October 2007

Mississippi State University Extension Service

Agronomy Notes

Corn and Wheat

by Dr. Erick Larson

Addressing Fertility Problems - Fall is a good time to begin addressing many fertility problems. Applying and incorporating lime during the fall is necessary to allow pH neutralization before the cropping season begins. Of course, soil testing is the foundation of a sound fertility program. Soil testing eliminates guesswork, allowing you to address nutrient limitations with appropriate fertilizers before problems arise. Thus, you apply only the necessary fertilizer, which will likely reduce expense and improve crop response! You should test soil at least every three years, using good sampling techniques and proper equipment. Since Mississippi corn is normally grown in yearly rotation with other crops, more frequent or even yearly soil testing may be beneficial, because crop nutrient demands often differ substantially. Phosphorus deficiency often occurs following cotton or soybeans, because corn requires double the amount needed for cotton or soybeans. Potassium deficiency often occurs following a high-yielding soybean crop, since 70 bu./a. soybeans remove about 100 pounds of potassium from the soil. However, delay application of potassium on low CEC or sandy soils until spring because of leaching problems.

Figure 1. Fall soil sampling can identify fertility limitations and give you ample time to address them before they limit yield.

Fall Weed Control - Many perennial weeds, including Johnsongrass and Bermudagrass, are very susceptible to herbicide application at this time of year, because they are storing energy in their rhizomes in preparation for winter. A translocated herbicide, such as glyphosate, will be drawn into the rhizomes and have a higher likelihood of killing these reproductive organs. Apply herbicides when weeds are actively growing and at least two weeks before the normal first frost date. Tillage or stalk shredding should be avoided for several weeks prior to or after herbicide application.

Killing Volunteer RR Corn before Wheat - The most practical option to control volunteer Roundup Ready prior to planting wheat corn appears to be tillage. Herbicide options capable of providing effective control of volunteer RR corn and permit subsequent wheat planting a short time after application have not been identified. The graminicide herbicides should have good efficacy, but have some residual activity in the soil, which restricts replanting to susceptible crops, such as wheat, for at least 30 days following application – refer to a specific herbicide label regarding replant restrictions. Furthermore, some of the herbicide options used to kill a failed stand of Roundup Ready corn and immediately replant corn, are either not labeled for immediate replant to wheat, or may produce wheat crop injury. Furthermore, herbicides which depend upon contact activity, may not provide adequate control of dense stands of large volunteer corn. Controlling volunteer corn prior to wheat establishment is important because it can harbor several insect pests which could directly injure or vector serious disease problems to wheat, as well as provide intense competition until a hard freeze occurs.

Figure 4. Tillage may be the most practical option to control volunteer Roundup Ready corn prior to planting wheat this fall.

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Wheat
by Dr. Erick Larson

Don't Plant Wheat Early – Planting date might appear to be a relatively trivial factor in the grand scheme of wheat production (particularly since wheat is often grown for forage), but is absolutely critical to high grain yield. For example, a summary of management practices from a recent Kentucky Wheat Production Contest (where the winners all exceeded 100 bushels per acre) showed only one entrant planted their field prior to the recommended optimal time. Planting too early unnecessarily exposes wheat to potential development, fertility, weed and numerous pest problems which ultimately reduce yield potential. The fact that southern winters are mild often aggravate this situation, because the onset of dormancy may vary considerably from year to year and temperatures may be warm enough to encourage substantial growth during the winter. Thus, growers accustomed to gaining developmental advantages from planting summer crops early, such as corn and soybeans, may run into severe problems by using the same strategy with winter wheat. The adverse effects from excessive fall growth potentially include winter and/or spring freeze damage, development of Barley yellow dwarf virus, Hessian fly and armyworm infestation, disease problems, more weed competition, poor nutrient use, and increased lodging. In fact, growers in north Mississippi this year reported yield reduction up to 90% from freeze injury to a specific variety, depending upon planting date.

