

Corn

by Dr. Erick Larson

Agronomy Notes

Will rainfall help? – Dryland corn which did successfully pollinate and still has green leaves will definitely benefit from late June rainfall or more rain in early July. Rainfall obviously will also generally be a tremendous benefit for irrigators because most irrigated corn will not reach physiological maturity (black layer) until mid-July or later. Kernel number is generally determined by the milk stage (roasting ear) about 20 days after pollination. Severe drought stress has already limited this vital yield component in many areas or pollination may have failed to some extent. However, corn will continue to fill seed weight normally well into July to August, depending upon crop maturity. Moisture will also substantially help maintain plant health, including stalk strength, and grain quality. If substantial rainfall does not come, extreme drought will accelerate maturity of stricken fields, as plants sacrifice energy reserves in vegetative parts in desperate attempt to fill grain. Thus, many fields will likely senesce or die prematurely.

Reduced water demand – Corn moisture requirement will steadily drop from a peak of 1.5-1.75 inches per week at the dough stage (four weeks post tassel) to an inch or less per week after dent. However, high evaporation rates during late July generally often counterbalance the reduced water use by corn plants to some degree. Thus, insufficient irrigation water and/or slight delays can quickly reduce yield potential and evaporate profitability. Most importantly, growers should continue supplying irrigation water until the kernels reach physiological maturity.

Corn irrigation termination – A common irrigation error is terminating irrigation before physiological maturity (black layer) occurs. Most Mississippi-grown corn will not likely reach physiological maturity until mid-July or later, depending upon the latitude and planting date. Premature irrigation termination will accelerate maturity, prohibiting kernels from reaching their full potential size and weight. Although kernels appear somewhat mature and corn water use begins declining at the dent stage, this is far too early to terminate irrigation. Potential kernel weight is only about 75% complete at the dent stage (Figure 1). Thus, termination of irrigation at the dent stage can reduce grain yields as much as 15-20% when hot, dry conditions persist. Early irrigation termination will also likely reduce stalk strength and promote lodging, because plants will cannibalize energy from vegetative organs to fill kernels when they are stressed.

Figure 2. Corn grain weight accumulation during reproductive growth stages.

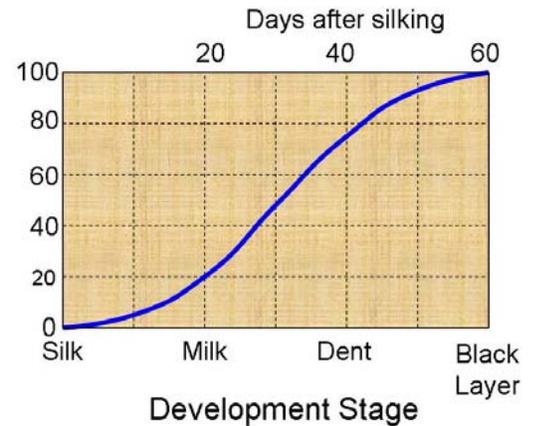
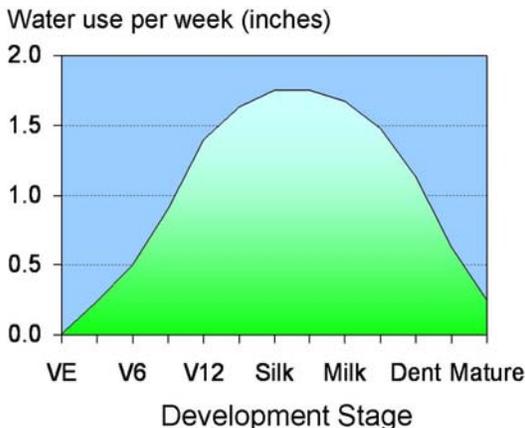


Figure 1. Corn seasonal water use.



