Louisiana Crops NEWSLETTER

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LSU AgCenter Research · Extension · Teaching

CORN • COTTON • GRAIN SORGHUM • SOYBEANS • WHEAT

ISSUE HIGHLIGHTS

Successful soybeans depend on early-season decisions

PLANTING CONSIDERATIONS

BY TODD SPIVEY

Soybean planting practices vary across Louisiana because of different environments and cropping systems. Planting date, seeding rate and seeding depth decisions should be based on local conditions, such as soil moisture and temperature, soil type and crop rotation.

Planting date

Our optimal planting window typically is April 10 to May 10. Although it is possible to produce high yields outside of this window, LSU AgCenter research has shown yields are most consistent when planted between those dates.

Due to recent mild winters in Louisiana, it is not uncommon to plant soybeans as early as late March, though precautions must be taken to account for cool, wet conditions that often occur at that time. Monitor soil temperatures carefully if you intend to plant early.

Soils should reach at least 55 to 60 degrees Fahrenheit by 10 a.m. before planting. The forecast for up to seven days after planting also should be considered for early-planted soybeans, as emergence will be affected by cool soil temperatures.

Soybeans are a photoperiod sensitive crop, so planting date directly influences the number of days to flowering. Timely planted soybeans have more time and greater potential to develop adequate vegetative infrastructure to support maximum yields than late plantings. The goal of vegetative growth, as it concerns planting date decisions, is to close the canopy before the R1 growth stage (first flower).

Seeding rate and depth

Seed size can vary by variety and even by seed lot within a variety, so pounds of seed per acre should never be used to determine seeding rates. Instead, rates should be based on seed per foot (**Table 1**). Seeding rates that are too low do not allow for adequate vegetative infrastructure for optimal yields. On the other hand, seeding rates that are too dense can reduce yields, encourage disease proliferation and lodging, and increase seed cost.

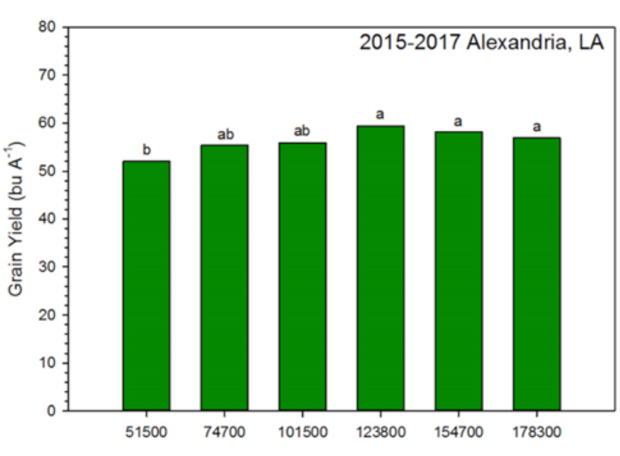
Research conducted by the LSU AgCenter has shown that soybean yields are not reduced with populations as low as 70,000 plants per acre as long as plants are uniformly distributed through the field (**Figure 1**). These same studies show that yields do not increase with higher seeding rates of up to 175,000 seed per acre. The AgCenter recommends 140,000 soybean seed per acre on sugarcane beds. In most other systems, seeding rates should range from 115,000 to 130,000 seed per acre in optimal planting conditions on 30-inch rows.

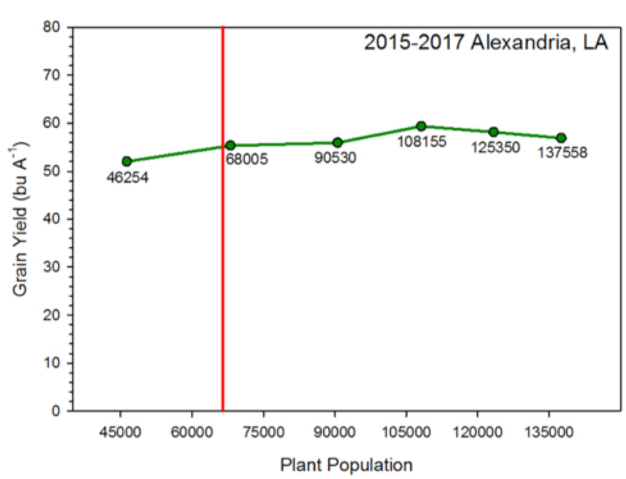
Seeding rates should be increased to between 125,000 to 140,000 on 20-inch or smaller rows. Regardless of row spacing, these values should be adjusted up to a maximum of 150,000 seed when environmental conditions before or after seeding are not conducive to seedling development. These environmental conditions are often encountered with early plantings and include cool soil temperatures and excessive soil moisture. Late-planted soybean seeding rates also should be adjusted up to account for the lack of time available for vegetative growth before flowering. With few exceptions, soybean seeding rates in Louisiana should not exceed 150,000.

