June 2007

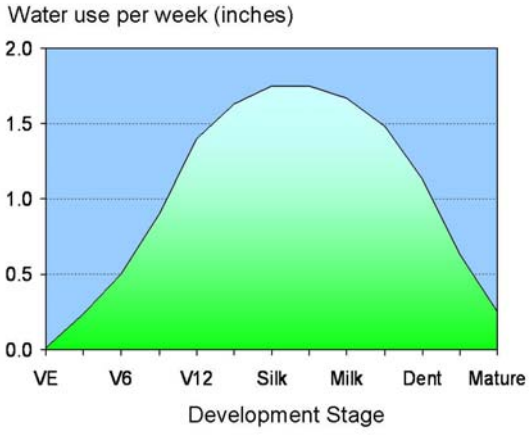
Mississippi State University Extension Service

Agronomy Notes

Corn
by Dr. Erick Larson

Critical time for rainfall/irrigation - Given that most of Mississippi has experienced substantial moisture deficit since early March, this season's crop will be extremely dependent upon rainfall or supplemental irrigation during the upcoming weeks. In fact, much of our dryland areas are drier than they were last year at this time. Corn's most critical and largest moisture requirement occurs during a four week period following tasseling, which will occur during June through mid-July for most of Mississippi's crop. Potential corn yield can be reduced up to 4 - 8 percent per day due to water deficit during this period. Thus, insufficient irrigation water and/or slight delays can quickly reduce yield potential and evaporate profitability. Corn plants use about 1.50-1.75 inches of water per week during peak water use, so producers nearly always must supplement rainfall with irrigation to meet crop demand during this extremely critical period. Furthermore, growers should anticipate this demand so they don't fall behind when it peaks, especially with center-pivot irrigation systems. Unfortunately, most center-pivot systems in our region were not designed to fully support crop demand without some rainfall to help them out. Thus, irrigators need to start early, so that subsoil moisture can be recharged somewhat, before peak water demand begins.

Figure 1. Corn weekly water use during the growing season.



Why is the corn tasseling early and short? – A lot of corn is tasseling early and some corn is shorter than normal this year. Mississippi growers planted an estimated 88% of the corn crop before April 1. This, coupled with the warm, dry weather prevalent this spring, except for the cold spell following the Easter freeze, has generally promoted corn establishment and early growth. Thus, our corn crop didn't experience many of the typical early season problems associated with slow growth, underdeveloped root systems and nutrient deficiencies. However, early-planted corn is usually shorter than normal, because heat unit accumulation during vegetative stages is reduced, compared to later-plantings. The frigid weather following Easter, likely reduced potential plant height of corn fields statewide, despite the presence or absence of freeze-damage. Fortunately, corn plant height has little effect on grain yield potential, if the leaf canopy is capable of intercepting 90% or more of available light when the sun is overhead. This is one substantial reason why we recommend substantially higher seeding rates, when planting early.

Scouting Needs - You don't have to be a corn specialist to effectively scout corn, but you should continue walking fields, closely looking for problems, so that appropriate and timely management decisions may be addressed throughout the entire growing season. The magnitude of crop response to many in-season inputs, such as irrigation, fertilizer, and pesticide applications is very dependent upon timing – and scouting can help vastly improve the timing of these inputs. Producers with irrigation capacity should monitor soil moisture status nearly daily during the sensitive early reproductive period. Scouting should also reveal fertility deficiencies, foliar disease infection and prevalent weed competition problems. The second generation of corn borers will also occur late this month. Also, monitor fields for postemergence herbicide injury and drift.

Inside this issue:

Corn and Grain Sorghum
by Dr. Erick Larson

Will irrigation or rainfall hurt corn pollination? - Corn possesses a vast overabundance of pollen and several traits, which make the pollination process relatively immune to overhead irrigation or rainfall disturbance. Corn produces a huge overabundance of pollen grains (more than 4000 pollen grains per silk). Physical disturbance caused by overhead irrigation occurs over a very short time period in relation to corn pollination capacity. Pollen shed normally lasts 5 to 8 days, during which pollination may occur at any time. Corn plants also have an innate ability to stop pollen shed when the tassel is too wet or dry and trigger pollen shed when conditions are favorable. Additionally, silks are quite sticky, which makes pollen grains hard to wash off after they land on a silk. Thus, the physical disturbance caused by rainfall or overhead irrigation will not reduce corn pollination in a normal field environment.

