August 2007

Mississippi State University Extension Service

Agronomy Notes

Corn
by Dr. Erick Larson

When do you start corn harvest? – This is a common question that a lot more growers will be asking this season, since corn acreage has exploded this year. The answer may vary considerably depending upon the interaction of many factors, which I will attempt to address this month. The primary factors you need to consider are the number of acres relative to combine/trucking/storage capacity. These factors determine the potential harvest duration and the relative risk associated with harvest delays or complications. Those potential risks include severe lodging and/or grain quality deterioration, which can result from inclimate weather, insect pest damage, and late-season weed growth.

Figure 1. Combine harvesting corn.

Grain moisture dockage - Corn may be harvested any time after grain reaches physiological maturity, which occurs at around 30% moisture. However, corn may not be safely stored until considerable moisture loss occurs. Thus, grain elevators discount wet corn to account for drying expenses and moisture weight loss during drying. Moisture dockage schedules between elevators may vary significantly, so thoroughly compare rates. Most schedules discount about 2.5% per each percent moisture above the standard, and may increase as moisture content rises. Water evaporated during drying (shrinkage) accounts for 1.18% of the dockage per each percent moisture. The producer loses this weight regardless of whether they sell wet grain to the elevator, dry it mechanically or let the grain field dry. Thus, a producer should subtract this value from the dockage rate to show their realized or "actual" dockage.

Harvest timing and expected losses - Harvest losses are just as important as moisture dockage rate in evaluating your harvest timing decision. The longer corn stays in the field, the greater the likelihood of substantial field losses. Factors such as stormy weather and southwestern corn borer damage can cause considerable lodging in unharvested fields. Late summer rainfall can also promote morningglory growth, which can greatly inhibit harvest efficiency. Each of these factors may cause substantial field loss, which would considerably outweigh moisture savings. Producers should also consider their harvest capability -- the longer it takes to complete harvest, the earlier you should start harvest. Besides harvesting drought-stricken fields promptly, growers should also harvest non-Bt hybrids infested with corn borers, early maturing hybrids or fields, and those possessing below average stalk quality as quickly as possible. Producers should closely check for loss while the combine is harvesting and make adjustments accordingly. Two corn kernels per square foot or one dropped ear per 100 feet of row equals about 1 bushel per acre yield loss. Research generally indicates combine efficiency is best when corn grain moisture is about 20-22%. Thus, growers seeking maximum profitability should always strive to finish harvest before grain moisture falls below 15%.

Figure 2. Morninglory growth can definitely impede combine harvest progress.

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Corn continued...
by Dr. Erick Larson

Don't Give Away Corn - Producers harvesting or selling corn at less than 15% moisture are giving away profit. A producer harvesting 180 Bu./A. corn at 14% moisture is losing $8.50 per acre or $16.99 per acre at 13% moisture (at $4.00/Bu.). This loss is solely from reduced grain weight due to lower moisture content. This moisture weight loss closely approximates the "actual" dockage most elevators charge for high moisture corn. Since corn loses approximately 0.6% per day during the harvest season, begin harvest early enough to guarantee all corn is harvested before it reaches 15%.

Figure 3. Harvesting severely lodged corn is a long, tedious process with significant harvest loss and inefficiency.

Aflatoxin tips – Aflatoxin contamination is a sporadic problem that Southern corn producers customarily prepare for. Perhaps the best method to minimize aflatoxin problems is to encourage strong plant health during the growing season by using sound agronomic practices, because extreme environmental stress normally promotes aflatoxin development. Fortunately, early harvest reports have indicated no apparent problems thus far this season. However, if aflatoxin is present during harvest, growers can also lessen aflatoxin contamination by properly storing and drying grain, maintaining grain quality, and sanitizing grain-handling equipment. Separately harvest obviously stressed, stunted or damaged areas and field edges, if you suspect any aflatoxin problem. These areas are much more likely to contain high levels of aflatoxin. Fungal infection is more likely in shriveled, cracked kernels and foreign material. Thus, grain quality may be significantly improved by reducing the combine ground speed, increasing fan speed and opening sieves, so that these sources of contamination are removed from the sample. A postharvest mechanical cleaner or gravity separator may also help. Improper grain handling can quickly promote aflatoxin development after harvest. High moisture grain should be immediately dried to below 15% moisture or hauled to an elevator (which will dry the grain). Wet grain should not be stored in trucks, combines, bins or any non-aerated site more than 4-6 hours before beginning drying. These conditions are critical to grain quality, because the fungal growth which causes aflatoxin will escalate to excessive levels very quickly in wet, warm grain. Conversely, fungal growth becomes dormant when grain moisture drops below 15%. Producers should also thoroughly sanitize handling and storage facilities before and during harvest.