Plant only deep enough to place the seed in moist soil. Depending on soil moisture, seed should be planted from 0.75 to 1.5 inches in sandy or silt loam soils and 1 to 2 inches in clay soils. Good seed-to-soil contact is imperative, especially when planting into residue from the previous crop or cover crop. Although planting deeper often results in reduced vigor, many of our varieties can emerge from depths below what is recommended, and growers can err on the deep side if soil coverage is a concern.

ROW SPACING	6-foot sugarcane bed		38 inches	36 inches	20 inches	15 inches	7 inches
	three drills	two drills					
SEED PER FOOT							
150,000 seed	6.9	10.3	10.9	10.3	5.7	4.3	2.0
140,000 seed	6.4	9.6	10.2	9.6	5.4	4.0	1.9
130,000 seed	6.0	9.0	9.5	9.0	5.0	3.7	1.7
120,000 seed	5.5	8.3	8.7	8.3	4.6	3.4	1.6
115,000 seed	5.3	7.9	8.4	7.9	4.4	3.3	1.5

TOP: Table 1. Seeding rates expressed as seed per foot of row.





BOTTOM: Figure 1. LSU AgCenter studies have shown seeding rates as low as 75,000 seed per acre are able to maintain optimal yield.

SEEDLING DISEASE AND FUNGICIDE CONSIDERATIONS

BY TREY PRICE

Early-season disease concerns can include *Pythium* or *Phytophthora* species, causing seed rot, damping off or root rot in areas that are not well drained. Group 4 seed treatment fungicides provide some protection against these species. If soils are well drained and planting conditions are optimal, disease caused by these pathogens is unlikely.

Pre-emergence seedling disease or post-emergence damping off caused by *Rhizoctonia solani* is the most commonly observed seedling disease in soybeans in Louisiana (**Figures 2 and 3**). Plants surviving the seedling stage may develop root rot, resulting in delayed development and stunting. Stresses such as cold weather, nematode and insect infestation and herbicide damage may exacerbate *Rhizoctonia* damping off.

In recent years, less-than-ideal planting conditions have caused significant stand losses in Louisiana. Seed treatments containing a strobilurin (Group 11) or SDHI (Group 7) compound are very effective at reducing incidence and severity of *Rhizoctonia* damping off. The pathogen population, which is soil-borne, may be reduced during long periods of flooding, when soil temperatures are high and in fallow fields. Potential for disease is greater in lighter soils, and optimal conditions for disease development are 75 to 90 degrees with 30 to 60 percent soil moisture, although the pathogen is capable of causing disease at lower temperatures and in any soil type.

"Base" fungicide seed treatments — usually consisting of metalaxyl or mefenoxam plus at least one broad spectrum fungicide — have become more common. In most cases, base treatments adequately protect seedlings under the adverse growing conditions often encountered early in the planting window.

Results from many years of field research trials at research stations across the state indicate fungicide seed treatments will result in increased stand under moderate to severe disease pressure. However, realizing significant yield preservation and economic benefit in soybeans is the exception rather than the rule.

If your seed company does not offer a choice of seed treatments, the base offering likely will be sufficient. It is unnecessary to over-treat base fungicides with additional fungicides in soybeans unless you are targeting a specific problem on your farm. Also, know which fungicides come on the seed, as it is redundant to over-treat with a fungicide having the same mode of action.

Figure 2. Thin soybean stand as a result of *Rhizoctonia solani*. LSU AGCENTER PHOTOS

Figure 3. Soybean seedling infected by *Rhizoctonia solani*.

