Unrelenting rains cause farmers major weed problems in 2015

Unrelenting rains that delayed planting of many Louisiana crops may have set the stage for a tougher-than-usual battle with weeds this year.

“Occasional dry spells in the spring saw farmers hurrying to get crops in the ground, only to be greeted by weed infestations thriving because of the wet weather. The herbicides that farmers applied a few months before planting to ‘burn down’ winter weed populations failed in many cases. "Farmers have got to have a root crop left, and both are sensitive to foliar herbicides because the constant rain caused fast growth, leaving plants with thin cuticles, Stephenson said. "If you start early and use a good burn down so you plant clean, then you apply a soil-applied residual herbicide behind the planter and follow with an early post-herbicide application."

“Some crops this year are sensitive to foliar herbicides because the constant rain caused fast growth, leaving plants with thin cuticles,” said Donnie Miller, USDA AgCenter weed scientist. "They’ve identified a problem and have a result six months later," said Myers. “You identify a problem, and it can be six or seven years before you have a solution.”

Researchers have been exploring various strategies for curtailing the aphids’ destruction through a delicate balancing act that includes attempts to preserve beneficial insects that attack aphids. However, development of resistant hybrids and use of effective insecticides are the most important tools in the arsenal.

Entomologist David Kerns is exploring strategies for reducing sugarcane aphids' spread. He said sugarcane aphids are the ultimate defense against an onslaught of sugarcane aphids. Gerald Myers, an LSU AgCenter plant breeder and genetics professor, has turned to transition from his normal crop, cotton, and began efforts to develop good-yielding sugarcane hybrids suitable to Louisiana’s climate with resistance to the aphid. His first step was to obtain sorghum lines representative of the majority of sorghum diversity worldwide. Researchers planted 320 lines in Alexandria and Winnbros, La., in 2014. From those evaluations, a smaller subset was identified.

"Louisiana is one of only a few land-grant universities in the Southeast with normal crop, cotton, and began efforts to develop good-yielding sugarcane hybrids suitable to Louisiana’s climate with resistance to the aphid. His first step was to obtain sorghum lines representative of the majority of sorghum diversity worldwide. Researchers planted 320 lines in Alexandria and Winnbros, La., in 2014. From those evaluations, a smaller subset was identified."

Each of these sugarcane aphids is about a 1/8-inch long. Photo by Fangneng Huang

One of the main concerns to the breeding program, according to Myers, "Breed is not one of those disciplines in which you identify a problem and have a solution six months later," said Myers. “You identify a problem, and it can be six or seven years before you have a solution.”

Researchers have advised producers to plant their grain sorghum as early as possible. Planting dates in the state range from early April and May for south Louisiana to mid-April and early May for north Louisiana. "Really, the key to controlling the aphids, not considering resistant hybrids at this point, is to stay on top of them and not let them get numerous," Kerns said. But LSU AgCenter researchers say effective hybrid varieties are the ultimate defense against an onslaught of sugarcane aphids. Gerald Myers, an LSU AgCenter plant breeder and genetics professor, had to transition from his normal crop, cotton, and began efforts to develop good-yielding sugarcane hybrids suitable to Louisiana’s climate with resistance to the aphid. His first step was to obtain sorghum lines representative of the majority of sorghum diversity worldwide. Researchers planted 320 lines in Alexandria and Winnbros, La., in 2014. From those evaluations, a smaller subset was identified. "Louisiana is one of only a few land-grant universities in the Southeast with normal crop, cotton, and began efforts to develop good-yielding sugarcane hybrids suitable to Louisiana’s climate with resistance to the aphid. His first step was to obtain sorghum lines representative of the majority of sorghum diversity worldwide. Researchers planted 320 lines in Alexandria and Winnbros, La., in 2014. From those evaluations, a smaller subset was identified."

Researchers have been exploring various strategies for curtailing the aphids’ destruction through a delicate balancing act that includes attempts to preserve beneficial insects that attack aphids. However, development of resistant hybrids and use of effective insecticides are the most important tools in the arsenal. One collaborative project includes researchers from the LSU AgCenter and Texas A&M AgLife. For the past two years, they have been refining foliar insecticide applications into a threshold action plan for spraying the right chemicals at the right time in the right place.

"A lot of research we’ve done to control these pests chemically over the past two years includes how to use those products and how to develop an integrated approach that considers other pests, like sorghum midge," said David Kerns, LSU AgCenter entomologist at the Macon Ridge Research Station in Winnbros. Kerns, who has researched insect pest management on corn, cotton, grain sorghum and soybeans, said spraying for midge infestations affects what happens to aphids. Pyrethroids have been effective for controlling midge, but the chemicals help sugarcane aphids proliferate.

If farmers don’t plant the natural enemy, you end up with aphid infestations that have enormous population growth potential," Kerns said. "In just a matter of days you can be covered with them.

In Louisiana, 100 percent of the sugarcane aphid population is female, and the aphids reproduce asexually. Adults give birth to 30 to 60 live, pregnant nymphs, which develop into mature adults in only three days. After five or six days, their population can grow to several hundred, according to Kerns.

Researchers have established a preliminary action threshold at the boot to milk sorghum development stage, with 30 aphids per leaf with colonization of 5 percent of the plants in the field before spraying insecticides.

Researchers have identified a problem and have a result six months later," said Myers. “You identify a problem, and it can be six or seven years before you have a solution.”

Entomologist David Kerns is exploring strategies for reducing sugarcane aphids’ spread to grain sorghum while preserving beneficial insects that attack aphids. However, development of resistant hybrids and use of effective insecticides are the most important tools in the arsenal. Photo by Bruce Schultz

Each of these sugarcane aphids is about a 1/8-inch long. Photo by Fangneng Huang

Without herbicide treatment, Palmer amaranth weeds grow large quickly and cause major problems for farmers. LSU AgCenter weed scientist David Stephenson is holding Palmer plants—one treated with herbicide and one not treated. Photo by Olivia McClure

A field of grain sorghum near Marksville, Louisiana, that suffered 100 percent grain loss in 2013 because of sugarcane aphids. Photo by David Kams

Researchers have been exploring various strategies for curtailing the aphids’ destruction through a delicate balancing act that includes attempts to preserve beneficial insects that attack aphids. However, development of resistant hybrids and use of effective insecticides are the most important tools in the arsenal. One collaborative project includes researchers from the LSU AgCenter and Texas A&M AgLife. For the past two years, they have been refining foliar insecticide applications into a threshold action plan for spraying the right chemicals at the right time in the right place.

