February 2007

Mississippi State University Extension Service

# Agronomy Notes

Inside this issue:



# Wheat
## by Dr. Erick Larson

**Wheat Nitrogen Fertilization -** Warm temperatures have encouraged considerable wheat growth this winter. Thus, since the initial topdress of a split application should be applied when dormancy breaks in late-winter while wheat is in tillering stages (Feekes growth stage 3 or 4 - normally early February), growers may need to alter their nitrogen application timing to compensate. Because, seasonal weather and weekly fluctuation can greatly influence wheat growth, wheat producers need to closely evaluate the weather forecast as well as wheat growth and health, rather than strictly managing according to calendar dates. I believe the most prudent method to apply nitrogen this season is either a 3-way or a 2-way split with about 2/3 of the nitrogen applied in the late split. Using split nitrogen applications with the majority of fertilizer applied late will satisfy crop demand without subjecting a substantial amount of expensive N to denitrification loss during wet, saturated conditions typical during the early spring. A small amount of N should be applied during tillering stages, well before stem elongation begins (15-30 lbs. N/a.). This nutrition is needed in both early-planted wheat (to sustain tiller development) and late-planted wheat (to promote tiller development before stem elongation begins). Neglecting wheat nutritional needs during tillering stages permanently limits the number of heads produced per acre, thus proper nitrogen timing is essential to produce high wheat yields. Thereafter, N can be applied according to crop uptake needs, which are relative to amount of growth. During a normal season, this may imply timing a second application around March 1 (40-60 lbs. N/a.) and a third around March 20. Urea is normally used on wheat because it is less expensive, can be applied by air, and is less subject to volatility during the late winter/ early spring, than during the summer (because temps are cool and rain is frequent). Ammonium sulfate should be applied in an early application, if sulfur is needed. Recommended spring nitrogen rates generally vary from 90-140 lbs./a. on light-textured soils and 120-160 lbs./a. on heavy clay soils with higher rates within this range recommended for high yield potential wheat.

**Growthy wheat/freeze damage?** Warm winter conditions that have promoted wheat growth have also raised questions about susceptibility to freeze damage. Wheat tolerance to cold temperatures is dependent upon the growth stage, with younger wheat being more tolerant than older wheat. For more information regarding potential freeze damage at various growth stages, please refer to the answer posted in “Frequently Asked Questions” within the Wheat section on MSUcares.com. There is little, if any method to manipulate crop maturity to influence susceptibility to freezing temperatures, including nitrogen application timing. Nitrogen nutrition does not influence wheat maturation! Maturation is determined by planting date and variety response to temperature and photoperiod. Thus, delaying nitrogen application will only reduce wheat yield potential by depriving plants of nutrition. Our best hope for the early-planted wheat is that cool temperatures prevail through February, slowing wheat maturation until spring.

**Wheat Weed Control -** High yield wheat management certainly requires timely wheat control. Dense winter growth of small winter weeds, including Annual bluegrass, Henbit and additional broadleaf species, can limit wheat yield potential as well as the weeds that are traditionally focused on, like Ryegrass and Wild garlic. If allowed to grow throughout the winter and into the early spring, these species steal valuable nutrition and may compete substantially with wheat during tillering stages, if they have a dense stand. This competition will limit the number of heads produced per acre. Thus, early spring control is necessary to release this competition while wheat still has the capacity to develop tillers.

# Corn
# by Dr. Erick Larson

**Short Corn Seed Supply** - Corn seed supply continues to tighten as planting intentions increase every day. The seed supply of normal and better-yielding hybrids are nearly exhausted, so beware that alternative hybrids, particularly those which have not been grown in your area or in University Trials and hybrids abnormal in maturity, might have severe yield limitations and/or adaptability issues which may limit profitability considerably when grown in our environment. Hybrid performance is normally severely tested when moving hybrids south of their native zone of adaptation. Thus, it would likely be prudent to consider planting grain sorghum or soybeans on poorer soil types, or if quality hybrid corn choices cannot be secured.

