April 2008

Mississippi State University Extension Service

Agronomy Notes

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Corn

by: Dr. Erick Larson

Bird Repellent Exemption - The Mississippi Department of Agriculture has declared a crisis exemption allowing the use of anthraquinone (Avitec™) for the purpose of repelling blackbirds in newly planted corn in the state of Mississippi. Avitec's active ingredient is a natural, non-lethal compound proven to repel birds. Avitec is available for use on corn seed as either a liquid or dry formulation. The liquid formulation has demonstrated very reliable performance on large avian species, such as cranes, and is the preferred formulation for high bird pressure fields, but does require commercial seed treating prior to planting. The dry formulation offers growers the convenience and speediness of hopper-box treatment, but its effectiveness is dependent upon thorough seed coverage and gentle handling. For example, performance of the dry material may not be as good as the liquid form when used in planters with air or vacuum seed metering systems, because the air circulation may remove some of the product from seeds before planting. The use of supplemental dry lubricant on the corn seed may also reduce Avitec seed coverage and/or adherence of the dry formulation, and subsequent repellency.

Figure 1. Mississippi growers now have a product available to reduce blackbird depredation in freshly planted corn fields.

Late planting suggestions – Hopefully, we will get some dry weather to allow corn planting to proceed, but here are some suggestions regarding late corn plantings. Optimum planting dates extend to April 20 to 25 in north Mississippi, depending upon latitude. Yield reduction from later plantings will likely vary considerably, with more yield loss expected from droughty conditions, especially for dryland fields. Research generally indicates planting beyond the last optimum date will reduce yield potential about one percent per day, or slightly less with full irrigation. I strongly recommend selecting well adapted, heat tolerant hybrids for late plantings. These hybrids tend to be mid to late maturity hybrids, rather than early maturity hybrids. Early-maturity hybrids normally perform poorly when planted late, compared to late-maturity hybrids, because they are generally bred for areas further north. Seeding rates can also be reduced 2000-4000 seeds/a at later planting dates, since warm temperatures enhance seedling establishment and produce taller, leafier plants, but are more likely to expose the crop to late-season drought stress, decreasing grain yield potential.

Nitrogen rate recommendations – MSU Extension Service recommends using 1.3 pounds of actual nitrogen for each bushel of corn yield goal. For example, the nitrogen recommendation for a goal of 160 bushels per acre is: (1.3 lb N × 160 bu/A) = 208 lb N/a. However, research shows you can use 10 to 15 percent less nitrogen than the normal, if you are growing corn on lighter, sandier soil. Nitrogen recommendations for corn in the south are based totally on corn yield goal because our warm, wet winters keep nitrogen from carrying over from year to year. This is different from the Midwest, where consistently cold, dry conditions effectively stop nitrogen loss during the winter.

Corn continued...

by Dr. Erick Larson

Nitrogen sources and application - Using the right nitrogen source and application method may be more important to corn grain yield than how much you apply. No-tillage research studies in Missouri and Tennessee show UAN-solution (N-sol) and urea broadcast on the soil surface reduced corn yield potential 9 to 23 percent compared to ammonium nitrate broadcast, N-sol injected, or anhydrous ammonia injected. Urea-containing nitrogen sources, including UAN-solution (N-sol, 32%, or 28-0-0-5) and urea (46-0-0 or 41-0-0-5), may not work as well because they are subject to volatilization loss when applied to the soil surface (either broadcast or dribbled in a band). Surface-applied urea sources readily volatilize when there's a lot of vegetation or crop residue on the ground, when temperatures are higher than 55 ˚F, and when rates exceed 100 pounds of N per acre, until rainfall incorporates the nitrogen. You're likely to lose a lot of nitrogen to volatility if you broadcast urea nitrogen sources just before a long dry period. You can reduce volatility by adding urease inhibitors, such as Agrotain, to granular urea or UAN-solution. Urease inhibitors temporarily slow the activity of the urease enzyme. But you'll still need timely rainfall or overhead irrigation to get urea-based N into the soil so the plants can use it. Thus, you should usually avoid surface application of UAN-solution (N-sol) or urea in your corn fertility program.

Nitrogen application timing – Because Mississippi springs are often very wet, we suggest you apply nitrogen fertilizer at different times according to crop need. This split application method reduces the likelihood of considerable nitrogen loss due to wet weather before crop use. Corn uses less than 10 percent of its nitrogen before rapid vegetative growth begins. This growth spurt usually happens in late April through mid-May, depending on planting date and seasonal temperatures. Therefore, you can use nitrogen more efficiently if you apply only a small portion of nitrogen just after plants emerge. Add the bulk of your nitrogen fertilizer just before the growth spurt, when the plants need it most. Our standard nitrogen recommendation is to apply no more than one-third of the total nitrogen near planting/crop emergence. Apply the second application about 30 days later, when the corn should be about 12 inches tall or at the V6 growth stage. Early fertilization can waste a lot of nitrogen, especially if there's a long period of wet weather before rapid corn growth begins. Considering the high fertilizer prices, coupled with relatively wet conditions thus far this spring, applying nitrogen fertilizer using sound management strategies, rather than ease of application, may produce tremendous economic returns this harvest.