Figure 4. Aflatoxin is a by-product of *Aspergillus* fungal growth. However, the presence of fungal growth does <u>not</u> necessarily mean aflatoxin is present.

Nutrient and Soil Management
by Dr. Larry Oldham

There will be an Environmental Quality Incentive Program in 2007 for poultry litter transfer from poultry producing counties to non-poultry producing counties. The eligible amount of cost-share depends on hauling distance, and a maximum of 500 tons. Additionally, the Natural Resource Conservation Service will offer cost share on practices associated with precision agriculture. Some details of these programs are yet to be determined, so be alert, and contact your local NRCS office. Note that these are two separate issues: it is not precision application of poultry litter.

Expanding poultry litter use as fertilizer inevitably will create numerous questions about effectiveness. We have about five decades of experience using it in forage and pasture management in the poultry production region of Mississippi, however there is little row crop production in the area. We know it is an excellent source of the macronutrients nitrogen, phosphorus, and potassium. Furthermore, because it is derived from once living organisms, it contains calcium, sulfur, magnesium, and micronutrients.

Providing nutrients to growing plants hopefully is a monetary response. Litter additionally improves less monetary soil properties such as tilth, water holding capacity, and nutrient holding capacity. There is a strong tendency to credit it as a liming material. While there is significant calcium in litter, and it seems to positively affect pH over very long time spans, it not a predictable response.

Litter, while beneficial, is not a perfect nutrient source; things can go astray such as not accounting for the variability in nutrient content mentioned in Agronomy Notes last month. The best option is analysis of the actual litter to be used. This is done by the Mississippi State Chemical Laboratory, not the soil testing laboratory. More information on this process is available in MSU Extension Service Information Sheet 1614 Soil and Broiler Litter Testing Basics.

Other issues that occur with litter use are not providing enough for crop nutrient needs, or poor distribution because of inadequate spreader patterns. Nitrogen in litter must be converted to plant available forms, and there is some 'discussion' about how much is available during the growing season. Estimates are available in the literature ranging from 40 to 95%. Under Mississippi conditions, a reasonable assumption is 50 to 60% is available. A significant percentage of the phosphorus is available, and practically all litter potassium is plant available the year of application.

Litter is a relatively light material (31 pounds per cubic foot) that provides challenges for those used to heavier inorganic fertilizers and lime. Using the proper equipment, calibrating it, and maintaining proper application widths are important for uniformity. Craig Coufal, MSU Poultry Science Specialist, and Herb Willcutt, MSU-ES Extension Ag Engineer Specialist, have refined a technique for litter applicator calibration that they recently demonstrated. Contact them for further information.

Sometimes litter is applied when plants cannot efficiently use it; apply when plants can best utilize it. The nitrogen becomes available over the first one to three weeks after application. Try to apply litter just prior to planting row crops, and avoid fall applications if there is no actively growing cool season crop.

Timing litter applications for best efficiency may require storing it. Litter should be covered when stored to conserve nitrogen loss to the atmosphere, and to prevent loss by runoff. Take care that runoff from litter storage is contained on site.

Many other factors can reduce litter effectiveness such as soil acidity, micronutrient nutrition, nematodes, diseases, insects, tillage, and soil compaction. However, the largest contributor to litter variability, just as with almost all agricultural issues, is weather. Temperature and moisture control the plant availability nutrients from litter, just as they do from other sources.

Keep these issues in mind if you choose to apply for cost-share under EQIP to move litter from a poultry producing county to a non-poultry area for use in crop production.

Note:

Any one that may have CCA Study Exam Video or DVD's and not using them at this current time, please return them as soon as possible so others may check them out for use, Thank you!