Figure 2. Center-pivot irrigation does not affect corn pollination.

Grain sorghum irrigation timing - Grain sorghum is very drought-tolerant. However, it will respond positively to supplemental irrigation during droughty conditions. These characteristics make grain sorghum well suited for limited irrigation. Grain sorghum is most dependent upon moisture around the boot stage. The boot stage is characterized by the head swelling inside the flag leaf sheath, immediately prior to heading. Grain sorghum water use is maximized from rapid vegetative growth stages through the soft dough stage. Water use during this time typically peaks at about 1.5 inches per week. Water use rapidly declines after the soft dough stage. Therefore, a furrow-irrigation application just prior to the boot stage, followed by another at bloom (if needed) should provide nearly the entire yield potential of full irrigation. Center-pivot irrigation systems typically require several applications since total water application is limited (compared to furrow irrigation) by runoff potential.

Figure 3. Grain sorghum or milo plant at the boot-stage of development.

Nutrient and Soil Management
by Dr. Larry Oldham

Now is the time to be thinking about your lime program because if you have moisture, your crops are growing. Uneven growth within fields may signal soil acidity issues. In many cases, soil acidity visual symptoms are not as dramatic as shown below (4.3 versus 5.3), but show up as poorer performing zones that grow larger over successive years. Plants will be pale and slow growing. Roots will be stubby and concentrated near the surface.

Photos courtesy Erick Larson and Bob Thompson.

Soil sample and tissue sample both good and bad areas to confirm if acidity is really the issue. Soil pH values below 5.8 are suspect from a plant nutrition perspective. Elevated plant manganese concentrations will confirm soil acidity is affecting plant growth and nutrition. The way to truly determine lime needs is the buffer test used for the lime recommendations from the MSU ES Soil Testing Laboratory (if you use this lab).

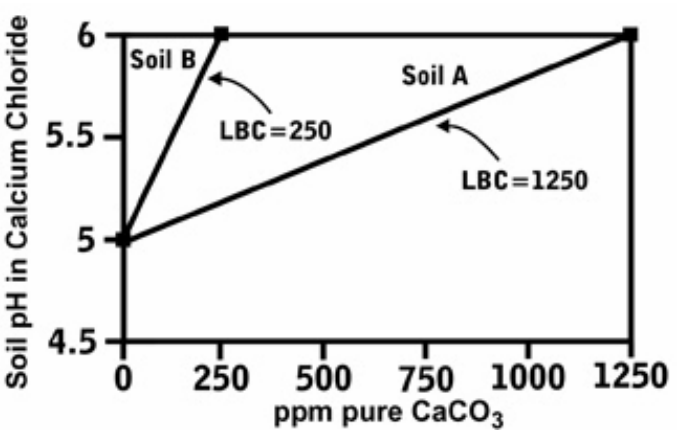
There are some treatment options available during the growing season for row crops, but it is more economical and practical to plan a post harvest lime program. Liming materials are easier to book and schedule delivery for fall application, and soils are usually dry enough to support spreader equipment and minimize compaction.

Mississippi lime sales were changed to a Relative Neutralizing Value basis by state regulation in 2005. To review, liming materials differ considerably, and these differences influence the ability to neutralize soil acidity. Purity of the liming material and how finely it is ground are the primary factors. How easy it handles is not a factor. Refer to MSU-ES IS 1587 on calculating RNV for liming materials. Note that this revision removed the old A and B designations for Mississippi lime.

Calcite and dolomite must be transported into Mississippi, making these 'hard' rock lime materials a significant investment. Sometimes soil testing after liming indicates there was no effect, either the pH is the same (or maybe lower), or the lime requirement is unchanged or higher. This can be perplexing to someone who just invested over $70 per acre to raise the pH.

What happens is the complexity of soils. I have said many times that two plus two does not always equal four in soil fertility. The propensity to resist change in pH, termed 'buffer capacity', is what we attempt to measure in the laboratory to determine lime rates. Workers have found up to tenfold difference within single fields in southern Georgia.

Several things contribute to soil buffer capacity variability, but the chief ones are soil organic matter and clay content. Generally, soils with higher levels of clay are more resistant to change. In the University of Georgia graph below, the buffer capacity of Soil A is five times the buffer capacity of Soil B. Soil B has less organic matter and clay, and has a lower cation exchange capacity (CEC).



