

New germplasm, irrigation management make a difference in corn production

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Germplasm and stay-green technology utilized by Texas AgriLife Research corn breeders could make growing corn on limited water a greater possibility in the near future, according to AgriLife Research studies.

Thomas Marek, AgriLife Research irrigation engineer and superintendent of the North Plains Research Field near Etter, walked through fields of [corn](#) this year that showed a stark contrast between existing commercial corn varieties and experimental germplasm developed by Dr. Wenwei Xu, AgriLife Research corn breeder in Lubbock.

In a research project designed to pump only 12 inches of irrigation to supplement whatever Mother Nature provided and still grow 200 bushels of corn per acre, 2011 showed the extreme differences irrigation and germplasm can make on a crop, Marek said.

It also showed the production risks and costs associated with potential limits on irrigation water for a high water-use crop, he said.

The research project is jointly sponsored by the North Plains Groundwater District and the Ogallala Aquifer program.

"This was an extremely dry year as we had no [soil moisture](#). And we only received a little over 2 inches of total rain during the entire growing season, with most coming too late to help production," he said. "We

were expecting on average a 10-inch contribution.

"Our irrigation goal with the project was to get the [corn crop](#) up, manage the limited [irrigation water](#) to [pollination](#), and then let the 'rainfall chips' fall where they may with the three varieties," Marek said.

The plots were 12 rows wide, 300 feet long with four replications each at four [plant populations](#).

Within the commercial varieties in this extremely dry year, some individual [corn plants](#) have no ears and some have relatively small ears, he said.

However, growing right next to these varieties under the same conditions is an experimental variety being developed by Xu that has nearly full ears. Marek said the difference is in the germplasm and stay-green, which is a drought-resistance trait.

"There's a marked difference in the stress conditions of these commercial corn plots versus the experimental varieties," he said.

The experimental germplasm variety has a pretty good sized ear on the plants and the plant exhibits good turgor pressure or plant strength, Marek said. The experimental variety that had not been irrigated in a month "still looked strong and green" in September, while the commercial varieties were beginning to dry out.

"It was apparent the commercial varieties were severely stressed, more so than the experimental variety," he said.

"These types of germplasm being developed by Dr. Wenwei Xu will be integrated into the commercial varieties through the corporate commercial companies' breeding programs," he said. "The desired traits

that are being derived through the AgriLife Research corn breeding program will be integrated into those new proposed varieties."

But Marek said germplasm alone won't be enough to sustain a corn crop through a summer like the one just experienced. Even in wetter years, greater production on less inputs are going to be required to feed the increasing global population of the world.

"The irrigation management or scheduling plays a vital role, up to 50 to 60 percent," he said. "It's paramount to get the combination of irrigation and genetics correct to achieve these types of production levels.

"These particular germplasms show extreme promise," Marek said. "But it's a synergistic effect where you need both genetics and [irrigation](#) management if you are going to derive the potential of the new variety going forward, especially in extreme and limited water conditions, which are prevalent throughout the Great Plains region."

Provided by Texas A&M AgriLife Communications

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