Please return video or DVD to:

Tammy Scott, Room 136 Dorman Hall

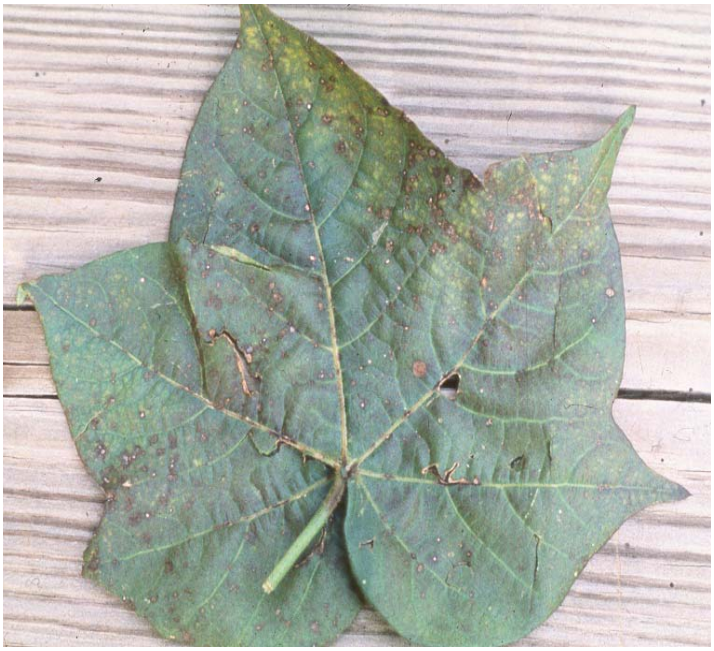
Department of Plant and Soil Sciences.

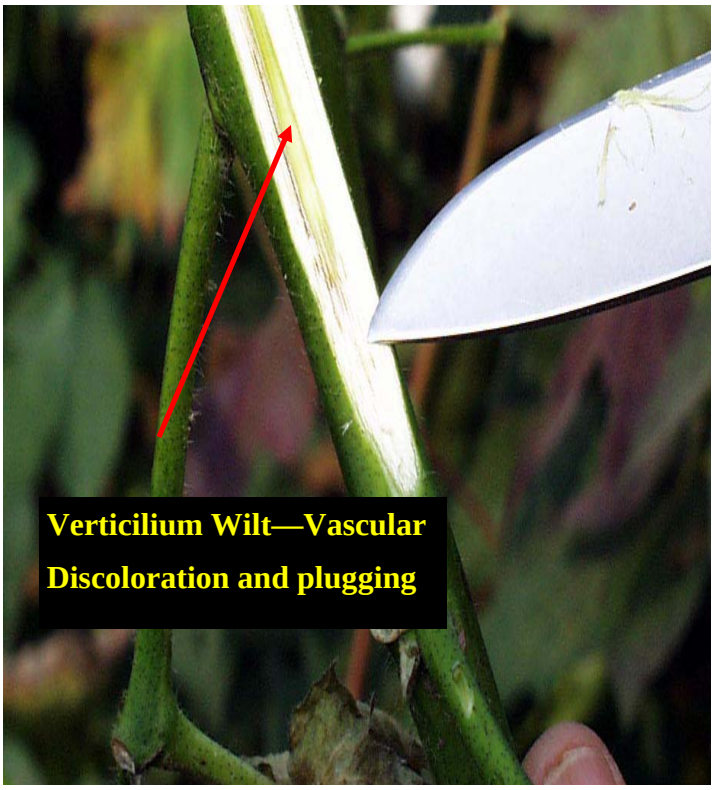
Contact phone number : 662-325-2701

Cotton
by Dr. Darrin Dodds

Crop Situation: National Agriculture Statistics Service reports released July 29 estimate that 75% of the cotton crop is in good to excellent condition. Rainfall over the past several weeks has boosted cotton growth, especially in dryland areas of the state. However, the week of July 23rd was dry for most areas of the state. If available, timely irrigation is extremely important in August. Cotton requires anywhere from 1.5 to 2 inches of rain per week during July and August to transport required nutrients to developing bolls during boll fill. Keep a close eye on soil moisture. Irrigation termination is recommended at first open boll.

Potassium deficiency: There have been several reports of potassium deficiency in the last several weeks. Prior to peak bloom, potassium deficiency symptoms are similar to those found on other broadleaf crops. Interveinal chlorosis (yellowing) first occurs on older leaves progressing to necrotic patches that develop at the leaf margins. When rapid dry matter accumulation in bolls begins, it can be difficult for the soil to supply adequate potassium to meet the increased daily demand. Late season potassium deficiency symptoms differ from early season symptoms. During and after peak bloom, deficiency symptoms appear on younger mature leaves in the upper one-third of the plant. Symptoms may appear as slight interveinal chlorosis that can rapidly change to a bronze-orange color. When diagnosing potassium deficiency, one should examine how much potassium is in the soil through soil testing. Tissue testing as also available through MSU to determine how much potassium is in a given leaf. During the time surrounding peak bloom, one may mark a given leaf in the upper portion of the plant that is showing deficiency symptoms (such as the fifth leaf below the terminal) and come back in a week and check the same leaf. If the leaf is still showing potassium deficiency you MAY indeed have potassium deficiency. However, if the marked leaf is no longer showing deficiency symptoms, plant demand may have been more than the soil could supply at the time. Potassium deficiency symptoms may also be confused with Verticilium wilt. If Verticilium is suspected, cut the main stem on the plant in cross section. If the stem is filled with dark streaking discoloration, the problem is most likely Verticilium. If the tissue is clean, the problem is most likely potassium deficiency. Tissue tests cannot always determine the difference between Verticilium wilt and potassium deficiency, Verticilium wilt will plug the main stem vascular tissue preventing proper uptake and distribution of potassium and other nutrients throughout the plant.





