May 2008

Mississippi State University Extension Service

Agronomy Notes

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Corn

by Dr. Erick Larson

Wet Weather Plagues Corn Crop - Weather conditions this spring have been virtually opposite of last year. Frequent rainfall has delayed planting, anaerobic soils have caused substantial stand loss in poorly drained areas, and floodwater and seep-water from the Mississippi and other rivers, has overrun many crop fields. I expect many problems related to poor corn root development to become apparent during the near future as well. These problems include rootless corn syndrome and phosphorus and other nutrient deficiencies. Further rainfall and wet soils could also make nitrogen fertilizer and herbicide application difficult. Considering the very wet conditions this spring, coupled with high fertilizer prices, applying nitrogen fertilizer using sound split application strategies, rather than ease of application (large amount of nitrogen applied early), will likely produce considerable economic returns this harvest.

Figure 1. Rootless corn syndrome is often caused by rainfall eroding soil from the top of beds, shallow seeding depth, and/or compaction from planting wet soil. There is no immediate remedy to this problem. If the soil surface is crusted or very dry, irrigation may help promote root growth, but this likely is not a problem currently. After plants become strongly erect, you may be able to refresh the beds, replacing the eroded soil with cultivation, which might enhance root growth in the long run.

Corn N / herbicide application difficulty - Considering widespread rains have fallen on a frequent schedule, seep-water is restricting ground access near the Mississippi river, and growers are now scrambling to plant other crops, I suspect some corn fields may not be fertilized and receive herbicide applications in a timely fashion. Although corn uses less than 10 percent of its nitrogen before rapid vegetative growth begins, some nitrogen is needed during early growth stages to support vegetative development. Foregoing nitrogen application indefinitely after corn emerges is going to reduce yield potential. If ground application is restricted by wet soils, aerially apply some granular nitrogen to support the crop until side-dressing can provide the balance of nitrogen, hopefully before plant height restricts ground application altogether. Ammonium nitrate, ammonium sulfate or urea treated with a urease inhibitor can be applied to supply nitrogen. Urease inhibitors, such as Agrotain temporarily slow the activity of the urease enzyme, but still need timely rainfall or overhead irrigation to incorporate the urea-based N into the soil. After the first application, there is normally a substantial window to apply the second application, before the corn grows tall enough to restrict tractor/applicator passage. However, difficulty with the second application may be compounded tremendously by further rains, because corn normally grows from 12-inches to exceeding 30-inches tall in about 10 to 14 days in Mississippi. Therefore, completing the second nitrogen application as well as postemergence herbicide applications should be a high priority for corn well over 12-inches tall as soon as soil moisture is dry enough to permit application and avoid considerable compaction.

Late May planting – Little research is available documenting corn plantings in late May and thereafter. However, grain yield potential can be expected to drop significantly and there is considerably more risk associated with corn production resulting from extreme drought, especially in dryland fields, and pest problems. Since late-May planted corn will be maturing in late June through August, 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. Bt corn borer protection is highly recommended for late-planting dates (please uphold the Bt refuge requirement). Seeding rates can also be reduced considerably for very late planting dates, since warm temperatures enhance seedling establishment and produce taller, leafier plants. Thus, I would seed about 22,000 - 24,000 seeds/a for dryland fields and no more than 28,000 seeds/a in irrigated fields. Nitrogen rates should also be reduced, according to lower yield expectations.

Wheat
by Dr. Erick Larson

Wheat Freeze Injury – Moderate to severe wheat freeze injury has been documented in central and south Mississippi from the April 15 frost. As time passes, freeze damage to our wheat crop is becoming more apparent. Severe injury has been documented where temperatures fell to 30 degrees F or less on heading wheat. Although temperatures were just as cold (and more widespread) in north Mississippi, they generally did not fall below 28 degrees F and the low temperature duration was quite short. It appears this slight climatic difference compared to last year's freeze, minimized freeze injury in northern Mississippi, where much of the wheat crop had not yet headed. Heads in the boot stage, just prior to heading, gain some insulation from the leaf sheath to their sensitive floral organs, which produce kernels. Thus, injury to wheat at pre-heading stages may be limited to bent-over heads and/or awns which had difficulty emerging from the "boot," and swollen or bent nodes. Wheat in the boot stage, where heads were nearly ready to emerge from within the upper leaf sheath, is sensitive to temperatures of 28 degrees F or less.

Field evaluation has confirmed wheat freeze damage was closely correlated to crop growth stage and low temperatures. Wheat is most sensitive to freezing temperatures while flowering, a few days after head emergence. Tremendous variation in injury between fields, and between individual heads in a field is likely depending upon wheat maturity at the time of the freeze. The crop growth stage will primarily vary depending upon planting date and variety maturity. The low temperatures during the freeze event were likely influenced by field topography and field borders (especially trees) producing variable damage in areas within a field.

