LOUISIANA CROPS NEWSLETTER, MARCH 2020

Soybean planting considerations

By David Moseley, Josh Copes, Boyd Padgett, Sebe Brown and Daniel Stephenson, LSU AgCenter scientists

Soybean growth and development is largely affected by photoperiod (the amount of sunlight and darkness per day). When the day length falls below a critical period for a maturity group, the plant will be induced to flower (R1 growth stage). The plant at the R1 growth stage has switched from building vegetative plant structures to building more reproductive structures. This is more apparent in determinate soybean varieties, which cease vegetative growth once the plant is induced to flower, than in indeterminate varieties. Indeterminate varieties typically will continue vegetative growth until the R5 growth stage (beginning seed).

Day length in Louisiana becomes shorter as the growing season continues. Thus, the planting date will directly affect the yield potential of soybeans. Earlier planting dates will allow the plant to develop more photosynthetic material before the onset of flowering. This is especially true for determinate varieties (typically mid-MG5 and up). In Louisiana, late March plantings are often possible; however, caution should be taken as soybean seed can be damaged during cool temperatures and saturated soil conditions that often occur in March. The optimum planting dates for Louisiana are from mid-April until mid-May. As planting dates become later, potential yield will be lost.

Nutrients

Availability of most soybean nutrients is greatest in a soil pH range from 6.2 to 7.0. If lime is required, it should be applied and incorporated into the soil in the fall. This mixing of the soil with the lime and fall application allows time for the lime to react with some of the soil acidity. If soil pH is below 6.2, a molybdenum seed treatment is recommended. Molybdenum is an essential nutrient for nitrogen fixation in soybeans. However, if a soybean inoculant is to be used in conjunction with a molybdenum seed treatment, the seed should be treated the day of planting. Using a soybean seed inoculant is recommended if the field has not been planted with soybeans within three years. Soil tests should be collected every three years from fields to determine nutrient replacement and lime needs. For a 55-bushel-per-acre crop, soybeans use approximately 5.2 pounds of nitrogen, 1.0 pounds of phosphorus and 3.4 pounds of potassium per bushel. In a 55-bushel-per-acre crop, soybeans remove from the field approximately 4 pounds of nitrogen, 0.8 pounds of phosphorus and 1.4 pounds of potassium per bushel. This equates to 220 pounds of nitrogen, 44 pounds of phosphorus and 77 pounds of potassium removed per acre for a 55-bushel soybean crop. Proper fertility management is critical for producing optimum soybean yields.

Optimum seeding rates

The planter should be calibrated using seed per foot instead of pounds of seed per acre. Different varieties will vary in their seed size; therefore, seed per foot will be more accurate than pounds of seed per acre. **Table 1**, adapted from the 2020 Soybean Variety Yields and Production Practices, includes recommended seed per foot at various row spacings.

Table 1. LSU AgCenter recommended seeding rates

Row width (inches)	Seed per row foot	Plants per row foot	Population in 1,000s
36 to 40	8 to 9	6 to 8	78 to 104
30 to 32	6 to 7	4 to 5	78 to 104
20 to 24	5 to 6	4 to 5	104 to 130
7 to 10	4 to 5	3	104 to 130
Broadcast	5 to 6/sq. ft.	3/sq. ft.	150
Late planting	6 to 7/sq. ft.	4/sq. ft.	200

When planted in the optimum period (mid-April to mid-May), recommended soybean seeding rates are approximately 120,000 to 130,000 seeds per acre, with a final stand of approximately 104,000 to 113,000 plants to acre. This planting rate and final stand require an 87% germination and survival rate of seedlings. This rate of survival would likely require optimum planting conditions and possibly seed treatments. Therefore, if planting under less-than-favorable conditions, seeding rates may need to be increased.

Planting conditions

It is recommended that soil temperatures reach 60 degrees Fahrenheit before planting. Soybean seed should not be planted in soils below 50 degrees, as the seedlings can be damaged during the rapid water imbibition stage. Make sure there is a favorable weather forecast for at least 48 hours after planting to prevent soil temperatures from dropping below 50 degrees. The seed should be planted to ensure good seed-to-soil contact and planted between 1 to 2 inches deep, depending on soil moisture conditions. Soybean seed is sensitive to compaction and saturated soils; therefore, favorable soil conditions and proper planter settings are critical for optimum soybean germination and stand establishment. Wet soil conditions at planting could lead to the compaction of the seed furrow side walls, limiting outward root growth. The most important day in a seed's life is the day it is planted. Plant during the most favorable conditions possible to help prevent the need for replanting.