Verticilium Wilt—Vascular Discoloration and plugging

Cotton continued...
by Dr. Darrin Dodds

Late Season Nitrogen: There have also been several questions surrounding late season nitrogen applications, especially in areas where plant bugs have caused low square retention. I would suggest to those thinking about making these late season applications to proceed with caution. Excessive nitrogen can delay maturity, increase rank growth, make the crop more attractive to insects, reduce yields and grade, and make the crop more difficult to defoliate. Before you apply nitrogen this late, be absolutely sure that it is needed. There may be areas that are chlorotic; however, this may be due to something other than nitrogen deficiency. Areas that have received excess amounts of rainfall over the last several weeks may have chlorotic due to insufficient oxygen supply to the roots. Keep in mind nitrogen application timing and rate. If a given field had all of the nitrogen applied early preplant and the plant is carrying a good fruit load, the potential exists for nitrogen deficiency. However, if nitrogen was applied in split applications, it is doubtful that nitrogen will become deficient. Deficiency symptoms may appear as chlorosis on the older leaves first and reduced size of younger leaves. Other symptoms may include: reduced plant height, short fruiting branches, and increased boll shed. Late season deficiency may appear as reddening in the middle of the canopy with poor boll retention at later fruiting sites.

Defoliation: Defoliation is one of the last and most important steps in producing a cotton crop. Benefits of proper defoliation include increased picker efficiency, elimination of trash in harvested seedcotton, faster drying of dew (which can increase picking hours per day), straightening of lodged plants, and reduction of boll rot. The activity of cotton harvest aids is dependant on environmental factors which may account for the variability observed between years. Keep in mind that no one harvest aid tankmix will work in all situations. It is important to understand harvest aid application timing and what specific harvest aids will and will not do. In terms of defoliation timing there are several methods used to time defoliation including: percent open bolls, nodes above cracked boll, and accumulated heat units after cutout. It is also important to consider harvest scheduling, and defoliation of later maturing varieties. However, with all of these methods, defoliation timing should be centered on maturity of a given field.

Defoliation Training: A defoliation training session will be held on August 15, 2007 from 9 am to 12 noon. Speakers include: Dr. Owen Gwathmey – University of Tennessee, Dr Clifford "Trey" Koger – MSU - DREC, Dr. Daniel Reynolds – MSU, and Darrin Dodds – MSU. Speakers with the exception of Dr. Gwathmey, will be at MSU (Dorman 321); however, we will video conference this session in all interested counties. This training session is targeted towards county directors, area agronomists, and growers; however, if there is anyone else who would like to come, contact your local county director or area agronomist.

As always if anyone has any questions or comments feel free to contact me by phone or email.

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Forages
by Dr. Rocky Lemus

Why measure yield? Pasture yield is the most important determinant of animal performance, yet is the most difficult to define and measure. Many of the important management decisions a livestock producer makes related to the management of the available forage resources. Knowing the forage dry matter yield of a given acreage is important in determining the productivity of the crop, purchasing or selling hay, making fertility and feeding recommendations, planning grazing schemes and adjusting stocking rates. It is important to take into consideration that the amount of forage produced per acre will vary significantly from one location to another. These variations are due to climatic changes, soil types, forage species, moisture, and management.

Table 1. Average dry matter yields in pounds per acre (lb/ac) per inch for various forage species.