"A lot of research we’ve done to control these pests chemically over the past two years includes how to use those products and how to develop an integrated approach that considers other pests, like sorghum midge," said David Kerns, LSU AgCenter entomologist at the Macon Ridge Research Station in Winnbros. Kerns, who has researched insect pest management on corn, cotton, grain sorghum and soybeans, said spraying for midge infestations affects what happens to aphids. Pyrethroids have been effective for controlling midge, but the chemicals help sugarcane aphids proliferate.

If farmers don’t plant the natural enemy, you end up with aphid infestations that have enormous population growth potential," Kerns said. "In just a matter of days you can be covered with them.

In Louisiana, 100 percent of the sugarcane aphid population is female, and the aphids reproduce asexually. Adults give birth to 30 to 60 live, pregnant nymphs, which develop into mature adults in only three days. After five or six days, their population can grow to several hundred, according to Kerns.
Board requests four new projects

Every year LSU AgCenter scientists make requests to the Louisiana Soybean and Feed Grain Research and Promotion Board for money to fund research and extension projects. But this year the board made requests of their own for four new projects.

“We appreciate the board’s confidence in our ability to find solutions to problems. They have identified areas where we need further research,” said Rogers Leonard, AgCenter associate vice president for plant and soil science programs.

Development of Control Options for Feral Swine in Soybean Fields – A big concern to Louisiana farmers is the continuing growth in the number of feral hogs destroying farmland and the environment. The most effective way to control feral hogs is trapping and killing them. AgCenter scientists have been studying alternative approaches such as sodium-nitrite-based bait. Read more on page 8.

Integration of Cover Crops in Louisiana Production Systems – AgCenter scientists will focus on Louisiana conditions and study the influence of cover crops on successive crop yields and proper management of cover crops in Louisiana.

Soil Test Recommendation Comparison of Five Laboratories in the Midsouth – AgCenter scientists will study soil testing results, comparing fertilizer recommendations from five different labs in the South. This project will allow producers and consultants to be more knowledgeable when using recommendations.

Survey on Use of Research Information and Future Needs – This survey seeks to identify those areas where our research outreach is critical to the soybean and feed grain industries moving forward. Survey results will be used to identify how research results can be more easily distributed to benefit growers. Read the story on page 8. Linda Foster Benedict

Project evaluates pest management tools used in soybeans

LSU AgCenter entomologists are evaluating programs that crop consultants and farmers use to control pests in soybean crops. The project evaluates the tools growers use and compares them to new approaches and new tools that either are available or will be in the near future, said LSU AgCenter entomologist David Kerns.

“A portion of what we do is to evaluate old and new insecticides for their ability to manage soybean insect pests,” he said. “First, we simply want to know how well they work for particular pests and, second, how to use them in an integrated system to maximize profits.”

“There is a large complex of insects that affect soybeans,” he said. “We look at everything that we come in contact with in that given year.”

For instance, after a particularly cold winter, redheaded stinkbugs will not be numerous, and the stinkbug complex will shift to brown and green stink bugs.

“In 2014, fall armyworms were a big problem in many areas,” he said. “The problem was so bad that one of my colleagues called it an ‘armyworm-a-geddon.’” As applied scientists, we try to be flexible to see what questions the growers and consultants have at a given time and what research to conduct to help address those questions.

Another factor that affects insecticide choice is the development of resistance. An insect’s susceptibility to a particular insecticide may change over time. For instance, Kerns and other entomologists have continued a program to monitor bollworms for susceptibility to pyrethroids. This program is the longest-running of its type in the nation, having been started in the 1980s.

“We are continuing to monitor resistance in bollworms today,” Kerns said. Some years, resistance is high while others are moderate. Data generated from this monitoring helps consultants and farmers decide which insecticides may or may not work under a particular situation.

Kerns said another goal is to determine action thresholds that indicate when farmers should apply insecticides to prevent economic injury. One project that’s been revisited for the past couple of years is the economic threshold for bollworms in soybeans.

“There was an action threshold that was developed years ago. And back when it was developed, a lot of the soybeans were different from what we plant today,” he said. “Back then, we were planting later-maturing soybeans – a lot of Group 6s. Now we are growing Group 4s and early Group 5s.”

The question that Kerns and other scientists want to answer is whether the action thresholds are still valid because the plants mature at different times.

“A group of us in the MidSouth – Louisiana, Mississippi, Arkansas and Tennessee – have a joint effort to try to redefine this threshold,” Kerns said.

The project involves releasing moths into cages, then sampling them to determine the number of larvae. But a number of factors could negatively affect the data, such as heavy rain and high wind or an infestation of natural enemies that may get into the cages and eat the eggs and the larvae.

“It is possible that we might be putting the moths out at the wrong time, where they may be getting heat stressed,” he said. “Based on the data we currently have, the action threshold for bollworms in soybean does not look like it will change much.”

Mary Morgan
New research will bring about more efficiency, cost savings through irrigation

As concern about the future of water resources grows, researchers at the LSU AgCenter’s Red River Research Station in Bossier City are identifying ways to help farmers improve irrigation efficiency.

Agricultural irrigation has steadily increased in recent decades, reaching about 1.1 million irrigated acres in Louisiana in 2013, which is the most recent data collected by the U.S. Department of Agriculture. While irrigation helps good crop yields, it can also cause runoff of valuable soil nutrients, which cost farmers and the environment in the long run.

Stacia Davis, AgCenter irrigation engineer, is studying how to schedule irrigation applications using two types of sensors that provide a percentage of the water volume per unit of soil and one that measures water pressure.

Sensors are not common in Louisiana, Davis said. But scheduling irrigation based on water needs identified by the sensors has benefits over irrigating on a calendar schedule regardless of moisture in the field. "You can save money and save water by running the pump less and potentially improve your water quality and soil health," Davis said.

Irrigating with poor quality water can lead to accumulation of salts that create soil salinity issues and lower fertility, said Syam Dodla, AgCenter agronomist. He is trying to find out how farmers can irrigate less but still reap the benefits.