Nitrogen placement – Close nitrogen placement in relationship to the crop row is certainly not necessary, or even preferred for corn production. This is largely because nitrogen is relatively mobile in the soil-water solution, compared to some nutrients. Corn also has a fibrous root system, which develops substantially more lateral growth than tap-rooted crops, such as cotton. In fact, corn roots will likely extend to the row middles before plants are knee-high. Furthermore, more than 90% of nitrogen uptake will occur after corn is more than knee-high. For these reasons, I suggest placing sidedress knives in the row middles or near the extreme edge of beds to avoid substantial root pruning. This suggestion applies to all normal (single) row widths and twin-row patterns (based upon wide rows). The outside knife on each side of the applicator should be modified to apply one-half of the intended nitrogen rate, since it will run between the same rows twice.

Figure 2. Close nitrogen placement is not needed, and may cause unnecessary corn root pruning.

Why is my corn not growing off? – Poor early plant health and slow growth is often due to sparse root development and/or nutritional limitations. Poor root growth often results from planting marginally wet fields. Seed furrow compaction prohibits root penetration, causing rootless corn syndrome and poor nutrient uptake. Many initially believe early growth problems result from inadequate nitrogen availability, but this is rarely the case. Nitrogen is very mobile in the soil and corn requires relatively little nitrogen until rapid growth begins, so nitrogen fertilizer placement and amount rarely limit early season corn growth. However, soil pH, phosphorus, potassium, magnesium and zinc commonly limit early season corn growth in MS. Field scouting will frequently reveal symptoms indicating a specific problem. However, the best method to diagnose fertility limitations is to collect soil and plant tissue samples from stunted and adjacent healthy field areas and submit these samples to a soil testing laboratory, such as the MSU Soil Testing Laboratory for analysis and recommendations.

Corn and Grain Sorghum continued...

by Dr. Erick Larson

Roundup Ready Corn Weed Control – Supplementing your RR corn weed control system with atrazine and/or other herbicides, which offer residual activity, is strongly suggested, particularly if you intend to use a one-pass herbicide program. These residual herbicides should generally be applied with the first application of glyphosate, since glyphosate should control most emerged weeds. This method should improve seasonal weed control, since the residual herbicide activity should be extended later into the growing season. The use of supplemental herbicides can also be very beneficial in reducing the development of glyphosate herbicide resistance weeds. Atrazine greatly enhances the effectiveness of the Roundup Ready system by providing economical residual weed control of some key weeds, such as morningglories and horseweed, that glyphosate may have difficulty controlling. Atrazine and most pre-mixes containing atrazine must be applied before corn exceeds 12". This application timing is suggested regardless of the atrazine restriction, because weeds should be emerged and potentially very competitive during this time. Fortunately, there is a relatively wide window for this application, because it normally takes about 30 days for corn to grow a foot tall after emergence. However, timing problems quickly develop thereafter, because corn growth accelerates quickly after this stage. This problem may be compounded tremendously by a single rain, because corn normally grows from 12" to exceeding 30" or V8 growth stage (the maximum legal height to broadcast glyphosate on Roundup Ready corn) in about 10 to 14 days in Mississippi. <u>All over the top glyphosate applications must be completed by the V8 growth stage or 30" tall corn.</u> Ground applicators equipped with drop-nozzles to avoid leaf contact may extend application to 48-inch corn and should improve herbicide coverage when corn gets tall, so they are a good choice for any late-postemergence timing, particularly when targeting morningglories.

Figure 3. Residual herbicides are suggested to help improve weed control in Roundup Ready Corn.

Don't plant sorghum too early - Grain sorghum will not germinate at soil temperatures less than 65 deg F. The soil temperature should be measured early in the morning, when you can measure the minimal daily temp. – not in the middle of the afternoon. Thus, planting before this threshold will greatly increase chance of stand failure. Also, sorghum does not have as much seed vigor as corn. Thus, the optimum planting dates for sorghum are similar to those for cotton: April 20 to May 15. Optimum sorghum seeding depth is 1 ¼ - 1½".

Figure 4. Grain sorghum is a very drought tolerant option for Mississippi growers.

Don't plant too much sorghum seed - A broad final plant population ranging from 40,000 to 70,000 plants per acre should produce optimum grain sorghum grain yields grown in dryland culture. Sorghum has tremendous ability to increase yield potential, if given favorable environmental conditions, especially if plants are spaced uniform. However, excessive stands allow plants little or no latitude to adapt to the environment or tolerate stress, which is the primary strength of this crop. Thus, dense stands often compound drought stress, reduce stalk/plant health and increase disease likelihood. Sorghum seeding rate should exceed the population goal by 10 to 20% depending upon seedbed conditions and planting date. This over-planting rate is relatively high because sorghum's seedling vigor is only moderate, compared to corn.

Cotton
by: Dr. Darrin Dodds

Planting Intentions Report: The USDA National Agriculture Statistics Service released planting intentions on March 31st. The USDA estimates that Mississippi Cotton growers will plant 420,000 acres this year. This is a 37% reduction in cotton acres from last year and a 66% reduction from 2006. However, early estimates (not from USDA) are that we will gain back approximately 200,000 acres next year.