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Corn and Wheat

by Dr. Erick Larson

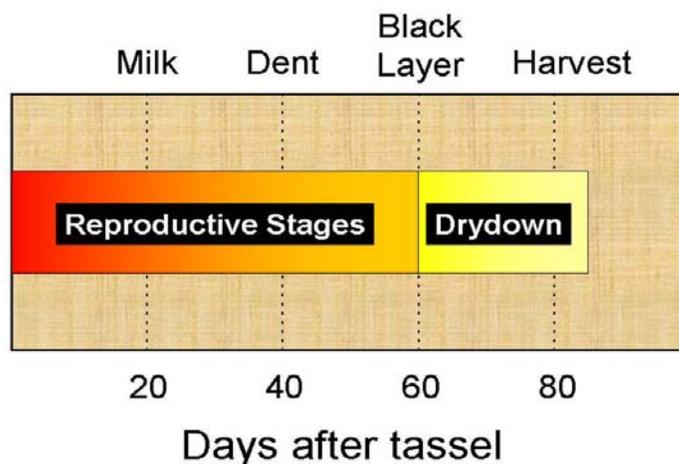
Check the milk-line - The most reliable method for corn producers to monitor kernel maturity for irrigation scheduling purposes is to observe progression of the milk-line between dent stage and black-layer. The milk-line is more relevant than the black-layer, because it indicates when physiological maturity will occur, before the black layer forms. The milk-line is the borderline between the bright, clear yellow color of the hard seed coat outside the hard starch layer, compared to the milky, dull yellow color of the soft seed coat adjacent the dough layer (Figure 3). To observe the milk line, break a corn ear in half and observe the cross-section of the top half of the ear (the flat side of kernels opposite the embryo).

Figure 3. Photo showing a cross-section of an ear of corn with the milk-line advanced half-way down the kernels.



Corn kernel maturation - Hard starch develops initially at the outside tip of the kernel and this transition and shrinkage associated with moisture loss causes the dent to form. This hard starch development gradually progresses towards the kernel base as kernels mature. It generally takes about 20 days for the milk-line to progress from the kernel tip, down to the base, where the black-layer forms (Figure 4). Growers can use this guideline to estimate the approximate maturity date. For instance, if the milk-line is half-way down the kernels, it will take about another 10 days to reach physiological maturity. Thus, the field needs supplemental irrigation water to supply moisture for 10 more days.

Figure 4. Normal sequence of corn reproductive development stages and moisture dry-down after grain reaches physiological maturity.



Wheat stubble management – Wheat acreage is expected to increase considerably this fall if markets hold or continue to rise, leaving many growers in an unfamiliar cropping sequence, that is continuous wheat. Many have questioned how to manage wheat stubble remaining after harvest. Many perceive this wheat residue is a hindrance which must be eliminated or it will impede planting. However, considering that many areas in Mississippi are currently enduring the worst drought in history and our soils are natively low in organic matter, I would strongly suggest we utilize this residue to our advantage, instead of literally burning it off. Producers in the Wheat belt, particularly the driest regions of areas natively dry, rarely burn wheat stubble. Wheat straw is an extremely effective moisture conservation tool during the hot summer. Wheat straw has high solar reflectance, particularly compared to bare soil. Therefore, it absorbs much less solar radiation than bare soil, meaning the soil surface will remain much cooler when wheat residue or stubble is present, reducing evaporation rates and retaining soil moisture. Thus, I would recommend leaving the stubble stand or lightly discing the stubble now to establish a dust/straw mulch through the remainder of the summer. Chemical weed control can be employed, when necessary, with either method to maintain the advantages of the mulch through the summer. Tillage can be utilized in the fall for seedbed preparation, if desired.

Nutrient and Soil Management

by Dr. Larry Oldham

We are transitioning to using more broiler litter to fertilize row crops, and there may be another NRCS EQIP-cost share program in 2007 that facilitates moving litter from poultry producing counties to those without poultry operations. About 25 applications were funded from the 2006 process, almost all in two counties on the east side of the state. A recent article in the farm press also stimulated more producer interest about broiler litter in row crop production, and got my interest because the MSU Extension Service was quoted that fertilizer analysis of broiler is X-Y-Z, despite saying just before that not all litter is created equal. The analysis in the article may be from an old publication currently in revision. My point is that, truly, not all broiler litter is created equal.

Table 1 (below) from the current draft of our publication revision is informative about litter nutrient levels from where and how it originates. The Alabama and Georgia data are averages of thousands of sample; Georgia averaged all litter samples analyzed by their version of the state Chem Lab in about two years. The Mississippi data is from Chamblee and Todd (2002) who systematically measured litter nutrients and production rates in 197 broiler houses working with six poultry integration firms. Dr. Craig Coufal, (MSU-ES Extension Poultry Specialist) grew 18 flocks and measured everything, including litter nutrient contents, during his dissertation work at Texas A&M. He used rations and chickens from a single integrator. The "One Farm" data is from a Mississippi Chemistry Laboratory analysis provided by a grower for use in an educational program on his farm earlier this summer. Therefore this group of data represents several different sizes and types of data sets.