Most farmers in Louisiana use furrow irrigation, where water is pumped onto the field and flows the furrows between rows. To save water, some farmers irrigate every other row middle. While this can minimize runoff, it can also affect nutrient uptake, which could affect yields.

Soil type also affects nutrient uptake because water seeps through clay soils at a different rate than through sandy soils. Depending on the soil type, rows may need to be narrower to ensure enough water and nutrients reach the crop roots, Dodla said.

Dodla is also studying how organic fertilizers such as poultry litter can be integrated with inorganic fertilizers and irrigation practices.

"North Louisiana has excess animal waste from poultry and cattle," Dodla said. "Some farmers use it already. The benefit is that it’s cheap and has to be disposed of anyhow, and it has many beneficial plant nutrients that can be used as a source of fertilizer for crops."

One of those nutrients – phosphorus – can move readily with irrigation. It can run off the fields and create water quality issues downstream, so farmers should apply poultry litter carefully and incorporate it into the soil soon after application, Dodla said.

Because poultry litter holds water, it’s also important to make sure enough water is still available for crops. Dodla wants to find out how irrigation should be altered for farmers who use organic fertilizers.

Changyeon Jeong, an AgCenter water quality specialist, is examining how water quality can affect soil salinity and overall soil health.

Some farmers in the Shreveport area irrigate using water from Red Bayou, a Natural Resources Conservation Service project that pumps water from the Red River into smaller pools. While Red River water isn’t known for high salt concentration, Jeong said, Red Bayou collects the runoff from nearby farms. Farmers then irrigate with that water, which is often laden with salts and plant nutrients.

"High salinity levels in soils make it harder for roots to uptake nutrients, which could decrease yields," Jeong said.

He wants to find out how the water from Red Bayou is affecting different soil types, crop yields and soil fertility in northwestern Louisiana. Olivia McClure

Small grains breeding program faced 2015 weather challenges

2015 has been a difficult year for the LSU AgCenter wheat and oat breeding program.

"This is my 30th season," said AgCenter wheat breeder Steve Harrison. “And this is probably the worst set of conditions I've seen.”

Calling it a season “full of challenges,” Harrison said the weather and good environment to evaluate and select breeding lines as well as commercial varieties, particularly to find those with good resistance to diseases and environmental stresses.

One challenge was all the spring rain, which created significant levels of leaf diseases—both bacterial and fungal. A late freeze also caused damage, which caused plants to fall over, or lodge. The earliest-maturing varieties were hardest hit, he said.

Another major problem for growers was a week of rain as wheat plants were flowering. Harrison said. This led to very high incidences of Fusarium head blight or scab.

"Fusarium head blight is a difficult disease to manage because no variety has complete resistance, Harrison said. Fungicides need to be applied within a window of a week to a ten days from the start of flowering. But fungicides cannot be applied during rain, so there’s a Catch 22," he said.

The AgCenter Baton Rouge wheat breeding nursery was particularly hard hit. The late-April storm leveled the plants, Harrison said. “It’s a big benefit to our growers because it’s locally adapted and resistant to Fusarium,” Harrison said.

"Fusarium resistance is not absolute but can cut losses from 40 percent to 15 percent in a bad year like this," he said. A second line is LA 3208. It also has high yield potential, is broadly adapted and has good disease resistance, he said. Unfortunately, it has little Fusarium resistance.

Both varieties were grown in large increase blocks at Georgia Foundation Seed in Plains, Georgia, under the SunGrains agreement.

A new oat variety was co-released in the spring of 2015 with the University of Florida, Texas A&M, the University of Georgia, the University of Arkansas and North Carolina State University in addition to the LSU AgCenter.

"This collaborative group of university faculty shares research projects and works together to train graduate students and develop new varieties," Harrison said.

SunGrains cooperators screen at eight locations across the South and provide evaluations in several environments and serve as backup sources for seed. "It’s an insurance policy for a year like this," Harrison said.

Despite the demanding growing season, Harrison said two new lines show promise for release in the summer of 2015. The breeding line LA 06146 is outstanding, he said. It has very good resistance to leaf rust along with high yield potential.

While not a big benefit to our growers because it’s locally adapted and resistant to Fusarium, Harrison said, "Fusarium resistance is not absolute but can cut losses from 40 percent to 15 percent in a bad year like this.

A second line is LA 3208. It also has high yield potential, is broadly adapted and has good disease resistance, he said. Unfortunately, it has little Fusarium resistance.

Both varieties were grown in large increase blocks at Georgia Foundation Seed in Plains, Georgia, under the SunGrains agreement.

A new oat variety was co-released in the spring of 2015 with the University of Florida, Harrison said. FL 0720 is a very good forage and silage oat with both high forage production and high grain production. It’s resistant to crown rust.

A license is pending and will likely include a Louisiana-based seed company, he said.

A seed variety of SunGrains wheat breeding lines with good scab and resistance are in the pipeline but no yet at the release stage, Harrison said.

Harrison works with plant pathologists Don Groth at the Rice Research Station in Crowley, Trey Price at the Macon Ridge Research Station in Winnissippi, Boyd Padgett at the Dean Lee Research Station in Alexandria and Jong Ham in the Department of Plant Pathology and Crop Physiology in Baton Rouge.

In addition to the plant pathologists, he depends on two researchers in the School of Plant, Environmental and Soil Sciences – Kun-Jun Han for evaluating forage quality and Narjan Darbaisi for work in developing molecular markers used as part of the breeding program.

Wheat was harvested on 149,838 acres in Louisiana in 2014 with a gross farm value of $63.4 million and value added $11.1 million for a total value of production of $74.6 million. Rick Bogren

In 2015 Louisiana Soybean & Grain Research & Promotion Board Report
Researchers look to nanoparticles to reduce pesticide use in agriculture

The soybean looper is a destructive pest on soybeans capable of defoliating fields if left unchecked. It can be difficult to control because of its resistance to many insecticides. LSU AgCenter scientists are looking at a novel way to increase the efficacy of pesticides to better control insect pests such as the soybean looper using nanotechnology.

Agricultural engineer Cristina Sabliov and entomologist Jeff Davis are testing the use of nanoparticles – particles 1,000 times smaller in width than a human hair – in insecticide spray to see if the particles help the chemical better adhere to the leaf tissue and provide better defense against pests. They want to see if the use of nanoparticles loaded with pesticides means farmers can use less chemicals on their crops while making the insecticides more effective.