Forage Species	Yield (lb/ac/in)
Legumes	
Alfalfa	225
Annual Legumes	130
Arrowleaf Clover	200
Crimson Clover	200
Red Clover	220
Sericea Lespedeza	175
Cool Season Grasses	
Annual Ryegrass – Fall drilled	250
Annual Ryegrass – Fall broadcasted	170
Annual Ryegrass – Spring broadcasted	200
Orchardgrass	180
Orchardgrass - clover	200
Tall Fescue	210
Small Grains* – Fall drilled	150
Small Grains – Spring drilled	115
Warm Season Grasses	
Bahiagrass	285
Bermudagrass	260
Crabgrass	130
Dallisgrass	150
Native Warm Season Grasses	200
Mixed Pasture	180

***Small grains = rye, oats, wheat, barley, and triticale. Source: Noble Foundation Grazing School, 2007 (online); Ball et al., 2002

It is recommended not to graze pasture below 3 inches to allow a rapid recovery and reduce stand loss. If a pasture has 6 inches of growth, this means 3 inches are grazeable. It is estimated that there are 200 pounds (dry matter) of grass per acre-inch. On 50 acres, this represents 30,000 pounds of available forage per acre (50 acres times 3 inches times 200 lbs/acre/inch). It is safe to assume that harvest efficiency under continuous grazing is approximately 25 to 50%, but efficiency can increase in a rotational grazing system up to 75%. Thus, the livestock will consume only 15,000 pounds of forage. Estimated daily dry matter intake levels of various groups of livestock are shown in Table 2. Dairy cows require on average about 26 pounds of forage (dry matter) per day. Fifty cows eating 26 pounds of dry matter per day equals 1,300 pounds of total forage consumed daily. The available 15,000 pounds of forage to be consumed by 50 cows will last about 12 days (15,000 lbs. available in pasture / 1,500 lb. daily consumption by herd). It is always recommended to use a management goal of 50%, meaning, "take half and leave half." The formula below calculates the approximate number of days that the pasture can support a specific group of animals:

Days = ((Total Forage (lbs/ac) **X** # Ac. **X** % Grazing Efficiency)) / ((Avg. Animal Wt. **X** Intake Rate (% Body Weight) **X** Animal #))

Table 2. Estimated daily dry matter intake (DDMI) by various animals based on body weight.

Livestock	Animal Weight (lb)*	DDMI (% Body Weight)	DDMI (lb)
Cow (mature beef)	1000	2	20
Cow (mature dairy)	1000	2.6	26
Cattle (yearling)	750	2	15
Sheep	150	2	3
Goat	100	2	2
Horse	1200	3	36
Donkey	700	3	21

***Average weight of mature male or female animal.

Rice

by Dr. Nathan Buehring

As the season winds down for this year, we still need to be on the lookout for two things: blast on late planted rice and rice stinkbugs. This year we have documented neck blast on Wells that was planted early. Most of the infection occurred during the rainy period received back about three weeks ago. If you have any later planted rice that was grown in the Wells, Francis, or CL161 variety, I would monitor it closely for neck blast. This disease can cause severe yield losses if not treated properly. A good preventative application of Stratego at 17 to 19 fl oz/A at the boot split timing will help prevent any problem with blast.

Rice stinkbugs have been relatively light this year. High numbers were reported on the earliest planted rice, but those numbers have now since diluted down to below threshold numbers. 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).

As it seems every year, a lot of rice will be ready to harvest at the same time. When making the decision on where to start or where to go next, there are some things to keep in mind. If you have multiple varieties/hybrids on your farm ready to harvest at the same time, I would harvest them in the following order: hybrids (XL 723, Clearfield XL 729, etc.), Wells, Cocodrie, and CL 161. There are two main reasons why I would harvest the hybrids first. First, hybrids have the tendency to shatter with high winds, especially as they approach maturity. I would harvest them soon as possible to maximize their yield potential. Second, the milling yields are typically better when they are harvested at 18% and dried down in the bin. As the hybrids dry in the field, the milling yields will begin to decline at faster rate than with a variety such as Cocodrie.

To achieve a high quality rice crop, there are some things you can do post-harvest. First, do not leave high moisture rice on a truck more than 24 hours. Also, if you cut a sample with your combine and decide that is to wet to harvest, dump it out. Do not leave it in the combine until the rice is ready to harvest and put it on the truck. Leaving it in the combine will result in stained rice. Second, when drying rice in the bin, avoid using excessive heat (> 90 F) and high volumes of air. Third, avoid putting rice with a moisture difference of 3% together in the same bin. Forth, avoid placing high moisture rice on top of low moisture rice.

In light of GMO contamination in Cheniere and CL 131, I am encouraging anyone who had these varieties in on-farm storage facilities to clean them out as good as possible. Cleaning your on-farm storage facilities will help prevent a GMO-positive result in any testing down the line, which will help the rice industry as a whole.

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

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