Wheat freeze damage is extremely tedious to assess, because it requires dissection of individual florets on wheat heads. Damage is likely to differ considerably from stem to stem, since wheat maturity naturally ranges by a week or more in most fields. Furthermore, damage may vary depending upon floret location in the head. Overall, there are around 10 million wheat kernels per acre to potentially evaluate.

Freeze damage can sometimes be quickly assessed by the presence of yellow-green, discolored wheat heads, which may turn white or light brown as the tissue dries. Wheat varieties possessing awns or beards often show injury on these organs, since they are very exposed. Varieties possessing awns or beards are not known to be any more or less sensitive to freeze injury than varieties without these organs. Damaged plants in some fields (but not all) are showing symptoms of secondary disease infection promoted by freeze injury. This disease is known as black chaff and is caused by a bacterium. Symptoms may include brown to black streaks or spots on the upper half of glumes. Leaf symptoms appear as irregularly shaped dark brown streaks and in some cases these can extend the entire length of the leaf. Leaf symptoms can give the plant an overall orange-brown hue or cast. Fungicide treatment would not have prevented this disease.

Wheat injury resulting from a freeze near heading will likely reveal complete sterility or arrested kernel fill when you dissect florets. Wheat-freeze damage may be assessed by observing grain development of successfully pollinated kernels. Pollination normally occurs within 3-5 days of head emergence. After pollination occurs, plump wheat kernels rapidly develop and attain their full length within about 12 days after pollination.

Freeze-damaged kernels may be shriveled and/or halt development altogether. These kernels will not likely develop appreciable seed weight. Close monitoring of freeze-damaged fields should reveal kernel development problems within a few days, since kernel development proceeds rather quickly following pollination.

Figure 2. Kernels severely damaged by a freeze shortly after pollination.

Figure 3. The two kernels on the left are plump and developing normally. The development of the kernels on the right is arrested by freeze damage during early grain fill. They have not attained their full length and are considerably shriveled and may appear rough or dimpled, despite being the same age as the other kernels. These moderately-damaged kernels will be very light and shriveled at maturity, if they continue to develop.

Cotton

by Dr. Darrin Dodds

Planting Report: USDA reports indicate that approximately 7% of the Mississippi Cotton crop has been planted. Rough estimations place this at about 20,000 – 30,000 acres planted in the state. Nearly all of these acres were planted last week. Over the past five years, we have planted approximately 29% of our acres by the last week of April. Mississippi was projected to plant 420,000 acres of Cotton this year, only time will tell if we hit this mark.

Based on USDA reports, nearly all of the corn and 50% of the soybeans in the state have been planted as of April 27th. However, significant rainfall has kept many producers out of the field for the majority of the week of April 28th. As a result, when fields become suitable to plant many will be rushing to get the remaining crop in the ground. In terms of planting cotton, we are not late – yet. Research has shown that we can plant until the 15th of May and not see yield losses due to planting date. However, it will not take many more rainfall events to push us to that window.

Cotton Root Development: The roots of a cotton plant are an often overlooked part of the plant that can tell us a great deal about what is going on with the aerial portions of the plant. Cotton roots have a simple structure. The root grows by adding new cells and enlarging at the end forming a tap root. Growth in this manner allows cotton roots to grow around dense clods as well as grow in cracks or root channels. The tap root should be 5-8 inches in length by the time the cotyledons emerge from the soil. The first 2-3 inches behind the root tip is the most active area for water and nutrient uptake. Lateral roots develop behind the root tip in older tissue. Lateral roots grow horizontally into the soil and are very important for nutrient and water uptake. These lateral roots tend to grow well in near the soil surface and are critical for seedling vigor. Once tap roots and lateral roots being to thicken, their ability to absorb water and nutrient decreases. Cotton has the ability to regrow after cultivation or severe drought because each root has the ability to grow at the tip as well as develop new lateral roots. However, as the plant ages and boll formation progresses, regrowth potential is greatly reduced.

Effect of Cool Soils on Root Growth: Cotton roots do not grow if the soil temperature is less than 60°F. Cotton root growth is one-half of maximum when soil temperatures are 70 to 75°F and root growth is maximized when soil temperatures are 90°F. Soil has a high heat capacity and warms slowly in the spring. A few hours of warm temperatures may only warm the surface of the soil especially if cool nighttime temperatures are occurring. Cool soils hinder cotton seedling growth by limiting nutrient uptake. Additionally, cool soils translate into increased susceptibility to seedling disease. Cultivation of cool soils may be of benefit. If the soil surface is moist, cultivation may aid in drying and allow sunlight to heat the soil as opposed to evaporating water. If the soil surface is already dry, cultivation may damage roots and also prevent soil at deeper depths from warming. Generally, cultivation of seedling cotton under cool conditions will do more harm than good. Finally, irrigation of seedling cotton in cool weather is not recommended. Irrigation at this time has the potential to reduce growth (in addition to already limited growth by cool weather) and increase potential for seedling diseases.

