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DROUGHT TOLERANT CORN HYBRIDS

With the current drought, there will be heightened interest in new advances in drought tolerant corn and whether to include these hybrids in your crop rotation.

Crops need water to carry out processes necessary for survival. Water helps cool plants and transports dissolved nutrients throughout the plant and supports photosynthesis and plant growth. That's why plant breeding for drought resistance is tricky.

It is much easier for plant breeders to develop insect or herbicide resistance compared to drought tolerance. Drought tolerance needs large numbers of genes that are impacted by environmental conditions. Insect and herbicide resistance are different, not influenced a lot by environmental conditions and are only controlled by a few genes in the plants.

Some of the environmental and genetic factors affecting drought tolerance include the timing and duration of water stress, soil type, heat, and humidity. All of these influence plant processes, such as the stomata (openings in the plant leaf surface). The stomata allow carbon dioxide in to make sugars for plant growth and release water, increasing transpiration of water and protein production.

Genes related to drought stress can affect these and other plant processes differently. For example, one inbred line may contain a trait which increases root depth and another which increases silking vigor. More traits related to drought tolerance will offer multiple modes of action, such as these, in response to drought stress conditions.

There is a "native gene" approach in the pipeline now that growers will analyze closely. The "native gene" approach has allowed breeders to bring in more than one gene affecting drought tolerance. I am referring to examples such as DuPont - Pioneer's AQUAmax® and Syngenta's Artesian® hybrids. For this year's growing season, a small quantity was commercially available in parts of Nebraska, Kansas and Colorado. About 2 million acres of AQUAmax® corn were planted across the Corn Belt this year, making it the first drought-resistant lineup to be widely available. Syngenta's Artesian® is wrapping up trials on 800 farms.

In contrast, a transgenic/biotech approach (which involves genetic engineering) introduces a single new gene into corn from another organism. Genes not present in any corn germplasm can be incorporated and then bred into elite crop lines through "native approaches." These biotech-derived varieties will be available in 2013. For instance, growers will be sorting through data from 250 large scale trials of Monsanto's Genuity® DroughtGard hybrids with numerous tests in Kansas and Nebraska.

These are not large miracle advances in yield. Company trials are reporting 5 to 15% improvement in yields in stressful environments. Be careful looking at individual dryland plot data this year in farm plots. At the Southeast Corn Growers dryland corn trial near Cortland, the "tester" or corn hybrid check number varied considerably. The same hybrid yielded 46 to 96 bu/acre, depending on the location in the plot. The field actually looked very uniform. Drought stressed induced a lot of yield and moisture content variability across fields this year.

Even though drought tolerant corn offers some advantages, care should be taken to determine whether these particular hybrids are suitable for your farming operation. Growers will need to weigh the added cost versus potential benefits for their own operations with the new corn hybrid offerings.

Mention of trade names in this article is not an endorsement nor is it inclusive of all available drought



tolerant hybrid seed available, but rather for educational purpose of recent changes in the agricultural industry.

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