Planting Forecast: On a brighter note, April is here again and planters are beginning to roll across the fields. Corn and soybeans are being planted when the weather will permit; however, based on the current weather conditions as well as the forecast through April 14, cotton planting should not start just yet. A good rule of thumb regarding when to plant cotton is waiting until the soil temperature is 65°F at a four-inch depth and a warming trend is predicted for the five- to seven-days following planting. Cotton typically requires 4- to 14-days to emerge after planting and cooler temperatures will push emergence to the far end of this range. Plant when conditions favor emergence, not when the calendar says to. Another guide commonly used to determine when to plant is DD60 accumulation for the five days following planting. The formula below is used to calculate DD60s:

$$\left(\frac{\text{Daily Maximum Temp. (°F)} + \text{Daily Minimum Temp. (°F)}}{2}\right) - 60$$

For Example: The predicted high/low in Greenwood, Mississippi on Tuesday, April 8th is 80°F and 55°F. To determine the number of DD60s accumulated on Tuesday, April 8th:

$$80+55 = 135$$

$$135/2 = 67.5$$

$$67.5 – 60 = 7.5 \text{ DD60s}$$

Table 1 can be used to determine when to plant cotton based on DD60 accumulation for the five days following your target planting date:

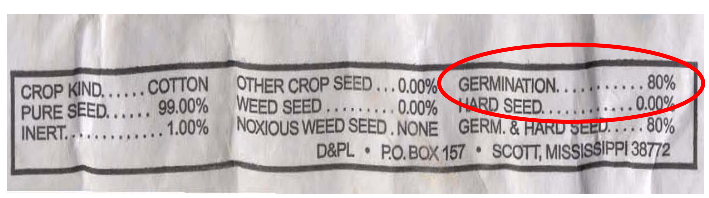
Table 1. DD60 accumulation for five days following

Predicted DD60 Accumulation for Next 5 Days	Outlook for Planting
< 10	Very Poor
11 – 15	Poor
16 – 25	Marginal
25 – 50	Good
50+	Very Good

However, keep in mind that soil temperatures are not taken into account with the DD60 calculation system. When considering planting decisions, take into account soil temperature, air temperature, and the extended forecast. Keep in mind that soils warm slower than air. Generally, if temperatures drop to 50°F to 55°F, chilling injury to germinating seedlings may become an issue. The symptoms of chilling injury are caused by improper cell membrane formation. When a functional membrane is not formed, stored cellular materials

necessary for proper plant growth may be lost. Additionally, these cellular materials may be used by disease organisms for growth and development which can further injure seedling cotton. Chilling injury can result in a damaged root system or even seedling death in severe situations

Plant Population: Generally speaking, we should strive to establish a plant population between 30,000 and 60,000 plants per acre. As always, take into account percent germination of the seed you are planting when targeting a specific plant population. Percent germination for a given bag of seed should be listed on the bag.



For example, if you have a desired plant population of 45,000 plants per acre and the germination rate of the seed you are planting is 80%, you would need to plant 56,250 seeds per acre to achieve your desired plant population.

Cotton continued...
by: Dr. Darrin Dodds

In most fields, a uniform population of 20,000 – 25,000 plants per acre can produce adequate yields; however, initial seeding rates to obtain a plant population of this magnitude are strongly discouraged. There are an untold number of factors that can reduce plant populations, planting for a stand of 20,000 – 25,000 plants per acre leaves no room for any plant loss due to seedling disease, insects, environmental conditions, etc. Additionally, plant populations can affect plant height, branch development, fruit location and size, crop maturity and yield. Any given year, reduced plant populations can delay the time required for cotton to reach peak bloom up to 2 weeks (Table 2). Additionally, reduced plant populations tend to result in more bolls partitioned to second, third, and vegetative positions (Table 2). Generally, bolls located at these positions are smaller than those located in position one. It is much easier to start of the year with a desirable plant population and potentially lose a few plants but still maintain adequate yields, than to start the year with a low plant population and face a difficult replant decision if plants are lost.

Table 2. Effect of plant population on days to peak bloom and boll distribution.

Population	Peak Bloom -Days After Planting -		Number of Bolls Per Plant		
	2003	2004	Total	1st Pos.	2nd, 3rd, & Veg. Pos.
61,896	74	76	10.7	6.7	4.9
30,958	77	84	14.2	7.3	7.4
20,631	78	90	19.1	8.6	10.5
13,755	79	91	24.1	9.9	14.6

Data From Dr. Alexander Stewart; LSU AgCenter; Alexandria, LA.

Forages
by: Dr. Rocky Lemus

Pasture establishment is vital to ensure high levels of production and longevity from perennial pastures. Before establishing a new seed bed or renovating existing pastures, producers must evaluate the farm's needs. It is important to consider how the new forage will be used (grazing vs. hay), what species might be more adapted to the area, and what resources (equipment, money, and time) are available. Reseeding or renovating a pasture should be based on existing percentages of the desirable species in the stand. The following criteria could be used in such a decision:

If the pasture contains 75% or more of the desirable species, then do not renovate and concentrate in management.

