

Agronomy Notes

March 2006

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Corn/Wheat By Dr. Erick Larson

Planting Pitfalls

Producers are well aware that early planting typically produces better corn yields, but rushing the process often instigates problems that overwhelm the benefits of early planting. Since southern growers are typically hurrying to get their crop planted, due to the fact that rainfall normally limits suitable fieldwork days during prime planting time, several major problems may result and substantially reduce corn yield potential.

Stand Uniformity

Francis Childs, 5-time NCGA corn yield contest winner and world record holder (442 bu/A), says "Root systems and uniform stands are the foundation of high corn yields." Variable plant spacing and seeding depth are common problems that can affect corn yield potential as much, or more than actual plant population. Planter meter system tune-up and calibration can certainly improve planter performance, but performance also depends heavily upon operator influence in the field. The most prevalent cause of seed distribution problems is excessive planter speed. Childs plants his corn at 2-4 mph. The standard maximum performance speed for plate and finger-pickup planters is 4.0-4.5 mph and vacuum-type planters is 4.5-5.0 mph. Speeds exceeding these values will usually cause much poorer seed spacing, increased double-drops, and less seed depth uniformity because seeds may roll and/or bounce in the seed furrow. Corn plants are extremely sensitive to variable plant spacing because they do not tiller or produce branches to alter their plant size. Crowded or late-emerging plants produce small, unfilled ears and spindly stalks due to intense competition for light, water and nutrients

with adjacent plants. This reduces yield potential of the whole field, because these runts steal resources from their healthy neighbors. Corn seed is available in numerous combinations of size and shape, which may also lead to planting problems. Growers with plate-type planters should match planter plates with their seed size. Likewise, growers with an air or vacuum-type planter should match disc or drum size and air pressure with their seed weight/size. Excessive wear to planter plates, finger pick-ups or worn vacuum/drum seals can also cause major problems. Remember that just because something worked last year, doesn't necessarily mean it will this year.

Avoid Planting Wet Soils

Rainy springs not only encourage growers to plant quickly, but also tempt them to plant marginally wet fields, particularly growers with large acreage. This often causes root development problems somewhat similar to shallow planting depth. Seed furrow openers will compact soil around seed trench when planting into excessively moist soil. The soil shrinks when it dries, particularly in clay soils, causing the seed furrow to open and expose the nodal roots - just like shallow planting. The hard, compacted seed furrow walls also prohibit root penetration, causing rootless corn syndrome, poor nutrient and water uptake, and exacerbate root lodging at maturity.

Seeding Rate Suggestions

Corn growers should strive for a goal of 24,000 to 32,000 plants per acre. These recommendations have increased considerably from years past, primarily because

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corn productivity is rapidly increasing and newer genetics are more tolerant of high planting rates. The desired plant population may vary depending upon a field's yield potential, planter row width and planting date. If a corn yield goal of 200 bu/A (50 bu/A soybeans or 2 bale cotton) is realistic, particularly under irrigation, then strive for 28,000-32,000 plants/acre. If this goal is unrealistic, then lower the seeding rate accordingly. You generally should exceed 28,000 plants/acre in dryland culture. Remember to over-plant the desired plant population about 5 to 10% depending upon planting conditions and seed germination. Also, having different row widths many alter optimum plant population because it ultimately affects plant spacing. Close plant spacing increases competition for light, water and nutrients, which weakens stalk quality without increasing yield potential, particularly under stress. Thus, optimum plant population in wide rows is generally around 2,000 - 4,000 plants/acre less than narrow rows. Early planted corn (soil temperature 50-55 degrees F) should be seeded about 10% thicker than normal because cool spring conditions usually promote higher seedling mortality and smaller plants with less leaf area at tassel, meaning more plants are needed to intercept available light. Conversely, growers should reduce seeding rate 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.