Optimum Planting Dates - The suggested wheat planting dates (within 10 to 14 days of the average first frost date in the fall) should provide warm enough temperatures and long enough days for seedling emergence and tillering to begin before dormancy occurs. This normally corresponds to:

North and Central Mississippi: October 15 - November 10

Delta Region: October 20 - November 15

South Mississippi: November 1 - November 25

Coastal Region: November 15 - December 10

Suggested Seeding Rates – Wheat growers should strive to establish 1.0 to 1.3 million plants/acre or 23 to 30 plants/ft.^{2}. Wheat seed size can range from 11,000 to 18,000 seeds per pound, so a grower should base seeding rate on the number of seeds (seeds per pound), rather than on the volume or weight of the seeds (bushels per acre) – particularly since seed price is high. Suggested seeding rates vary considerably for different planting methods. Planting with a grain drill should produce good emergence (80 to 90 percent of planted seed) under normal conditions. Thus, plant about 1.1 million to 1.6 million seeds per acre (about 75 to 125 pounds of seed per acre) with a grain drill. This seeding rate corresponds to 18 seeds/ft. for 7-inch drill spacing, or 26 seeds/ft. for 10-inch drill spacing. Growers broadcasting and incorporating seed should use higher seeding rates (40-45 seeds/ft.^{2}), because emergence success will likely be modest (60-70% of planted seed). Growers broadcasting small grain seed on the soil surface should generally utilize very high seeding rates (50-60 seeds/ft^2), because emergence and seedling survival can be relatively low (around 50% of planted seed). For more information, please refer to Publication 2401 "Planting Methods and Seeding Rates for Small Grain Crops." http://msucares.com/pubs/publications/p2401.pdf

High Yield Seeding Rates? – Many wonder whether wheat yield can be improved by drilling more seed than standard. However, wheat grain yield is relatively unresponsive to seeding rate, unless planting dates vary considerably later than normal. In fact, an Arkansas study showed no significant yield difference for seeding rates from 60 to 180 pounds per acre. Thus, utilizing a drill and conservative seeding rates, may substantially improve enhance your bottom line. Healthy wheat has tremendous tillering ability to compensate for variable stands and the south's warm winter climate typically allows wheat to fulfill this potential. Higher than normal seeding rates may also promote lodging and disease infection.

Wide Drill Row Spacing – Many are considering planting wheat with a wide-spaced drill (10-15 inch) more appropriately designed to plant soybeans or other crops. Research data generally indicates only slight yield difference between 10-inch drill spacing and narrower widths. However, expect about 5-15% yield reduction with 15-inch spacing compared to normal widths (8-inch or less). This yield loss cannot be overcome by increasing seeding rate. In fact, seeding rates (per acre) can be reduced somewhat in 15-inch rows with little yield loss, because the seeding rate per linear foot will be comparable. When planting wheat in 15-inch rows, I would suggest relatively medium to tall varieties that develop lush canopies and tiller well.

No-Till Planting - Growers can successfully establish and produce small grains in no-till systems, but need to closely manage factors capable of limiting planting performance and stand establishment, particularly plant residue. The presence of heavy plant residue in no-till systems, may restrict drill penetration, seed placement, and furrow closure. Thus, you should closely check drill performance in the field, reduce drill ground speed, and increase seeding rate by 10-15%, compared to drill rates in conventionally prepared seedbeds, to compensate for difficult planting conditions. Drill performance in standing stalks may be improved by drilling at an angle slightly different from the direction of the existing crop row. This redistributes the residue concentration zone continuously along the drill's frame, minimizing residue accumulation. In most cases, applying a burndown herbicide prior to planting will improve seeding establishment and by killing emerged winter weeds.

Nutrient and Soil Management
by Dr. Larry Oldham

Ending one crop means starting another one. As harvest ends, If your soil CEC (Cation Exchange Capacity) is greater than 8, consider fall application of phosphorus and/or potassium fertilizers, IF recommended by a reputable soil testing laboratory BASED on a recent soil test. ALWAYS follow Best Management Practices (BMP's) in fertilizer application. They ensure more effective fertilizer use, and minimize environmental impacts.

The first BMP, and probably the most important is to base fertilizer applications on recent soil tests. Soil testing does offer fertilizer recommendations, but the most important thing it may offer is the circumstance that fertilization with P and K may not be necessary if your nutrient index is medium or higher.

Other BMP's are listed below. Some concern nitrogen, however since Mississippi is rather warm and humid, we do not recommend fall application of N for next season row crops. This has been reconfirmed in some recent work by USDA ARS researchers in Mississippi. These are retained from my original list because there will be a lot of attention to wheat and corn fertility programs in the next few months.

- **When application rates are correlated with yield goals, make sure you are realistic concerning your soils and management.** Use average crop yields from the past 3 to 5 years, then add 10% for a realistic projection of the production potential on your soils, using your production management, in your climate area.