Seed treatments

Seedling diseases are usually not an issue when soybeans are planted during favorable weather for seed germination and seedling establishment. However, when planting occurs during adverse weather, a basic fungicide seed treatment can help ensure stand establishment. Seedling diseases are a greater concern when soils are wet. Diseases associated with cool to warm, saturated soils include root rots and preemergence and postemergence damping-off caused by *Pythium*, *Fusarium* and *Rhizoctonia*. Diseases associated with temperatures above 60 degrees and saturated soils are *Phytophthora* root rot and some *Pythium* species.

Soybeans can tolerate a substantial amount of insect injury during the seedling stage. However, early-planted soybeans may also encounter greater amounts of environmental fluctuations that affect air and soil temperatures. Cool conditions can negatively affect vigor and, under the right conditions, stall plant growth and development. The addition of insect injury to the aforementioned environmental conditions increases stress the plant encounters, resulting in loss of stand and yield potential. Therefore, the inclusion of 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, threecornered alfalfa hopper, wireworms, grape colaspis and thrips.

On the opposite end of the spectrum are soybeans planted late in the growing season. 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 present in the environment. As a general rule, the later the crop, the more insect pressure that will be encountered throughout the season. This is particularly evident when soybeans are planted into wheat stubble. Wheat stubble is favorable for the development of threecornered alfalfa hoppers. Thus, an IST is a sound investment when soybeans are planted late.

Early-season weed control

Planting soybeans in a weed-free field is very important. An application of herbicides for control of winter vegetation (burndown) four to six weeks prior to planting is the primary method producers use. However, issues could arise if fields scheduled for soybeans receive a burndown application more than six weeks before planting. When that occurs, a second burndown application may be needed to control newly emerged weeds. Another option is to apply paraquat at 0.5 lb. ai/acre plus 0.25% v/v nonionic surfactant or 1% v/v crop oil concentrate at planting. To help keep the soybeans weed-free during and after emergence for at least three weeks, a residual herbicide should be applied preemergence. It can be tank-mixed with the paraquat applied at planting if needed. However, the choice of residual herbicide is not a one-size-fits-all scenario because weed spectrum dictates residual herbicide choice. Data have shown that maintaining weed-free soybean fields for the first five weeks after emergence will help ensure maximum yield. A great program is one that contains a residual herbicide applied preemergence followed by a postemergence application of a residual herbicide tank-mixed with a non-selective herbicide three to four weeks after emergence.

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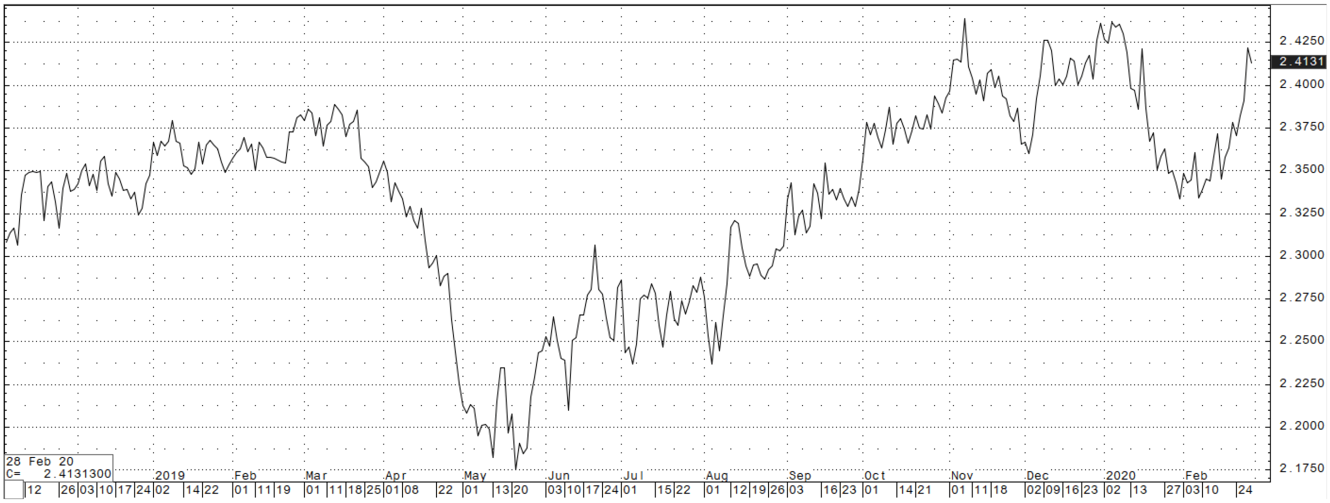
What can be inferred from new crop soybean-to-corn price ratios?