**Fertility Keys for Corn -** Everyone knows nitrogen is considered the key nutrient for corn production, so accordingly, I believe Mississippi producers generally do a very good job of addressing corn nitrogen needs. In fact, nitrogen problems don't usually even make the top five frequent fertility problems I annually see in fields. We are much more likely to overlook other major fertility needs and sometimes micronutrients, particularly at high corn yield levels. The first fertility issue, which must be addressed before any other supplemental nutrients are applied, is low soil pH (below 6.0). Low pH will substantially restrict nutrient availability and stunt crop growth drastically (resulting from increased availability of toxic elements) when pH is below 5.5. Corn requires nearly twice as much phosphorus and about 40-50% more potassium, compared to cotton and soybeans. Corn potassium deficiency often occurs following a high-yielding soybean crop, since soybeans remove double the potassium from the soil as a cotton crop. Potassium deficiency is particularly prevalent in no-tillage systems, where uneven soybean residue distribution (windrowing) may occur by the combine spreader during soybean harvest. Sulfur, magnesium and zinc deficiencies are also becoming more common. These nutrient requirements, except for sulfur, can be proactively addressed by a sound soil testing program. Plant tissue analyses during the crop season will indicate sulfur availability and will be helpful in confirming plant uptake for all nutrients.

**Managing Limitations/Early Planting -** Growing corn in Mississippi can be very profitable, but does have considerable risk, which producers should address with management practices. The primary environmental risks include wet springs and hot, dry summers. Growers should utilize raised beds on fields with marginal drainage to relieve potential waterlogging and warm the soil to promote better seedling establishment and vegetative development. Early burndown herbicide application helps both these problems because it promotes warmer, drier seedbeds during the spring and encourages earlier planting. Early planting helps corn avoid stress associated with mid-summer drought. Irrigation can help alleviate water stress, but does not over-ride the importance of early planting (because of heat stress).

**Burndown Herbicide Timing -** Moist soil conditions often severely restrict planting time during the optimum corn planting period. Utilizing a late winter burndown herbicide to control winter vegetation allows producers to manipulate soil moisture and encourage earlier planting. Killing winter weeds several weeks before planting allows the soil to absorb much more solar energy, compared to soils covered by a blanket of lush weed vegetation until immediately prior to planting. This warms and dries the soil, which allows earlier planting and promotes corn seedling vigor. Burndown herbicides utilizing glyphosate should be applied four to six weeks before planting to gain these advantages.

**Risk of Ultra-Early Planting -** Abnormally warm, dry conditions sometimes allow an opportunity to plant corn during late February or early March. Although early planting is a critical component of successful corn production, planting corn extremely early (well before recommended dates), even if soil temperatures are warm, provides little if any crop development advantages, while risking stand failure. Extraordinarily early planting enhances maturity very little, because corn growth rate is correlated to temperature, and heat unit accumulation (GDD 50) is historically very low during early March.

**Guidelines for Corn Planting Date -** The standard guideline for determining earliest planting date is when morning soil temperature at a two-inch soil depth is 55 degrees F or 50 degrees F at a 6-inch soil depth. Planting before the soil temperature is warm enough for germination greatly increases the potential for stand failure, because germination growth rate is dependent upon soil temperature. Soil temperature may vary considerably depending upon amount and type of plant residue, soil texture and slope. Thus, randomly measuring soil temperature with a thermometer within a field should provide a reliable indicator of desirable conditions for stand establishment. Corn produces highest yields when planted within 4 - 5 weeks after soil temperature is warm enough for germination. This has historically corresponded with the following calendar dates:

Geographical Region of Mississippi:

Southern: February 25 - March 15
Central: March 5 - April 10
North-Central: March 15 - April 20
Northern: March 20 - April 25

# Cotton
# by Dr. Tom Barber

The 2007 season appears to be one that will go into the record books before we begin. If all the talk and rumors are true, Mississippi may plant from 700,000 up to one million acres of corn in 2007. This will potentially reduce cotton acres to below one million for the first time since 1998. In 1998, Mississippi cotton acres were 940,000; however, this was the second lowest acreage since 1900. In 1983, Mississippi planted only 687,000 cotton acres, the lowest acreage in history. It's interesting to look back in history and see how the market and planted acres fluctuate. No doubt acreage will fluctuate again and cotton acres will return to normal levels and remain a steadfast commodity in Mississippi.

