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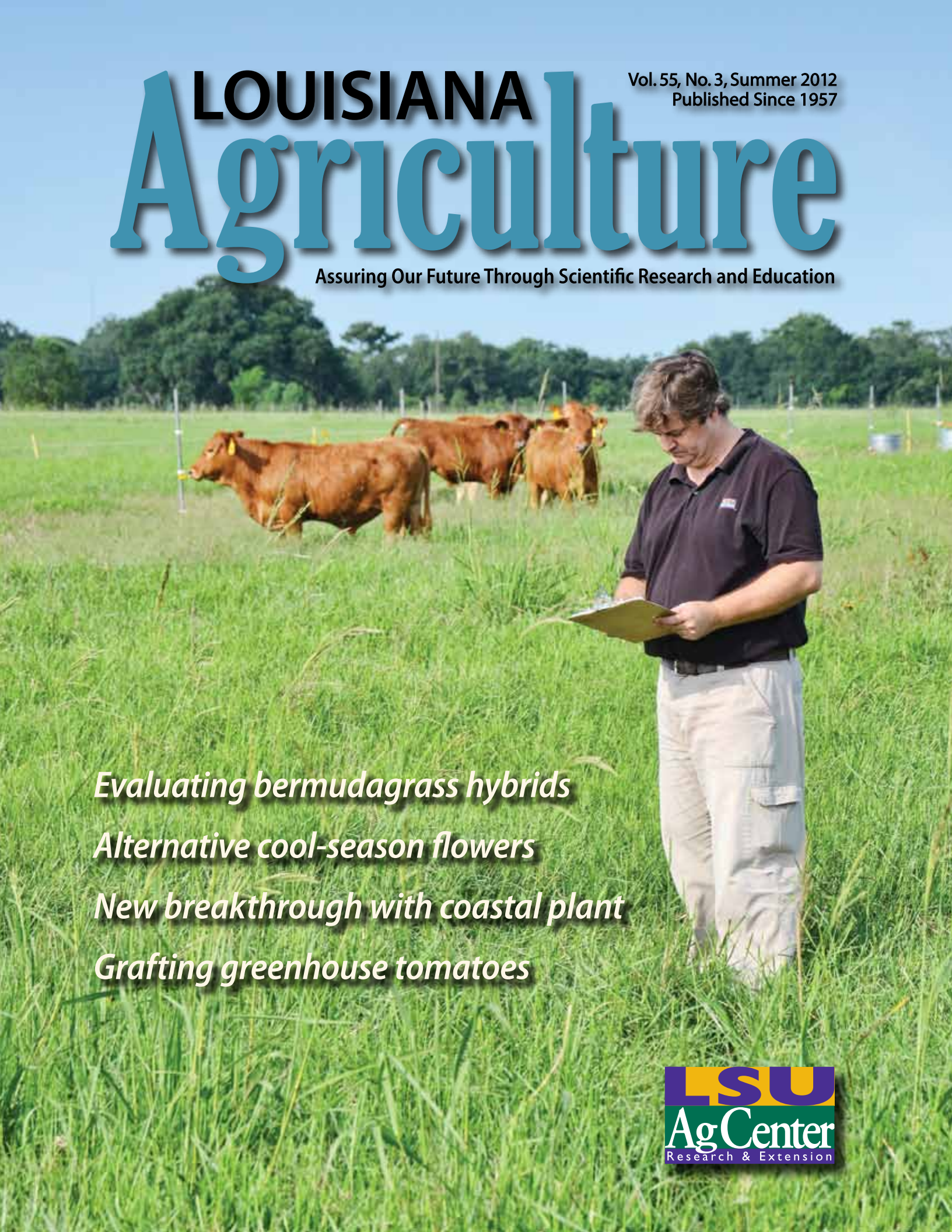
LOUISIANA Agriculture

Assuring Our Future Through Scientific Research and Education



Evaluating bermudagrass hybrids

Alternative cool-season flowers

New breakthrough with coastal plant

Grafting greenhouse tomatoes

LSU AgCenter
Research & Extension

Energy cane, sweet sorghum field day set for Oct. 2 in Houma

The LSU AgCenter has announced a field day featuring energy cane and sweet sorghum on Oct. 2 at the U.S. Department of Agriculture-Agricultural Research Station Sugarcane Research Farm near Houma, La.