By Michael Deliberto, LSU AgCenter economist

In determining a farm's crop mix, there are a wide range of factors to be considered. Such factors include acreage availability, rotational strategy and spring weather conditions that could potentially impact the actual planting activities and ultimately affect the final crop mix. Two crops that commonly compete for acreage are corn and soybeans. Often, producers will use the soybean-to-corn price ratio prior to planting as an indicator of the relative profitability of the two crops. The intent is to gain insight on the relative profitability of the crops on paper when comparing the November soybean futures price to the December corn futures price. Nationally, values for new crop soybean-to-corn futures that are close to 2.5 favor the planting of soybeans, and values below 2.3 favor the planting of corn. Values in the middle are more of a gray area. For those values that are not indicative of one crop's superiority to the other, additional resources can be employed in assisting producers in their decision.

As of March 5, November soybean futures were trading at $9.112 per bushel. December corn futures were trading at $3.842 per bushel. The implied soybean-to-corn ratio was 2.37 ($9.112/$3.842). To put this price ratio into perspective, the last day of February saw the new-crop soybean-corn ratio would seem to suggest that producers were more likely to plant corn than soybean in the coming weeks and months. The graph below provides a yearly account of the November soybean-to-December corn futures ratio. Movement in the price ratio below its February close of 2.41 to now 2.37 indicate that corn is gaining ground. Prior to that, the January ratio was retreating, implying that more corn acres were possible. It is important to note that the long-term average for the soybean-corn ratio is around 2.40.



Source: Marketwatch

Because the longterm ratio falls within the gray area for producers, one might ask, “What factors can change the price ratio?” The simple answer is the futures prices for the commodities themselves. For instance, the uncertainty of the 2020 crop year could cause price volatility to rise for both grain and oil seeds. If fears associated with COVID-19 begin to subside, the impact of the Phase 1 trade agreement could be more quickly felt with a surge in Chinese demand for U.S. soybeans. Some market observers see this as a bullish sign for soybean prices.

For those cases where the soybean-corn price ratio falls within the gray area — close to 2.4 — producers can gain additional insight into determining the relative profitability of corn and soybeans by using a farm management tool developed by the LSU AgCenter. The tool compares the net returns per acre for corn and soybeans by taking into account production costs, expected yields, market prices and land rents for both crops so that a pair-wise comparison can be made. Results are presented in tabular format over a given set of prices and yields. The figure below is a screen view of the user interface of the decision tool.

Corn Net Return Advantage Compared to Soybean Net Returns

Corn Variable Costs =	**$447** per acre	Soybean Variable Costs =	**$350** per acre
Corn Expected Yield =	**160** bushels per acre	Soybean Expected Yield =	**50** bushels per acre
Corn Share Rent =	**20%** crop share	Soybean Share Rent =	**20%** crop share
Corn Cash Rent =	**$0** per acre	Soybean Cash Rent =	**$0** per acre

Corn Price ($/bu) \ Soybean Price ($/bu)	$9.00	$9.25	$9.50	$9.75	$10.00	$10.25	$10.50	$10.75	$11.00
$3.00	-73	-83	-93	-103	-113	-123	-133	-143	-153
$3.25	-41	-51	-61	-71	-81	-91	-101	-111	-121
$3.50	-9	-19	-29	-39	-49	-59	-69	-79	-89
$3.75	**$23**	**$13**	**$3**	-7	-17	-27	-37	-47	-57
$4.00	**$55**	**$45**	**$35**	**$25**	**$15**	**$5**	-5	-15	-25
$4.25	**$87**	**$77**	**$67**	**$57**	**$47**	**$37**	**$27**	**$17**	**$7**
$4.50	**$119**	**$109**	**$99**	**$89**	**$79**	**$69**	**$59**	**$49**	**$39**
$4.75	**$151**	**$141**	**$131**	**$121**	**$111**	**$101**	**$91**	**$81**	**$71**
$5.00	**$183**	**$173**	**$163**	**$153**	**$143**	**$133**	**$123**	**$113**	**$103**
$5.25	**$215**	**$205**	**$195**	**$185**	**$175**	**$165**	**$155**	**$145**	**$135**
$5.50	**$247**	**$237**	**$227**	**$217**	**$207**	**$197**	**$187**	**$177**	**$167**
$5.75	**$279**	**$269**	**$259**	**$249**	**$239**	**$229**	**$219**	**$209**	**$199**
$6.00	**$311**	**$301**	**$291**	**$281**	**$271**	**$261**	**$251**	**$241**	**$231**
$6.25	**$343**	**$333**	**$323**	**$313**	**$303**	**$293**	**$283**	**$273**	**$263**
$6.50	**$375**	**$365**	**$355**	**$345**	**$335**	**$325**	**$315**	**$305**	**$295**
$6.75	**$407**	**$397**	**$387**	**$377**	**$367**	**$357**	**$347**	**$337**	**$327**

Values in table equal to corn net returns minus soybean net returns above variable costs

Source: LSU AgCenter.