For those who still intend to plant some cotton, timely decisions are being made this month about variety selection, seed treatments, planting strategies and burndown applications. Burndown applications should be at the top of everyone's to do list in February. Timely, early burndown applications are crucial, especially in fields infested with glyphosate-resistant horseweed (Marestail). Every year, populations of glyphosate-resistant horseweed increase and some fields in the north Delta may contain populations of over 40,000 horseweed plants per acre. Desoto, Tunica, Coahoma, Panola and Quitman counties have high populations of glyphosate resistant horseweed. Most counties in the north Delta (north of highway 82) contain glyphosate resistant horseweed and the problem continues to move south. Horseweed seed is wind blown and it won't be long until the problem is scattered throughout the south delta and state of Mississippi. Therefore if horseweed or marestail is present in your field at burndown, consider them to be resistant and treat them accordingly. Fields should be scouted to determine if the weed is present. The following 3 images depict horseweed at various growth stages. The first and second image will closely resemble what horseweed will look like this time of year, in the small to medium rosette stage. Once the temperatures begin to warm up, horseweed can bolt quickly and will look like image 3. Herbicide applications for control need to be made before horseweed begins to bolt.

If horseweed is present, burndown herbicide applications should be made early, generally before the first of March. This is not only beneficial for horseweed control but will help reduce over- wintering and early season insect populations as well. If horseweed is present and a glyphosate (Roundup) system is used, 8 oz of a 4 lb dicamba product (Clarity, Banvel etc) should be added to the tank-mix. 2,4-D is a product that many like to use at burndown. It will kill the horseweed but has to be applied at the 1qt/A rate to insure good control. In fields with a history of glyphosate-resistant horseweed, a residual herbicide may be needed to reduce horseweed emergence after planting. If horseweed comes up in Roundup Ready cotton, there is basically nothing that will control it. If you have experienced horseweed in-season, add a residual such as 2 oz of Valor or 1qt of Caparol with the initial burndown application to prevent in-season horseweed emergence. Burning down early will mean that most of the time a second shot will be needed before planting. If a residual is used horseweed should not be a problem but other weeds may flush warranting a second shot. This may sound expensive but it is cheaper than having a horseweed problem in season.

Ignite does an excellent job in controlling horseweed at all stages. There are two things to remember about Ignite applications at burndown. 1. Temperatures need to be above 60-65 degrees or control will be reduced. 2. Coverage is essential with Ignite; make Ignite applications with at least 15 gallons of water. If flushes of glyphosate-resistant horseweed occur before planting, Ignite will provide good control without injury carryover into the cotton. However if it looks like you may have a problem in season and no residual herbicide was applied, you may want to consider planting Liberty Link cotton, which will allow over the top applications of Ignite all season long.

Paraquat, or Gramoxone based burndown programs have not provided as good of control as glyphosate + Clarity or Ignite alone on glyphosate-resistant horseweed. Horseweeds will be burned back but they will recover within a week after Gramoxone applications. Regardless of which program you choose if a residual (Valor) or phenoxy herbicide such as 2,4-D or dicamba is used, double check preplant intervals before planting cotton.

# Cotton continued...
# by Dr. Tom Barber

Image 1:  Horseweed in small rosette stage.