Field tours will include visits to the biomass quality laboratory and photoperiod and crossing house along with presentations on cultural practices, soil fertility, planting, harvesting, transportation, variety demonstrations and pest management, according to LSU AgCenter sugarcane specialist Kenneth Gravois.

The field tours will be followed by a short indoor program and lunch, Gravois said. After lunch, the group will tour the Raceland Raw Sugar Factory.

Producers in Louisiana and surrounding states will be interested in both energy cane and sweet sorghum, said LSU AgCenter crop specialist John Kruse.

"Those crops are going to be looked at not only from an agronomic perspective but also a fuel-efficiency perspective," Kruse said. They will allow growers to produce alternative crops, particularly on more marginal lands and be profitable.

Both crops will be displayed under different production scenarios, such as various population densities and fertility regimens, Kruse said.

In addition to producers, Gravois said he expects the audience to include industry leaders interested in biofuels as well as researchers who may want to see practical results.

The field day is serving as a pre-meeting tour for the 2012 National Conference: Science for Biomass Feedstock Production and Utilization, which will be held Oct. 2-5 in New Orleans, Gravois said.

The USDA research farm is located at 501 Bull Run Road, Schriever, La.

■ **Rick Bogren**

John Kruse, cotton and feed grain extension specialist at the Dean Lee Research and Extension Center in Alexandria, La., is developing management practices for sweet sorghum, a crop with potential for the growing biofuels industry. The crop is similar to grain sorghum but has more biomass that can be converted to fuel products, such as ethanol, he told farmers at a field day on July 19. An advantage to sweet sorghum is that it can be grown on more marginal lands not as suitable for corn or other crops, and it is not a feed grain. Photo by Bruce Schultz

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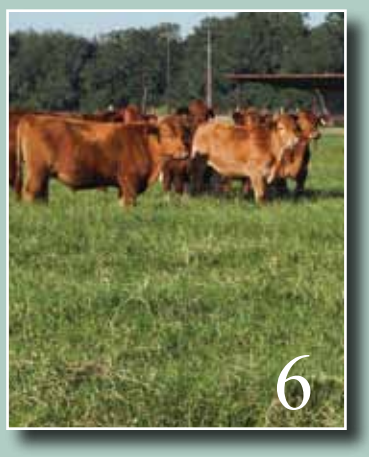

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On the cover: Guillermo Scaglia, LSU AgCenter ruminant nutritionist, evaluates different forage systems to produce forage-fed beef. His study reported in this issue of Louisiana Agriculture concerns grazing and hay production in south Louisiana. Go to page 6. Photo by Bruce Schultz

Elzer named assistant vice chancellor

Phil Elzer has been named assistant vice chancellor of the LSU AgCenter and assistant director of the Louisiana Agricultural Experiment Station.

In this position Elzer will assist in oversight of all animal-related programs and personnel. This encompasses research activities for aquaculture, animal and veterinary sciences, wildlife, food science and nutrition. He will also be the liaison with state commodity groups.

He has a special interest in incorporating biotechnology into research.

"These efforts will not only enhance the state's economic development, but they will also improve animal health and human welfare," he said.

One of Elzer's goals is to increase the level of external funding for research through state, federal and international sources.

Elzer has been with the AgCenter since 1995, when he became an assistant professor with a joint appointment in the Department of Pathobiological Sciences in the LSU School of Veterinary Medicine and the Department of Veterinary Science in the LSU AgCenter.

During his tenure at LSU, Elzer has conducted brucellosis research using numerous animal species. His current research projects involve vaccines for brucellosis, tuberculosis, Johne's disease, pseudorabies and infectious diseases, including chronic wasting disease, scrapie and mad cow disease.