The cotton, corn and soybean net return comparison tool can be accessed free of charge at www.lsuagcenter.com. Please select Topics-Crops-Cotton-Budget icons to be directed to download the Microsoft Excel spreadsheet and accompanying user's guide.

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Cotton seed treatment considerations

By Sebe Brown, LSU AgCenter entomologist

In Louisiana and the cotton belt, thrips are considered the No. 1 early-season pest of seedling cotton. Tobacco thrips compose the primary species infesting Louisiana cotton, while western flower thrips are often present at lower numbers. With the absence of Aldicarb (although we now have a commercially available Aldicarb replacement named AgLogic), insecticide seed treatments now dominate the early-season cotton insect pest management landscape. As of 2020, there are only two seed treatment options: acephate and neonicotinoids. Imidacloprid and thiamethoxam are the two most commonly used neonicotinoids. These treatments are offered alone and in combination with nematicides.

Based on bioassay data generated in the past eight years, the LSU AgCenter does not recommend thiamethoxam alone as a seed treatment for cotton. This is due to the formation of resistance by tobacco thrips. However, imidacloprid is still effective, and when used in conjunction with the insecticide-nematicide thiodicarb (Aeris), it provides very good control of thrips. If Aeris is not an option, imidacloprid overtreated with acephate (6.4 oz/cwt) is another viable option. Acephate alone will control thrips; however, acephate has a significantly shorter residual period than imidacloprid. The probability of having to return with a foliar application is very high. Also, if you elect to overtreat cotton seed with acephate, the seed cannot be returned.

In-furrow applications of imidacloprid also work very well controlling thrips. Four-pound imidacloprid at 9.2 oz/acre or 2 lb material at 19.0 oz/acre provide excellent control of thrips. AgLogic has demonstrated satisfactory control of thrips at the 3.3 and 4 lb/acre rate.

Lastly, foliar rescue treatments are also an option. Foliar treatments should be made when immature thrips are present and/or when large numbers of adults are present and damage is occurring. Seedling cotton will typically always have a few adult thrips, but the treatment trigger is the presence of immatures. The presence of immature thrips often signifies the insecticide seed treatment has lost its efficacy and reproduction is occurring. Avoid spraying solely based on plant injury because the damage has already occurred. Be aware that residual herbicides and sandblasting injury can mirror thrips injury.

Below are some considerations when deciding what foliar insecticide to use.

Dimethoate
Positives: Relatively inexpensive, decent efficacy at high rates, less likely to flare spider mites and aphids than acephate.
Negatives: Less effective on western flower thrips, less effective than acephate or bidrin when applied at lower rates.

Acephate
Positives: Relatively inexpensive, effective on western flower and tobacco thrips.
Negatives: May flare spider mites and aphids if present.

Bidrin
Positives: Effective, less likely to flare spider mites and aphids than acephate.
Negatives: More expensive, less flexibility with applications early season.

Intrepid Edge
Positives: Effective, unlikely to flare spider mites and aphids. Intrepid Edge is a mix of Radiant and Intrepid. Activity is similar to Radiant.
Negatives: Requires the application of two modes of action but only gets the benefit of one.
Insecticide choice depends on a number of factors such as cost, impact on secondary pests and spectrum of thrips species present. If a foliar thrips treatment is justified, do not wait for a herbicide application and only spray when necessary to avoid flaring spider mites and aphids.

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Use of free elevation data for precision agriculture applications

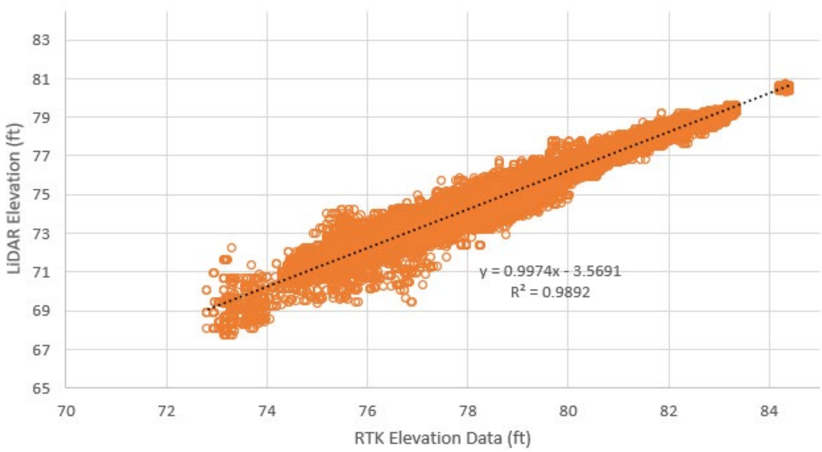
By Luciano Shiratsuchi, LSU AgCenter precision agriculture specialist

