Mississippi Crop Situation

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Wheat Insects

Angus Catchot and Dr. Jeff Gore

Aphids: Still getting calls on aphids in wheat. For the most part we have two aphid species that can be found in wheat at this time, greenbugs and bird cherry-oat aphids. Back in early February I printed a table showing greenbug thresholds and identification, but based on the number of calls over the last several weeks I think it is worth revisiting. First, greenbugs are the primary concern because they have a toxin when they feed that causes localized chlorosis/necrosis and when numbers exceed economic thresholds they can cause severe stunting and even death to the plants in extreme cases (Table 1.). To date we have had only a few fields at economic threshold for greenbugs but we can generally find them at some levels in quite a few fields around the state. The confusion comes in when we see the sometimes very high numbers of bird cherry-oat aphids. Currently in the mid-south we have no threshold for treating bird cherry-oat aphids in the spring. Our primary concern from this aphid is that it vectors barley yellow dwarf virus (BYDV). BYDV is vectored in the fall months and is not a concern at this point in the season, so any damage from this aphid at this point would be strictly physical damage. Because they do not have a toxin associated with their feeding like greenbugs you do not see the chlorotic lesions around bird cherry-oat colonies like greenbugs, therefore they are simply not as damaging as greenbugs and we generally do not treat for them in the spring.

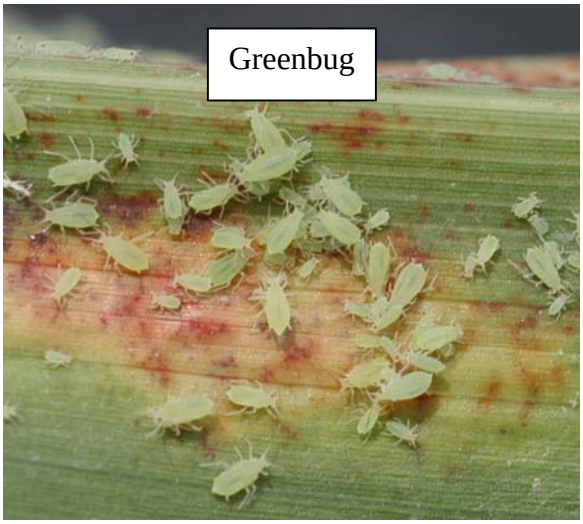

Table 1. Treatment levels for greenbugs in wheat.	
Number Per Linear Foot	**Plant Height**
50	4 - 6 inches
200	6 - 10 inches
300	18 - 20 inches
800	30 + inches

With that said, the question becomes "Is there ever a time when we should treat for bird cherry-oat aphids in the spring?" Table 2. shows data from a yield study that Dr. Jeff Gore conducted last year under extremely high bird cherry-oat populations at Stoneville. This was an unbalanced test with 9 replications of plots with low numbers of bird cherry-oat aphids and 7 replications of plots with extremely heavy numbers of bird cherry-oat aphids. You can see from the data that although rare, bird cherry-oat aphids can sometimes reach numbers that would require treatment. Also keep in mind that it was extremely dry during this period adding an additional stress factor to the plants. The low treatment averaged less than 50 aphids per plant and the heavy treatment was greater than 200 aphids per individual stem. Populations are rarely uniform across large acres. Looking at the whole field, approximately 40% would have been classified as "heavy".

Table 2. Wheat yield comparisons in plots with low and heavy bird cherry-oat aphids

	Yield	**SEM**
Low bird cherry-oat numbers	**63.8 bu/acre a**	**3.35**
Heavy bird cherry-oat numbers	**44.2 bu/acre b**	**2.10**
T = 5.24, df = 14. P > t < 0.01		

Possible criteria that <u>may</u> justify treating spring populations of bird cherry-oat aphids in wheat in Mississippi.

1. **Is the crop stressed?** Always look at the condition of the crop, a non-stressed healthy crop can always tolerate (sometimes much more without economic impact) higher levels of aphids.
2. **Are beneficial insects present?** Aphids have many predators and parasitoids that can keep populations in check, including disease, lady beetles, parasitic wasp etc.. In wheat it is not uncommon for these biological factors to completely take out aphid populations and they must be factored in to any decision making process.
3. **Are the aphids physically hurting the crop?** Is there stunting, chlorosis or necrosis that you can attribute directly to the aphids and not to other factors such as normal lower leaf yellowing or water logging.
4. **Are large areas of honeydew present?** Is honeydew becoming heavy and uniform throughout field, Is honeydew covered plants beginning to develop sooty mold?