Corn Seeding Rate Chart:

Seed- ing Rate	Planter Row Width			Final Stand	
	30 inch	38- inch*	40- inch*	@10% loss	@5% loss
	Seed Spacing (inches)				
24000	8.7	6.9	6.5	21600	22800
26000	8.0	6.3	6.0	23400	24700
28000	7.5	5.9	5.6	25200	26600
30000	7.0	5.5	5.2	27000	28500
32000	6.5	5.2	4.9	28800	30400
34000	6.1	4.9	4.6	30600	32300
36000	5.8	4.6	4.4	32400	34200

*Growers using twin-row planters can simply double the seed spacing of their base row width to account for twin-rows.

Planting Depth

Many producers who are unfamiliar with corn seedling development plant corn too shallow. Corn seed should be planted 1 ½ - 2 inches deep. Planting depth should be set in the field during planting. This is important be-

cause soil type, seedbed condition and moisture may influence actual depth. Corn seed's inherent energy and germination process ensure emergence from depths as great as 3-inches. The initiation point of the nodal root system, the crown of the stem, is moved upward when corn seed is not planted deep enough. Corn seed placed less than 1-inch deep will develop nodal roots near or even above the soil surface. This potentially exposes these roots to factors such as hot, dry soil, herbicide injury, and insect predation which can significantly impede root development. This often leads to standability problems, nutrient deficiencies and even drought stress throughout the year. Birds may also cause stand loss by extracting shallow planted corn seeds.

Starter Fertilizer

Many corn growers utilize starter fertilizer to supplement their corn fertility program. Starter fertilizer enhances vigor, promotes earlier maturity and often improves grain yield, particularly in minimum or no-tillage systems. Starter fertilizer enhances growth primarily by providing a concentrated phosphorus supply in the root zone of young plants. Phosphorus placement is very important to young plants with small root systems because phosphorus is not mobile in the soil. Growers applying starter fertilizer in the seed furrow should apply no more than 4 gallons per acre in 38 to 40-inch rows or 5 gallons per acre in 30-inch rows, because of the threat of salting injury to seedlings. The most commonly used source of starter fertilizer is ammonium polyphosphate (10-34-0 or 11-37-0). Orthophosphate fertilizers are also available, but are much more expensive, and routinely show no yield difference compared to polyphosphate fertilizers in field trials.

Bt Refuge

Growers can plant no more than 50% of their corn acreage in Bt hybrids designed for corn borer resistance. This includes hybrids containing either YieldGard Corn Borer or Herculex 1. Growers will be required to plant an equal acreage of non-Bt corn as a refuge within a half-mile of their Bt corn. Neighbors' conventional corn does not count as refuge. The non-Bt refuge may be treated with insecticides (excluding sprayable Bt products) as needed. Thus, growers should plant their refuge as a separate block, so they may manage it separately, if infestation warrants insecticide treatment.

Prevent Stand Loss

Growers who wait to apply a burndown herbicide near planting greatly increase their likelihood of experiencing stand loss from cutworms. Cutworms feed on green winter weed vegetation present in fields during the early spring. If a burndown herbicide is applied near planting, cutworms present will be forced to feed on new, emerging corn plants (because the weed vegetation is dying

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from the herbicide application). Thus, growers should use a labeled pyrethroid before corn emergence or with the burndown herbicide to control cutworms, unless a labeled granular insecticide is applied in a band at planting. Seed treatments may require a supplemental pyrethroid application to enhance cutworm control, because they generally do only a modest job on cutworms.

WHEAT

Late nitrogen application

Frequent February rainfall may have prohibited or delayed nitrogen application on some wheat acres. If an

early split of nitrogen was applied in February, then wheat growers should have ample time to apply nitrogen without reducing yield potential. However, if nitrogen application has been prohibited thus far, growers should apply nitrogen as soon as soils dry. The final nitrogen topdress should be applied by the time the first node appears at the beginning of stem elongation (jointing, Feekes growth stage 6). This application delivers the main nutritional needs of the crop. Growers should never apply nitrogen fertilizer to wet, saturated soil.

Forage

By Dr. Richard Watson

Alternative Forage Crops one of the major focuses of the MSU forage research program

One of the greatest limiting factors on forage-based animal production in Mississippi is the difficulty in maintaining forage quality, particularly through the summer months. This problem is often compounded by the fact that many of our high quality crops are annuals (e.g. annual ryegrass), which have an inherently high risk of crop failure (as many of us experienced last fall). We are currently looking at specialty forage crops that may address these problems. One of these crop is chicory.