Table 1. Root growth of Cotton versus cereal crops.

	Cotton	Barley, Wheat, and Corn
Root Density Under Favorable Conditions	5" per cubic inch of soil	15-25" per cubic inch of soil
Growth in Drying Soil	Poor	Good
Growth Response to Frequent Irrigation	Slight Increase in Surface Roots	Dramatic Increase in Surface Roots
Response to Subsoil Compaction	Little Increase in Surface Roots	Large Increase in Surface Roots
Response to Nutrient Rich Soil	Slight Increase in Root Density	Large Increase in Root Density

Nutrient and Soil Management

by Dr. Larry Oldham

Cold calls about wonderful investment opportunities are always annoying. A recent caller claimed that I had requested information on the gold bullion market which was an outright lie. Unfortunately, the current fertilizer price and availability situation is leading to many claims for products that need fact-checking. One of my old bosses uses the term “FOO FOO juice” on his new blog about soil fertility. He taught me many years ago that sales claims are just that, claims. Some products are legitimate, and have credible research backing. Others are marginal, others are still in progress, and others are still appearing.

Another consequence of fertilizer prices this spring was reduced preplant applications. We will see as the crop develops what deficiencies appear and there will be products offered with various claims to address the symptoms. However ‘traditional’ fertilizers should be the first options as a remedy. (See the May 7, 2008 Corn and Wheat Newsletter for more information.)

Data from several MSU Experiment Station studies of some foliar applied products show cumulatively and optimistically, across crops and years, there may be a 5 to 10% percent chance of a yield response. That is a 90 to 95% chance of NO significant yield response. The science of foliar nutrient uptake is straight forward: plants cannot absorb sufficient nitrogen, phosphorus, or potassium to produce a crop. Recently, North Carolina State soil fertility faculty recently reviewed and updated plant nutrient uptake data. A 50 bushel soybean crop will have 188 pounds of N, 40 pounds of phosphate, and 74 pounds of potash in the harvested seed. Another 89 pounds of N, 16 pounds of phosphate, and 74 pounds of potash are in the stems, leaves, and pods. Cotton plants will have 120 pounds of N per acre in the above ground dry matter (seed, lint, and plant parts), and corn about 235 pounds. When these amounts are utilized, intuitively, adding a few pounds is not a good way to go. Remember that fertilizing to meet removal is risky as soil bound nutrients become available throughout the growing season.

Some sales pitches say their products claim more efficient or effective use of nutrients. A recent study in Mississippi found no difference in phosphate or potash uptake in soybeans with one such product. My old boss uses the word “ridiculous” to describe this concept.

‘Traditional’ fertilizers are more costly than last year, or even last month, however spending money for “FOO FOO juices” is not wise. Farmers should concentrate on improving fertilizer efficiency, working with reputable suppliers, and asking questions. Do not hesitate to ask your area or state MSU Extension Service agronomist for additional information about fertilizer or soil amendment options.

Forages
by Dr. Rocky Lemus

Sometimes producer are confused with which type of summer annual forage grasses to plant. Summer annual grasses that can be grown in Mississippi include sudangrass (*Sorghum bicolor*), forage sorghum (*Sorghum bicolor*), sorghum x sudangrass hybrids, browntop millet (*Panicum rmosum*), pearl millet (*Pennisetum americanum*), foxtail millet (*Setaria italica*), and crabgrass (*Digitaria sanuinalis*). Each of these species has its strengths and weaknesses, but the choice should be based on livestock nutritional needs and intended forage use (grazing, hay, silage, or green chop).

Sudangrass and Sorghum-sudangrass hybrids – Sudangrass is a rapid growing warm-season grass which can produce good quality forage if managed properly. It usually grows between 3 and 8 feet high. True sudangrass usually has fine stems and grows rapidly after grazing. Sudangrass develops only fibrous roots and does not have rhizomes. It usually contains lower levels of prussic acid than sorghum-sudangrass hybrids, but is also lower yielding.

There are several sorghum-sudan hybrids in the market nowadays and they resemble sudangrass in growth. These hybrids are taller, have larger stems (stalks), and are higher yielding. Some of the new varieties use the "Brown Midrib (BMR)" genetic trait that produces less lignin. This genetic trait has shown a decrease in lignin concentration (40 to 60%), an increase in forage palatability (15 to 30%), and therefore, an increase in digestibility and improvement in forage quality. The BMR hybrids have also shown a better yield potential compared to traditional sorghum-sudan hybrids.