From Kissel and Vendrell, 2006

While it is relatively simple to understand that a sandy soil (Soil B above) has less buffer capacity therefore the pH of it can be raised relatively rapidly, it is not so easy to grasp buffer capacity variability within single fields containing one series. Remember that buffer capacity is related to CEC, which is in turn is related to clay mineralogy and organic matter. These properties within soils, especially those managed in production agriculture, can vary within centimeters. This underscores the importance of properly soil sampling to obtain samples that truly represent the situation, and no more than 15 or 20 acres.

Another consideration in testing soils for pH and lime requirement is the time of year the soil is sampled. Soils sampled in the fall, particularly after a dry summer, often have pH's lower by 0.1 to 0.3 units as compared to a spring test. There are several reasons for this depression including persistence of unused fertilizer salts in the upper six inches due to lack of plant use or less downward movement due to low rainfall. This seasonality is one rationale for consistently soil testing the same time each year. So if you test for diagnostic purposes as suggested above, but usually test in the winter or spring, return to that schedule for continuity.

Forages
by Dr. David Lang

Water Use During Drought

It looks the drought most of you experienced last year and into the spring of 2007 may continue during the summer of 2007. There are fast growing summer annuals that make the most of limited water. These include sorghum-sudangrass and pearl millet. Both of these can be planted in June and July if needed for emergency summer forage though their yield potential is less the later they are planted. Browntop millet will not produce great quantities of forage and it will be much lower in forage quality than either pearl millet or sudangrass, but will make a nice a dove field in September. Though they are best planted into a prepared seedbed, success can be achieved with limited disking or even sod-seeded. A burn down herbicide will be needed if sod-seeding either sudangrass or pearl millet. Bermudagrass is very tolerant of a single application of either paraquat or glyphosate at 1 pt/acre but other perennial grasses such as bahiagrass will be damaged. Dallisgrass will be killed so use an herbicide only if you are willing to remove dallisgrass from your pasture. Bermudagrass will recover the following year but it may come back slowly after being over-seeded with a summer annual.

Sorghum and sudangrass are the same genus and species but sudangrass has been selected to be suitable for grazing and hay rather than for grain as is sorghum. Research at the Prairie Research Unit at Mississippi State University has showed that sudangrass can provide excellent quality summer forage. Animal gains of 1.5 to 1.8 lbs per day were achieved in 2005. Varieties with the brown mid-rib (BMR) gene are more digestible and will provide greater animal gains. The BMR gene lowers the lignin level and improves digestibility. Yield is similar to non-BMR varieties and newer varieties have been selected for reduced lodging. Planting rate for sudangrass is 25-35 lbs per acre. Use 50-60 lbs of nitrogen (N) per acre but don't over apply N not only because it's expensive but also because of potential nitrate-nitrite toxicity. Nitrate accumulates in the stems and is converted to protein in the leaves, but this process is slowed down during dry weather and can accumulate to toxic levels during a drought. Young animals, calves and particularly growing fetuses can be killed. It's the same as 'Blue-baby" syndrome that human infants can be exposed to if they are fed greens such as spinach. Another potential problem with sudangrass during a drought is prussic acid or cyanide poisoning. This is also a problem following frost in the fall so use extreme caution with late season grazing or if the drought continues this summer as prussic acid can kill even a mature animal.

Pearl millet and browntop millet are two separate species that are not related to each other. Planting rate for pearl millet is 15-25 lbs per acre and for browntop millet 20-25 lbs per acre. Use the higher seeding rate if seed are broadcast. An advantage of millets over sudangrass is that they don't accumulate prussic acid. They can however, accumulate nitrate during drought as can all nitrogen fertilized plants. Nitrate remains in the hay, but prussic acid does not remain as it is released during drying.