What is chicory?

Chicory is neither a grass nor a legume. It is classified as a forage herb or forb. Chicory originates from southern Europe (similar to alfalfa), and is a short lived (3-5 years) perennial. While chicory is a cool-season plant, it is summer-active and continues to be quite productive during the Mississippi summer. At first glance, chicory looks more like a pasture weed, such as curly dock, or the mescaline lettuce you buy in the grocery store, rather than a forage crop. I am also told that chicory is used as a coffee substitute in Louisiana. Chicory has a deep tap root (which makes it very drought tolerant) like alfalfa, broad 'lettuce-like' leaves that grow from a crown, and produces 4-5 foot tall stems with pink, purple, and blue flowers.

Chicory has very high nutritive value (crude protein 15%-30% and digestibility 75%-90%), is high in many important minerals, and palatable to a wide range of livestock, including cattle, sheep, horses, goats, and deer. Chicory is not necessarily new to Mississippi. It makes up a significant portion of the USA wildlife seed market, since deer have a particular liking for it.

However, as a grazing crop for livestock, there is limited information available on this crop in the Southeastern

environment. So how did I get onto chicory? Chicory is used a lot in countries like New Zealand and Australia where most of the livestock that require high nutritive intake (i.e. growing cattle, dairy cattle, finishing cattle) are grazed on specialty high quality forage crops, such as chicory. The relatively high cost of grain products, and general scarcity of cheap commodity feed sources, means that these high quality forage crops are a necessity for animal production. Obviously, New Zealand is not Mississippi, so why should chicory work here? Agronomists, Dr. Carl Hoveland and Dr. Don Ball (esteemed co-authors of Southern forages, with Dr. Gary Lacefield, and professors at The University of Georgia and Auburn respectively) have successfully grown chicory in agronomic plots for some years. In fact, it was Dr. Hoveland who encouraged me to perhaps take it further. Dr. David Lang, forage agronomist at MSU, has also successfully grown chicory in plots at Starkville in the past. While agronomic plots at least provide us with confidence that chicory will grow in the Mississippi environment, we still do not have any grazing data to know with any confidence if the potential could be realized or not. Many forages look very appealing in a well fertilized, manicured plot, but do not last too long when you throw grazing animals into the mix. In addition to the questions of grazing, new chicory varieties have been introduced to the market, which ultimately need evaluation.

Does chicory have a place in Mississippi cattle production?

My initial answer to this is "yes", given that we only have one full year of grazing data at one location in North Mississippi. There is still much to learn but results from our grazing and agronomic plot work have been promising to date.

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What we have found so far

Our grazing trial at the MAFES Holly Springs Branch Station has indicated that spring average daily gain was about 2.75 lb/day, and gain per acre was in excess of 600 lb/acre over a 56-day grazing period, with an average stocking rate of 3.16, 600lb steers/acre. These results were comparable to Marshall annual ryegrass. During the summer (July and August) we could stock one and a half 700lb steers/acre and maintain growth rates at 1.82 lb/day. Preliminary data from the fall of 2005 indicate that ADG is similar to spring but carrying capacity is more like two 600lb steers/acre (bearing in mind we had a severe drought in the fall of 2005). So the first year's data suggest that we have an exceptionally high productivity forage crop capable of growing stocker steers throughout much of the year.

Agronomic plot trials at Starkville indicate that chicory will yield in excess of 6 tons of forage/acre from March through November. We are also finding that variety selection may be very important in Mississippi. We have three varieties (Oasis, Puna, and Choice) that vary in levels of a compound called lactucin (Oasis = high, Puna = intermediate, and Choice = low). While we have not seen any yield difference between the three varieties in the first year, we have started to note a rapid decline in the stand of the low lactucin variety, indicating that this has a role in persistence in the MS environment. This is moot at this stage, as the low lactucin line is not available in MS anyway, and is more suitable for the dairy cattle market north of here.