The researchers are using nanoparticles made of zein, a biodegradable corn-derived protein. They entrapped the insecticide – technical-grade methoxyfenozide – within the nanoparticles before moving forward with additional research.

“The particles were designed to assist in electrostatic binding to the foliage or the roots of the soybean plant and to provide controlled release properties of the entrapped component,” Sabliov said.

The nano-delivery system was tested over two years against the soybean looper. Before they could test it with entrapped pesticide, however, they had to make sure the nanoparticles alone (without the insecticide) had no toxicity against the soybean looper.

Davis said they fed the soybean loopers a diet with and without nanoparticles and saw no mortality, demonstrating the particles without the insecticide would not hurt the pests.

Next, they looked to see if the nanoparticles would prolong the effectiveness of the insecticide when entrapped in the nanoparticles.

“We sprayed the plants and would feed the leaves to the soybean loopers at three days out, seven days out, up to 42 days after application,” Davis said.

The insecticide alone is usually effective up to 14 days. But when used with nanoparticles, they saw good control of the soybean looper for 21 days.

The researchers said these results could mean that nanoparticles may help farmers spray less often and spray less of some pesticides. But questions still remain on the safety of the nanoparticles, Davis said.

“Last year, we were looking for 90 percent control, but only saw 50 percent, which I consider a field control failure,” he said.

Researchers look to nanoparticles to reduce pesticide use in agriculture

Variability in Louisiana’s climate seem to be causing changes in the Louisiana population of the redbanded stink bug, said Jeff Davis, LSU entomologist.

“Redbanded stink bug is still our major stink bug pest and has been for the past 15 years,” Davis said. “But last year throughout the state, there were very low populations.”

“With soybean prices trending lower, producers need to cut expenses wherever they can. So avoiding unnecessary applications is the goal of this current study.”

What we have seen consistently throughout is a 13 percent yield loss; Davis said. “Weight is being affected, but not quality.”

This means that even after applying the harvest aid, the stink bugs are still feeding on the seed and affecting weight, he said. “And when you go to the elevator, you’ll have lower test weight, which will mean lower bean yields per acre.”

“It appears that redbanded stink bugs are becoming resistant to acarpet.” Davis said. “So we need to remind our growers to not use the same products in subsequent applications.”

“Last year, we were looking for 90 percent control, but only saw 50 percent, which I consider a field control failure,” he said.

With insecticide resistance becoming a problem, growers are using foliar applications of premixes that include a pyrethroid and a neonicotinoid.

Davis said the study is in its early stages and will continue for a few more years to provide conclusive results.

Johnny Morgan

Scientists studies effects of salt and stress on soybean insect pests

LSU AgCenter entomologist Julien Beuzelin is in the second year of a study, being conducted at the Dean Lee Research and Extension Center in Alexandria, to see how irrigation and concentration of salts in soil affect soybean hopper growth.

“Last year, in the greenhouse, the soybean loopers preferred the plants that were exposed to salt,” Beuzelin said.

What I really want to do is determine how managing for stress in the plant will impact management for insect pressure,” he said.

Beuzelin also is working on reassessing the pest status of the three-cornered alfalfa hopper, one of the main insect pests in soybeans.

“Our research is showing that there is not much damage caused by the adults, but some damage from the nymphs can occur,” Beuzelin said.

When these hoppers feed on young plants, they can kill the plants. But neighboring plants usually compensate for stand loss. However, potential yield losses associated with hopper feeding during soybean reproductive stages is a concern.

“We have not pinpointed the amount of yield loss that the insect causes from mid- to late-season infestations, so we will need further studies” Beuzelin said.

Johnny Morgan

Jeff Davis, LSU AgCenter entomologist, directs research on the redbanded stink bug, which continues to be the No. 1 stink bug problem for Louisiana soybeans. Here he checks his sweep net for stink bugs in soybeans. He is looking at proper timing for insecticide applications to help farmers cut down on expenses. Photo by Johnny Morgan

Juliet Beuzelin, LSU AgCenter entomologist, at the Dean Lee Research and Extension Center field day on July 9, 2015. Photo by Olivia McClure

Kurt Ristroph and Cristina Sabliov, AgCenter biological and agricultural engineer. Photo by John Wozniak

Johnny Morgan

2015 Louisiana Soybean & Grain Research & Promotion Board Report
Search continues for answers to soybean diseases

Many scientists look for genes that are expressed in a particular way, such as for yield or plant stem strength. But Zhi Yuan Chen is looking for genes that can make soybeans more resistant to infection from the soybean rust pathogen.

“We have found some soybean lines that are resistant to rust, but they’re not commercial varieties,” Chen said. “We’re looking for genes from these resistant lines by comparing differences between rust-resistant and rust-susceptible soybean lines.”

These genes can be “turned off” so they don’t do what they’re supposed to. This process is called “virus-induced gene silencing.”

Chen’s procedure is to insert a gene of interest into a modified soybean virus that does not cause disease on soybeans and apply the virus onto soybean seedlings by physically rubbing the plant tissue. After waiting three to four weeks for the modified virus to become established, he inoculates the plants with spores of soybean rust.

Chen is comparing the virus-treated soybean plants with control plants to see if the treated plant is more susceptible to rust.

“We have identified several genes that may be responsible for soybean resistance to this disease,” Chen said. “The next step is to introduce the gene into soybean lines and breed a commercial variety.”

Chen’s work is in the laboratory, verifying the strategy to be sure these genes are effective in controlling soybean rust disease. “We don’t want to waste time without knowing the results,” he said.

Chen is using a similar strategy with Cercospora, another soybean disease problem in south Louisiana. “There are no soybean lines that are resistant to Cercospora leaf blight, so we can’t use the same strategy,” he said.

Chen is looking at the pathogen to understand what makes it virulent. The goal is to make the pathogen less aggressive.

The scientists have discovered that Cercospora toxin production is light-induced.

“We grow Cercospora in the lab in light and dark conditions and then compare for differences in gene expressions,” he said. “If we can determine which genes are affected by light – which are active in light – then we can concentrate efforts around those genes when the pathogen infects soybeans to reduce virulence.”