If the pasture contains 40 to 75% of the desirable species, then over-seed and manage.

If the pasture contains less than 40% of the desirable species, then start with a new seed bed.

New pasture establishment or renovating an existing pasture usually requires some management practices to get the forage growing quickly and vigorously. Some of the steps involved in establishing or renovating a pasture include: (a) implementing the correct seeding method and rate, (b) selecting species adapted to a specific area, (c) implementing a weed control program, and (e) using proper management to maintain a productive stand.

Seedbed Preparation—A properly prepared seedbed is the next step in getting your pasture established. Forage seedlings need a firm seedbed. Large soil clods and excess sod will impact seed germination. For conventional seeding, prepare a fine and firm seedbed by plowing or heavy disking followed by rolling the field with a cultipacker after the final disking to provide a firm seedbed. Preparing a firm seedbed will allow capillary action to draw water to the soil surface where moisture is needed for seeds to germinate, and will also help sustain small seedlings during dry periods. A firm seedbed will not allow excessively deep seed placement which usually results in poor seed emergence and weak stands. A general rule is that if you walk across the seedbed and it sinks past the sole of your shoe, the seedbed is too soft and should be cultipacked. No-till seedbeds must also be prepared by suppressing the existing sod and reducing surface residue prior to seeding by hard grazing in late fall and early spring. Vegetation can also be suppressed by using a low rate of nonselective herbicide. For more information regarding herbicides for sod suppression, see the Guidelines for Weed Control (**MSU Publication 1532**).

The type of seeding method you choose will depend on the type of equipment available and whether you are preparing a no-till or a conventional seedbed. No-tillage involves using herbicides to kill existing vegetation and then seeding directly into the residue. The advantages of no-tillage are the reduction of passes over the field, reduced soil erosion potential, and better moisture conservation. The disadvantages of no-till are slower and less uniform seedling emergence. Conventional tillage should be used when a firm and a uniform seedbed is needed. Conventional seedbeds usually provide uniform and rapid seedling emergence in pastures with adequate moisture. These exposed seedbeds also warm quicker, allowing for better seed germination at cooler temperatures. Some disadvantages with conventional tillage include soil erosion potential, changes in soil structure due to tillage, and higher oxidation of organic matter (less moisture retention).

To ensure good soil to seed contact and that seed will germinate and emerge in a timely manner, different seeding methods are available. Some of these methods include drilling, cultipacking, and broadcasting. Drilling cuts a thin furrow in the soil, deposits the seed, then covers it and firms the soil with press wheels. A good rule is to plant the seed three to four times as deep as the diameter of the seed. When cultipacking, the seed is dropped from a hopper onto the soil where toothed rollers press the seed below the surface. When using a cultipacker, be careful not to bury the seed too deep, decreasing germination. Broadcasting could be used in small areas, but seeds are not usually spread uniformly. Most broadcasting can be done using a fertilizer spreader, but make sure spreader is calibrated for the necessary seeding rate. When broadcasting, recommended seeding rates should be increased by 20%, and the stand should be rolled with a cultipacker to establish a good soil/seed contact.

Seeding on the correct date is also very important. Cool-season grasses are usually established in early spring or late summer. Warm-season grasses should be planted in late spring or early summer after the soil has reached a temperature of 65°F or above. Usually spring seeding has plenty of moisture for seed germination, but there is an increase in weed pressure. Early spring seeding should be made at least four weeks after the last frost killing. Late summer seeding is recommended for wet areas, since the soil is usually dry enough during the summer with less weed pressure. Late-summer seeding should be made at least four to six weeks before the first killing frost in the fall; this will allow seed time to have adequate growth before the winter. No till-drill planting in late summer might provide adequate moisture for seed germination since organic matter provides cooler temperatures and higher moisture levels.

Proper seeding rates depend on the seeding method being used (**MSU Publication 1532**). It is also important to make sure that the seed used is good quality (germination rate and purity) and has not been stored for a long period of time. If the seed is poor quality, the seed must be applied at higher rates to obtain the desired stand densities. The use of certified seed with good quality is recommended. Buying lower cost seed does not always translate into savings, since the quality will affect the amount of pure live seed needed to achieve the desired seeding rate (**Table 1** - page 7).

Forages continued...
by: Dr. Rocky Lemus

If legumes are seeded, make sure the seed is inoculated with the proper bacterial strain. In many cases, legume seed has been pre-inoculated. If the seed is not pre-inoculated, mix prepackaged inoculum with the seed just prior to seeding (**Visit MSUCares Forage website for inoculation methods**). Make sure that the inoculants have been store properly. Legumes form a symbiotic relationship with Rhizobium bacteria, in which nitrogen from the air is fixed into a plant-available form. There is no need for nitrogen fertilizer when legumes make up more than 30 percent of the stand on a dry matter basis. Seeding rates for commonly used forages are shown in Table 1. It is vital to have proper seeding depth and seed coverage. When drilling, make sure to plant no deeper than ¼ to ½ inch. A deeper seeding depth may sometimes be needed during dry periods for the seedling roots to be in moist soil.