- **Use the most suitable nitrogen fertilizer source, depending upon the crop, application method, and climatic conditions.** Some fertilizers work better in certain situations due to climate and soil conditions. Remember that not all 33-0-0 is ammonium nitrate anymore. Ammonium sulfate and urea blends offer certain concerns in some situations.

- **Price fertilizers on the cost per pound of nutrient.** This is the best way to compare cost of nitrogen among equivalent sources.

- **Use proper application techniques.** Use the correct technique for the particular situation.

- **Maintain and calibrate application equipment.** Improperly maintained and poorly set equipment 'steal' crop input dollars. Make sure owned equipment is properly working and calibrated. Confirm with custom applicators that their equipment is calibrated.

- **Avoid application to surface waters.** Absolutely avoid direct application to any surface streams.

- **Time application properly for the crop.** Nitrogen use efficiency is best when applied close to the time of crop uptake.

- **Control soil erosion.** Nutrients move when soil particles move. Using soil conservation keeps soil and nutrients where they can be utilized by growing crops. If you have a conservation plan, follow the nutrient management component of it.

- **Properly control water flow.** Nitrogen movement in the landscape is closely linked to water movement. Slow water down when appropriate by conservation practices, or speed water movement when appropriate.

- **Use cover crops, and maintain crop residue on the soil surface.** Cover crops reduce the likelihood of N movement in the landscape by 'scavenging' N left in the soil profile after the previous crop. Using the residual N increases cover crop dry matter production, thus enhancing soil quality attributes such as soil organic matter levels and tilth.

Again, we do not recommend fall application of N fertilizers in Mississippi. However, this may be problematic if the only P containing fertilizers available are mono-ammonium phosphate (MAP, 11-52-0) or di-ammonium phosphate (18-46-0). The nitrogen in both materials is positively charged ammonium, and hopefully it exchanges with another cation when these materials or forms mixed ammonium/calcium or magnesium phosphates which precipitate.

MAP and DAP are interesting in that MAP forms an acidic zone around the granules as they dissolve, but DAP forms an alkaline zone. These zones dissipate and are apparently not a factor within 3 to 4 weeks after field application. At the agronomic level, both are excellent sources of P with very, very little yield differences found in the literature.

REMINDER

Cotton Short Course; December 11-12

Delta Ag Expo; January 15-16

Crop College; February 12-13-14

Cotton
by Dr. Darrin Dodds

Cotton harvest is progressing rapidly and early yield reports are very promising. Approximately 60% of the crop has been harvested to date compared to 74% at this time last year and a 5-year average of 50%. 68% of the crop is rated as good to excellent at of October 7. One major concern heading into the fall is soil moisture. Only 39% of our soils are rated as having adequate to surplus soil moisture. Hopefully fall and spring rains will erase the soil moisture deficit that we continue to struggle with and get next year started on the right foot.

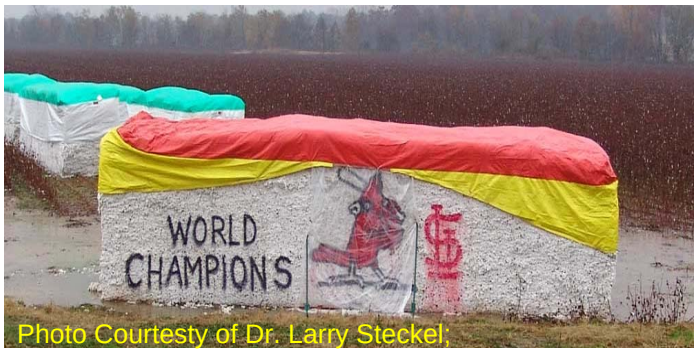

Photo Courtesty of Dr. Larry Steckel;

As harvest progresses it is important to keep module placement and storage in mind. Modules should be placed in areas where that are well drained such as turnrows or field roads. These areas should be smooth and firm and be free of debris such as gravel, stalks, long grass, etc. Modules should be placed in areas where they are easily accessible by module trucks. Areas that are difficult to access in wet weather or have overhead power lines nearby should be avoided.