Potential problems

The two red flags we have so far are that chicory does not like heavy wet soils, particularly if they are wet in the hot summer months. Like many taproot species, chicory suffers from diseases in wet ground (this may be why we see a benefit of high lactucin levels as this compound helps protect against some common diseases), and you may lose the stand in the first summer. Chicory grows best in moderate to free drained soils with no impediment to root penetration.

The other potential problem is one of weed control. Being a broad leaf, you will be unable to use any broadleaf herbicides on chicory crops (in fact 2-4-D products will kill chicory very effectively). Sethoxydim products (e.g. Poast) can be used to remove grass weeds. The upside is that chicory is a very vigorous crop and, if managed and fertilized correctly, will out-compete all of the common weed species in MS. In fact, we have exceptionally clean stands where we have good chicory growth, which brings me to Management!

Management of chicory

Chicory is best managed as a specialty crop if you intend to utilize it as a perennial. We have had success establishing chicory on a prepared seedbed and sod-seeding

into a herbicide-treated field (clip or make hay in August, spray 2.5 pt roundup/acre and seed chicory at 5-7 lb/A in early September). Seeding dates for chicory appear quite flexible, with a potential window from after the last spring frost to about 3-4 weeks before the first fall frost being optimal.

Chicory can tolerate soil pH down to 5 but tends to do better when lime, P and K are applied according to soil test recommendations for the cool-season grasses. Chicory also responds well, in fact, needs regular nitrogen applications. We have had success in a grazing situation with 33 lb N/acre applications (100 lb/A ammonium nitrate) at planting, and then during each month of grazing.

Chicory needs to be strip or rotationally grazed so that pregrazing forage height is about 8-14" and postgrazing (what you leave behind) is no shorter than 3-4". High stocking rates (over 5 head/acre) may be needed to keep on top of spring growth. If you are unable to apply this grazing pressure, you may need to clip to a height of 10-12" if flowering stems start to develop. The flowering stems are generally quite palatable but letting them go will reduce leaf production, quality, and overall yield. An extension publication will be produced this year outlining in more detail the establishment and management practices for chicory.

Holly Springs Field Day

If you would like to see the chicory grazing study there will be a field day held on the 11th of May 11th this year at the Holly Springs Branch Research Station in Holly Springs. For more information on this field day, please contact the Marshall county Extension Office at 662-252-3541.

Rice

By Dr. Nathan Buehring

Planting season is closely approaching. Variety placement and seeding rates are some things that need to be considered before planting. Clearfield 131 does not need to be planted on light soil that has the potential to straighthead. Research has shown that Clearfield 131 is similar to Cocodrie for straighthead susceptibility. If you do plant Clearfield 131 on light soil that could straight-head, do not hesitate to drain at midseason.

There has been a lot of discussion on how lower seeding rates do not affect rice yields. I think that last year producers learned where their seeding rates need to be. I know last a April was cold month and I can not guarantee what kind of weather we will have this coming April, but based on that, I would shoot for about 40 seeds/ft² in the late March and early April planting window and use a good seed treatment as well. All varieties are different in the number of seed per pound. Therefore, when planting rice based on pounds/acres, be willing to adjust the rate based on the variety. Table 1 gives the proper seeding rate (lb/A) to achieve the proper seed/ft². A lower seeding rate (30 to 35 seed/ft²) can be used if you are planting in an optimum seedbed that will result in good germination rates in the late April and early May planting window.

One of the biggest questions this winter is how to I reduce production cost. I do not have any silver bullets that can save you \$50/A without affecting yield. What I have been encouraging producers to do is look at what they did last year that possibly reduced their yield potential or cost them more money than was necessary.

Water is getting more expensive due to higher energy cost. However, not wanting to spend \$5 to \$10/A on flushing to keep a herbicide active can often lead to spending an extra \$20 to \$30/A on additional herbicides.

Grass control is very critical for getting the maximum yield potential. Letting the grass go and trying to clean it up in flood can be a very costly mistake as proven last year. Be more proactive than reactive.