Species Selection—Selecting the right seed mixture is extremely important. When seeding an area or renovating a pasture, it is important to match forage species to site, soil type, and type of operation (grazing or hay, dairy or beef cattle, or horses). Know your soil types, soil composition, drainage, and forage capability. This information can be used to predict the success or failure of the new seeding base. Soil survey maps will provide this information. It is also important to select a forage species that will tolerate close and frequent grazing.

Seasonal yield distribution is another factor to consider when making species selections so that forage production will match animal daily requirements. Cool-season perennial species (tall fescue) grow best between 60 and 80 ºF, and they generally have their highest production in the spring, followed by a summer slump and another growth period in the fall. Cool-season annuals (ryegrass and annual clovers) grow some in the fall, followed by a period of dormancy or minimal growth in the winter and highest production in the spring. Warm-season annual (sundangrass, millet, and sorghum) and perennial (bahaiagrass, dallisgrass, and bermudagrass) species grow best between 80 and 95 ºF (from mid-May) until a hard freeze in the fall with peak production in mid-summer. Legumes are also an important part of the establishment process because they can provide nitrogen to the grasses, as well as increase production during the summer months and increase forage quality. Make sure that the growth habit of the selected legume species is compatible with the grass species to decrease species competition.

Do not graze new stands too early or frequently. Newly established forage stands do not develop into a fully mature sod until the second growing season after establishment. Allow plants to become well established before heavy grazing or set stocking. It is recommended to mow or lightly graze when plants have reached 8 to 12 inches and plant should not be grazed below 4 inches. Maintaining grazing height will trigger new plants to tiller. Allow plants to re-grow to 18 to 20 inches before grazing or mowing again. A rotational grazing approach would be beneficial in establishing a good stand.

Establishment Cost—Pasture establishment is an expensive part of a forage program, and it is important to get forage species actively growing as quickly and vigorously as possible. Seed costs could average $40 to $55 per acre. Tillage to prepare a conventional seedbed can cost approximately $70 to $90 per acre depending on equipment. Herbicides will cost $30 to $50 per application based on time of application and method used. Hiring someone to plant the pasture will cost $20 to $30 per acre. Applied lime will cost $35 to $45 per acre. Total costs will typically run $110 to $210 per acre for establishment. Smaller pasture acreage (< 10 acres) can often double or triple those expenses on an acre base. Equipment rental is an option, but does require a higher level of knowledge and management (calibration) to help ensure the establishment is successful.

Table 1. Determining the effect of lower quality seed in planting rates and seed cost[1].

Price $/lb	Quality (purity x germination)	Pure live seed (%)	Planting rate (to give equivalent planting rate of live seeds) (lb/ac)	Cost of live seed ($/lb)
3.00	(80 x 40)/100	32	4	12.00
2.50	(70 x 20)/100	14	10	25.00
1.50	(60 x 10)/100	6	23	34.50

[1]Assume that the same forage species is used with different seed quality.

Nutrient and Soil Management
by: Dr. Larry Oldham

With increased fertilizer prices, there is more interest in applying fertilizers in bands or with the seed. The 2 by 2 placement used in some places has not been popular in Mississippi but other options have been used such as 3 to 4 inch bands over planted rows or in-furrow with seed. When considering placing fertilizer with seed, or very close, be aware of the down side. Research results with cotton have not been as consistent as with corn. Soybean seed should never be in direct contact with fertilizer.

Studies suggest no more than 1.5 gallons per acre of 10-34-0 or 11-37-0 be applied to cotton in-furrow. Higher rates have occasionally resulted in cotton seedling injury and reduced stands. Also in-furrow applications of more than 10-12 pounds of acre of nitrogen, or nitrogen plus potash could result in injury.

Urea or urea-containing sources (including UAN solutions) should not used in direct contact with any crop seed. Neither should nitrogen sources that form free ammonia, such as diammonium phosphate (DAP), ever be placed in direct contact with seed.

Why? Fertilizers are often salts which dissolve after application to soils. A salt is a compound of positively charged cations linked to negatively charged anions. In solution, they 'drift' apart from each other. Sodium chloride, table salt, is the positively charged sodium cation with the negatively chloride anion. The fertilizer, muriate of potash or 0-0-60, is the salt potassium chloride.

Seedling injury (fertilizer burn) can occur when the concentration of ions in the soil around a plant is greater than the concentration of ions within the plant cells. Water moves from the plant cells into the surrounding soil because of higher osmotic pressure created by the fertilizer salts. The plant tissue then blackens (the origin of the term 'fertilizer burn') and the plant eventually dies.

The risk from ammonia is in addition to salt issues. Ammonia (not ammonium) in soil is toxic, and can enter plant cells freely. Nitrogen fertilizers have differences: urea, UAN, ammonium thiosulfate, and DAP have more ammonia based problems than MAP, ammonium sulfate, and ammonium nitrate. Ammonia production can be accelerated in moderate alkaline soil conditions, either in bulk soil or by fertilizer reaction.

The susceptibility to salt injury depends on soil moisture and soil properties, and leads to year-to-year variability. In moist soils, fertilizer salts will diffuse away from the application band and become diluted. In dry soils, the fertilizer does not move so it remains concentrated and a greater risk to plant injury.