Again, it would not be common to have to treat bird cherry-oat aphids in Mississippi in the spring, but you can see there are always those extremes that still have to be addressed to the best of our ability. Use the criteria mentioned above and do not hesitate to call me with any questions you may have.

Facts about *Lysiphlebus testaceipes* (Aphid Parasitoid)

http://www.utextension.utk.edu/fieldCrops/cotton/cotton_insects/pubs/W127-Beneficials.pdf

General Comments: This small parasitic wasp does not really have a common name, but it is often referred to as the "aphid wasp." Next to the "aphid fungus" (*Neozygites fresenii*), it is probably the most important biological control agent of cotton aphids. Levels of parasitism can exceed 70 percent in some situations. It is likely that this parasite would play an even greater role in aphid population suppression if it weren't for the fungal disease eliminating aphids first. On the other hand, there are indications that the parasite helps spread the fungal spores from one aphid to another, thus hastening the development of the disease epizootic.

Description and Biology: The adult is a very small black wasp, approximately the size of a winged cotton aphid but more slender. Females can be seen crawling about on the undersurface of cotton leaves in search of aphids to parasitize. When a suitable aphid is found, the wasp curls its abdomen forward between its legs and "stings" or lays an egg in the unfortunate host. An individual adult can parasitize up to 100 aphids during its brief life. Eggs hatch in 2– 3 days, and the larval parasite begins feeding inside its aphid host before ultimately killing it. The larval stage lasts about a week, and the pupal stage, which takes place inside the body of the host aphid, takes an additional 4 – 5 days. Thus, the complete life cycle takes roughly two weeks. During the early stages of parasitism, parasitized aphids appear normal. As the developing parasitic larva grows larger, it eventually kills the aphid, causing it to swell and turn beige to tan in color. These "aphid mummies" are readily recognized and provide an easily observed indication of parasite activity. However, it is important to keep in mind that the actual level of parasitism is considerably higher than would be indicated by counting the percent of aphid mummies. Once the percentage of mummified aphids reaches 10 – 20 percent, it's a good bet that most of the aphids present on a leaf have been parasitized. Upon reaching the adult stage, the wasp cuts a small circular hole near the back end of the aphid, emerges and begins searching for aphids into which to lay its eggs. *Lysiphlebus* overwinters inside its aphid host as a larva or pupa, and mummified aphids can be found throughout the year.

Prey (Hosts): For a parasitoid, *Lysiphlebus* has a relatively wide host range, attacking a number of economically important aphid species. Cotton aphids and greenbugs, an important pest of wheat and sorghum, are two of the more important aphids parasitized by this wasp, but it can be found attacking many other aphids.

Wheat Disease Update

Dr. Tom Allen

As a general wheat health report from across the Delta, there have been increasing (but still very low) levels of septoria leaf blotch reported. I have only seen one field where a fungicide recommendation was required to control septoria. This particular field was earlier planted wheat, and most of the field was beginning to head. Low levels of powdery mildew in some fields continue to be observed. Very (and I stress very) low levels of leaf rust are also present in Delta wheat.

Northern Delta counties, particularly Coahoma and Quitman experienced a snow event a few weeks ago. Earlier planted wheat, with leaves extending above the snow pack experienced some minor freeze damage. It was initially thought this might was glyphosate injury, however, with the widespread nature of the fields showing symptoms – typically, white to yellow damage generally at the tip of the leaf (see attached photo) - it was determined that freeze damage had occurred based on the temperatures immediately following snow fall. Those particular plants exhibiting symptoms will grow out of the damage, and overall yield will not be reduced.

In the past ten days I have positively identified stripe rust in a single field in the Delta. This field was just east of Arcola, MS. However, stripe rust levels were very low, and the infection tended to be in areas where standing water had occurred. Wheat plants within low areas tended to be more nutrient stressed, and have higher levels of disease. However, incidence of stripe rust was much lower than 2% even where I was able to find the disease. While scouting I have also only found two fields that contained leaf rust. Both fields had disease incidence less than 1% on affected leaves. I have also checked the wheat variety trial in Stoneville, paying careful attention to the more susceptible varieties and could not find stripe, or leaf rust. This suggests that a fungicide application to control leaf and stripe rust is not recommended at this time.

Additionally, I have spoken with numerous farmers and consultants in the past few weeks about yellow wheat plants. In one case, a field of earlier planted wheat, on heavy soil, that had two shots of nitrogen with sulfur had a severe sulfur deficiency (see attached photo). While the soil surface had dried, there was still quite a bit of excess moisture below the surface that meant the plant was not able to efficiently uptake soil nutrients. Even the foliar fertilizer applications containing nitrogen and sulfur was not enough for the plant (see attached photo). Since diagnosing the deficiency the field has greened up but we have had added rains in the past week. In some cases, nutrient deficiency can look like several other diseases, particularly *Barley yellow dwarf virus* (BYDV). However, BYDV will tend to occur in small, localized, round areas within an infected field, rather than across an entire field. BYDV infected plants will also appear stunted compared to healthy, uninfected plants. Leaf tissue samples should be submitted for nutrient analysis to pinpoint the specific problem.

