Corn and Grain Sorghum Irrigation Termination

By Author: Jason Kelley, Wheat & Feed Grains Extension Agronomist

The end of the irrigation season is in sight for many of our early planted corn and grain sorghum fields. For the most part this year we have had to irrigate less than some years due to abundant rainfall, but recent high temperatures and lack of consistent rainfall makes having adequate soil moisture to maturity very important to preserve maximum yield potential. Questions are now being asked, when I can stop irrigation and not suffer any yield loss and how long will it take me to get to maturity.

Corn Irrigation Termination

Once we get to the dent stage (R5) in corn (Figure 1.) we are approaching maturity, but it is a slow process to maturity (black layer) and we will still likely need irrigation to maximize yield potential.

At the beginning of the R5 stage, only about 50% of the total kernel dry weight has been accumulated, so in other words it is very important to have adequate soil moisture to maturity for maximum kernel weight and yield. In general, with normal July temperatures (90’s for highs and 70’s for lows), at the beginning of R5 (just beginning to dent), you are approximately 21-23 days from maturity. The starch line will begin at the top of the kernel and slowly progress down the kernel (Figures 2, 3). Once the starch line has moved half way down the kernel, you are approximately 10-12 days to maturity.

For furrow irrigated corn with good soil moisture, irrigation could be terminated if the starch line has moved 50% or more down the kernel. For pivot irrigated fields, the starch line needs to be 75% or greater and good soil moisture before irrigation termination. Keep in mind that maturity may be variable across a field, so check several spots to be sure you are getting an accurate measurement of maturity. If in doubt whether the plant will have adequate moisture until maturity, it is advisable to irrigate once more, especially if hot and dry conditions are present.

Growing Degree Days (GDD), aka heat units, can also provide an estimate on how close corn is to maturity. Most corn hybrids grown in Arkansas are full season hybrids and require approximately 2800-2950 GDD’s from planting to reach maturity. In looking at GDD’s this year, accumulations are at or slightly above the 30-year average. GDD’s accumulated from March 31th to July 16th across the state range from approximately 2400-2500 in Southeast Arkansas, 2350-2450 in Central Arkansas, and 2200-2350 for Northeast Arkansas. Based on accumulated GDD’s the earliest planted corn in southeast Arkansas should be approaching maturity in 10 days and field observations agree with this. The earliest planted corn in Southeast Arkansas is likely receiving the last irrigation this week, while later planted corn and corn further north may need one or more irrigations to reach maturity if rainfall does not occur.
Grain Sorghum Irrigation Termination:

This year Arkansas grain sorghum acreage is estimated to be 500,000 acres, much higher than in recent years. With increased acreage, many are growing grain sorghum for the first time in many years and are having questions about how quickly grain sorghum will progress to maturity and when irrigation can be terminated. As a general rule of thumb, it generally takes about 40 days from beginning of flowering to get to maturity with the full season hybrids and normal July temperatures and approximately 28 days from the beginning of flowering to hard dough. Of course temperatures and hybrid can cause variation in these estimates and there will be variations in maturity across the field.

In grain sorghum, just like with corn, the goal is to maintain good soil moisture until maturity. **Grain sorghum irrigation termination can occur on furrow irrigated fields when 50% of the heads are at the hard dough stage (50% of heads with good color development) and adequate soil moisture is present. For pivot irrigated fields, 75% of the heads should be at the hard dough stage (75% of the heads with good color development) and have adequate moisture before terminating irrigation.** One of the problems we often have is the lack of uniformity in maturity across a field, which makes termination a harder decision. With the wet spring we have experienced, many grain sorghum fields have considerable differences in maturity from one side of the field to the next.

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Below are some examples of grain sorghum growth stages and irrigation management recommendations for each stage:

**Figure 4.** Milk/Soft dough stage. Still needs irrigation if water is limiting for maximum yield.

**Figure 5.** Hard/Soft dough stage. The top kernels are rapidly maturing, while bottom kernels are at the soft dough stage. If soil moisture is limiting, consider irrigating one last time.

**Figure 6.** Mature ready to harvest once grain moisture is 14% or less. No irrigation is needed and harvest aides can safely be applied if needed. Harvest is typically 7-8 weeks after flowering with normal temperatures.

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*2015 SOUTHEAST ARKANSAS DISTRICT FAIR*

*SEPTEMBER 27 THRU OCTOBER 4*
With grain sorghum on the rise this year in the county and throughout the state (500,000 acres state wide), a lot of growers, agents, and specialists attention has been on the movement of the sugarcane aphid. The sugarcane aphid is born pregnant. The babies are clones of its mother which is why they reproduce so rapidly. As of this week the aphid has been found in 22 counties across the state. Scouting for these insects is recommended twice a week. Application recommendation is a 1.5 oz/ac of Transform, or 4.0 oz/ac of Sivanto.