Image 2: Horseweed, medium rosette

Image 3: Bolting horseweed

# Forages
# by Dr. David Lang

**Bermudagrass in 2007** - Bermudagrass is a staple of most cattle producers whether planted to an improved hybrid or seeded to common bermudagrass. Most pastures in Mississippi contain some bermudagrass. Three hundred years ago, however, no fields contained bermudagrass anywhere in America, because it is a native of Africa and India. It is a warm season perennial grass that responds aggressively to irrigation and nitrogen fertilization. Without water or fertilizer, most warm season perennial grasses such as bahiagrass, dallisgrass, johnsongrass and bermudagrass will yield very little, such as happened in 2006. During 2006, a very dry summer, average yield of bermudagrass was 4,000 lbs per acre (Table 1), only 26.7 % of that achieved in 2005 (Table 2). Yield of improved bermudagrass in 'normal' years ranges from 10,000 to 20,000 lbs per acre. In 2005, a moist summer, the average of these bermudagrass was 15,000 lbs per acre (Table 2). Another unusual characteristic of 2006 was below normal temperatures in April and May that led to very poor growth early in the summer. Compare June yield in 2006 (Table 1) with June yield in 2005 (Table 2).

In order to achieve high levels of yield of bermudagrass you need to add 50 lbs of actual nitrogen (N) fertilizer after every cutting. These plots were fertilized with 400 lbs. of 15-5-10 per acre in May, June, July and September in both 2005 and 2006. Fall growth was not harvested to provide a winter cover and was/will be removed with fire in early February. The difference in yield between 2005 (15,000 lbs/acre) and 2006 (4,000 lbs/acre) was primarily due low rainfall during 2006. During 2005, we had 3 to 6 inches every month from May to August before hurricanes Katrina and Rita belted us. In 2006, there were less than 2 inches of rainfall per month from May to August. We had 3 inches of localized rainfall in early September, which helped to increase our September bermudagrass yield at Starkville. Most of you received rainfall in late September and October that helped produce more hay in late October than was produced all summer long.

During a dry year, application of N fertilizer becomes very uneconomical, but it's hard to predict ahead of time whether to apply N or not. A general rule of thumb is to apply N fertilizer in May and July regardless of rainfall. August and September applications become questionable in most years. Much of the late fall growth observed in 2006 utilized N that was applied prior to August. N is highly volatile and can be lost under wet conditions if applied as nitrate and under dry conditions if applied as urea. Nitrate applied during dry conditions will generally stay in the soil until it rains. Ammonium nitrate (34-0-0) has been the fertilizer of choice for bermudagrass during summer months. Its availability has become limited in the past few years because of its high cost to produce and it's a potential terrorist ingredient. More and more, urea and ammonium sulfate will become the N fertilizers available to Mississippi's livestock producers for hay and pasture. There's a new 34-0-0 being marketed in Mississippi that's not ammonium nitrate. It's a blend of urea and ammonium sulfate that should be just as effective as ammonium nitrate in most situations.

Table 1. Bermudagrass yield (lb./a) at Starkville, MS 2006.

| Variety | 05 June, 2006 | 17 July, 2006 | 08 Sept, 2006 | Total Yield 2006 |
|---|---|---|---|---|
| Alicia | 493 | 1819 | 2841 | 5153 |
| BY101 | 246 | 659 | 1863 | 2769 |
| Coastal | 159 | 1238 | 2627 | 4024 |
| Dixie | 246 | 1974 | 2806 | 5027 |
| Lott | 174 | 904 | 2291 | 3369 |
| Murphy | 666 | 984 | 2351 | 4001 |
| Russell | 130 | 1991 | 2859 | 4899 |
| Sumrall | 319 | 1852 | 2601 | 4772 |
| Tifton 44 | 145 | 1123 | 2436 | 3703 |
| Tifton 85 | 449 | 2107 | 3859 | 6415 |
| LSD 0.05 | 282 | 684 | 771 | 1373 |

Table 2. Bermudagrass yield (lb./a.) at Starkville, MS 2005.