If seed companies offer "naked" seed, soybeans may be planted without a fungicide seed treatment as long as you have no history of seedling disease issues, plant in the recommended window, achieve appropriate soil temperature and soil moisture, and schedule planting when the long-term weather forecast is ideal for soybean development. If you prefer to plant fungicide-treated seed, significant cost savings may be attainable by allowing distributors to over-treat or treating naked soybean seed yourself.

INSECT PESTS AND INSECTICIDE CONSIDERATIONS

BY SEBE BROWN

Soybeans can be planted from early March to late June in Louisiana. This wide range of planting dates exposes seedling soybeans to a multitude of insect pests that affect both above- and below-ground plant structures.

OPTIMAL SEEDING DATES IN LOUISIANA BY MATURITY GROUP	
Group III	April 15 to May 10
Group IV	April 15 to May 10
Group V	March 25 to May 5
Group VI	March 25 to April 30

Soybean seedlings possess exceptional vigor and can tolerate substantial insect injury. However, early-planted soybeans also may encounter greater environmental fluctuations that affect air and soil temperature. Cool conditions can reduce vigor and, under the right conditions, stall plant growth and development. The addition of insect injury increases stress on the plant, resulting in loss of stand and yield potential. Therefore, using an insecticide seed treatment (IST) provides growers a risk management tool when soybeans are planted early. The primary insect pests of early-planted soybeans are bean leaf beetles, wireworms and grape colaspis.

On the opposite end of the spectrum are soybeans planted late — those planted behind wheat or that are late due to unforeseen circumstances, such as inadequate or excessive soil moisture. These beans are more at risk for insect injury due to the potential for large insect populations to build in neighboring fields and generally more insects being present.

As a general rule with all agronomic crops, the later the crop, the more insect pressure there will be throughout the season. This is particularly evident when soybeans are planted into wheat stubble. Wheat stubble is favorable for the development of three-cornered alfalfa hoppers and thrips. Thus, an IST is a sound investment when soybeans are planted late.

However, soybeans that are planted within the recommended planting window under optimal soil conditions and low pest densities often will not benefit from the addition of an IST. Insecticide seed treatments typically produce the most benefits when environmental conditions are sub-optimal. With the current economic climate, many farmers are looking for ways to cut input costs. It is difficult to justify using an IST on soybeans planted under optimal conditions. That money could be better spent on something with a greater economic return — for example, a stink bug application later in the season.

In addition to early or late plantings, there are other situations in which ISTs are justifiable. These include weedy fields with incomplete burndown applications, reduced tillage field arrangements, fields with historically problematic early insect pests (such as wireworms and three-cornered alfalfa hoppers) and continuous plantings of one crop. Each field is unique, and the use of ISTs as a blanket treatment over every acre may not be justifiable with $8 soybeans.

Soybeans are planted on a farm near Port Barre, Louisiana, in May 2016. LSU AGCENTER FILE PHOTO

EARLY-SEASON WEED CONTROL
BY DANIEL STEPHENSON

Data have shown that keeping soybeans weed-free for the first five weeks after emergence is required to maximize yield. To do this:

1. Apply a residual herbicide to the soil after planting and before soybean emergence. This application is commonly called a pre-emergence, or PRE, application. The choice of PRE herbicide depends on the weed spectrum in the field, so call your LSU AgCenter parish agent or a weed scientist for help. If small weeds are present at planting, tank-mix paraquat at 0.5 lb ai/A (32 oz/A of a 2 lb/gallon formulation or 21.3 oz/A of a 3 lb/gallon formulation) with the PRE residual herbicide to provide control.

2. Apply a residual herbicide, such as Dual Magnum, Zidua, Zidua SC, Warrant, Prefix or Warrant Ultra, at labeled rates tank-mixed with glyphosate or Liberty post-emergence (POST) two to three-and-a-half weeks after PRE application.