Several weeks ago I brought up the issue of wheat fungicide plant health. This continues to be a hot topic with consultants as well as farmers in the Delta because of the increased wheat value. At present time, based on 2007 data from 2 locations, with Headline and Quilt (earlier this month I

had mistakenly said this was Stratego), provided by Jerry Singleton, an economical yield response was not observed. Essentially, there was no yield benefit from applying the fungicide at early head. Currently, based on this set of data, our 2008 wheat fungicide recommendation is to scout for disease and apply a labeled fungicide if disease is present at economically damaging levels. One thing to keep in mind, fungicides can only be applied up until Feekes growth stage 10.5, which is full head.

USDA Prospective Plantings Report Summary

Dr. Steve Martin and Dr. John Anderson

The *Prospective Plantings* report released today was a shock to the corn and soybean markets. With respect to corn, the shock was positive. Corn plantings for 2008 are projected to total just 86 million acres in 2008. This is almost 1.4 million acres below the average pre-report estimate and a very low acreage figure in view of current use projections. With respect to soybeans, the shock was decidedly negative. Soybean plantings are projected at 74.793 million acres – over 3.2 million acres larger than the average pre-report estimate and larger than even the highest pre-report estimate by about half a million acres. Acreage estimates for other major crops were basically in line with expectations.

On a regional note, the *Prospective Plantings* report forecasts a rather dramatic shift of acres into soybeans and wheat. Across the Mid-South (MS, AR, LA), soybean and wheat acreages are expected to be up about 27% each. These acres are coming at the expense of corn – with corn acreages coming down fairly sharply from 2007's historic levels – and cotton. Of the three Mid-South states, only Arkansas is projected to hold cotton acreage above the half million acre mark. Key numbers in the report are summarized below:

USDA also released the latest quarterly *Grain Stocks* report on Monday morning. As with the *Prospective Plantings* report, the information was generally bullish for the corn market and bearish for the soybean market. March 1 corn stocks were pegged at 6.859 billion bushels, about 200 million bushels shy of average pre-report estimates. Based on the change in stocks from December 2007 through February 2008, indicated disappearance for that period was 3.42 billion bushels – up from 2.86 billion bushels over that period during the prior marketing year. March 1 soybean stocks were pegged at 1.428 billion bushels, about 75 million bushels larger than the average pre-report estimate. Indicated disappearance of 904 million bushels was actually off a bit (about 1%) from the prior year. For wheat, the *Grain Stocks* report reflects the rationing effect of recent very high prices. March 1 wheat stocks were estimated at 710 million bushels, just over 40 million bushels larger than the average of pre-report estimates. Indicated disappearance of 422 million bushels from December through February was down 8% from the prior year.

US *Prospective Plantings* Summary

	2008	Pre-Report Expectations		2007	2008/2007
	Estimated	Average	Range	Actual	Percent
Corn	86.014	87.387	85.70 - 89.75	93.600	91.90%
Cotton	9.387	9.15	8.80 - 9.50	10.83	86.68%
Rice	2.77	2.8	2.70 - 3.00	2.761	100.33%
Soybeans	74.793	71.526	70.00 - 74.24	63.631	117.54%
Wheat	63.803	63.625	62.33 - 65.40	60.433	105.58%

Mid-South *Prospective Plantings* Summary

	Mississippi			Arkansas		
	2008 Est.	2007 Actual	2008/2007 %	2008 Est.	2007 Actual	2008/2007 %
Corn	670	960	69.8%	490	610	80.3%
Cotton	420	660	63.6%	650	860	75.6%
Rice	180	190	94.7%	1,371	1,331	103.0%
Soybeans	2,050	1,450	141.4%	3,250	2,830	114.8%
Wheat	450	370	121.6%	970	820	118.3%
5-Crop Total	3,770	3,630	103.9%	6,731	6,451	104.3%

	Louisiana			Total for Region		
	2008 Est.	2007 Actual	2008/2007 %	2008 Est.	2007 Actual	2008/2007 %
Corn	560	740	75.7%	1,720	2,310	74.5%
Cotton	280	335	83.6%	1,350	1,855	72.8%
Rice	340	380	89.5%	1,891	1,901	99.5%
Soybeans	910	605	150.4%	6,210	4,885	127.1%
Wheat	400	235	170.2%	1,820	1,425	127.7%
5-Crop Total	2,490	2,295	108.5%	12,991	12,376	105.0%

Market Briefs

Dr. Steve Martin and Dr. John Anderson

Cotton: New York Board of Trade (NYBOT) cotton futures prices have eroded over the last two weeks. The Dec 08 contract has fallen from the $0.87 per pound range in mid-March to $0.82 heading into today's much anticipated acreage report. Overall weakness in the commodity markets has put downward pressure on the cotton market as well.