Browntop, Foxtail, and Pearl Millet – Millet has smaller stems and greater leaf biomass than forage sorghum, sudangrass, and sorghum-sudangrass hybrids. Browntop millet is a very short and leafy species with high tolerance to soil acidity. Browntop has a growing season of about 60 days and only hay cut is obtained. Pearl Millet is usually preferred due to faster growth after cutting or grazing. Pearl millet does not produce prussic acid, and the summer forage produced is safe for pasturing horses. Millet is best used for hay or pasture. It is not as drought tolerant as some of the other summer annual grasses. Foxtail millet has smaller stems and is leafier than the sorghum, sudangrass, or sorghum-sudangrass hybrids. However, foxtail millet does not grow after harvest. Foxtail millet yields are usually lower than yields of sorghum-sudan hybrids. Start grazing millet at 18 inches tall and stop at a height of 8-12 inches. Manage additional growth in same manner.

Forage Sorghums – Forage sorghum is best adapted to fertile, well-drained soils that have a good water holding capacity. Forage sorghums have improved leafiness, better seedling vigor and excellent yield potential.

Most of the growth (90%) occurs in June, July, and August. Sorghum can be grazed 45 to 60 days after emergence. Summer grazing may occur with caution due to higher levels of prussic acid even when plants are completely headed. Before grazing, sorghum should be at least 30 inches tall and graze to a height of 5 to 7 inches. Manage additional growth in the same manner. Forage sorghums are best used in a single hay cut. Haying is best done when plants are in bloom or early dough stage and a mower-conditioner should be used to crush the stems. Allow drying time for stems to dry before baling. In the fall after plants have been killed by frost, insure that plants have no re-growth before allowing livestock to graze.

Crabgrass – Crabgrass is commonly considered a weed, but possesses significant potential for supplying high quality summer forage. Some advantages of crabgrass are that it occurs naturally in most summer pastures, especially those that have been overgrazed, and it has a good reseeding potential. Crabgrass is best adapted to well-drained soils such as sands, sandy loams, loamy fine sand, loams, and silt loams. Crabgrass is best utilized in a rotational grazing system. It can produce grazable forage in as little as in 35 days, but normally 40 to 60 days are required. Grazing can be started at 6 to 8 inches and stopped at 3 to 4 inches. Hay should be cut at the early-to-late boot stage or at a height of 18 to 24 inches. Animals should be removed at least two to three weeks before the first expected frost in the fall to allow for reseeding.

Establishment – Summer annuals should be planted when soil temperature reaches 70 ºF to 75 ºF. These summer-annual species can be broadcast seeded and cultipacked or seeded with a grain drill into a well-prepared seedbed. These species should be seeded alone rather than in mixtures since they mature at different times. A firm, well-prepared seedbed is best, although acceptable stands may be established without tillage using no-till drills. A one-third to one-half acre area could provide adequate grazing for one mature animal during the critical summer months. Seeding one-half of the acreage as early as possible and the remainder four to six weeks later can extend the useful period of these summer annual forages. One disadvantage of late planting is a reduction in yields due to hot and dry conditions in later summer. Seeds could be planted from ½ and 2-inches deep depending on the species. Seeding rates for summer annuals are relatively high because their germination rate ranges from 65 to 75%. Rates vary across the Mississippi depending upon plant variety, rainfall, growing conditions, and intended use of the forage. Plant sudangrass, sorghum-sudangrass hybrids, and millets 1 inch deep in medium to heavy soils and 1 ½ inches deep in sandy soils. If the soil is dry and rain is not anticipated before seedling

Forages continued...

by Dr. Rocky Lemus

emergence, cultipack the seedbed to maximize seed-to-soil contact and moisture conservation. See **Table 1** for seeding rates and seeding dates.

Fertilization – A soil test will provide the best information related to nutrient needs. Nitrogen is the nutrient most frequently lacking for optimum production. Nitrogen (N) fertilization is critical to achieve high yields and split applications are recommended. Split applications provide better nutrient distribution and reduce the potential for nitrate or prussic acid toxicity. Usually half of the nitrogen should be applied and incorporated prior to or at seeding, assuming that weeds are not a problem for nutrient competition. The remainder of the nitrogen can be equally divided and applied after each grazing or cutting period. This will allow the summer annual grasses to more efficiently utilize the nitrogen. Since most of the summer annuals will be planted under warmer and drier conditions, ammonium nitrate should be used for the nitrogen source. If urea is chosen, apply it prior to rainfall, and increase the amount 15 to 20% to compensate for volatilization losses.

