent level, 160-180 bushels per acre for the 75 percent level and 100-120 bushels per acre for the 50 percent level.

"At the full irrigation level, drought-tolerant hybrids hardly showed any yield gain as compared to the check hybrids," Xue said. "However, the drought-tolerant hybrids showed yield increases of up to 20 bushels per acre at 75 percent and 50 percent evapotranspiration levels over the check, depending on hybrid and population."

One of the most significant things he said they saw during the trials was better kernel set among the drought-tolerant corn compared to check hybrids. This could be, in part, due to the hybrids reaching moisture deep in the soil and developing root systems that go down deeper than the traditional hybrids.

Another possibility is that the drought-tolerant hybrids may have ability to conserve water by rolling the leaves during dry and hot periods, Xue said. He and his team will work to better understand the physiological mechanisms for higher yields in these drought-tolerant hybrids as their research continues.

"We clearly saw some yield benefits of the drought-tolerant hybrids at reduced irrigation levels as the drought-tolerant hybrids really did well exerting silks, even during very harsh conditions – dry and hot – at the same time tassels were shedding pollen."

Xue said he has not conducted any economic analysis for these trials.

"It will be up to the producer to determine if he can ever afford a 100-bushel-per-acre corn yield level or not," he said. "But certainly, if we are talking about limited irrigation in the future, drought-tolerant corn may fit into producers' choices."

Xue said in terms of irrigation water savings, 75 percent evapotranspiration may be the most attractive because the yield only dropped about 15 percent, but irrigation water was reduced by 25

percent or 6 inches of water savings.

Provided by Texas A&M University

Citation: Expert: Drought-tolerant corn advances beginning to show (2012, December 27) retrieved 13 August 2024 from https://phys.org/news/2012-12-expert-drought-tolerant-corn-advances.html