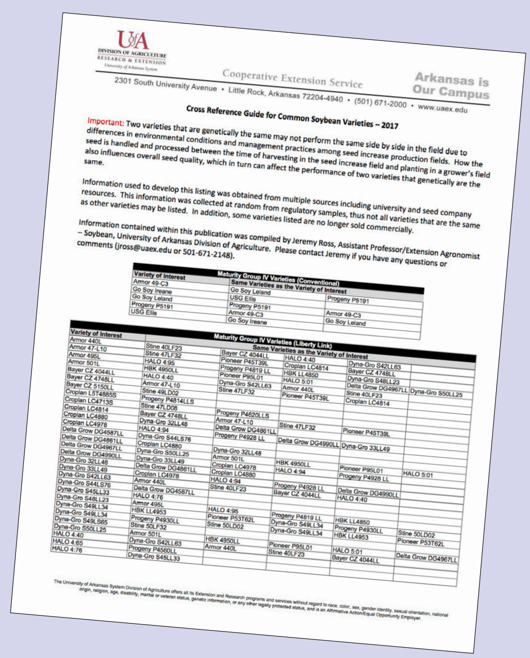
Farmers, consultants and pesticide dealers often worry about injury to soybean seedlings by a PRE herbicide and don't want to use them. I have evaluated PRE herbicides in soybeans for the past eight years, and rarely have I observed a reduction in yield due to early-season herbicide injury. Did some of these herbicides reduce soybean growth? Yes, but when growing conditions are proper, yield most likely won't be reduced.

Glyphosate-resistant Palmer amaranth and waterhemp, both pigweed species, can be found in virtually all Louisiana parishes where soybeans are grown. To manage resistant pigweeds, a herbicide program must contain residual herbicides. Also, a herbicide program for resistance management must contain multiple modes of action, meaning every herbicide applied kills the weed in a different way. If a weed isn't killed by a herbicide application, the first thing to do is remove it from the field by pulling it up, then call us to help you figure out why the herbicide application didn't work. §

Soybean cross-reference variety guide available

Jeremy Ross, an assistant professor and extension agronomist at the University of Arkansas Division of Agriculture, has compiled a cross-reference guide of common soybean varieties. The tables in the guide indicate which varieties are similar to others. The information is from 2017.

Click here to access the guide. §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Cross Reference Guide for Common Soybean Varieties – 2017

Watch for signs of rust, scab in wheat

BY BOYD PADGETT AND TREY PRICE

Currently, wheat diseases have not been observed at the Dean Lee Research Station in Alexandria or at the Macon Ridge Research Station in Winnsboro. However, leaf rust has been reported at the at Ben Hur Research Farm in Baton Rouge. Information on disease development and symptoms is below.


At left, stripe rust pustules, and at right, stripe rust in early-season wheat.
LSU AGCENTER PHOTOS

Stripe rust development is most aggressive when temperatures are 50 to 65 degrees Fahrenheit in the presence of intermittent rain or dews (six to eight hours). However, development can occur when temperatures range from near freezing to 70 degrees. Initial infections on seedling wheat may not have the characteristic striping pattern that occurs on older plants. Seedling infections often occur in thumb-sized clusters on the leaves as opposed to a random distribution that occurs with leaf rust. Infections may appear as linear rows of small yellow to light orange pustules (stripes) on the lower leaves during late winter or early spring. Striped patterns are typical of infections in older pants. If conditions remain favorable for development, pustules may cover the entire upper leaf surface as well as portions of the head. A life cycle from infection to reproduction can be completed in seven to 10 days under optimal conditions.


At left, stripe rust on tillering wheat, and at right, a stripe rust hotspot.