USDA's *Prospective Plantings* report pegged 2008 overall cotton acreage at 9.3 million acres down from earlier estimates of 9.5 million. Mississippi acreage was estimated at 420,000 acres, the lowest on USDA record and down over 30% from last year's record low.

Short term cotton prices will remain under pressure due to the large level of carryover stocks. Longer term cotton fundamentals should improve based on reduced acreage. The real key, though, will be whether 2008 yields and harvested acres repeat the record performance of 2007 or return to more traditional expectations. In 2007, acreage was reduced by 5 million acres yet overall production was down only slightly. Another production year like 2007 will do little to improve cotton fundamentals and prices will remain under pressure. However, should the 2008 crop yield only 14-15 million bales and exports remain strong, ending stock levels could be reduced to levels to support the rumors of "$1.00 cotton."

Soybeans: As noted above, the soybean market didn't get much friendly information out of Monday's much-anticipated reports. The combination of much higher than expected intended plantings and larger than expected soybean stocks was enough to push every soybean contract on the board down the 70 cent daily limit on Monday at the Chicago Board of Trade (CBOT). This follows on the heels of a near-limit down move last Friday so that soybean futures have been pushed back below lows posted in the broad-based commodity sell-off of two weeks ago.

Moving forward, it probably won't be but a day or two before we feel like we don't know any more than we did before the release of the *Prospective Plantings* report. Adjustments in

corn and soybean futures will be significant (already are significant based on Monday's trading) and will call into question just how firm those planting intentions really were. Of course, at this stage, planting intentions have as much or more to do with weather than with anything else. No matter how strong the market signals, they can't change the weather. According to USDA, in 12 of the last 20 years, the final corn acreage figure has been lower than intentions. Conversely (as one would expect) in 12 of the last 20 years, final soybean acreage has been higher than intentions. Thus, the greater weight of probability would appear to be on the acreage situation getting more bearish for soybeans. This will largely depend on the weather of course and whether or not farmers will be able to get into the field to plant as much corn as they would like. The market will, as always, be watching closely.

Rice: Near term rice futures prices on the Chicago Board of Trade have strengthened over the last two weeks as short rice supplies around the world have kept many countries out of the export market. New crop contracts have weakened somewhat in response to weakness in the other grain contracts as well as in anticipation of the *Prospective Plantings* report.

The *Plantings* report revealed overall rice planting acreage intentions of 2.8 million acres, in-line with most industry estimates. Mississippi producers reported planting intentions of 180,000 acres, only slightly lower than last year. Overall, the report was bullish for the rice market since acreage similar to last year will send next year's ending stocks to levels that may mean very little rice available for export.

Short term, rice prices should remain strong as supplies are tight and demand has been excellent. Longer term (new crop) will depend on actual 2008 acres and the export market. If the export market can afford to pay for the limited amount of rice available for export over the next 18 months, rice producers will likely see record prices. Near term CBOT contracts are above $20.00 per cwt. Under the scenario set by the *Prospective Plantings* report, prices much higher than this may continue through at least August 2009.

Corn: The corn market got basketful of bullish news in Monday's reports: much lower than expected planting intentions and much smaller than expected corn stocks. Under slightly different circumstances, one could easily envision a report day like Monday yielding a locked-limit-up move. That didn't happen today, though. Corn futures got out of the gate respectably enough, trading about 15 cents higher on most contracts early. That is about as good as it got, though. Monday's reports basically torpedoed soybean and wheat futures. With soybean futures limit-down across the board and wheat futures at or near limit-down, corn's upside potential was limited. This effect was compounded by the fact that energy futures were off sharply today. Nearby light crude oil futures were down by more than $4 per barrel in Monday's trading, getting back down to about where they stopped falling after the recent equities market shake-up. By the end of trading, gains on corn futures looked fairly modest. December 2008 was up just 4 ¼ cents to $5.81.