The use of elevation and derivatives (slope, aspect, microrelief, terrain) information is crucial for decision making in agriculture. Elevation maps can help farmers makes decision about irrigation schemes, leveling, variety and crop selection, and management zones for input placement. Few farmers in Louisiana are taking advantage of GPS-RTK (Real Time Kinematic) elevation data. GPS-RTK has less than 1 inch of error in elevation; other types of data have errors that can be as high as 30 feet depending on configurations and service providers. The rule of thumb is if your GPS has 1 foot of error horizontally, the error in altitude will be three times more, so be aware if you want to use other GPS receivers to plan irrigation or other activities that require precise elevation. For those farmers that have service providers or have purchased the RTK base station, they are automatically recording elevation data every second during planting, spraying, harvesting and other operations in their fields. Most precision ag providers can make maps for them.

For those that don't have access to RTK, the Louisiana LIDAR project (https://atlas.ga.lsu.edu/about/) has high-precision elevation data available for free to view or download. The LIDAR (Light Detection and Ranging) elevation data was obtained in a grid of 16 feet by 16 feet, meaning that for every 256 square feet, we have elevation data that can be interpolated to generate a map.

Our LSU AgCenter precision ag group started a study to compare LIDAR and RTK data. Preliminary results show the correlation with GPS-RTK elevation data is very good and certainly can be used for activities such as creation of management zones, placement of varieties and crop type, etc. Using LIDAR data for irrigation and leveling is not recommended because the spatial resolution of LIDAR is not as dense as RTK, and the survey was done in 1997. Many farmers have leveled their fields between 1997 and 2020.

The graph below shows preliminary results of the comparison of LIDAR elevation with elevation acquired from a farmer's field harvested in Louisiana with combine equipped with RTK. The correlation is strong, showing that a LIDAR map can be used for precision ag applications such as management zones generation, comparison of wet and concave areas with drier and convex areas, selecting crop type, adjusting the planting calendar (having wet zones mapped help schedule planting), etc.



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LSU AgCenter specialists

Specialty	Crop responsibilities	Name	Phone	Email
Corn, cotton, grain sorghum	Agronomic	Dan Fromme	318-880-8079	DFromme@agcenter.lsu.edu
Cotton	Agronomic	Dan Fromme	318-880-8079	DFromme@agcenter.lsu.edu
Grain sorghum	Agronomic	Dan Fromme	318-880-8079	DFromme@agcenter.lsu.edu
Soybeans	Agronomic	David Moseley	318-473-6520	DMoseley@agcenter.lsu.edu
Wheat	Agronomic	Boyd Padgett	318-614-4354	BPadgett@agcenter.lsu.edu
Pathology	Cotton, grain sorghum, soybeans	Boyd Padgett	318-614-4354	BPadgett@agcenter.lsu.edu
Pathology	Corn, cotton, grain sorghum, soybeans, wheat	Trey Price	318-235-9805	PPrice@agcenter.lsu.edu
Entomology	Corn, cotton, grain sorghum, soybeans, wheat	Sebe Brown	318-498-1283	SBrown@agcenter.lsu.edu
Weed science	Corn, cotton, grain sorghum, soybeans	Daniel Stephenson	318-308-7225	DStephenson@agcenter.lsu.edu
Nematodes	Agronomic	Edward McGawley	225-342-5812	EMcGawley@agcenter.lsu.edu
Irrigation	Corn, cotton, grain sorghum, soybeans	Stacia Davis Conger	904-891-1103	SDavis@agcenter.lsu.edu
Ag economics	Cotton, feed grains, soybeans	Kurt Guidry	337-788-7547	KMGuidry@agcenter.lsu.edu
Precision ag	Agronomic	Luciano Shiratsuchi	225-578-2110	LShiratsuchi@agcenter.lsu.edu

Distribution of the Louisiana Crops newsletter is coordinated by

Dan Fromme

Dean Lee Research and Extension Center

8105 Tom Bowman Drive

Alexandria, LA 71302

Phone: 318-473-6522

Fax: 318-473-6503

We're on the web.

www.lsuagcenter.com/topics/crops

www.louisianacrops.com

William B. Richardson, LSU Vice President for Agriculture

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