The process, called host-induced gene silencing, is a new strategy with soybeans, Chen said. But it’s been successful in other crops, including wheat and barley.

Rodrigo Valverde is looking at the green stem syndrome in soybeans, which has been called a “malady” because no one is sure if it is a disease or insect problem. “It seems random,” Valverde said. “There’s no pattern. Some years are more severe, and it’s all over the country.”

Rain affects soybean study in southwest Louisiana

Weather has hampered Dustin Harrell’s soybean agronomy project this year.

“This has been a trying year for us, but it is representative of our area,” said Harrell, an LSU AgCenter agronomist. Many growers in southwest Louisiana were unable to plant soybeans because of adverse weather conditions.

Harrell, the LSU AgCenter extension rice specialist, is in charge of a project to adopt production practices specific for soybean production in the rice country of southwest Louisiana. His project is in its third year.

He said the project’s goal has been to have at least six dates-of-planting trials, but this year only two were planted, one on April 2 and another on April 22, because of excessively wet conditions during the majority of the planting period.

Frequent rains kept the ground too wet for planting during much of May and early June. Soybeans planted for the study in early May were flooded and the stand was lost, he said.

He said a variety trial had to be replanted on June 5 at the South Farm of the Rice Research Station in Crowley because of heavy rains that followed the first planting.

“We’re happy to at least have some data coming out of that,” Bruce Schultz

Rodrigo Valverde examines soybeans in a greenhouse on the Baton Rouge campus. He planted seeds harvested last year from plants affected with the green stem malady to see if the problem is transmitted by seeds. Photo by Rick Bogren.

Odds are low for grain sorghum disease, but still scout

While disease can wreak havoc on soybean or cotton crops, grain sorghum may be less likely to suffer from a disease outbreak. Trey Price, a plant pathologist at the Macon Ridge Research Station in Winnboro, said the odds are low that a grower will have to make fungicide application for disease control in grain sorghum most years.

This does not mean growers should neglect their fields. “You should still recommend that growers or their agricultural consultants inspect their fields at least once a week throughout the growing season,” Price said.

If a grower discovers a disease pathogen infects a field, the more susceptible the crop is to yield loss. Grain sorghum is most sensitive to yield loss because of lost foliage during heading. “The closer the crop is to maturity, the more foliar damage can take,” Price said.

Anthracnose is the most prevalent disease found in sorghum, Price said, adding that losses of up to 20 percent have been reported.

“In some years, we will see yield loss from anthracnose, more so in the central and southern part of the state. The disease is more likely to be found in late-planted sorghum,” he said.

In 2014, Price had 10 field trials across the state examining grain sorghum diseases. In 2015, he has six trials in three locations – these trials at Macon Ridge, two at the Northeast Research Station near St. Joseph, and one at the Dean Lee Research and Extension Center near Alexandria.

“Don’t have a lot of fungicides available to treat for diseases. However, the fungicides we do have are effective on some of the foliar diseases,” Price said.

Price strongly believes that producers should only apply fungicides when absolutely necessary.

“Fungicides are expensive to apply. There really is no need to make a blanket or automatic application. You have to make certain the economics work,” he said.

One recent concern for sorghum growers has been the sugarcane aphid. In addition to damaging plants, the honeydew it creates clogs combines and causes harvest problems.

“It’s probably more feasible for farmers to save their money on fungicides and budget those funds for additional insecticide application if the aphid presents a problem,” Price said.

While grain sorghum is known for its drought tolerance, irrigation may help stave off disease. “Water is important, irrigation may help stave off disease. ‘Water is important, irrigation may help stave off disease,’ Price said.

Frequent rains kept the ground too wet for planting during much of May and early June. Soybeans planted for the study in early May were flooded and the stand was lost, he said.

He said a variety trial had to be replanted on June 5 at the South Farm of the Rice Research Station in Crowley because of heavy rains that followed the first planting.

“We’re happy to at least have some data coming out of that,” Bruce Schultz
Griffin’s career spans agriculture’s weed science revolution

About three decades ago, as fields in Louisiana choked on nearly uncontrollable weed populations, the 1981 state soybean yield was a low 21 bushels per acre. It’s a far cry from last year’s average of 57 bushels per acre – a milestone LSU AgCenter weed scientist Jim Griffin said is only partially due to modern high-yielding varieties. Soybeans have very high yield potential when they are watered properly, weeds are eliminated to reduce their competition with the crop, and insects are controlled and diseases are managed,” Griffin, who plans to retire in 2016, has helped farmers navigate that constantly evolving equation since August 1979, when he arrived at the Rice Research Station in Crowley on “the edge of a great shift,” he said. Farmers around Louisiana were growing more soybeans, and rice farmers in the southwest were just beginning to rotate them with their crop. Griffin initially worked as a production agronomist, evaluating soybean varieties, tillage, irrigation and weed control practices.

Eight years later, when he moved to LSU’s main campus, to concentrate on weed management in Louisiana crops, the agricultural chemical industry was changing fast. Part of his job was to evaluate and determine application rates for new herbicides being released to control grass and broadleaf weeds.

Despite those advances, Griffin said, it was still common to see fields with heavy weed infestations. In the mid-1990s, Monsanto rolled out Roundup Ready technology – soybeans, cotton and corn resistant to glyphosate, the active ingredient in Roundup. Roundup Ready seeds were more expensive but enabled farmers to effectively control a host of weeds with a single affordable herbicide. Many eventually used glyphosate exclusively. “With weed control newly defined in crops year after year, it was only a matter of time before Mother Nature would exert her influence,” Griffin said. “Weed populations in fields began to shift toward weeds less sensitive to glyphosate.”

Griffin was the first to document glyphosate-resistant johnsongrass in Louisiana, and colleagues later identified glyphosate-resistant Palmer amaranth. Those two weeds remain major problems today. “The Soybean and Grain Research and Promotion Board has been generous over the years in supporting weed management research in Louisiana,” Griffin said. “This has been important because of differences in weed complexes, site types and crop rotations around the state.”

Farmers themselves revealed many of those intricacies. Taking time to talk with them, as well as to consultants and chemical company reps, about their concerns was often rewarded with a relationship and trust. They often call Griffin for his advice. “You’re being called on to make major decisions on that crop – a decision that will cost those growers a lot of money,” Griffin said. “It’s fulfilling to know that folks have that much confidence in your knowledge and expertise.”