Seed cotton stored in modules should have a moisture content of 12% or less. Moisture content above 12% can lead to increased heat production within the module; this can lead to problems such as module fires and reduced grades. A rapid, continuous rise in temperature of 15° to 20° F during the first five to seven days of storage indicates a high moisture problem. If internal module heat reaches 110°F, modules should be ginned immediately to avoid the possibility of significant losses. Seed cotton harvested at the correct moisture and stored in modules should not increase in temperature more than 10° to 20° F. As time progresses, normal increases in temperature should level off and temperature should begin to decline. Always inspect tarps before use. Whipping action from wind can cause fabric to wear and no longer be waterproof. Tarps should also be inspected for rips, holes, etc. and be repaired or disposed of as needed. If I can be of service to anyone, don't hesitate to contact me at 662-418-1024.

The 2007 Cotton Short will be held at the Bost Extension Center on the campus of Mississippi State University on December 11-12, 2007. Pre-registration fees are $80 (until November 30, 2007) and $100 thereafter. Pre-registration for the 2007 Cotton Short course is now available on-line at:

http://msucares.com/crops/cotton/short-course07/

Forages
by Dr. Rocky Lemus

Although winter forages are produced in Mississippi, hay is still the primary source for livestock feeding during the winter. A better understanding of hay losses and quality changes associated with hay storage conditions is critical to reduce feeding costs. Maintaining hay quality after harvest depends on proper storage. Total loss for high quality hay stored outside on the ground could range from 25% to 30%. This dry matter loss from poorly stored hay also translates to dollar values related to the amount of nutrients that have to be supplemented as protein or energy products.

Table 1. Effect of storage method on percent dry matter (DM) loss from large round hay bales.

	Storage Period (months)	
Storage Method	**0 – 9**	**12 – 18**
	——— % DM loss ———	
Ground		
Covered	5 – 10	10 – 15
Exposed	5 – 20	15 – 20
Elevated (pellets/tires)		
Covered	2 – 4	5 – 10
Exposed	3 – 15	12 – 35
Enclosed barn	>2	2 – 5
Under roof (open building)	2 – 5	3 – 10

Source: Huhnke, 2003.

Where to Storage hay?

Most producers in the state are moving in the direction of utilizing round bales instead square bales and they might have limited space for indoor hay storage. It is important to select a well-drained area in the farm where round bales could be stored. Placing round bales in pallets, tires, or gravel minimize dry matter losses (Table 1). Some studies have shown that these techniques reduce storage losses by 15 percent.

These are the not the most recommended methods, but most frequently used by producers with limited storage. These methods are only recommended if the storage period is less than 90 days and daily temperatures are less than 95 °F. In this case, utilizing a tarp is recommended to reduce weathering effects. This reduces dry matter and hay quality losses. Other methods include enclosed barns and roofed-open buildings where the cost of the structure can increase considerably the amount of money invested in hay storage.

Table 2. Percent of dry matter (DM) loss in the outer layer of round hay bales with different diameters.

	Bale Size (ft)[1]				
Outer layer depth (inches)	**4 x 4**	**5 x 4**	**6 x 5**	**7 x 6**	**8 x 6**
	————————% DM Loss -————				
2	16	13	11	9	8
4	31	25	21	18	16
6	44	36	31	27	23
8	56	46	40	34	31

[1]Bale size = diameter x width.

Source: Huhnke, 2003

When storing bales outside, it is important to place bale rows in the same direction and the prevailing winds, leaving at least 3 ft between bale rows to increase air circulation. Leave at least 2 ft between bales if they are stored side by side. When bales are stored outside, it important to maximize solar exposure to reduce moisture levels; therefore avoid shaded areas close to trees or buildings. Hay stored outside and unprotected often display high weathering and decrease in quality. This weathering process also decreases digestibility and increases fiber content. Storing these bales over longer period of time has shown that up 8 inches of the outer layer could be lost due to weathering (Table 2).

Forages continued...
by Dr. Rocky Lemus

Some producers might think that this is a small percentage lost, but when it translates to economics, significant amount of money can be lost, especially in years where the drought has a large effect in available forage and hay prices (Table 3 and 4). In 6x6 round bale, a six-inch weathered layer could have a 36 to 38% decrease in digestibility and less available nitrogen (crude protein).

Table 3. Estimated cost of hay after storage lo losses for different round bale sizes.