| Variety | | 25 July 2005 | 07 Sept 2005 | Total Yield 2005 |
|---|---|---|---|---|
| Alicia | 5520 | 7360 | 4511 | 17391 |
| BY101 | 3884 | 7693 | 3590 | 15167 |
| Coastal | 3443 | 7254 | 3656 | 14353 |
| Dixie | 6114 | 9343 | 4592 | 20049 |
| Lott | 3108 | 6251 | 3853 | 13211 |
| Murphy | 4294 | 7120 | 3041 | 14454 |
| Russell | 5378 | 9754 | 4117 | 19250 |
| Sumrall | 4048 | 10135 | 4111 | 18294 |
| Tifton 44 | 2961 | 8228 | 3349 | 14538 |
| Tifton 85 | 4712 | 10374 | 4502 | 19588 |
| LSD 0.05 | 1466 | 2257 | 853 | 3123 |

# Nutrient and Soil Management
# by Dr. Larry Oldham

The expected shift to corn on many Mississippi acres will require close attention to nutrient management by growers and consultants, especially if the fields have been in long-term cotton production. Mississippi State has a standard nitrogen recommendation for corn production: 1.3 lbs N per bushel of realistic yield goal. Management of lime, phosphorus and potassium should be based on current soil tests. We have potential issues with crop sulfur nutrition that are not addressed as plainly.

We generally rely on soil organic matter and atmospheric deposition for the sulfur required by our crops. Over half the soil samples for cotton from the Delta area recently processed by the MSU Extension Service laboratory have had less than one percent organic matter. Deposition has decreased due to lower sulfur emissions by automobiles and industry. Together, soil organic matter and the atmosphere contribute 20 to 30 pounds of sulfur per acre annually for plants to utilize. Some irrigation water in Mississippi can provide sulfur as well.

While cotton yielding two bales per acre uses 24 pounds of sulfur, 180 bushels of corn require 30 pounds, and 220 bushels need 36 pounds (International Plant Nutrition Institute data).

This balance can be precarious for some growers, particularly if soils are sandy and/or have low organic matter levels. Furthermore, if cool weather occurs during early crop development, plant sulfur availability may be lower because of decreased soil microbial activity and slow plant root growth. If there is sufficient reason to believe supplemental sulfur is needed pre-planting, a rule of thumb is to add sulfate form sulfur at 10% of the total applied nitrogen rate (10 pounds for each 100 pounds of N added).

Sulfur deficient corn plants develop interveinal chlorosis. Whole plants suffering from sulfur deficiency are light green with more expression in the upper parts, nitrogen deficiency is more noticeable in the lower, older parts.

If sulfur deficiency is suspected, obtain laboratory analysis of sulfur and nitrogen in 'good' versus 'bad' plants. Determine the ratio of nitrogen to sulfur (in percentage or ppm, as long as each in the same unit) in the plants; non-deficient plants will have N/S ratios in the range 7/1 to 15/1.

Monitor confirmed sulfur problems for a short time as symptoms may lessen as plant root activity increases. Topdress dire situations with a sulfate source at 20 pounds sulfate-S per acre, as long as rain or irrigation can move it into the soil.

Sulfur containing fertilizers include ammonium sulfate (21-0-0-21S), potassium sulfate (0-0-52-16S), potassium magnesium sulfate (K-mag, 0-0-21-23S). A common program is sidedressing using ammonium thiosulfate (12-0-0-26S) blended with liquid nitrogen solutions for a 28-0-0-5S product.. If it is available and can be applied, gypsum (18% S) may be used.

Elemental sulfur is available; however the sulfur in it must be oxidized to the sulfate form before plants can utilize it. The oxidation rate depends on the particle size on the particular material, temperature, and moisture, so it has more utility in a planned fertility program than in remedial use. Elemental sulfur is also used to lower soil pH.

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



Mississippi State University Extension Service

DEPARTMENT OF PLANT & SOIL SCIENCES
MISSISSIPPI STATE UNIVERSITY

Michael Collins