Harvesting and Grazing Management – Summer annual grasses can be used for grazing, green chop, silage, or hay. Summer annual grasses respond better to a rotational grazing system (**Fig. 1**). When used for grazing, these grasses must be grazed at the proper stage of growth to reduce herd health problems and to optimize production. Planting dates are sequentially planned so cattle are sequentially rotated to a field that is ready to graze. The best time to graze is when plants are between 18 and 30 inches tall (6 to 8 weeks after planting). The pasture should be subdivided, and high stocking rates should be placed in the pasture to graze the grass down to six- to eight-inch stubble in 10 to 14 days and efficiently rotate cattle to the next field. It will normally take three to four weeks for sufficient re-growth for grazing again. Actual stocking rates are difficult to predict because they depend upon plant species, cattle size, soil type, fertilization, moisture, and other managerial and environmental factors. At least three or more subdivisions are needed in the rotation. With the appropriate rotation, these summer annual grasses can provide between 80 and 90 days of high quality forage. Until the producer has gained experience, committed and able to manage a good rotation, conservative stocking rates are recommended.

Sudangrass and pearl millet are usually best suited for pasture production because of their rapid re-growth rate, and cause fewer animal health issues and poisoning due to lower prussic acid levels. Sorghum-sudan hybrids and pearl millet are best suited for hay or green chop due to higher yields and good feed value when cut two or three times during the growing season. Foxtail millet is also suitable as a summer hay crop, but not well adapted to sandy soils, and it does not re-grow after cutting under dry conditions. Forage sorghums, especially the hybrids with high grain production, are best suited for chop silage since they produce high yields and have good feed value. When making hay, a mower-conditioner should be used to increase the drying rate. Making hay can be difficult because of the high moisture content and large stems. Sudangrass, sorghum-sudangrass hybrids, and millet should be harvested for silage when they are between 36 and 48 inches tall or in the boot to early-head stage (whichever comes first). Crabgrass is commonly considered a weed, but possesses significant potential for supplying high quality summer forage. Some advantages of crabgrass are that it occurs naturally in most summer pastures, especially those that have been overgrazed, and it has a good reseeding potential.

Potential Animal Health – The two most frequently reported animal health problems associated with summer-annual grasses are prussic acid poisoning and/or nitrate poisoning. To avoid possible issues, it is recommended to follow the guidelines: (1) graze or green chop only when grass is greater than 18 inches tall; (2) do not graze plants during or immediately after a drought; (3) do not graze on nights when a frost is likely; (4) do not graze after a killing frost until the plant is dry or until re-growth is greater than 18 inches; and (5) delay feeding silage for 6 to 8 weeks after ensiling.

Table 1. Establishment of summer annual forage grasses.

Forage Crop	Seeding rate (lb PLS[1]/acre)	Planting depth (in)	First grazing (weeks)	Estimated Hay Yield (ton/acre)	Palatability
Crabgrass	4 – 6	¼ - ½	5	4 – 6	High
Browntop millet	15 – 20 25 – 30[2]	½ - 1	4	2 – 3	Medium to high
Forage Sorghum	4 – 6 15 – 20[2]	1 – 2	8	3 – 6 15 – 30[3]	Medium to high
Foxtail millet	15 – 20 20 – 30[2]	½ - 1	5	2 – 3	Low
Pearl millet	12 – 15 25 – 30[2]	½ - 1 ½	5	2 – 4	High
Sudangrass	20 – 25 30 – 35[2]	½ - 1	4	3 – 4	High
Sorghum-sudan hybrids	20 – 25 30 – 35[2]	1 – 2	4	4 – 5	Medium to high

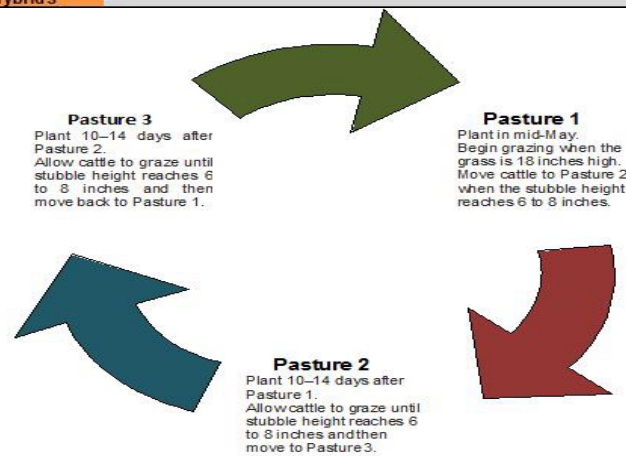


Figure 1. Rotational grazing plan for summer annual forage grasses.

Soybeans
by Dr. Trey Koger

The last six weeks have definitely been challenging for everyone trying to get a crop in the ground and up to a stand. The past few springs have been fairly dry and helped us to forget what it is like trying to get a crop in the ground and up in an extremely wet spring. This is not to say we cannot make a good crop in years with wet springs because we have in the past, it is just something we haven't dealt with in a few years. About the time you get frustrated with drowned out low lying spots in fields or bottom ends of fields where we have lost some crop, think about those dealing with flood waters that have killed entire wheat, corn, and/or soybean crops and that still have floodwaters covering a tremendous amount of their acreage. Unfortunately, it does help to put things in perspective for those not dealing with extreme floodwaters.

