

Researchers develop drought-tolerant corn

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At the end of the day, drought tolerance in corn has to equate to good yields and good quality, not just good looks, said a Texas AgriLife Research scientist.

Dr. Wenwei Xu, AgriLife Research corn breeder from Lubbock, is working with crosses between temperate and tropically adapted varieties of corn to find a drought-tolerant plant that performs well under reduced irrigation.

"With the continuing decline of the Ogallala Aquifer water level and increasing cost of pumping water, the use of drought-tolerant and high-yield corn hybrids is a key for sustainable corn production under limited irrigation," Xu said.

A field day was held recently at the North Plains AgriLife Research Station near Etter to demonstrate the differences between the parent plants and the offspring, or crosses.

"We hope to reduce the amount of water required for corn by at least 10 percent," Xu said.

Already the AgriLife Research program out of Lubbock has released four inbred lines of corn and numerous others are in the process for release, he said.

"The new multiple-stress-tolerant corn lines can be used to produce corn hybrids adapted to Texas and other southern states," Xu said. "They can

be a powerful tool to save water and produce crops with yield and grain quality under stressful environments."

The research station at Etter is one of three test sites in Xu's program. The others are located at Halfway and Lubbock.

About 500 hybrids are being evaluated this year for either grain yield or silage yield and quality, he said.

Xu said there has been an increasing demand for silage corn in the Texas High Plains, and producers need new hybrids adapted to the local environment. Corn produced in the U.S. is primarily based on two races of maize, but there are more than 250 races identified around the world, Xu said.

"Most of our breeding efforts start by crossing tropical corn with temperate elite lines," he said. "Then we select for desirable traits to broaden genetic diversity and introduce useful genes from exotic corn to improve stress tolerance, agronomic productivity, disease resistance, insect resistance and value-added grain characteristics."

Xu said some of the experimental hybrids they are working with have produced the same silage yield under irrigation equaling 75 percent evapotranspiration as with 100 percent evapotranspiration irrigation.

Evapotranspiration is the loss of water from the soil both by evaporation and by transpiration from the plants, and is reported on a daily basis through the Texas High Plains Evapotranspiration Network (<http://txhighplainset.tamu.edu/>).

Bruce Spinhirne, AgriLife Research associate based in Lubbock, said they reduced the irrigation on a few hybrids by 50 percent and had a severe yield and quality limitation, so they followed that by the 75

percent water application.

Those results are due in part to the use of stored moisture in the soil profile, Spinhirne said.

"At 75 percent (evapotranspiration), you have 3 to 4 inches of available moisture that is used, where if you are watering at 100 percent, it is wasted," he said.

The average silage yield of 20 corn hybrids at two locations (Etter and Halfway) was 26.84 tons per acre under 75 percent evapotranspiration irrigation, just slightly lower than the 27.49 tons per acre under 100 percent evapotranspiration irrigation, Spinhirne said.

However, he said, there were significant differences among hybrids in each environment.

"One of our experimental hybrids produced the same amount of silage in both locations when irrigation was reduced from 100 percent to 75 percent," Spinhirne said.

"Developing and using new corn hybrids with improved tolerance to drought and other stresses is important and a viable water-saving approach," he said.

Source: Texas A&M University

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