Conversations with growers have helped Griffin see things differently, he said. Some of their questions and suggestions led to innovative research projects for his graduate students. Griffin has mentored more than 50 graduate students, teaches courses in weed science and field research methods, and is the College of Agriculture’s graduate student recruitment coordinator. Students, he said, have been both his biggest challenge and greatest reward.

“To see students come in with little self-confidence and a perceived inability to speak in front of a group, and then to graduate, overcome those issues and be very successful is extremely rewarding,” Griffin said. “The opportunity to conduct meaningful research and to work with clientele and students has truly been a blessing.”

The weed management strategies that Jim Griffin and his students have developed for Louisiana’s soybean, feed grains and sugarcane industries are a primary reason these growers have been successful with profitable crop yields. Much of his basic work on weed ecology, crop tolerance and herbicide performance in Louisiana cropping systems formed the framework for strategies used across the Southern region of the U.S. His contributions to teaching, research and extension in weed science have been recognized not only in the state of Louisiana, but by his colleagues in national professional societies,” said Roger Leonard, AgCenter associate vice president for plant and soil science programs. Olivia McClure

Jim Griffin, weed scientist, will retire in 2016 after more than three decades with the LSU AgCenter. Photo by Olivia McClure

2015 Soybean and Grain Research and Promotion Board Funded Projects

Ag Economics

Cost Impacts of Stunning Soybeans & Field Corn in Louisiana, Krishna Paudel

Industry (Producers, Consultants, Suppliers, etc.) Survey of Utilization of Research Information & Future Needs, Kurt Guidry

Biological & Ag Engineering

$29,000

Electrochemically-Functionalized Fungicidal Adjuvant, Cristiana Sabitelli

Communications

$7,500

2015 Soybean & Winter Grain Research & Promotion Board Report, Francine Gould

Pocket Field Guide for Corn & Sorghum Weed, Insect and Disease Identification, Francine Gould

Dean Lee Research Station

$420,575

Agronomic Research to Improve Soybean Production in Louisiana, Ron Levy

Soybean and Grain On-Farm Demonstration Program, Ron Levy

Corn On-Farm Demonstration Program, Dan Fromme

Reevaluation of Three-cornered Altafa Hopper Pest Status in Louisiana Soybeans, Julien Beuzelin

The Effects of Drought & Salt Stress on Soybean Insect Pest Management, Julien Beuzelin

Soybean Weed Management Systems in Louisiana, Daniel Stephenson

Weed Management Systems for Feed Grain Crops in Louisiana, Daniel Stephenson

Variety Evaluations & Wheat Disease Management in Corn and Grain Sorghum in Louisiana, Boyd Padgett

Development of UAV Technologies for Soybean & Small Grain Crops, Randy Price

Entomology

$88,725

Integrated Management of Changing Soybean Insect Pest Complexes, Jeff Davis

Soybean Looper Population Growth Rates on Herbicide-Sensitive and Resistant Weeds, Jeff Davis

Development of Improved Programs for Managing Major Insect Pests of Corn and Grain Sorghum in Louisiana, Fangjuan Huang

Bob R. Jones-Idewild Research Station

$40,000

Development of Control Options for Feral Swine in Soybean fields, Glen Gentry

Macon Ridge Research Station

$86,371

Timing of Irrigation Initiation and Termination on Soybean Yield in Northeastern Louisiana, Josh Lofton

ImprovingNitrogenManagementinRowCropProductioninLouisiana,JoshLofton

Refining Soybean Insect IPM Strategies for Louisiana, David Kerns

Updating Field Corn & Grain Sorghum IPM Strategies, David Kerns

Evaluating Management Decisions on Late-Season Losses in Louisiana Soybean Production, Josh Lofton

Improving Soil Fertility & Agronomic Management in Louisiana Soybean Production, Josh Lofton

Management Strategies for Double Crop Soybeans, Josh Lofton

Research and Extension Programs in Wheat Production, Josh Lofton

Managing Diseases in Louisiana Grain Sorghum, Trey Price

Corn Disease Management in Louisiana, Trey Price

Louisiana Wheat Disease Management, Trey Price

Foliar Soybean Disease Management in Louisiana, Trey Price

Soybrome Soybean Disease Management in Louisiana, Trey Price

Integration of Cover Crops in Louisiana Production, Lisa Fultz, Josh Lofton, Syam Dodla, Daniel Stephenson

Northeast Research Station

$171,239

Soil Test Recommendation Comparison of Five Laboratories in the Midsouth, Beatrix Haggard

In Field Evaluation of Soil Fertility for Soybean & Corn, Beatrix Haggard

Soyweed Weed Control Research in Northeastern Louisiana, Dennis Miller

Development of Weed Management Programs in Northeast Louisiana Corn and Grain Sorghum, Dennis Miller

Evaluating Production Inputs in Soybean & Corn via Omission Trials, Beatrix Haggard

Enhanced Efficiency Nitrogen Fertilizers (ENF) Under Simulated Heavy Rainfall Conditions, Beatrix Haggard

Plant Pathology

$297,209

Using Molecular Biology to Control Soybean Diseases, Zhi-Yuan Chen

Cercospora Leaf Blight and Rust, Zhi-Yuan Chen

Cercospora Leaf Blight Disease of Soybean – Explore New Approaches for Management, Zhi-Yuan Chen

Ephiphytic Bacteria and/or Their Metabolites for Control of Alternaria Contamination of Corn, Kenneth Damante

Measuring Yield Losses Due to Diseases of Soybeans, Clayton Holler

Soybean Disease (including rust) Sentinel Plot Scouting Program, Clayton Holler

Optimization of Fungicide Usage for Management of Soybean Diseases, Raymond Schneider

Assessing Genetic Diversity in Cercospora Kikuchi, the Louisiana Soybean Leaf Blight Pathogen, Raymond Schneider

Management of Cercospora Leaf Blight of Soybean with Foliar Applications of Iron and Other Minor Elements, Raymond Schneider

Survey for Soybean Green Stem Disorder & Investigations on Graft & Seed Transmission, Rodrigo Valverde