With respect to soybean plant populations and how low can we go and still make good yields, it is important to note that there are a lot of fields across the state that have good to excellent soybean stands. This is a blessing considering the weather they have been through the past six weeks. However, there are fields that have extremely low populations and will be replanted, fields with skippy stands that will be patch planted, and fields we are going to keep using the existing populations. In years past, we likely would have replanted some of these fields, but because of several key issues discussed below, we are going to go with the existing stands. There are several key issues regarding replanting options that can be discussed at great lengths. I will keep the discussion on these key issues brief.

First, even though we are planting a later crop than what we have planted in several years, we can still make a good crop planted in the month of May. This is especially true for irrigated acres. We moved to the early planting system to avoid late summer drought as well as late-season insect and disease pressure. Making an excellent crop that is planted late is possible, we just have to intensively manage pests that we have the tools to manage, do a good job of managing water on irrigated acres, and hope for late-season rains on our dryland acres.

Second and most importantly, seed availability is extremely tight and driving a lot of potential replant decisions. There may not be seed available for replanting in a lot of cases.

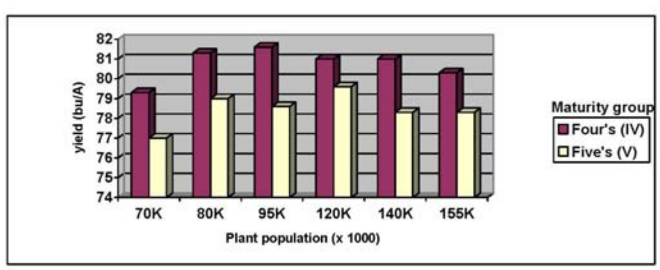
Third, the calendar date is affecting our replant decisions. Soybean planted in mid-may often will not yield as well as that planted in mid-April, especially dryland acres. Additional cost for watering replanted soybean as well as the potential losses and cost of managing late-season diseases and insects must be taken into consideration.

Fourth, the cost of seed for replanting and to kill the existing plants must be considered. Cost of seed, seed treatment, tillage or chemical used to kill existing crop, and labor should be considered and these costs can exceed $50/acre. Replanting soybean into a field and not killing what is already up either with tillage or chemicals often leads to essentially two crops that do not uniformly dry down and are difficult to manage come harvest time, and in a lot of cases the older crop actually acts like weeds that can compete with the second planted crop.

Several other issues that come into the picture and must be factored into the replanting equation are dryland vs. irrigated, row spacing, planted vs. drilled, and uniformity of existing stand, and planter capacity. Many of us are either still planting our first crop or haven't even started planting due to wet weather and/or corn replanting. In these situations planter capacity is such that we should concentrate on planting what we have left to plant and then concentrate on replanting. This will only put us later into the season when we make the replanting decisions, but getting our first planting is top priority.

I mention all of these issues not trying to discourage replanting. I know there are times when we do not have a choice and must replant a crop. These are just issues that must be considered and weighed into the decision whether to replant or not.

What population is too low? Keep in mind that a soybean plant has an excellent capability to compensate for a thin stand. A stand consisting of evenly spaced, healthy plants that came up about the same time and that does not have huge skips, often will produce adequate to good yields. It is often difficult to come up with a single plant population that will work for every field. Adequate populations that will produce adequate yields must be determined on a field by field basis. Below is a summary of a multi-year, multi-variety data set on seeding rates for group four and group five soybean varieties planted in late-April to early-May. This research was conducted at the Delta Branch Experiment Station, Stoneville in 2005 and 2006 on heavy clay soil. The trials were irrigated and



Soybeans continued...

by Dr. Trey Koger

Based on this research, yields for maturity group four and five varieties were essentially the same at plant populations of 80,000 plants or higher. A slight yield reduction was observed at populations of 70,000 plants/acre.

In situations where seed is available and when taking into consideration:

1) Calendar date

2) Cost to replant

3) Time period lost to replanting and potential yield reduction associated with mid-May planted soybean vs mid-April planted soybean

Replanting soybean this year should be considered only when plant populations are below 75,000 plants/acre. Again, keep in mind it is difficult to come up with a definitive number with so many factors involved and so many different scenarios. If you have a uniform stand consisting of healthy plants that came up at the same time, that does not have huge skips, and are at a population of at least 75,000 plants/acre it would be more advantageous to keep what you have rather than replanting. One thing to keep in mind, the minimal plant population for drilled beans in row spacings of less than 15" should be closer to 85,000 plants/acre before replanting is considered.