Elzer earned his master's and doctorate from Cornell University in Ithaca, N.Y., and is active in teaching and professional development. Elzer contributes to courses and laboratory exercises in immunology, microbiology and reproductive diseases in the veterinary curriculum. ■ **Johnny Morgan**

International Service Award goes to Datnoff

Lawrence Datnoff, head of the Department of Plant Pathology and Crop Physiology, was presented the International Service Award from the American Phytopathological Society on Aug. 5 at the annual meeting in Providence, R.I.

The award recognizes outstanding contributions by society members to plant pathology in countries other than their own.

Beginning in the 1990s, Datnoff built cooperative research projects around the world, influencing governmental, academic and private organizations on regulatory policies, guidelines and cropping practices.


Elzer


Datnoff


Beuzelin

A pioneer in the use of elemental silicon to suppress plant diseases, Datnoff initiated silicon research programs in Colombia and Brazil with subsequent collaborations with Canada, India and Japan. In addition, he was instrumental in developing a series of world conferences addressing silicon and agriculture.

An invited speaker, visiting professor and mentor in many countries, Datnoff joined the LSU AgCenter as department head in 2008 after 20 years on the faculty at the University of Florida. He earned his bachelor's degree from the University of Georgia, his master's degree from Virginia Tech and his doctorate from the University of Illinois. ■ **Rick Bogren**

3 scientists hired, 2 get promoted

Three new scientists have joined the LSU AgCenter, and two scientists have taken on new responsibilities.

Julien Beuzelin, a recent Ph.D. graduate of LSU, is the new field crop entomologist at the Dean Lee Research and Extension Center with a 90 percent appointment in research and 10 percent appointment in extension. His responsibilities include feed grains, soybeans, sugarcane, rice and sweet potato.

He is not an unknown face to many in the AgCenter because he has worked closely with Gene Reagan, entomologist, over the past few years trying to track the march of the Mexican rice borer into Texas and finally southwest Louisiana. Originally from the French Caribbean, where his family farms, he was formally educated in France.

David Kerns is an entomologist at the Macon Ridge Research Station. He was raised in West Texas and attended Texas A&M University, Oklahoma State University and Auburn University. He has worked as a crop consultant in Texas, within the agricultural chemical industry in the Mississippi Delta, as a vegetable and citrus entomologist and as a cotton entomologist.

Kerns' responsibilities include insect pest management in cotton, corn, soybeans and grain sorghum with statewide responsibilities in cotton. Much of his research includes insecticide efficacy, monitoring insecticide resistance, insect outbreaks, developing action thresholds and the development of insect-resistant transgenic crops. His program supports three research associates, a research technician, a graduate assistant, four student workers and additional summer labor.

Josh Lofton, who was awarded his Ph.D. from LSU in May, joined the faculty at the Macon Ridge Research Station May 1 with a 90 percent research and 10 percent extension appointment. His current research responsibilities are to improve management of the major row crops in northeast Louisiana–corn, cotton, soybeans and grain sorghum–with emphasis on improving nutrient and water use efficiency. He also is statewide agronomic contact for grain sorghum production.

As of July 1, Boyd Padgett, former plant pathologist at the Macon Ridge Research Station in Winnsboro, became director of the AgCenter's 10-parish Central Region with an office in Alexandria at the Dean Lee Research and Extension Center. His responsibilities include overseeing all extension and research efforts in that area.

Donnie Miller, weed scientist, assumed duties as research coordinator at the Macon Ridge Station on May 1. This is in addition to his duties as research coordinator at the Northeast Research Station in St. Joseph.

■ **Rick Bogren**


Kerns


Lofton


Padgett


Miller

Strategic weed control needed for pigweed

ALEXANDRIA, La. – A herbicide-resistant weed in soybeans and cotton has caused what an LSU AgCenter weed scientist calls an epidemic in Louisiana.

"This is the year of the pigweed," Daniel Stephenson told farmers gathered for the field day on July 19 at the LSU AgCenter Dean Lee Research and Extension Station.

The hardy weed, also known as Palmer amaranth, which is native to the Southwest desert, was first documented as glyphosate-resistant in Louisiana in 2009 in Concordia Parish. Then, in 2010, the problem was identified in Tensas and Madison parishes, which are north of Concordia.