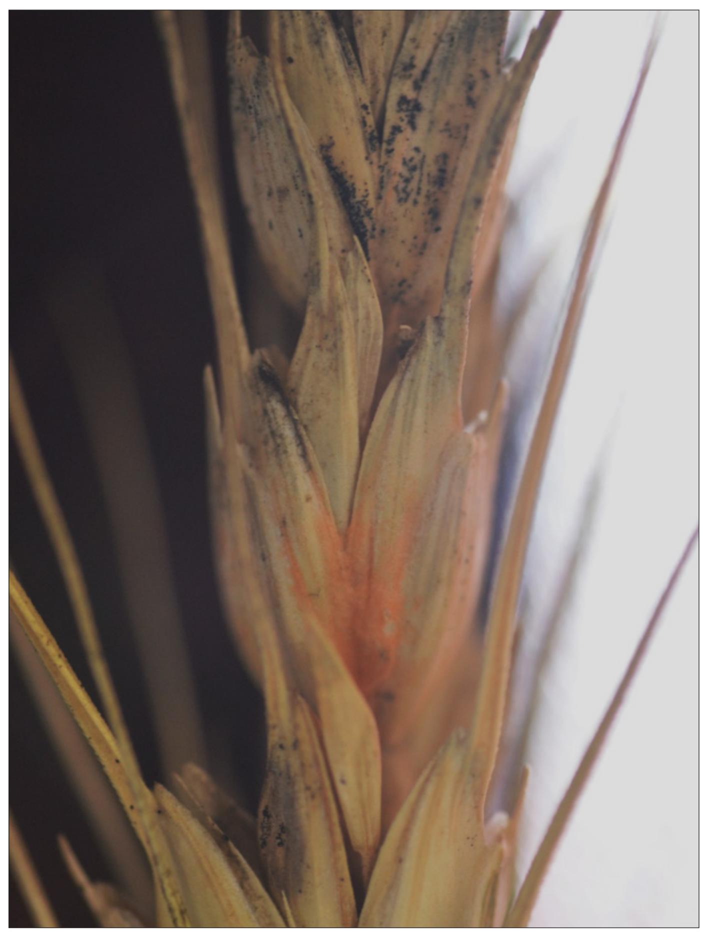
Leaf rust is usually evident later in the season than stripe rust. This is because the leaf rust pathogen requires warmer temperatures for development. Initial symptoms of leaf rust begin as brick red spots, usually on the lower foliage. As the disease develops, small "pinpoint" pustules form on the upper leaf surface. Pustules are dark orange to brick or dark red and occur randomly on the leaf. Similar to stripe rust, leaf rust pustules can cover the entire leaf surface if conditions remain favorable for development. A life cycle can be completed in seven to 10 days. The disease develops optimally when nighttime temperatures are 50 to 70 degrees and leaves remain wet for six to eight hours.

Stripe and leaf rust can be managed by selecting resistant varieties. This is the first line of defense; however, if genetic resistance is not available, some fungicides are effective. To manage rust and other foliar diseases, applications should be made when wheat is at flag leaf emergence (F8 stage of development).

Leaf rust.

Fusarium head blight (scab) devastated Louisiana wheat during the 2015 to 2017 growing seasons. The fungus damages the grain directly and produces the mycotoxin deoxynivalenol (DON), which is toxic to animals and humans. Damage caused by this disease was in part responsible for the lowest wheat acreage on record for Louisiana in recent years. There are several reasons this occurred. First, warm and wet weather during flowering favored infection. Second, these conditions persisted, which fueled epidemics. Third, there are no highly effective management practices (varieties or fungicides), making the disease difficult to control.

The fungus can infect corn; therefore, wheat grown in fields planted to corn the previous year may be at higher risk for this disease. Infected corn debris — as well as wheat straw and other hosts — can serve as initial inoculum. Fungal spores produced on this debris are dispersed by rain splash or wind to nearby wheat plants. Other inoculum can be introduced into the field as windblown spores. Later in the season, plant-to-plant spread is possible. Infection can occur from head emergence to harvest, but infection during the flowering to soft dough stages is most damaging.



Salmon-colored fungal spores from scab on grain.

Conditions that favor infection are temperatures from 75 to 85 degrees and 48 to 72 hours of free moisture.

Symptoms of the disease can appear 10 to 14 days after flowering as bleached heads, which will be evident from the turn row. This symptom is often mistaken for the appearance of maturing wheat. Upon closer inspection, affected wheat heads usually will have infected kernels showing the characteristic bleached appearance with pinkish, salmon or light orange coloration along the glumes. This coloration is millions of microscopic spores, or reproductive structures, of the fungal pathogen. There are usually healthy kernels along with the diseased kernels on the same head; however, the entire head may be infected in extreme cases. At harvest, affected seed will be shriveled, off color and much lighter than healthy kernels. These are referred to as "tombstones."

While there is no single effective management practice, combining a moderately resistant variety with a timely fungicide application for suppression can reduce the damage from this disease. It is important to have a management plan in place before planting. In the past several years, LSU AgCenter scientists have been able to evaluate scab severity in varieties at some official variety trial locations.