Red River Research Station

$132,239

Soybean Breeding and Variety Development, Blair Buckley

Evaluation of Plant Response to Soil Moisture Regimes in Soybean, Stacia Davis

Effect of Skip-Row Furrow Irrigation on Crop Growth, Water & Nutrient Use Efficiency in Soybean & Corn Production under Different Soil Types, Syam Dodla

Optimization of Nutrient Use Efficiency of Corn Through Integrated Use of Organic & Inorganic N Fertilizers Under Different Irrigation Regimes, Syam Dodla

Evaluation of Recycled Tailwater Irrigation on Soil Nutrients, Soil Salinity Distribution & Soybean Yield in Louisiana, Chanyong Jeong

Rice Research Station

$64,710

Evaluation of Soybean Cultural and Fertility Practices in Southwest Louisiana, Dustin Harell

School of Plant, Environmental & Soil Sciences

$193,425

Development of DNA-Based Markers to Complement Wheat Breeding for Herbicide & Disease Resistance, Niranjan Bashaki

Weed Management & Biology Research in Soybean, James Griffin

Small Grain Breeding, Variety Development, and Variety Testing, Stephen Harrison

Improved Grain Sorghums for Louisiana, Gerald Myers

Soy Fertility Research: Improving Yield & Allaying Disease in Grain Production, Brenda Tubaba

Total

$1,873,208

6 2015 Louisiana Soybean & Grain Research & Promotion Board Report
On-farm demonstrations help farmers make decisions on varieties and production practices

Iron Levy, LSU AgCenter soybean specialist, said 39 on-farm soybean demonstrations were planted in 2015 across the state, including one in Washington Parish for the first time. Unusually large amounts of rainfall caused planting to be late for Levy and for farmers. Locations along the Red River in Caddo Parish were flooded, eliminating those plots from this year’s demonstration.

“We did get them planted in most areas of the state, and most of them look good,” he said. The project includes variety comparisons and demonstrations of weed, disease and insect management strategies. The project provides the opportunity for farmers to see how well different practices perform in their respective areas of the state.

“Producers are very interested in variety development and all aspects of production that will increase their profitability,” Levy said. “These demonstrations are a good venue to bring producers together to see the latest research-based information from the LSU AgCenter.”

New this year is a soybean irrigation demonstration in Calcasieu, Evangeline, Madison, East and West Carroll, Tensas and Concordia parishes. Soil moisture sensors are being installed at those locations on farmers’ fields to determine when fields should be irrigated. Levy said this is an ongoing project that will be repeated for several years.

Dan Fromme, LSU AgCenter corn specialist, said the on-farm corn demonstrations show farmers how well new varieties perform in different areas of the state.

Hybrids used in the demonstrations — grown on land provided by farmers — are nominated by seed companies. “They pick their hybrid most suitable for Louisiana growing conditions,” he said.

Each of the 19 locations this year has 13 hybrids represented by six companies. “The tests are valuable because hybrids change so fast,” he said. He said yield is not the only factor considered in the demonstration. Resistance to insect pests and diseases also are factors included in the testing.

Farmers provide the land, and LSU AgCenter extension agents plant the crop and harvest it, he said.

Field corn demonstrations are being conducted in the parishes of West Baton Rouge, Beauregard, Rapides, Avoyelles, East Carroll, West Carroll, Pointe Coupee, Ouachita, Concordia, Franklin, Morehouse, Tensas, St. Landry, Madison and Caldwell. Four parishes have more than one demonstration, Fromme said.

Josh Lofton, LSU AgCenter wheat specialist, said this year’s on-farm wheat demonstration encountered the same problems and disappointing outcome faced by farmers. Of the six locations, only four could be harvested. The other two locations were lost because of excess rainfall, he said.

“The big issue was the same issue we had as a whole in the state,” he said. All four locations that were harvested had varieties affected by fusarium blight, he said.

The demonstrations used 14 varieties that showed yield potential in official variety trials directed by Steve Harrison, LSU AgCenter wheat specialist. Lofton said the results from the on-farm demonstration will be compared to Harrison’s results to see if the results from the variety trials are matching up with the on-farm demonstrations.

Lofton said the Louisiana wheat crop could be small next year, given the 2015 results, but the demonstrations will be continued. “As long as there’s a wheat acre in this state, this work is going to continue.”

Iron may help combat Cercospora leaf blight in soybeans

Foliar applications of iron may provide some opportunities to reduce the impact of Cercospora leaf blight in soybeans.

For the past several years, LSU AgCenter plant pathologist Ray Schneider has been applying minor elements – zinc, copper, manganese, boron, aluminum and iron – to soybean plants to find out if they can reduce the impact of disease pathogens.

“We had good results with some, but we consistently had disease suppression with foliar applications of iron,” Schneider said.

The initial tests used several variations of minor elements, but none were fertilizer grade. But when Schneider began focusing on iron, he started using commercial formulations of foliar nutrients.

“We needed a form of the material that allows iron to get into the leaves,” Schneider said. He is now using a formulation that can be absorbed into the plant tissue.

“Cercospora leaf blight thrives in hot, dry weather,” Schneider said. “This is a problem because soybeans have no natural resistance to the Cercospora pathogens.”

To make sure the soybeans are prime targets for a Cercospora infection, Schneider waits until late in the planting season when hot weather is assured.

Cercospora is not as responsive to fungicides as other diseases, such as frogeye leaf spot and rust, Schneider said. So the results of tests with iron applications hold promise of combating the disease.

Schneider has gotten good results in field trials when foliar iron was applied to soybeans at the R-5 growth stage when no Cercospora symptoms were visible. “We know it’s effective before R-6,” he said.

“We showed that the Cercospora leaf blight pathogen is almost always present in leaves, but with no symptoms,” he said. “Apparently it becomes pathogenic at later stages of soybean growth.”

Leaf tissue samples indicate low levels of iron, mostly in the upper leaves after the plants pass the mid-reproductive growth stage. “It may be that iron concentrations in the upper leaves are not as high as in the lower leaves, and the disease appears in those upper leaves,” Schneider said.

The recommended level of iron sufficiency is 50 to 100 parts per million in a plant tissue analysis. But following foliar applications, iron levels increase in the leaves, and symptoms of Cercospora leaf blight are suppressed when iron is at 280 parts per million in the tissue.