Though 2011 was quiet, the problem has exploded in 2012, Stephenson said, and now resistant pigweed can be found throughout the northeast region and is rapidly spreading to other parts of the state.

The remedy is a diversified weed control management program, which includes use of residual herbicides applied preplant, at planting and in-season, Stephenson said.

"Crop yield is determined early in the season," Stephenson said, adding that farmers can't allow weeds to outcompete the crop for sunlight, water, nutrients and space.

Herbicides should include products with different modes of action as a means to manage resistance development, which has occurred because of long-term use of glyphosate, or Roundup herbicide, Stephenson said.

Treat not only the field, but also turn rows and drainage ditches because the weeds that grow there produce seed as well, Stephenson said.

When pigweed plants are too tall for herbicides to kill, the only remedy is hand-pulling, Stephenson said.

■ **Linda Foster Benedict**

LSU AgCenter offers quicker route to Master Farmer status

Under revisions to the Louisiana Master Farmer Program, a producer's farm conservation plan may now be developed through the LSU AgCenter. Previously, farmers had only one option through the Natural Resources Conservation Service.

"This is a priority program for the AgCenter," said Dwight Landreneau, LSU AgCenter assistant vice chancellor for extension.

Farmers who want to participate in the program are to contact their county agents, who will arrange for Louisiana Master Farmer Program personnel to tour farms and develop a farm-specific conservation plan.

If the plan is fully implemented, it will be recommended to Paul Coreil, LSU AgCenter vice chancellor for extension, who will then review the application and forward it to Mike Strain, State Commissioner of Agriculture and Forestry, who makes the final decision on certification.

Ernest Girouard, Master Farmer coordinator, said current conservation practices already being done by farmers will be included in conservation plans required for the final phase. Activities such as attendance at approved field days and farm clinics are required components of the certification process. These will also count toward the continuing education required to remain certified.

Steve Linscombe, LSU AgCenter Southwest Region director, said rice farmers who obtain Master Farmer certification could have a good chance of being considered for the Kellogg's Master Rice Grower program. "The biggest part of the Kellogg's program is the Master Farmer Program," he said.

■ **Bruce Schultz**

Grow soybeans in fallow sugarcane fields

To increase profits, LSU AgCenter weed scientist Jim Griffin encourages sugarcane farmers to grow soybeans in their fallow fields.

Because farmers have to use a glyphosate product in fallowed fields anyway to hold down the weeds for the next sugarcane crop, "they might as well get the potential value of another crop," Griffin said.

Early-maturing soybean varieties can be harvested early enough to avoid interference with sugarcane planting, which occurs in August and September.

A sugarcane crop is harvested for four and even five years. After the final harvest, the sugarcane stubble is destroyed, and the field is fallowed until the crop is replanted.

Soybeans are the perfect crop for fallow fields for several reasons. Predominant weeds in sugarcane are fairly easy to manage with current herbicides, and resistant weeds are not an issue. Planting on the raised beds used in sugarcane production helps with drainage. Soybeans also benefit the succeeding sugarcane crop by providing residual nitrogen.

Another reason is soybeans are selling at record high prices, Griffin said.

"Even if the soybeans were planted as a cover crop and not harvested, this strategy would improve the soil without sacrificing weed control," Griffin said.

The drawback is that sugarcane farmers need different equipment for soybeans. But Griffin said this is an investment that will pay off. Some sugarcane farmers in the Bunkie and Cheneyville area, for example, are already doing this, and they're increasing their productivity, Griffin said.

■ **Linda Foster Benedict**

Evaluation of Three Bermudagrass Hybrids for

Grazing and Hay Production in South Louisiana

Guillermo Scaglia

Bermudagrass is an important warm-season, perennial, sod-forming forage grass grown across the southeastern United States. Bermudagrass is productive from spring until fall and is well-suited for grazing or hay production. It is a high-yielding grass; 5 to 7 tons of hay per acre can be produced with good management and ample moisture. In the South, beef cattle and dairy farms depend on bermudagrass as primary grazed forage from early spring until autumn. Thousands of tons of bermudagrass hay are fed to beef and dairy herds during winter, transition periods of seasonal deficiencies in forage available, and drought periods. Bermudagrass stands often persist and remain productive for more than 35 years, if properly managed. Most are tolerant to acidic and sandy soils, moderate to heavy grazing pressure, variable rainfall distribution, and differing management. Almost all are dual-purpose, producing pasture forages and hay.