With high nitrogen cost, it is imperative to capitalize on this costly investment. Getting the flood established within 5 days after the pre-flood nitrogen application will allow you to get the most out of your nitrogen. If flooding takes longer than 5 days, you need to consider using Agrotain or multiple inlet irrigation. Agrotain will protect your nitrogen for up to 10 days after application. Multiple inlet irrigation will help you get the flood established quicker and allow more flexibility in your irrigation program.

Foliar fungicides and insecticides are production costs that need to be based on the presence of the diseases and insects. Therefore, it is necessary to intensively scout to determine if the investment in a fungicide or insecticide will pay for itself. For CL 131 and CL 161, a foliar fungicide will pay for itself more times than not. Varieties, such as Cocodrie, Cheniere, Wells and Priscilla, need to be scouted to decide whether or not a fungicide application needs to be triggered.

For rice water weevil control, I would consider using an insecticide if there are rice water weevil adults or fresh feeding scars present. I would also treat if there is a thin stand of rice. Preflood pyrethroid insecticide applications have shown to be effective when applied up to 7 days before the initial flood has been established. If you are making a pre-flood herbicide application, you may consider adding a pyrethroid insecticide in the tank.

Table 1. Proper seeding rates for popular varieties grown in Mississippi.

Variety	Seed/ft ²		
	30	35	40
	-----lb/A-----		
Cheniere	62	72	83
CL 161	66	77	88
CL 131	63	73	84
Cocodrie	68	80	91
Priscilla	77	89	102
Wells	73	85	98

Cotton

By Dr. Tom Barber

As this is written most everyone has decided on cotton varieties and which technology they wish to utilize in 2006. All implications are still favorable for increased cotton acres this season we could see acreage reach 1.3 million or maybe more. Rise in fertilizer costs and declining corn prices will be the major reason for the continued increase in acreage. Of course we will not know for sure until the seeds are dropped but all indications are pointing to increased acreage.

The costs of planting cotton seem to rise every year. Technology fees continue to increase and, coupled with the costs of the seed and seed treatment, a very high front-end input cost for planting cotton. This unfortunately, will be a trend that we deal with for years to come. Considering the costs involved with planting operations we need to make sure that we follow some basic guidelines that have been around for many years. Remember the technology you buy, including the seed treatments utilized, are worthless until the cotton plant germinates. Germination and seedling health depend on many factors. Seed placement and good seed/soil contact is critical in determining germination and attaining an even cotton stand. The planter used today is very precise but keep in mind these things are not meant to run 10 mph. The faster you go with a planter over 5 mph will cause less accuracy in seed placement. This could be the difference of placing the seed in good soil moisture and popping them out on top of the ground. Once the seed is placed in the ground, several factors such as moisture, seedbed temperature, seed quality and weather forecast will determine the fate of the seed.

Seed quality, as we all know, is very important in determining the germination and vigor of a young cotton crop. Seed quality is much better today than it was ten years ago. However, we still need to look and ask your dealers and seed company representatives for cool germ tests. The cool germ test of any given seed lot should be at least 60% for high quality seed. The cool germ test is a good one to look at because it is a reliable representation of what you could expect for germination in field-like conditions. In other words, it is a relative representation of the percentage of cotton plants that will survive field conditions. The cool germ can be used as a management tool for decisions on which lot of seed to plant first. The higher cool germ should be planted first because this seed will have a greater chance of experiencing adverse conditions. As hard as we try to dodge bad weather, we have a lot of ground to cover, and in most years, adverse conditions will be experienced to some degree. This is why it is so important to check the cool germ before planting. One other key thing to remember about cool germ tests is that they are not all conducted the same.

Each individual seed company will either do a cool germ in house or contract it out. Any small differences in temperatures utilized in a cool germ test can lead to big differences in the percentage. Therefore, when looking at cool germ data, do not compare between seed companies or company name brands because the tests were probably conducted one differently. When looking at the cool germ on seed lots, only compare within company name brands.