“Iron is relatively immobile and doesn’t move well in plants, but we’re looking at test levels higher than the plant needs to be healthy,” he said. “In some cases, we get complete disease suppression – as good as or better than with fungicides. But we still have more to learn about the mechanism of action.”

Schneider said his next step is to investigate other minor elements to see their effects in foliar applications. His earlier work suggested a different nutrient appeared to suppress soybean rust.

Schneider said his research program wouldn’t be successful without the work of graduate students Eduardo Chegas Silva and Brian Ward and research associate Clark Robertson. Rick Bogren

Ray Schneider examines soybeans for signs of Cercospora on the Batrou farm in Baton Rouge. He suspects the pathogen needs iron to survive, and when the element is in short supply, Cercospora begins taking iron from the plant cells. Photo by Olivia McClure
Scientists work to enhance fertility and nutrient management

Beatrix Haggard, LSU AgCenter upland crops fertility specialist, is participating in a number of studies to improve field corn and soybean yields. 

One of those projects is evaluating the use of products to enhance nitrogen efficiency for field corn. Some of the materials are intended to prevent the conversion of nitrogen after rainfall, and the heavy rains of the spring of 2015 provided a good chance to conduct those tests. She said the project started by pumping water on a field to simulate a 6- to 8-inch rain. “We applied the flood and we still got rain,” she said. “The ground was very saturated.” 

Haggard also is working on an omissions study to determine what practices could be included, eliminated or minimized on field corn and soybeans without sacrificing yields. Her partners on the project are Josh Lofton, agronomist; David Kerns, entomologist; and Trey Price, plant pathologist.

In the test, two primary management systems are evaluated – high management and standard management. This year the high management system for soybeans received a premium seed treatment, two fungicide applications, a preemergence herbicide, in-crop application, nematode control, inoculants and sulfur. The standard system for soybeans received untreated seed, one fungicide application, a standard herbicide, no inoculums and no sulfur.

Other plots within the trial receive different combinations of these treatments to determine the value of each individual management practice and the value of all the management practices together. Haggard said all of the plots are at the Macon Ridge Research Station in Winnboro.

“It is important to know if that extra seed treatment or one more fungicide application will actually pay off at the end of the season,” Haggard said. 

Haggard also is reviewing the results of soil tests, comparing fertilizer recommendations from five different labs in the South. Soil samples were obtained from research stations and commercial fields in Louisiana. This project will allow producers and consultants to be more knowledgeable when using recommendations.

Brenda Tubala, LSU AgCenter soybean fertility specialist, is working on a project to determine if the proper amount of silicon in the soil protects plants from disease. She said the 2014-15 wheat crop provided a good chance to test whether wheat plants are more susceptible to disease when silicon levels are below recommended levels and whether silicon plays a role in suppressing disease progression.

“Just like a human, if a plant receives a balanced amount of nutrients, it is less likely to get sick,” she said. “In the end, what we really want to use is the reduce of fungicides.”

She also is studying recommended levels for potassium and phosphorus for the corn and soybeans in rotation. She said current recommendations for the corn are established for crops that are repeatedly grown on the same field.

But, she said, it’s possible that more potassium is needed for corn planted after a soybean crop. 

Editor’s note: Since this report was published, both Beatrix Haggard and Josh Lofton have relocated to Oklahoma State University in Stillwater. We appreciate the contributions they have made to the agricultural industry in Louisiana.

New feed grains field guide will be ready early 2016

Tackling weed, insect and disease problems quickly is critical for farmers to avoid damage and maintain good yields. That’s why the LSU AgCenter is producing a feed grains field guide that growers and consultants can use to easily determine solutions.

Frankie Gould, AgCenter communications director, said the guide contains general information, images and identifying characteristics of weeds, insects and diseases that cause issues in corn and grain sorghum. More detailed sources on the AgCenter website, information, images and identifying characteristics of weeds, insects and diseases that damage and maintain good yields. That’s why the LSU AgCenter is producing a feed grains field guide for early 2016.

The guide is a spiral-bound book that measures 3 1/2 inches by 5 inches, making it easy to carry in the field. It is printed on moisture-resistant paper. This publication will join the soybean and wheat field guides in an AgCenter series supported by funding from the Louisiana Soybean and Grain Research and Promotion Board.

Survey aims to find ways to better serve ag industry

LSU AgCenter economist Kurt Guidry is conducing a survey to find out how the AgCenter can better serve industry stakeholders through research and extension programs.

Guidry is gathering information from soybean farmers, crop consultants and personnel from the agricultural industry. The survey responses will be used as the AgCenter tailors its programs to better meet changing needs of the industry, Guidry said.

The survey can be taken online at www.surveymonkey.com/r/LSASurvey any time through Nov. 30. It can also be taken at several agriculture-related events around Louisiana and will be mailed to a random sample of producers and crop consultants, Guidry said.

Respondents will be asked to identify what issues are most important to them and what sources they consult for agriculture information. These responses will help the AgCenter determine more efficient ways to reach stakeholders with research findings and educational programs, Guidry said.

“The survey project is being funded in part by the Louisiana Soybean and Feed Grain Research and Promotion Board to ensure that the board is supporting activities with the greatest positive impact,” Guidry said. Olivia McClure

Feral hog researcher explores options with grant

Feral hogs continue to be a major problem in the state, and research is being conducted to reduce their numbers, said LSU AgCenter animal scientist Glen Gentry.

Sodium nitrite is currently being studied as a way to reduce the hog numbers, but it will take time to get approvals and to know proper doses to achieve the needed effect, Gentry said.

Sodium nitrite is effective in taking the oxygen out of the pig’s blood through the formation of methemoglobin. The process causes the pig to become drowsy, lie down and expire, Gentry said. At the right level, this will happen in most mammals, but deer and some other animals are less sensitive to the chemical.

“Feral hogs are prolific in their reproductive activity, and their young tend to survive in high numbers,” Gentry said.

The study will help determine the effective lethal dose of sodium nitrite, an effective delivery medium and an effective and selective delivery system. Laws and regulations say that the poisons must be publicly acceptable and produce a humane death.

In addition, Gentry is looking at a trap in which a camera inside the trap sends a photo to a smartphone when there is movement. Then, if the receiver of the photo sees that there is movement from a pig, the receiver can remotely close the gate. Photo by Matt Capelle