To accomplish the objective of producing beef and hay from the same area, pastures have to be stocked with fewer animals per acre, allowing excess forage not consumed by cattle to be harvested as hay. This approach is detrimental to the total beef that can be produced on bermudagrass pastures but will offer the possibility to generate income from hay. The purpose of this trial was to evaluate Tifton 85, Alicia and Jiggs bermudagrass hybrids as dual-purpose forages. The hybrid Coastal was the first hybrid bermudagrass developed for forage production and sometimes will be used in this article as the standard to which the other bermudagrass hybrids are compared.

Characteristic of the bermudagrass hybrids used in the study, Tifton 85 is an F1 hybrid between a plant introduction from South Africa (PI 290884) and Tifton 68. It is taller and has larger stems, broader leaves and darker green color than most commercially available bermudagrasses. It has large rhizomes and very large stolons that spread rapidly and quickly cover the ground. It is, however, harder to establish a stand of Tifton 85 than Coastal or Jiggs.

Tifton 85 establishes rapidly from sprigs or tops. The larger and thicker stems of Tifton 85 increase the time required for drying to make hay by approximately 12 hours. Consumer perception is that thicker stems are related to low nutritive value. This perception, although false, sometimes limits the market for Tifton 85 hay. The increased digestibility of Tifton 85 over other hybrids is most likely due to different chemical bond ratios in the plant's fiber fraction. Tifton 85 is highly resistant to leaf rust.

Alicia, a variety imported from South Africa, establishes aggressively from either tops or sprigs. It spreads primarily by stolons and has fewer rhizomes, but it spreads and becomes

Alicia bermudagrass. Note the mature plants of ryegrass. In some pastures, ryegrass will volunteer, but in other cases it could be seeded for grazing during winter months. Photo by Guillermo Scaglia

Tifton 85 bermudagrass. Note the dark green color of the pastures. Mature ryegrass is still present. Photo by Guillermo Scaglia

established more rapidly than other hybrids. Under moderate to heavy grazing and fairly severe winters, its recovery in the spring has been slow. Alicia is popular horse hay because of its fine stems. Digestibility of Alicia usually is less than most bermudagrasses. Alicia is extremely susceptible to leaf rust.

Jiggs establishes easiest of all varieties and quicker than Coastal on heavy-textured soils. It is adapted to various soil types and even does well on heavy, wet soils. Jiggs is easy to plant by tops. The thin stems of Jiggs also make it a desirable variety for hay production. Recent research, however, has shown that Jiggs has lower production and nutritive value than other improved bermudagrass hybrids. It does not have many rhizomes and does not produce as much as Tifton 85 in a drought.

Bermudagrass response and animal performance

In three consecutive years, 36 spring-weaned steers (initial body weight = 555 pounds) per year were rotationally stocked (3.3-acre pastures) for an average of 140 grazing days between June and October on three different bermudagrass hybrids (Alicia, Tifton 85 and Jiggs) at a stocking density of eight to 10 steers per acre (variable through the grazing season). Fertilization rate was 217 pounds per acre of urea initially and each time round bales of hay (900 pounds average weight) were harvested. Bermudagrass forage mass available (pounds per acre) was estimated and sampled for nutritive value analysis. Samples were taken at the beginning of the study and every 28 days thereafter during the grazing period. Individual animal weights were taken every 28 days coinciding with the bermudagrass sampling.

The three hybrids did not differ in the availability of forage mass throughout the grazing season (Figure 1). Crude protein, acid detergent fiber and neutral detergent fiber concentrations also did not differ. These variables are important because they are closely related to the digestibility of the forage and the

Steers grazing Jiggs in July. Note the abundance and height (leaves reach the carpal joint or "knee" of the steers) of the bermudagrass. Photo by Guillermo Scaglia

Guillermo Scaglia, LSU AgCenter ruminant nutritionist, evaluates different forage systems to produce forage-fed beef. Photo by Bruce Schultz.