Table 1. Nutrient content of broiler litter on 'as is' basis, derived from Chamblee and Todd, Coufal et al, and other sources.

	<u>N</u>	<u>P₂O₅</u>	<u>K₂O</u>
Alabama	54	27	44
Georgia	63	55	47
Mississippi	62	31	63
Texas	57	71	61
One Farm	72	38	92

Chamblee and Todd (2002) also looked at the litter nutrient analyses on an integrator basis. Different companies involved in large scale commercial poultry production utilize centralized feed mills that prepare specific rations, company specific house management practices, different strains of chickens, different final bird weights, and different health programs. These different management programs inevitably lead to differences in the broiler litter nutrient contents. (Table 2). The Texas and "One Farm" data in Table 1, each derived from a single integrator operation confirm this difference.

Table 2. Effect of integrator on nutrient content of broiler litter in Mississippi, from Chamblee and Todd (2002).

Integrator	Nitrogen (N)	Phosphate (P ₂ O ₅)	Potash (K ₂ O)
	<i>lb/ton</i>	<i>lb/ton</i>	<i>lb/ton</i>
1	57b	32a	55b
2	50c	29a	56b
3	64a	30a	64a
4	67a	32a	64a
5	43d	21b	51b
6	57b	28a	63a

In the nutrient management planning process that Mississippi poultry operations undertake to operate under the state general permit, the preference is to use nutrient analysis results from that particular farm. In Table 1, "One Farm" has 14% more nitrogen, almost 20% more phosphate, and almost a third more potash than the Mississippi average litter. The Texas data, also a single farm, has less nitrogen and phosphate, but much higher potash than the Mississippi average.

This variability leads to several considerations if the litter is to be land applied on the originating farm, which in the poultry production region is usually to pasture and hay fields. However, it also raises additional concerns in row crops such as cotton. Work by the USDA Agricultural Research Service in cooperation with MAFES has shown broiler is an effective fertilizer for cotton when two tons per acre are applied a few days prior to planting, and then sidedressed with an additional 60 pounds of nitrogen.

This would seem to indicate this applies about 180 pounds of nitrogen per acre, well above the normal cotton recommendation. However, broiler litter is a slow release fertilizer of organic origin. Most Mississippi litter starts with pine shavings, and then water and bird 'by-products' are added.

Nutrient and Soil Management continued...

by Dr. Larry Oldham

Over time, there is considerable microbial activity in the litter, just as in soils. The litter nitrogen measured for these table values is in large organic molecules or ureic acid that must be converted to nitrate or ammonium before plants can utilize it. There is some discussion about how much of the total nitrogen applied in litter is used by plants in the year of application. I contend that 50% of the nitrogen is used in the crop year of application, particularly by row crops. If about 120 pounds is added in the preplant litter application, half or 60 pounds is plant available in the course of the growing season. Another 60 pounds sidedressed as inorganic fertilizer would give a net application of 120 pounds of plant available nitrogen: just about what we normally recommend on most Mississippi cotton soils.

If you are interested in using broiler litter, either through EQIP (if funded), or otherwise, and are not in a poultry area, you may contact potential suppliers through the Mississippi Farm Bureau Federation clearinghouse at <http://poultry.msfb.org/poultry/>. Based on the discussion above, it is best to have nutrient analysis of the actual litter in question. In Mississippi, the Mississippi State Chemical Laboratory is responsible for litter nutrient analysis. Their price sheet is at <http://www.mscl.msstate.edu/pdf/prices.pdf>.

How much is it worth? I know fertilizer prices have risen dramatically in recent months. I can track those prices, and take a nutrient analysis, factor in the 50% nitrogen use, and calculate a 'paper' value. I have shown those calculations in a number of meetings recently, but I always point out that the actual value is determined on the open market factoring in demand, supply, transportation, storage, competitive products, and other factors.

Save the dates! This fall we start planning next year's Crop College. If you have suggestions for the program, please contact Larry as listed below. Unlike previous years, the web site is 'hot' now, but not taking registrations yet. And no, the athletic department has not let me know if we have a home basketball game any of these nights.

