

Overcoming Drought Stress

Pioneer’s Optimum® AQUAmax™ Improves Corn Yields In Water-Limited Environments

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DuPont business Pioneer Hi-Bred launched a new generation of corn hybrids early this year, developed and tested to help deliver a yield advantage in water-limited environments, allowing growers to minimize risk and maximize productivity. These hybrids will be offered to growers under the Optimum® AQUAmax™ brand name.

Dr. Jeff Schussler, senior research manager for Pioneer Hi-Bred, discussed the AQUAmax™ products at the recent media event in Johnston, Iowa.

These hybrids, introduced for planting in 2011, contain a collection of native corn traits that improve water access and utilization and deliver greater yields in water-limited conditions. The initial class of Optimum AQUAmax innovations includes five hybrid platforms across a range of maturities and technology packages. The 2011 launch size is limited and primarily targeted in the western Corn Belt, however the advancement is an important milestone toward the longer-term objective of bringing breeding and biotechnology solutions to all major drought-prone environments.

In on-farm, advancement and research trials, the Optimum AQUAmax hybrids show a 5 percent yield advantage, on average, over leading commercially available competitor and other Pioneer® brand corn hybrids. The performance of Optimum AQUAmax hybrids is validated through on-farm and research testing in water limited environments throughout the western Corn Belt. From 2008 to 2010, Optimum AQUAmax hybrids were tested in 223 water-limited trials concentrated in Nebraska, California, Kansas, Colorado, Oklahoma and Texas.

“Our new AQUAmax products really are designed to deal with water stress, water optimization and, those terms are kind of interchangeable,” Schussler said. “When we talk about water stress the implication is that the plants are under stress due to a limitation in water, whether it’s the availability in the soil or through rainfall.”

“There are processes involved in giving plants the ability to withstand flooding,” he said. “However, corn is not inherently very tolerant to flooding. That does represent another trait that one could develop in the future. It’s not as high a priority right now as limited water but certainly in many areas of the country in the last couple of years especially with the high rainfall patterns we’ve had we’ve seen the value that trait can provide.”

Schussler said his topic was on the drought research program Pioneer has been involved in the last several years. The Optimum AQUAmax products for water-limited environments were developed through native variation.

“We’ve been using a lot of molecular breeding techniques to develop products that are specifically suited for limited water conditions, especially in the western corn belt,” he said. The last 10 years quite a bit of progress has been made in that direction.

“We’ve seen a real nice improvement in overall ability of the crop to make more grain with a limited amount of water,” Schussler said. “This has been done in very high precision trials over several years now in over 200 locations in the western Corn Belt. We have very specific and strict criteria for putting the AQUAmax label on

these products and the products that we released this year have met those specifications.”

While the target area for these products is the western dryland markets, AQUAmax products will be available throughout the United States for those who want to try them.

“They will be in relatively much more limited quantities the further east you go compared to, say, Kansas, Nebraska, Colorado and Texas,



that’s really the primary area. As you go into Missouri, Iowa, Illinois the allocations will be much reduced.”

Quite a few studies have been done on how these products will fit with the farmer who is 100 percent irrigated.

“The good news is they’re very comparable to other products out there under irrigated conditions,” he said. “We don’t seem to have yield drag associated with them, that’s very reassuring. So we expect growers can plant in basically all of their environments. Their real value, though, we think is going to be exhibited under drought stress.”

“If you have a well that has a limited water availability, we’re also looking at improved yields there because water is your main driver there. When you have limited water, that’s where the products are going to shine.”

Only select hybrids will meet the criteria set for AQUAmax.

“The challenge is these are being developed as unique hybrids all along the way,” he said. “We simply can’t add it to an existing hybrid. It has to be developed all along through many years of research, so we will continue to release new AQUAmax products and expand that portfolio, but it’s not a trait that you can just stick into a currently existing set of genetics.”

One question from the audience centered on whether a farmer could reduce irrigation in areas where the crop is totally irrigated.

“We are actually conducting studies on that right now,” he said. “We have some new scientists hired specifically in Kansas to start looking at those water management approaches. Can we reduce the number of spins the pivots run? Can we work in limited irrigation more productively? Now that we have the initial response of the hybrids evaluated, we’re looking at these management interactions.”

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