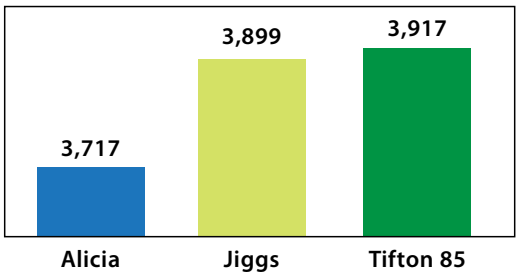

Figure 1. Average dry matter (forage mass) available (pounds per acre) throughout the grazing season for each of the bermudagrass hybrids.

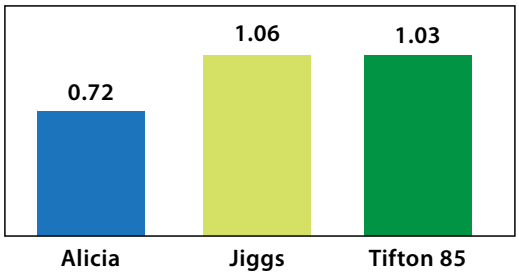

Figure 2. Average daily gains (pounds per day) of beef steers grazing different bermudagrass hybrids.

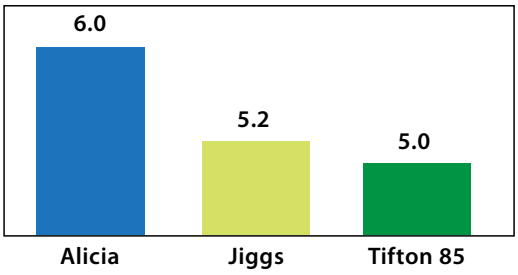

Figure 3. Average lignin concentration (%) of three bermudagrass hybrids during the experimental period.

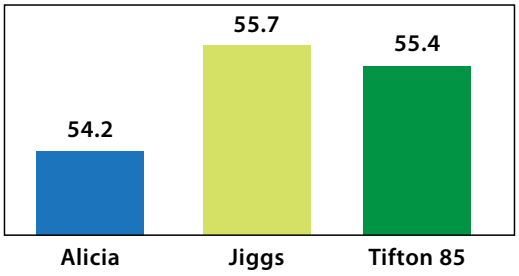

Figure 4. Average total digestible nutrients concentration (%) of three bermudagrass hybrids during the experimental period.

Bermudagrass cut for hay. After cutting, bermudagrass remains on the ground for drying before the bales are made. Photo by Guillermo Scaglia

Round bale. Once made on the field, it should be stored appropriately until feeding, away from soil moisture, rainfall, as well as air temperature and humidity. Photo by Guillermo Scaglia

potential forage intake of the animal. The lack of differences may imply that animals should perform similarly. Average daily gains, however, of steers grazing Alicia were smaller than those grazing on Tifton 85 or Jiggs (Figure 2). A closer look at the nutritive value of the different hybrids reveals that Alicia has a greater concentration of lignin (Figure 3), a plant structural carbohydrate that is not digested by the microbes in the rumen. It is known that lignin concentration and some chemical linkages in its structure in many grasses and legumes may impair digestibility of the forages, probably decreasing the amount of forage that the animals consumed.

A common variable used to express nutritive value of forages is Total Digestible Nutrients (TDN). As indicated in Figure 4, TDN levels for the different hybrids were similar. In terms of hay produced, Jiggs produced an average of seven bales per acre, which was similar to Tifton 85 (7.5 bales) but more than Alicia (5.5 bales per acre).