Rice Sheath Blight
BY: Yeshi Wamishe, Extension Rice Plant Pathologist

Sheath blight is a major disease of rice in Arkansas. It is caused by a soil pathogen and the fungus has several hosts including soybean and corn among others. It prevails in any rice field if conditions are right for the fungus to develop. Prolonged periods of high humidity and high temperatures favor the sheath blight disease to start and progress. The fungus mostly survives as “sclerotia” (tiny masses of fungal structure called “mycelia”) which are capable of floating on flooded rice fields. The floating fungal structures coming in contact with the growing rice and infect the sheath at or just above the waterline and spread throughout the plant tissue. The infection progresses upward through the canopy and to adjacent plants. Areas with the thickest stands and heaviest nitrogen use often show severe sheath blight disease. Sheath blight every so often starts at panicle initiation (green-ring) to panicle differentiation (1/2” internode elongation) and its development and spread can continue throughout the season. Therefore, scouting for sheath blight is recommended from green ring to pre-heading. The optimum fungicide treatment timing usually is 7-14 days past panicle differentiation (Table 1).

However, decisions on fungicide application depends on varietal susceptibility, the height of the variety, weather condition, the field management (seeding rate and nitrogen fertilizer rate), and the treatment threshold (Table 1). For unfamiliar eyes, sheath blight may be confused with other diseases such as “aggregate sheath spot”, “bordered sheath spot”, “stem rot”, or “black (crown) sheath rot”. These diseases have not required fungicide applications to date. Therefore, correct diagnosis of the disease before fungicide application is also important. Protection of at least the upper three leaves including the flag leaf is highly recommended to reduce grain yield loss. Susceptible shorter cultivars can be severely damaged compared to taller cultivars, and the damage can occur quickly under favorable conditions for sheath blight. Note that there is no complete resistance in cultivars to sheath blight. However, if all is done right, a fungicide application would give the desired level of sheath blight control for susceptible or moderately susceptible cultivars. Research has shown that fungicides work better in well managed fields.

SCOUTING:
"The entire field should be scouted for symptoms in a zigzag pattern stopping every 50 steps. Only a 3-ft long section of rice should be inspected at each stop for sheath blight symptoms. If symptoms are present the stop is positive. A minimum of 50 stops per field should be made or one per acre to determine the level of sheath blight for the field. If sheath blight is not widespread in the field, but concentrated in certain areas, then treating only those areas with the fungicide may be more economical. While experience may be substituted for scouting in fields with a history of sheath blight, the economic use of fungicides depends on adequate knowledge of the distribution of the disease in a field and its intensity between ½” internode elongation and early heading” (Source: Rick Cartwright).

On assessment of the research from Dr. Rick Cartwright the following information has been extracted. Stratego at 16 oz provided 14-17 days control, whereas the 19 oz rate for 21-24 days. Quadris at 6.4 oz provided 10-14 days control while 9 oz for about 21 days. But the full rate of 12.5 oz provided 28 days of control. Moreover, his research indicated, azoxystrobin (Quadris) to be somewhat more effective on sheath blight than trifloxystrobin (GEM) – but the difference was just slight (Source: Rick Cartwright). To read more on rates and contents of the fungicides go to: http://www.arkansas-crops.com/2015/07/02/fungicides-major-diseases/

In the last two weeks, sheath blight is being reported in a few fields. However, none were in severe situations. Field edges double drilled or double fertilized have shown a little higher level of sheath blight in a few fields (Figure 1).
Although the day temperatures these days appear unfavorable to sheath blight development, the disease may progress in fields where inoculum is active and nights are dewy and warm. Experimental plots inoculated on July 9, 2015 with temperature of the week were in high 90s produced lesions in four days. Sclerotia of the fungus have started producing mycelia and the disease appears in progress. These plots have thick canopy and were provided with excessive amount of nitrogen fertilizer. Continue scouting!

*Dates to Remember*

**Rohwer Research Station Field Day**  
*Thursday, July 30th*  
Registration for the field day will be at 4:00 pm, with tours starting at 5:00 pm. At 4:30 pm Jason Davis, the Application Technologist will have a spray application demonstration. There will be three tours to

**Ag Economic Meeting August 10th at Jefferson County Extension Office**  
The meeting will begin at 11:00 am at the Extension Office. Scott Stiles, Extension Economist, will be speaking on the market outlook, crop budgets, and will touch on the farm bill. Meeting is free and open to the public. Meeting will be over at 12:00 pm and lunch will be served. If you are interested in attending, call Anthony Whittington, County Extension Agent-Agriculture at 870-534-1033 to RSVP.

**Pine Tree Research Station Field Day Tuesday, August**
**The Arkansas Cooperative Extension Service offers its programs to all eligible persons regardless of race, color, sex, gender identity, sexual orientation, national origin, religion, age, disability, marital or veteran status, genetic information, or any other legally protected status, and is an Affirmative Action/Equal Opportunity Employer." Persons with disabilities who require alternative means for communication of program information (large print, audiotapes, etc.) should notify the county Extension office as soon as possible prior to the activity.