These recommended minimal plant populations are lower than what we would recommend in a year in which more seed for replanting is available and considering where we are on the calendar. We should never plant seeding rates to reach these low populations in hopes that they will produce optimal yields year in and year out.

In a year like this in which seed availability is so tight, we are going to keep fields with populations below this minimal recommendation of 75,000 to 85,000 plants/acre. We can still make adequate yields with populations below this, but yields are likely to be lower to a degree that is difficult to estimate but may very well be minimal. Including residual herbicides such as Sequence (glyphosate + Dual or a metolachlor product) or Prefix (Reflex + Dual) + glyphosate over the top of small soybean early in the season should be considered to combat increased weed pressure in thin soybean stands.

The table below provides the number of plants per linear row foot for various row spacings at plant populations ranging from 65,000 to 95,000 plants/acre. This information can be used to determine plant populations by counting the number of plants in a given length of planted row. If you count the number of plants in a 10-foot length of row, then divide that number by 10 the resulting number will be the number of plants per linear row foot. If you count plants from more than one 10-foot length, then divide the number of plants you counted from each 10-foot length by ten and average these numbers according to the number of 10-foot lengths counted. For example: assume you counted the number of plants from five 10-foot row lengths. The numbers you counted were 98, 102, 120, 100, and 99. Divide 98/10, 102/10, 120/10, 100/10, and 99/10. This results in 9.8, 10.2, 12, 10, and 9.9. Average these five numbers: (9.8+10.2+12+10+9.9)/5= 10.38. There are 10.38 plants per foot of row in this given field.

Plant	Soybean row spacing (inches)											
population	7	7.5	8	10	15	18	19	20	25	30	38	40
plants/acre	number of plants per linear row foot											
65,000	0.8	0.9	1.0	1.2	1.9	2.2	2.3	2.5	3.1	3.7	4.7	4.9
70,000	0.9	1.0	1.1	1.3	2.0	2.4	2.5	2.6	3.3	4.0	5.1	5.3
75,000	1.0	1.1	1.14	1.4	2.2	2.6	2.7	2.8	3.6	4.3	5.4	5.7
80,000	1.1	1.14	1.2	1.5	2.3	2.7	2.9	3.0	3.8	4.6	5.8	6.1
85,000	1.13	1.2	1.3	1.6	2.4	2.9	3.1	3.2	4.1	4.9	6.2	6.5
90,000	1.2	1.3	1.4	1.7	2.6	3.1	3.3	3.4	4.3	5.2	6.5	6.8
95,000	1.3	1.4	1.5	1.8	2.7	3.3	3.4	3.6	4.5	5.4	6.9	7.3

How to calculate plant populations: There are several ways to calculate plant populations and there is no one best method. The most important objective behind estimating plant populations is that the estimate is a good representation of the entire field. Plant populations can vary tremendously across a field due to soil type, soil roughness, and drainage aspects of the field. Populations in fields with shallow slopes are likely to be higher in the upper portion of the field and lower towards the bottom of the field due to the substantial and numerous rainfall events received this spring. Whole field populations should be estimated by taking into account areas of the field having good populations as well as drowned out depressions or skippy stand areas of the field. If a lot of thin spots exist in the field, patch planting these low population areas should be considered.

Steps to calculating the plant population in a soybean field.

1) Determine the row spacing.

2) Count number of plants from a 10 foot length of row either in 5 or 10 places throughout the field. See recommendations below.

a. For uniform stands, counting the number of soybean plants from five 10-foot lengths is suffi cient (see diagram)

b. For skippy stands, counting the number of soy bean plants from ten 10-foot lengths is sufficient.

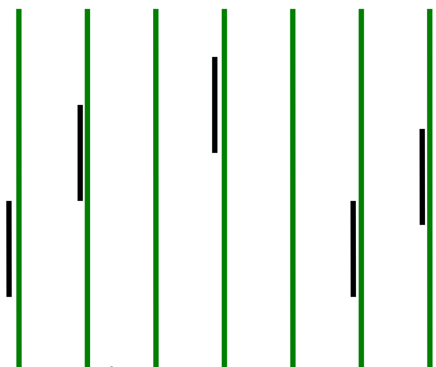
Soybeans continued...

by Dr. Trey Koger

c. Take counts from field areas that represent the entire field.

d. If the stand is thin in some areas and adequate in others, take half of the counts from the thin areas and half from adequate areas.

For uniform stands: = soybean row



For skippy stands:

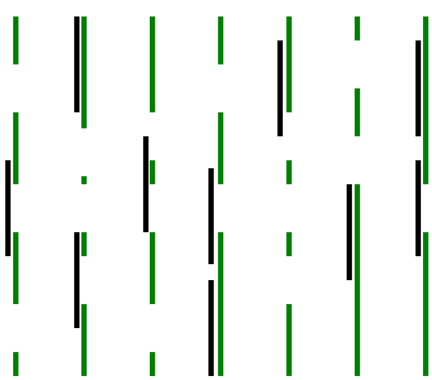
Add the total number of plants counted across all five 10-foot lengths. Then divide that number by 5.