Hay prices skyrocketed in 2011 because of drought conditions in many beef cattle states. According to the 2011 LSU AgCenter Agricultural Summary, many Louisiana hay producers were able to sell their hay in drought-stricken areas such as Texas for a good price. Under the conditions of the present experiment, managing bermudagrass for grazing and hay production, assuming a cost of $320 per acre (2012 Beef Cattle and Associated Forage Crop Production in Louisiana), is a profitable management strategy for producers in south Louisiana. The drought situation certainly would increase the profitability of these management practices, but even with average historic prices ($48 per round bale), management of bermudagrass for grazing and hay production is a viable alternative for beef cattle producers. ■

Forage Nutritive Value Characteristics

Crude protein (CP): Laboratories measure the nitrogen (N) content of the forage and calculate crude protein using the formula: CP = % N x 6.25. Crude protein will include both true protein and nonprotein nitrogen. Cattle can use both types to some degree. Crude protein values give no indication if heat damage has occurred, which may alter protein availability.

Acid detergent fiber (ADF): This value refers to the cell wall portions of the forage, which are made up of cellulose and lignin. These values are important because they relate to the ability of an animal to digest the forage. As ADF increases, digestibility of a forage usually decreases.

Neutral detergent fiber (NDF): The NDF value is the total cell wall, which is composed of the ADF fraction plus hemicellulose. Neutral detergent fiber values are important in ration formulation because they reflect the amount of forage the animal can consume. As NDF percentages increase, dry matter intake will generally decrease.

Lignin: It is the prime factor influencing the digestibility of plant cell wall material. As lignin increases, digestibility, intake, and animal performance usually decrease.

Total digestible nutrients (TDN): It is the sum of the digestible fiber, protein, lipid and carbohydrate components of a feedstuff or diet. It is directly related to digestible energy and is often calculated based on ADF.

Guillermo Scaglia, Associate Professor, Iberia Research Station, Jeanerette, La.

Issues Facing Animal Agriculture in Louisiana

Theresia A. Lavergne, Sidney M. DeRouen, Gary M. Hay and Michael F. Burnett

The combined value of Louisiana's beef, dairy and poultry industries was $2.18 billion in 2011. The poultry industry is the largest animal agriculture industry with a total value of $1.6 billion. There are 354 commercial broiler and table egg producers that produce about 900 million pounds of broiler meat and 21 million dozen eggs each year. The total value of the beef industry is $448.3 million with 11,015 producers. The cow-calf production system is the primary beef cattle enterprise in Louisiana. The majority of beef commercial herds in Louisiana are composed of fewer than 50 cows. The total value of the dairy industry is $134.5 million. There are 140 dairy farms with a total of 16,190 cows in Louisiana. The total milk production is 221.4 million pounds annually.

Many issues can affect the management, profitability and sustainability of beef, dairy and poultry operations. Extension and research faculty need to be aware of these issues and work to help producers improve production practices. To determine the important issues, surveys were administered at group meetings with beef, dairy and poultry producers across Louisiana.

A total of 230 surveys were completed. Of the respondents, 85 worked in the beef industry, 71 in the dairy industry, and 74 in the poultry industry. One hundred thirty-six respondents were producers/growers, 18 worked in allied animal agriculture industries (industries that supply products or services to the beef, dairy and/or poultry industries), 13 worked for state agencies, 52 worked for the LSU AgCenter serving the animal agriculture industries, and 11 worked in other animal agriculture positions. Sixty-three of the respondents worked in animal agriculture for more than 40 years, 73 for 30 to 39 years, 40 worked for 20 to 29 years, 40 for 10 to 19 years. The other 14 worked for less than 10 years.

The makeup of the group was 150 males and 80 females, four African-Americans, 219 Caucasians, four Hispanics, and three "other" race.

The survey items and the average ratings of overall, beef, dairy and poultry industry respondents are presented in four tables, which are included in the Web version of the magazine. Go to www.LSUAgCenter.com.

For economic issues, all groups rated the issues substantially important. "Rising input costs" is the item that received the numerically highest rating for all groups of respondents. "Global competition" received the numerically lowest rating for overall and for dairy respondents, "global competition" and "maintaining industry infrastructure" received the lowest ratings for beef industry respondents, and "land prices" received the numerically lowest rating for poultry industry respondents.