Underlying fundamental support in the corn market is impressive. The table below shows projections for 2008/09 carryover based on acreage from the intentions report and the most recent carry-in, import, and use projections from USDA. Clearly, with anything like reasonable trend-line yield estimates, it is impossible to come up with growing stocks in this market – *and this assumes no growth in demand over current USDA projections*. The market anticipates that additional rationing of the available supply will be necessary, and the process of accomplishing that appears to have gotten well underway in last week's trading.

Last week's big gains in corn futures are worth considering for a second. They suggest that the market was already building in more bullish 'last minute' expectations than pre-report estimates suggested. The real question now is how much more upside remains. How much more bullish

can things get after Monday's reports? As noted above in the soybean section, history suggests the potential for some slippage between intended and actual corn acres, but the market is certainly well aware of that potential already. The table above suggests the need for additional rationing. On the other hand, the full impact of recent price increases has probably not worked through the system. Recent losses in the livestock sector have been staggering. Even at current corn prices, feed demand is likely to diminish in coming weeks and months. Moreover, if the dollar strengthens, this will have the same rationing effect on exports as a price increase. In short, corn fundamentals look very strong, but in a commodity market, downside risk is never too far away.

Wheat: Monday's reports were a mixed bag for the wheat market. Planting intentions came in at 63.803 million acres: right about where the market expected. The *Grain Stocks* report showed wheat stocks that were a good bit higher than anticipated. Wheat futures fell pretty sharply in the wake of Monday's reports, with the July 2008 contract on the CBOT losing 59 cents to close at $9.37. This price is certainly nothing to sneeze at, but it looks almost pathetic compared to the $12.50+ that this contract traded up to less than a month ago.

High prices in the wheat market did appear to effectively ration available wheat supplies in the December through February quarter of this marketing year. As noted earlier, indicated offtake in that period was down 8% from the prior year. Prices right now are still much higher than they were for most of that December – February time frame. It will be interesting to see how recent stocks figures along with the anticipation of the effect of current prices will affect projected wheat ending stocks in the next *World Agricultural Supply and Demand Estimates* report. Even with an upward revision, stocks will remain historically tight. Looking ahead, this year's production prospects will get increasing attention as harvest draws near. Certainly some acres have been lost to flooding in the Mid-South and Midwest, but from the market's perspective, these losses probably won't have much impact.

Cotton

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 11, 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:

$$\left[\frac{\text{Daily Maximum Temperature (°F)} + \text{Daily Minimum Temperature (°F)}}{2}\right] - 60$$

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 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 planting and planting outlook.

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 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. 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. Depending on 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.

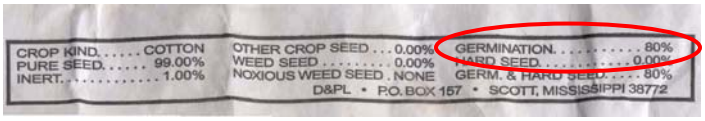

Table 2. Effect of plant population on days to peak bloom and boll distribution.

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.

Corn

Dr. Erick Larson

Nitrogen rate recommendations – Mississippi State University 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 standard recommendation 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.

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 <u>after</u> 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. Nitrogen loss because of saturated soil happens mostly through denitrification, particularly in heavy, clay soils. Denitrification happens when microorganisms turn nitrate nitrogen into nitrogen gas. These gases then escape into the air. Warm soil temperatures speed up this process. Research indicates denitrification rates range from 2 to 3 percent per day at soil temperatures from 55 to 65 ˚F. Denitrification rates increase to about 5 percent per day when soil temperatures are warmer.

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 corn growers place sidedress knives in the row middles or near the extreme edge of raised 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.

Why is my corn not growing off like it should? – Poor early plant health and slow growth is often a product of sparse root development and/or nutritional limitations. Poor root growth often results from planting marginally wet fields. Seed furrow compaction prohibits nodal root penetration, causing rootless corn syndrome and poor nutrient uptake. Many initially believe early growth problems result from inadequate or poor 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 Mississippi. 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. This method is particularly useful for identifying marginal problems, which may not show up when using a composite soil-sampling technique.

Sorghum

Dr. Erick Larson

Don't plant Sorghum too early - Grain sorghum will not germinate at soil temperatures less than 65 degrees F. The soil temperature should be measured early in the morning, when you can measure the minimal daily temperature – not in the middle of the afternoon. Thus, planting before minimal soil temperatures are stabilized above this threshold will greatly increase likelihood of stand failure. Furthermore, sorghum does not possess as much seed vigor as you are accustomed to with corn. Thus, the optimum planting dates for sorghum are similar to those for cotton: April 20 to May 15. Optimum seeding depth is 1 ¼ - 1½", rather than a shallower depth at which cotton and soybeans are seeded.

Don't plant too much 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. Grain 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.

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