Most application rates applied in bands in the old 2 by 2 configuration, or on the surface will not pose fertilizer burn risks. As mentioned previously, "pop-up" or in-furrow applications should be limited to no more than 10 pounds of N, or N plus potash. However some recent research indicates that plants may be more susceptible to N applied than potash.

To review:

No pop-up with soybeans

Be very careful with cotton,

Be careful with corn (see March 2008 Agronomy Notes), and

Remember soil moisture conditions are very important.

Salt indices can be used to assess fertilizer application issues as shown in this Fluid Journal article

Rice
by: Dr. Nathan Buehring

The rice planting season began the last full week of March for some producers. Planting projections for the 2008 growing season would indicate that rice acres will be slightly up in Mississippi. In discussions with industry representatives from Arkansas and Missouri, they have indicated rice acres will be up slightly as well. There is good demand for US long grain rice, which is reflective in the current price. Even with great rice prices, there will not be a tremendous increase in rice acres due to the excessive amount of soybean contracts that have to be fulfilled for the 2008 growing season. With low long grain rice stocks and limited increase in 2008 long grain acres, the price of rice should remain good to possibly going even higher.

Soil Fertility: Phosphorus is an essential nutrient to consider in a fertility program. However, with the price of Diammonium Phosphate (DAP) exceeding $700/ton, everyone is trying to figure out if they really need to include phosphorus in their fertility program. That is a question I cannot answer without having a soils test report in front of me. In years past we have often found ourselves shooting from the hip on whether or not a phosphorus application is necessary. But, with 100 lb DAP application exceeding $35/A, everyone is rethinking their strategy. Now, more than ever, having a soil testing program on your farm makes dollars not cents because a $6 soil sample can possibly save you over $35/A. Also, if you are going to need DAP, I would contact your retailer to let them know your needs upfront. Local phosphorus supplies may be limited and a week's notice may be necessary to get the supply in stock.

Weed Control: As always, a good portion of the rice will be planted stale-seedbed. Producers have finished up their initial burndown applications. Another application of glyphosate will probably be necessary at planting. When applying glyphosate with Command, I would increase the glyphosate rate to at least 1.5 qt/A (4 lb/gal material). With rates lower than 1.5 qt/A, the Command can sometimes antagonize the glyphosate. I know the price of glyphosate has increased, but it is imperative to start with a clean rice crop. The unwillingness to spend a little extra money on some glyphosate can result in 4 to 5 leaf grass when the rice is emerging, which will result in a lot of money trying to clean up that mess.

Early season grass control is critical for not only maximizing yields, but also maximizing economic returns. This is one thing that was proven years ago and has not changed. The keys to be successful in a grass control program is starting early, knowing when more grass is coming and being ready to hit it again.

Small grass is easier to kill than bigger grass. Once the grass gets big, you will never catch back up and get a good handle on them. On these clay soils, which we grow a majority of our rice on in Mississippi, a two shot herbicide program will generally be required and I would add something in the tank that has residual grass control each time an application is made if you are not going to flood up immediately. Do not hesitate in making that second application and just say we will just get it in the flood, especially if there is a high population of grasses present.

Planting: When planting, be sure to keep an eye on your seeding depth. Most of the varieties that we grow can germinate and emerge from over an inch deep. I would rather plant the seed a little deeper and get it up from soil moisture than having to flush. Also, when changing from field to field, check the seeding depth to make sure that it does not need to be adjusted. Soil texture and soil moisture conditions can highly affect seeding depth.

The table below shows suggested seeding rates of current varieties grown in Mississippi. These seeding rates are based on 30 to 36 seed per square foot on silt loam soils and 32 to 40 seed per square foot on clay soils. Also, the right side of the table contains the number of seed that should be planted per a linear row feet for both an 8" and 10" drill spacing.

Suggested Seeding Rate Table.

			Suggested Seeding Rate		Seed/Row Foot	
Variety	Soil	Seed-bed Condition	lb/A	bu/A	8" Drill	10" Drill
CL-161	Silt Loam	Good	63	1.4	20	25
		Poor	75	1.7	24	30
	Clay	Good	67	1.5	21	27
		Poor	84	1.9	27	33
CL-171	Silt Loam	Good	66	1.5	20	25
		Poor	80	1.8	24	30
	Clay	Good	71	1.6	21	27
		Poor	89	2	27	33
Cocodrie	Silt Loam	Good	69	1.5	20	25
		Poor	83	1.8	24	30
	Clay	Good	74	1.6	21	27
		Poor	92	2.1	27	33
Sabine	Silt Loam	Good	70	1.6	20	25
		Poor	84	1.9	24	30
	Clay	Good	75	1.7	21	27
		Poor	93	2.1	27	33