Mississippi Crop College
February 12 - 14, 2008
Starkville, MS
Bost Extension Center

Web site: <http://msucares.com/crops/college/>

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Rice

by **Dr. Nathan Buehring**

Rice over the past month has matured quite rapidly. As a whole, our rice crop would rate good to excellent. Conditions this year was good for achieving excellent rice stands and helped on the weed control. These good growing conditions have continued on through the growing season. As of the end of June, most of the midseason fertilizer has been applied.

During the last week of June, sheath blight pressure severely increased. Favorable conditions for sheath blight are highs in the 85 to 90 F range with high humidity throughout the day. Under humid conditions, it can take until after mid-day to get the rice plants dry from dew. This disease thrives under high moisture conditions and does not take much time to move all the way up the plant. Under low humidity conditions, sheath blight can be seen underneath the canopy, but it will not move up the plant as fast due to the top portion of the canopy drying off quickly in the morning. If you have not sprayed a fungicide on your rice crop, I would monitor your crop closely to determine if a fungicide application will be necessary.

Over the past month I have been seeing rice stinkbugs scattered across the field in non-headed rice. I am not sure what this means for rice stinkbug pressure this year. Corn and grain sorghum can serve as a host for the rice stinkbug. With an increase in these two crops this year, we could see high rice stinkbug numbers in the rice. As the rice begins to head, I would monitor it closely for stinkbugs, especially on early headed rice.

When scouting for rice stinkbugs, I would sample early in the morning (before 10:00 am) or late in the evening (after 5:00 pm). Rice stinkbugs move lower in the canopy during the hot part of the day, which would lower your sample numbers. Our threshold is 5 rice stinkbugs per 10 sweeps for the first two weeks of heading and 10 rice stinkbugs per 10 sweeps for the second two weeks of heading. Four pyrethroid insecticides are currently labeled and recommended for rice stinkbug control: Karate Z (1 gallon/50 to 80 Acres), Mustang Max (1 gallon/32 to 48 Acres), Prolex (1 gallon/62 to 100 Acres), and Proaxis (1 gallon/25 to 40 Acres).

Mississippi Farm Bureau is hosting its Summer Rice Policy Meeting in Cleveland on Thursday, July 12 at the Bolivar Ag Expo Annex Building beginning at 10:00 AM and concluding around noon.

Lunch is provided, and the meeting is open to all rice growers in the state.

Cotton

by Darrin Dodds

I would like to take this opportunity to introduce myself to everyone. My name is Darrin Dodds and I started as Extension Cotton Specialist on June 16. I was born and raised in Illinois. I have been at Mississippi State University since January of 2003 and have been working for Dr. Dan Reynolds for the past three years. The most common question that I have gotten the last couple of weeks is "How does a kid from Illinois get to be Cotton Specialist in Mississippi?" I am still working on a good answer for that but I am very excited for this opportunity and I am looking forward to meeting and working with everyone.

According to the National Agriculture Statistics Service, planting finished up about the last week of May or the first week of June. Mississippi Boll Weevil Management Corporation is estimating about 667,000 acres of cotton this year which is about 60-65% of what has been planted the last few years. This is the smallest cotton crop in Mississippi on record with the previous low for cotton acres being 687,000 in 1983.

As of last week, 77% of the crop was squaring compared to the five-year average of 59% and 4% was setting bolls compared to the five year average of 6%. 77% of the Mississippi cotton crop is rated as good to excellent. In terms of crop condition, we appear to be fairing as good as or better than some of our neighbors. 74% of Arkansas cotton was good to excellent followed by 66% in Louisiana, 49% in Tennessee, 48% in Texas, and 4% in Alabama.

Due to market prices some producers may be planning to plant wheat behind cotton. Keep in mind that certain layby herbicides have a recrop interval such that wheat planting may have to be delayed in order to comply with label restrictions. Recrop intervals for several commonly used layby herbicides are as follows:

Herbicide	Wheat Recrop
Aim	Anytime
Glyphosate	Anytime
Valor	30 days - Must have 1" rainfall after application
Ignite	70 days
Envoke	3 months
Suprend	3 months
Dual Magnum	4.5 months
Direx	1 year
Caparol	No fall recrop (wheat grown for grain)
Layby	Up to 1 year

If anyone has any questions or needs to get in touch with me, my contact information is: darrind@ext.msstate.edu

**Have A
Safe & Happy
July 4th!**

To receive Agronomy Notes via email, please contact Tammy Scott at (662) 325-2701.

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Michael Collins