Average Depth of Weathered Layer (inches)	Bale Size (ft)[1]		
	4 x4	5 x 4	6 x 6
	——— $/ton ———		
2	59.50[2]	57.47	56.18
4	72.49	66.67	63.29
6	89.29	78.13	72.46
8	113.64	92.59	83.33

[1]Bale size = diameter x width.

[2]Assumes a production cost of $50/ton

Source: Collins, 1997.

Table 4. Economics of hay lost in storage.

Hay Price	Storage loss (%)[1]							
($/ton)	5	10	15	20	25	30	25	40
	———- Economic loss ($/Ton hay) ———-							
40	2	4	6	8	10	12	14	16
60	3	6	9	12	15	18	21	24
80	4	8	12	16	20	24	28	32
100	5	10	15	20	25	30	35	40
120	6	12	18	24	30	36	42	48

[1]Loss percentage does not include losses associated with shrinkage or reduced forage quality.

Source: Huhnke, 2003.

For example, consider a 5x4 bale of bermudagrass weighing 1000 lb and stored outside, in the ground, and uncovered. There are 50 bales in the lot. The 4-inch outside layer has been degraded and represents a 30% dry matter loss. This means a 300-lb loss per each 1000-lb bale. Bermudagrass originally contained 10% protein and 58% TDN. Forage quality loss amount to 30 lbs of protein and 174 lb of TDN. If you need to replace TDN with corn at a cost of $6.00 per cwt, the replacement cost is $10.44 per bale of TDN. Replacing protein loses using is soybean at $12.00 cwt will be $3.60 per bale. Due to this losses, additional hay have to be bought to replace losses from storage and feeding. All of these translates to losses of $5 to $8 per bale ($250 to $400 per lot) when hay is properly stored.

Dry matter (DM) loss of dry hay bales is a function of hay moisture, temperature, and how long the hay is exposed to those conditions. To maintain harvest quality as much as possible, it is important that the hay be stored immediately and properly. Investments in storage facilities need a long-term plan to obtain beneficial returns from the infrastructure cost. Low capital storage systems such tarps and elevating the bales to minimize ground contact could be used for a short-term period by producers to offset costs and losses. To reduce loss in hay dry matter and hay quality ensure that: (1) hay is properly cured (<15% moisture), (2) protect the bales from rain and other elements, (3) ensure proper ventilation and air circulation, (4) maintain hay elevated and away from ground level, and (5) check your hay for mold and increasing heat.

Rice

by Dr. Nathan Buehring

Producers around the state are winding down and wrapping up this years rice crop. Yield reports have been average to above average with the possibility of another record rice yield for Mississippi. Rice yields have slightly declined as the planting date moved later in the season, which is commonly what we see every year. Most of the earlier planted rice (April 15th or earlier) was past the pollination period at the first of August when the excessively high temperatures set in. As a result, not much kernel blanking was observed on the earlier planted rice. Milling rice yields have been average so far.

As a whole, this was an excellent year for growing rice. Earlier in the year, conditions were optimal for achieving good rice stand densities and controlling weeds. This ultimately set the crop up for a good year. As we moved through the growing season we, for the most part, avoided rain showers and hot temperatures during heading. All of these factors have contributed to the good yields.

Now that we have gotten most of the crop out of the field, we still need monitor grain bins and storage facilities. Make sure fans and stir-all augers are working properly when drying your rice. Monitor the moisture content on a regular basis to insure that it is drying down at the proper rate. Do not over dry your rice or use an excessive amount of heat (> 90 F). Make sure all bin doors or caps are properly secured so that no rain or water can enter the bin. Moisture inside a bin can cause stain, which will greatly affect the quality and value of your rice crop. Just because you have it in the bin, does not mean that rice season is over with. Monitor the bins to achieve the best quality crop as possible.

With this year winding down, producers still need to think about finishing this year up on a good note in preparation for next year. With rain off and on during the harvest season, conditions this fall have been up and down for land preparation. However, if time allows, producers need to get as much land preparation done as possible.

A stale-seedbed approach has worked and will continue to work for many producers, especially on the heavier soils. To achieve maximum yields in rice, a crop rotation with soybeans will be necessary. Roundup Ready soybeans have not cleaned up the red rice infested fields as we have seen this year with the low availability of Clearfield varieties and hybrids. With these reduced tillage systems, there are only one or two flushes of red rice emerging. Therefore, we are not depleting the seedbank of red rice seed. Our recommendations is still one year of Clearfield rice followed by two years of soybeans.

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

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