Soybeans

by: Dr. Trey Koger

Week of March 17, 2008: For the second week in a row seed quality and seed availability are the most critical issues affecting our soybean producers and everyone involved in the soybean industry as a whole. I spoke specifically in last week's newsletter article about issues regarding seed quality and what is causing the low germination and poor quality seed in most cases. This week I feel it is important and timely to discuss our options when it comes to planting seed having low germination. The low germination is due mostly to mechanical damage to the seed. We only have two options to offset low germinating seed that is due to mechanical damage. One is to plant different seed, and with the short supply and high demand this is not an option this year. The other option is to plant more seed to account for the low germination. In the past we have typically assumed and our standard has been 80% germination. Even when seed tested higher than 80% germination, and outside of this year this has occurred frequently, we have typically tagged it 80% germination because that has been the norm. In years when demand has not been so high and supplies have not been limited, seed companies didn't have to put seed having lower than 80% germination in the pipeline for planting purposes. This year is definitely an exception. We are going to plant a lot of seed this year having germination levels below 80%. By law we can not sale soybean seed for planting purposes in Mississippi that has less than 60% germination. This year we are going to plant a lot of seed that is between 60 and 80% germination. So be mindful of the percent germination of each variety that you plant. By state law, all soybean seed sold in the state must be tagged with percent germination information.

Extensive research has been conducted in the past three years on optimizing seeding rates for our early soybean production system. This research was conducted on heavy clay soils across planting dates ranging from early April to mid-May and for maturity group three, four, and five varieties. We found that planting date played a minor role in seeding rate recommendations. This was especially true for group three and four varieties. We have not planted many group three varieties in Mississippi in the past few years, but we will likely plant more this year due to the overall seed shortage. Maturity group three's should be planted at rates to reach plant populations of 140,000 plants / acre and should be planted in the mid- to late-April planting window. Planting group three varieties earlier than mid- to late-April often result in sub-optimal growth and yield potential, as well as exposed row middles that do not canopy over in most cases. These seeding rate recommendations for group three's are higher than those for group four's and five's. Higher recommendations for group three's are due to the plants not establishing as much overall plant height and growth as group four's and five's. Planting group three's should be restricted to narrow row patterns only, since the plants often don't put on enough growth to lap the row middles in 38 or 40 inch rows. Group three's will probably put on sufficient growth to canopy the row middles in a twin-row system under irrigated settings.

As far as maturity group four's and five's the following explanations, diagrams, and tables define recommended seeding rates for Mississippi soybean producers. These seeding rate recommendations are based on desired plant populations that result in optimal yields. Table 1 indicates optimal plant populations for group four and five varieties across various planting dates. This table is derived from a lot of research conducted over multiple group four and five varieties, over years, as well as a wide range of seeding rates.

Tables 2 – 4 indicate seeding rates based on desired plant populations and more specifically the recommended number of seed to plant per acre and per foot of row for narrow row patterns. There is an individual table for narrow row patterns for 80, 70, and 60% germination levels.

Tables 5 – 7 indicate the same information but for twin-row systems. There are also individual tables for 80, 70, and 60% germination levels.

If you have any questions regarding seed quality issues, seeding rates, how germination levels affect seeding rate recommendations, or any other issues related to soybean please don't hesitate to contact me.

Steps to determining soybean seeding rates based on seed quality.

Ideal seeding rates for your soybean production system can be determined using the four step process listed below. Seeding rate recommendations are based on recommended plant population for your system, percent germination and percent emergence estimates. Once a seeding rate is derived please refer to seeding rate charts for various row patterns including twin-row patterns.

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•.Recommended plant population based on planting date and maturity group

Table 1. Recommended soybean plant populations.			
Planting date		Recommended **plant** population (plants / acre)	
		Group 4's	Group 5's
Late March to April 5		130,000	120,000
April 5 to April 20		120,000	100,000
Late April to early May		100,000	100,000

These numbers are recommended **plant populations** not final seeding rates.

Step 1. Identify recommended plant population for your system from Table 1.

Step 2. Determine the percent germination, which should be indicated on the seed bag.

Step 3. Estimate percent emergence, which is the % of the seed capable of germinating that will actually come up. This estimate should be determined on a field by field situation and is dependant on the type of planter or drill, field conditions (i.e. roughness), planting depth according to moisture conditions, etc. The % emergence estimate is not provided on the seed tag and is an arbitrary number to be determined prior to planting. Typically 90% percent emergence is a good rule of thumb, but should not be used in all situations.

Step 4. Calculate required seeding rate based on desired plant population, percent germination, and estimated percent emergence.

First calculation: Divide desired plant population by % germination

Second calculation: Divide 150,000 / percent emergence estimate

Final number will be the recommended seeding rate.

For example: assume a grower is planting a group 4 variety in mid-April. The recommended plant population (table 1) is 120,000 plants / acre. The bag states 75% germination and the grower assumes 90% of the seed capable of germinating will actually come up.

Here are the calculations to go through to get the desired seeding rate for this scenario.

First calculation:

120,000 (plants/a) / 0.8 (% germination) = 150,000

Second calculation:

150,000 / 0.9 (% emergence) = 167,000 seed/ acre

Following tables indicate how many seed per foot of row to plant depending on row spacing and percent germination level.

- Tables 2 – 4 are for **narrow row spacings** at 80, 70, and 60% germination levels.
- Tables 5 – 7 are for **twin-row patterns** at 80, 70, and 60% germination levels.
- All tables assume 90% emergence.
- Step 1. Use the table above (Table 1) to determine recommended plant population to be planted.
- Step 2. Then find appropriate table below depending on your row pattern and percent germination of your seed to determine how many seed to plant per foot of row.