These ratings can be found by clicking here or by visiting www.wheat.lsu.edu. This information can be used to avoid planting a susceptible variety. However, varieties that rate low for scab may not be resistant because conditions may not have been conducive for infection at the time of flowering. Determination for genetic resistance should be based on multiple locations and years when scab was present. AgCenter scientists also collaborate with other scientists across the country as a part of the U.S. Wheat and Barley Scab Initiative. Efforts from this multi-state initiative are directed toward identifying varieties and practices to manage this disease. In addition, new and existing fungicides are being evaluated.

Other management practices that may be helpful include crop rotation with a non-host crop, tillage, mowing or shredding, and staggered planting based on varietal maturity. At harvest, combine fan speed may be increased to blow out infected seed, which is lighter than healthy seed. These cultural practices alone will not completely manage scab. But it is important to take multiple approaches to managing this disease. §

At left, bleached heads infected by scab fungus. At right, infected seed on top and healthy seed on bottom.

Growing degree days and corn development

BY DAN FROMME

Corn growth and development is closely related to temperature. Warmer temperatures mean faster corn growth, and cooler temperatures mean slower corn development.

Temperatures are used to calculate growing degree days (GDD). Some people call them heat units (HU). Several formulas exist to calculate these GDD, but the one used most often is the “modified 86/50 cutoff method,” or MGDD.

To calculate MGDD for any given day, subtract 50 from the average daily temperature. The average daily temperature is calculated by adding the daily high and the daily low temperatures, then dividing by two.

$$\text{GDD} = \frac{\text{max temp} + \text{min temp}}{2} - 50$$

There are two rules for calculating MGDD. First, if the daily high was greater than 86 degrees Fahrenheit, then 86 is used to calculate the average. Second, if the daily low was less than 50 degrees, then 50 is used to calculate the average. These upper and lower temperature limits define the boundaries beyond which corn develops very slowly, if at all.

Through the years, we have talked about the number of MGDD accumulation when silking or physiological maturity (black layer) occurs. For example, a particular hybrid may silk at 1,365 MGDD or reach physiological maturity at 2,800 MGDD.

Another useful purpose for following MGDD accumulation is to track the rate of leaf development prior to pollination. From the V1 to V10 stages of development, new leaves (defined by the appearance of leaf collars) emerge at a rate of about 85 MGDD per leaf. This is equivalent to about one leaf every five to six days in early April. From V10 to the final leaf, leaves emerge at a rate of about 50 MGDD per leaf.

This information can be used to estimate how far along corn should be for any given location if we know the planting date and the MGDD accumulations since the planting date. It is especially important to know the emergence date, but if this is not known, we can use 125 MGDD from planting to emergence.

For instance, corn should reach the V6 growth stage by the time 635 MGDD have accumulated since planting. This is calculated by using 125 MGDD from planting to emergence, then figuring 510 MGDD (6 x 85) from emergence to V6.

Also, we can use this information to compare predicted leaf development for different years. **Table 1** shows accumulated MGDD from the emergence dates (March 1 and March 15) and the predicted leaf stage as of April 19 for each year. Remember that a shortage of MGDD resulting from early-season cool temperatures can really never be recovered. Mid-summer days in the 90s do not necessarily accelerate MGDD accumulations because the rate of growth is minimal when temperatures are above 86 degrees.

Also, plant stress caused by factors like soil compaction, excessive soil moisture, pest injury and hail damage can interfere with this relationship and slow leaf development. Comparisons of predicted leaf development stages with actual leaf stages can therefore be used as an indicator of plant stress. §

Table 1. Estimates of leaf stage development for March 1 and March 15 emergence dates for three different years at the Dean Lee Research and Extension Center in Alexandria, Louisiana.

	APRIL 19, 2015		APRIL 19, 2014		APRIL 19, 2012	
EMERGENCE DATE	ACCUMULATED MGDD	ESTIMATED LEAF STAGE	ACCUMULATED MGDD	ESTIMATED LEAF STAGE	ACCUMULATED MGDD	ESTIMATED LEAF STAGE
March 1	772	9	466	5	932	11
March 15	673	8	391	4	732	9

LSU AGCENTER SPECIALISTS

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