

Drought Tolerance

Study May Provide Crops That Better Stand Up To Drought

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Drought tolerance has been on everyone's mind, especially throughout the summer of 2012, however Dr. Earl Vories, agricultural engineer with the USDA ARS in Portageville, Mo. and adjunct professor with the University of Missouri, began work on drought tolerance before the heat and drought of 2012.

"We had actually decided to start emphasizing drought tolerance before we knew what 2012 was going to be like," he said. "We have to update our research plans every five years, so last year we decided to emphasize drought tolerance and it became real timely as we got into it."

By "we" he means the research team that includes part of the University scientists and his colleagues with ARS at Columbia, all of whom work together on several different projects. "It's actually not just one project, it's a series of projects," Vories explained.

"One reason we wanted to look at it is that all the seed companies are coming out with improved drought tolerance. It's sort of the next big thing. We have Roundup Ready and Bt, and now drought tolerance is getting more attention. It is real timely with what 2012 turned out to be. But from our aspect, people normally think that it doesn't affect us; we're in a subhumid climate and we have rain. We saw this year that that's not always the case. But we believe that even in our typical years we can get an advantage from improved drought tolerance, both from being able to survive in between rains if it's a rain fed crop, no irrigation, or maybe being able to irrigate less to get the same kind of production. So we're going to have to change our recommendations to fit these new products that are available. If we still irrigate by the same recommendations and the same schedules as before, we're going to use the same amount of water; so we're trying to investigate and see where there is an opportunity perhaps to use less water. As a part of that, we have a corn study this year with Pioneer and we've been talking with Monsanto about maybe starting a cotton study with some of their more drought tolerant materials."

For several years, Pioneer has been breeding drought tolerance into their corn varieties with a line called AquaMax that is more drought tolerant. It is conventionally produced, it's not biotech.

"They gave us one of their hybrids that is recommended for this area and one of their AquaMax hybrids that is usually recommended for more arid regions, and we're going through them with our sensors to test for a lot of different things, not just drought tolerance," Vories said. "We're looking for stresses, so we want to see if there is a difference in response that can be picked up with these sensors between the two lines. That will help us if we need to change our irrigation recommendations. Maybe we can go longer between irrigations with a drought tolerant line, and these sensors will help to see that. So right now we're just beginning to see if there is a difference that we can measure or if that difference cannot be measured and we need to try some different approach," he said.

Vories and the other scientists have not come to conclusions yet. They have collected a lot of data but are only beginning to analyze it.

"So we don't know much yet, other than just walking through and seeing the visual differences which are readily there," he said.

Vories expects that seed companies will get into drought tolerance to different degrees.

"They won't all be into biotech drought tolerance, some will and some won't," he said. "However, this year has everybody's attention. Companies will want to say 'here's how we compare in drought tolerance.' They've been reporting that for a long time so it's not something new, it's just that people in our area are going to pay more attention now. Again, from our standpoint, we want to be able to advise a farmer on how to take advantage of this in a climate like we have in southeast Missouri," he said.



Before the heat and drought of 2012, Dr. Earl Vories, agricultural engineer with the USDA ARS in Portageville, Mo. and adjunct professor with the University of Missouri, began work on drought tolerance.

He wants farmers to be able to see the difference in their own management. Farmers should consider if they can use less water because they are able better to take advantage of the rainfall when it comes.

By next spring the study should provide some insights but the question will be whether the results of the first year can be repeated. Researchers must consider whether their observations were just a fluke because of an extreme season, or whether the results will apply for another year or two.

"So we're not planning to come out with a whole set of recommendations from this right away, but we hope there are some insights," he said. "Already this year we've seen some things that we need to do a little bit different with our equipment. For one thing, we've seen that we're going to have to make our equipment taller because corn gets so tall later on in the season, and before the equipment was used mainly for nitrogen stress which is done early in the season when you can still make an impact with another application. With drought tolerance, we want to see it through the seed filling period when we have a lot taller crop. We need to get our sensors a lot higher in the air."

This is just the beginning of a process that hopefully will produce some recommendations in future years; and that should lead to guidelines on how best to manage the new drought tolerant seed products.

"It's going to be relative," Vories said. "This one is more drought tolerant than this one. If we can show that there's a water advantage for our area then maybe farmers who aren't thinking drought tolerance will help here will find that it really will." △

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