Table 2. 80% germination and narrow row spacings

Desired # of plants	Seeding rate		Row spacing (inches)							
plants / acre	seed / acre		7.5	8	10	15	18	20	25	30
			seed / ft of row to be planted							
100,000	139,000		2.0	2.1	2.7	4.0	4.8	5.3	6.6	8.0
110,000	153,000		2.2	2.3	2.9	4.4	5.3	5.9	7.3	8.8
120,000	167,000		2.4	2.6	3.2	4.8	5.8	6.4	8.0	9.6
130,000	181,000		2.6	2.8	3.5	5.2	6.2	6.9	8.6	10.4
140,000	195,000		2.8	3.0	3.7	5.6	6.7	7.5	9.3	11.2
150,000	209,000		3.0	3.2	4.0	6.0	7.2	8.0	10.0	12.0

Table 3. 70% germination and narrow row spacings

Desired # of plants	Seeding rate		Row spacing (inches)							
plants / acre	seed / acre		7.5	8	10	15	18	20	25	30
			seed / ft of row to be planted							
100,000	159,000		2.3	2.4	3	4.6	5.5	6.1	7.6	9.1
110,000	175,000		2.5	2.7	3.3	5	6	6.7	8.4	10
120,000	191,000		2.7	2.9	3.6	5.5	6.6	7.3	9.1	11
130,000	206,000		3	3.2	3.9	5.9	7.1	7.9	9.9	11.9
140,000	222,000		3.2	3.4	4.2	6.4	7.6	8.5	10.6	12.8
150,000	238,000		3.4	3.6	4.5	6.8	8.2	9.1	11.4	13.7

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Table 4. 60% germination (narrow row spacings)

Desired # of plants	Seeding rate		Row spacing (inches)							
plants / acre	seed / acre		7.5	8	10	15	18	20	25	30
	seed / ft of row to be planted									
100,000	185,000		2.7	2.8	3.5	5.3	6.4	7.1	8.9	10.6
110,000	204,000		2.9	3.1	3.9	5.8	7	7.8	9.7	11.7
120,000	222,000		3.2	3.4	4.2	6.4	7.6	8.5	10.6	12.8
130,000	241,000		3.5	3.7	4.6	6.9	8.3	9.2	11.5	13.9
140,000	259,000		3.7	4	5	7.4	8.9	10	12.4	14.9
150,000	278,000		4	4.3	5.3	8	9.6	10.6	13.3	16

Table 5. 80% germination (wide and twin-row patterns)

Desired # of plants	Seeding rate		Wide-row (inches)			Twin-row*	
plants / acre	seed / acre		38	40		38-inch row	40-inch row
			Seed / ft of row to be planted in each row				
100,000	139,000		10.1	10.6		5.1	5.3
110,000	153,000		11.1	11.7		5.5	5.8
120,000	167,000		12.1	12.8		6.1	6.4
130,000	181,000		13.2	13.9		6.5	6.9
140,000	195,000		14.2	15.0		7.1	7.5
150,000	209,000		15.2	16.0		7.6	8.0

*Seeding rate does not need to be adjusted for row spacing within a twin-row set (ex. 7.5, 8, or 10 inches between individual rows of a twin-row set). Adjust seeding rate for twin-rows only when switching from 38 or 40 inch main row pattern to twin-row row patterns.

Table 6. 70% germination (wide and twin-row patterns).

Desired # of plants	Seeding rate		Wide-row (inches)			Twin-row*	
plants / acre	seed / acre		38	40		38-inch row	40-inch row
			Seed / ft of row to be planted in each row				
100,000	139,000		11.5	12.1		5.7	6.1
110,000	153,000		12.6	13.3		6.3	6.6
120,000	167,000		13.8	14.5		6.9	7.2
130,000	181,000		15	15.7		7.5	7.8
140,000	195,000		16.1	17		8.1	8.5
150,000	209,000		17.3	18.2		8.6	9.1

*Seeding rate does not need to be adjusted for row spacing within a twin-row set (ex. 7.5, 8, or 10 inches between individual rows of a twin-row set). Adjust seeding rate for twin-rows only when switching from 38 or 40 inch main row pattern to twin-row row patterns.

Table 7. 60% germination (wide and twin-row patterns).

Desired # of plants	Seeding rate		Wide-row (inches)			Twin-row*	
plants / acre	seed / acre		38	40		38-inch row	40-inch row
			Seed / ft of row to be planted in each row				
100,000	185,000		13.5	14.2		6.7	7.1
110,000	204,000		14.8	15.5		7.4	7.7
120,000	222,000		16.1	17		8	8.5
130,000	241,000		17.5	18.4		8.7	9.2
140,000	259,000		18.8	19.8		9.4	9.9
150,000	278,000		20.1	21.2		10	10.6

*Seeding rate does not need to be adjusted for row spacing within a twin-row set (ex. 7.5, 8, or 10 inches between individual rows of a twin-row set). Adjust seeding rate for twin-rows only when switching from 38 or 40 inch main row pattern to twin-row row patterns.

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

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