Once the cool germ of the seed is determined, focus on the soil temperature, moisture and 5-day weather forecast. Generally we recommend planting when the soil temperature at 2 inches is 65 degrees for 3 consecutive days. This time of year the soil temperature at this depth will correspond closely with ambient temperature. Keep in mind that cool wet soils will most likely result in root tip injury. I looked at several fields last year with this symptom. A taproot that is injured early in the season could spell disaster if the weather turns hot and dry, because there will not be a viable root system to gather water and needed nutrients. Consider the 5-day forecast, as well, in determining when you need to plant. Research has shown that 50 DD60's (heat units) are required for adequate cotton emergence and stand establishment. Take note of the temperatures (Highs and Lows) for the next five days before you plant. In general, the optimum planting window for Mississippi is between April 15th and May 15th. It is important not to jump the gun and start before conditions are good. Many years you may be able to get by with starting a little early but sooner or later there is a chance we will get into bad situations. Cotton is more expensive to plant than ever before. Take an extra look at temperatures and weather forecasts before taking in out of the sack. I have included a table below that gives the 30-year average DD60 accumulations for weeks of April and May.

30 Year Seven Day Average DD Accumulation:

Stoneville, MS

Apr 9-15:	28.7
Apr 16-22:	45.6
Apr 23-29:	48.4
Apr 30-May 6	53.8
May 7 - 13:	71
May 13- 20:	85.2

Soybeans

By Dr. Alan Blaine

Variety selection remains a major challenge for the upcoming season. Supplies of the most sought after varieties are once again only available in limited quantities. Hopefully, this will minimize, to some degree, in the future but that has not been the case up to this time.

If you had problems obtaining your choices this year remember this and start early next year. I realize that when available supplies are short it becomes very frustrating. However, variety selection is still a major input and one you must live with all year.

I am sure many of you have been following the articles regarding seed regulations in Arkansas. Many different opinions exist but in Mississippi it is against our seed regulations to sell branded varieties. Based upon these possible occurrences in other areas we may need to increase our efforts of monitoring. I hope this is a minor concern but, with little enforcement due to budget constraints, I expect we are prone to be guilty of the same issues being addressed across the river.

Application of burndown herbicides shifted into high gear in the last week (March 3rd). I do not feel we are behind as a whole due to the prolonged wet, cool weather we have experienced in the last several weeks. However, it is hard to believe that just ten days ago I was fighting several inches of ice getting out of Tunica and fields were so wet I was wondering if it would ever quit raining. How fast conditions changed!

Many growers had to shift their burndown plans because of delayed applications. We have gotten a lot of calls regarding planting intervals behind 2, 4-D and Clarity from those who did not change or who just put our some materials.

Both materials have planting restrictions but 2, 4-D is less of a concern than Clarity for soybeans. The interval between application and planting depends on the formulation used, rate, soil type, temperature and rainfall. Oftentimes you will not see a problem, but the closer you apply 2,4-D to planting the greater the chance of potential injury. The best avoidance mechanism is an early application. As late as some went out, I expect to see some injury this year. I hope I am wrong but only time will tell.

Clarity is used at lower rates, but given the short planting interval, this one is a greater concern. If you have delayed burndowns and do not have any resistant weeds, just increasing the rate of Roundup is a good shot. An

application of 3 pints (4# material) can take care of a lot of concerns.

Following the great weather this week, I expect planting to start the first of the week (March 6th). It is early, but several have planted this early before. Soybeans can be planted early but consider your planting capacity, soil type, irrigated versus dryland, combine capacity and your location.

Drainage continues to be the most important factor to consider when planting early. If we experience cool, wet conditions it will impact the early season growth and development of all varieties. Soil type, bed versus flat, drainage, previous crop and level of fertility will all effect growth. Soybeans will begin the germination process at 55 degrees. Though this is not as cool as corn it can fill a niche in order to avoid planting cotton too early. With the exception of flooded acreage and double cropped beans, you should have all your beans planted before you ever start planting cotton.

Seed treatments are also an integral part of an early planting system. Although not needed in every situation, they should be viewed as insurance. Given the cost of seed and the potential yield loss due to replanting it is very inexpensive insurance.

As of March 7th, we have 12 sentinel plots planted across the state with planting beginning March 1st. We will continue to wrap up these plantings and monitor other legumes, primarily kudzu, for rust.

In the near future we plan on setting up a "1-800 information line" for rust updates. Once this line is established we will publicize the contact information.

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