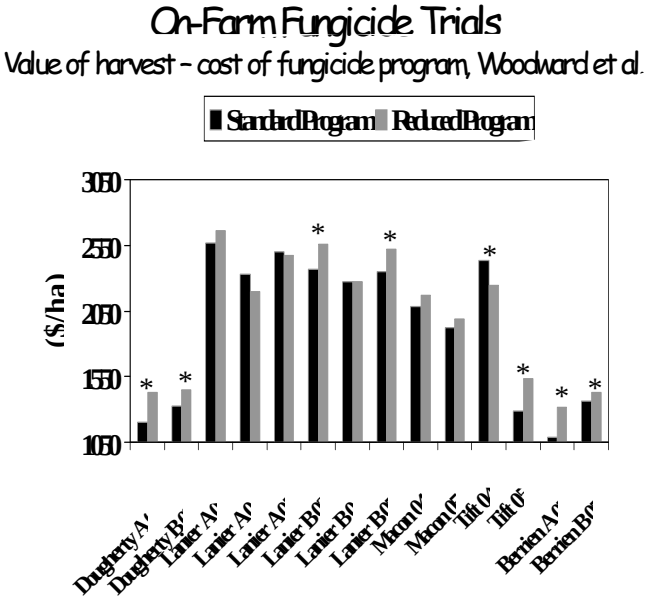
See Warm Season Summer Annuals http://msucares.com/pubs/infosheets/is1616.html for additional information.

Peanuts
by Mike Howell

Crop Situation - As of May 30, peanuts are 90-95% planted and off to a good start, and I would anticipate that the remaining acres will be planted in the next few days. Other peanut producing areas in the southeast are considerably behind this pace due to extremely dry conditions during the months of April and May. Current estimates Georgia indicate that as much as 50% of their crop has still not been planted.

Weed Control - Cracking sprays for weed control are well underway for most of the earlier peanuts. Keep in mind that the first 6 weeks are critical to prevent yield loss due to weed competition. Stay on top of weed control and avoid salvage treatments. Yes we can clean up large weed problems in peanuts rather easily, but we really want to avoid that situation.

Disease Control - As we near the point when our early peanuts are reaching 45 days old, we need to get prepared for timely fungicide applications. I encourage growers to utilize the Georgia disease risk index as an aid in determining fungicide timings. Data using the disease risk index suggest that profits can be increased by reducing the number of fungicide applications compared to the full season approach (see chart). This index takes into account previous cropping history, planting date, variety, and disease history to determine risk on a field, and allows growers flexibility in managing disease problems. It does not take into account weather conditions. As conditions become more or less favorable for disease development, additional adjustments may need to be made.



Rice

by Dr. Nathan Buehring

This year we have been very fortunate with the weather. With the exception of March, we have received a rain about every time we needed it. This has saved us some money in several ways. The only rice that was flushed was at the end of March or later planted rice that has not gone to flood yet. With the timely rains, preemergence herbicides have worked good as they ever had (almost too good in some places). So this year we are off to one of the best starts as we have ever had.

With that being said, we still have run into a few isolated glyphosate drift complaints. These complaints have been forwarded to the Bureau of Plant Industry for investigation and hopefully the liable parties will be found. As it shows, this is a problem that did not correct itself and will likely continue.

Things to be thinking about in upcoming months are fungicides. Rice diseases can be very costly for you the producer. Fungicides can be costly if you apply them when they are not needed and foliar rice diseases can be costly if they are left untreated. When looking at using a fungicide for sheath blight control, consider the susceptibility of the rice variety you are growing.

Here is how I rank the most popular varieties we grow in Mississippi in susceptibility to sheath blight from very susceptible to least susceptible: CL 161 (VS), Cocodrie (S), Sabine (S), CL 171 (MS), Wells (MS), and XL 723 (MS). CL 161 is rated very susceptible to sheath blight. Since sheath blight can move very rapidly on this variety, I would be leaning more toward using a preventative than a curative fungicide application. As you move down the list in variety susceptibility, it becomes less likely for a fungicide will pay for itself. However, a variety lower on the list does not mean that a fungicide will not pay for itself, which leads to my next point. Scout and treat on a field-by-field basis. Not every field is going to have the same sheath blight pressure. Sheath blight pressure can depend on other factors such as weather, rotation pattern, and repeated use of strobularin fungicides (Quadris, Stratego, etc.) in the previous years thereby reducing inoculum levels.

Fungicide rates for sheath blight control will depend on how long you need to protect the crop. If you are applying a fungicide in the preboot timing, a higher fungicide rate will be needed to protect the crop through heading. As you get closer to heading, a lower rate may be used since the length of residual control needed will be less.

Last year I had several questions on how early can I spray a fungicide that contains propiconazole (Quilt and Stratego) and get protection from kernel smut. To get protection from kernel smut the application needs to be made in the boot stage. If applying in the early to mid boot stage, an equivalent rate of Tilt at 6 to 8 fl oz/A will be necessary. If applying in the mid to late boot stage, an equivalent rate of Tilt at 4 to 6 fl oz/A will be necessary.

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