

# Varieties Differ *With* Irrigation

*Top Third In Trials Always Shows High Response to Irrigation*

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An explanation of how varieties and hybrids differ in their response to irrigation was presented recently by Dr. Fred Allen, professor in the Department of Plant Science at the University of Tennessee. Allen, who is home based in Knoxville, works throughout Tennessee coordinating the agronomic crop variety testing program, which deals with corn, soybeans, wheat, grain sorghum and some niche crops such as sunflowers and switchgrass <<http://varietytrials.tennessee.edu/>>. However, the major crops he works with are corn, soybeans and wheat.

"At two of our research and education centers, we conduct all the corn tests under irrigation as well as an identical set of tests without irrigation so we have comparison tests for all maturities," he explained. "We do the same for all the different maturity group tests of soybeans.

a consistently higher response to irrigation compared to the middle and the bottom third," Allen explained.

"As the saying goes, the cream rises to the top; the corn hybrids that yield well across all locations also tend to be those that respond very well when you put them under irrigation. They're most consistently the top yielders with or without irrigation," he said. "We find a few varieties that are exceptions to that, but overall the trend holds."

Irrigation is accomplished with overhead sprinklers, since both locations' systems are traveling laterals with overhead sprinklers.

"How you get the water onto the crop is a matter of preference and availability: lateral line, center pivot, row furrow, etc. The principle is the same no matter the kind of irrigation system; it's important to get the water to the crop at critical times. For both corn and soybeans the reproductive growth period is the most critical.

"For both corn and soybeans, we use crop ob-



**Dr. Fred Allen, Professor in the Department of Plant Science at the University of Tennessee, explains the response to irrigation by varieties and hybrids.**

Photo by  
John LaRose, Jr.

Milan Research and Education Center in west Tennessee is one of those locations, the other location is the Highland Rim Research and Education Center located in the middle part of the state at Springfield." A lateral traveling irrigation system has been installed at both centers.

Allen discussed the results from previous years, including 2007, a very drought stressed year; 2008 and 2010, which were more normal years. He did not include 2009 because rainfall occurred naturally all summer long as it was a very wet year.

"We didn't have any differences between irrigated and non-irrigated tests in 2009," he said. "The data from 2007, 2008, 2010 show, first of all, how corn and soybean varieties respond differently to irrigation, and, secondly, how the different maturity groups respond. Corn, averaged across the maturity groups, showed about 60-70 bu/a yield advantage for irrigation versus non-irrigation. Soybeans, averaged over all maturities, were in the neighborhood of 20-25 bu/a, higher under irrigation."

Within each of the maturity groups though, there's quite a range in how varieties respond. There was more yield under the irrigated, both corn and soybeans. Within those groups though there's quite a range in how varieties respond.

"Each year the yield results for each crop are averaged across all six of our test environments and then ranked from top to bottom, based on what we call a state average yield. For this presentation, we have divided the entries in any given test into thirds and looked at how they responded in yield with and without irrigation. In general, we find that the top yielding third has

servation: Go out and look at the plots and assess crop growth status and condition, and we also use the MOIST program developed by one of our faculty members, Dr. Brian Leib, in the Department of Biosystems Engineering & Soil Science <<http://bioenr.ag.utk.edu/Weather/>>. With the MOIST program you have soil moisture samplers placed throughout the field that measure soil moisture levels and those readings are used to determine timing of irrigation. So we're using both the visual and the MOIST program to time our irrigation. In most years, we start about the middle of June and we'll put on usually a half inch of water per week throughout the growing season from just prior to tasseling until we get close to the black layer formation in corn. In the case of soybeans, we apply about one-half inch of water per week, depending on rainfall, from approximately R1 through R6 when the pods are well formed and the seeds are close to physiological maturity."

Allen's take-home message is that corn and soybean varieties do differ quite a bit in how they respond to irrigation.

"Our recommendation to producers who have an option for irrigation is to choose the top varieties based on the state average yield, and then refine their choice based on those varieties' response to irrigation," he said. "The varieties that tend to do really well across all locations, also tend to be the ones that respond well to irrigation, and that's true for both corn and soybeans," he said. "Cream rises to the top." Δ

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