For ex.: Assume 10, 9, 8, 9, and 10 plants were counted from the five 10-foot lengths.

10+9+8+9+10 = 46

46/5= 9.2.

There are 9.2 plants per foot of row in this field.



Add the total number of plants counted across all ten 10-foot lengths. Then divide than number by 10.

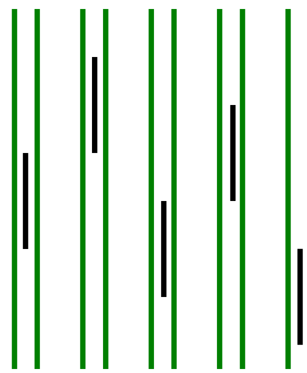
For ex.: Assume 7, 10, 7, 5, 8, 10, 7, 9, 9, and 6 plants were counted from the ten 10-foot lengths.

7+10+7+5+8+10+7+9+9+ and 6 = 72

72/10= 7.2.

There are 7.2 plants per foot of row in this field.

For uniform twin-row patterns:



Add the total number of plants counted across all five 10-foot lengths. Then divide that number by 5.

For ex.: Assume 10, 9, 8, 9, and 10 plants were counted from the five 10-foot lengths.

10+9+8+9+10 = 46

Soybeans continued...

by Dr. Trey Koger

3) Find your given row spacing in the table below and see the square foot area per foot of linear row for that given row pattern.

Row spacing (inches)	Ft^2 / linear foot of row
7	0.583
7.5	0.625
8	0.666
9	0.75
10	0.833
15	1.25
18	1.5
19	1.583
20	1.667
25	2.083
30	2.5
38	3.167
40	3.333
38 (twin) *	3.167
40 (twin) *	3.333

*regardless of distance between rows in twin-row sets.

4) Calculate the plant population using steps below:

a. Divide the number of total plants you counted by the number of 10-foot lengths you counted from.

For ex.: assume you counted a total of 92 plants from ten 10-foot lengths. Therefore you divide 92/10, which results in 9.2 plants per foot of row.

b. Divide the number of plants per foot of row you calculated (see step a. just above) by the square foot estimate provided in above table for your given row spacing.

For ex.: assume you estimated 9.2 plants per foot of row and the row spacing is 38 inches.

Step 1. Divide 9.2/3.167,which equals 2.904.

Step 2. Multiply 2.904 by 43,560*. This equals 126,539 plants/acre.

*There are 43,560 sq. ft / acre.

I hope this information provides useful information on how to determine soybean plant populations and replanting options.

Rice
by Dr. Nathan Buehring

To maximize yields and returns in 2008, early season weed control will be necessary. Two things that make early season weed control successful is timing and soil moisture.

Grass that has two leaves is a whole lot easier to control than grass that has five leaves. Research has proven this time and time again. Therefore, to achieve the most effective control of grasses, it will be imperative to make the herbicide application in a timely manor. 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.

Soil moisture is key component in making herbicides work. For preemergence herbicides, the soil moisture conditions after the application are the most critical. A preemergence herbicide needs to be activated by rainfall or flushing soon after an application. This will move the herbicide into the soil so that it can work. If the activation of the preemergence herbicide is delayed, weeds can germinate and emerge before the herbicide is activated, which will result in a failure.

For postemergence herbicides, the soil moisture conditions at the time of application are the most critical. If weeds are drought stressed, they are harder control due to less of the herbicide being taken up by the weeds since they are not actively growing. As a result, it may be better to flush before an application to get the most effective control if a rain is not in the eminent future.

Salvage situations are something we often face. I know these salvage situations are not always the result of poor management. In a salvage situation, a two-shot program may be necessary, especially under heavy grass pressure. Therefore, I generally try to start cleaning grasses up before the flood. This will allow for reduced competition between the grasses and rice at flooding. Also, if there is less grass at flooding, not as much costly nitrogen will be lost to grasses. The last couple of years, I had good results with Regiment plus their new recommended adjuvant system for large barnyardgrass control. RiceStar is another good option if multiple grass species are present. On the second shot, I will go with 15 fl oz/A of Clincher in the flood. Also in a salvage situation, it is always best to use 10 GPA by air and 15 to 20 GPA by ground.

Dr. Will McCarty retired as Associate Director of the MSU Extension Service on April 30. Of course, Will contributed directly to this audience for many years during his role as Cotton Specialist. The Agronomic Crops Group would like to sincerely thank Will for his sound leadership and extensive service to this organization, row crop producers, consultants and the entire agricultural industry during his distinguished career at Mississippi State University. We wish Will and his family best wishes.

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