For environmental issues, the average ratings of overall respondents and poultry respondents were substantially important, whereas the average of beef and dairy respondents was moderately important. "Public perception of the environmental effects with animal agriculture" received the numerically highest average for all groups of respondents. The numerically lowest rating for overall respondents was for "impact of animal agriculture on air quality" and "tillage practices." For beef producers the lowest average was for "impact of animal agriculture on air quality." For dairy producers the lowest average was for "mortality disposal." And for poultry producers the lowest average was for "tillage practices." The greatest degree of difference in responses was for "animal waste disposal/utilization," "mortality disposal," "impact of animal agriculture on water quality" and "impact of animal agriculture on air quality." The poultry industry rated these issues numerically higher than the beef and dairy industries.

All groups rated public policy issues substantially important. For all groups, the numerically highest rating was for "consumer confidence in food and animal product safety." "Government subsidies of animal products" received the lowest numerical rating for beef and poultry respondents, and "government regulation of animal agriculture production practices" received the numerical lowest average for dairy respondents.

For production issues, the average ratings of all groups were substantially important. All groups of respondents gave the highest numerical rating to "improving production efficiency." All groups gave the lowest numerical rating to "natural and organic production methods." The greatest degree of difference in responses was for "biosecurity." The poultry industry rated this issue higher than the beef and dairy industries.

Future animal agriculture research and extension programs should address the highly rated items: maintaining profitability with rising input costs; means of marketing products for producers to receive the best price for their products; being a "good neighbor" to ensure that the public perceives the animal agriculture industries as good stewards of the land and that animals are treated humanely; developing, implementing and continually practicing optimum quality control on the farm to maintain consumer confidence in animal agriculture products; and evaluating practices to increase the efficiency of production throughout all phases of animal production. ■

Theresia A. Lavergne, Professor, School of Animal Sciences, LSU AgCenter, Baton Rouge, La.; Sidney M. DeRouen, Professor, Dean Lee Research and Extension Center, Alexandria, La.; Gary M. Hay, Director and Professor, School of Animal Sciences; and Michael F. Burnett, Director, Human Resource Education and Workforce Development, LSU, Baton Rouge, La.

Alternatives in Cool-season Flowers for the Landscape

Allen D. Owings, Regina P. Bracy and Roger Rosendale

The LSU AgCenter Hammond Research Station evaluates approximately 300-350 cool-season bedding plants in landscape settings each year from October through May.

Of the annual flowers for the cool season of the year, most people are familiar with pansies, snapdragons, petunias, garden mums and older varieties of dianthus. But there are many more.

Violas are the cousins of pansies and continue to gain in popularity. The Sorbet series of violas always perform well in landscape plant evaluations. The series blooms early and performs well from midfall through May. Planted in mass, they provide a great flower show. The blooms will last two weeks longer into the later spring than typical pansies. The new pansy for the past two years has been the trailing series called Plentifall. This series is being discontinued but is being re-introduced with new genetics under the name Cool Wave pansies.

The best of new dianthus is the Amazon series. These prolific flower producers should be planted in September, October or November. Flower heads are large and will last until mid-May. The series also has cut-flower potential. Flower colors include Rose Magic, Purple, Cherry and Neon Duo. Amazon dianthus was a Louisiana Super Plant selection from the fall of 2010.

Dwarf flowering tobacco is a good alternative cool-season bedding plant for south Louisiana. Though dwarf they still reach heights of 24 inches. Nicotianas have less cold hardiness than some other cool-season flowers. In south Louisiana they should be able to withstand winter conditions as long as plants are not exposed to temperatures in the upper 20s or lower in the first week after installation. They can be planted in mid-to-late February in both south and north Louisiana. Plants last until late spring. Flower colors available include white, lime, rose and red. They do best during the cool season of the year in full sun but will perform better into late spring, if partial shade is provided. The Nicki, Perfume and Saratoga are popular.

The LSU AgCenter has been evaluating landscape performance of columbines the past three years. The Swan and Songbird series are both propagated by seed. Columbine is a perennial normally treated as an annual in Louisiana. For the landscape, plant in flower beds mid to late fall for eight weeks of flowers in March through early to mid-May. Many flower colors are available besides the yellow or golden columbines from Texas. Varieties in the Songbird series are Blue Bird, Bunting, Cardinal Improved, Dove, Goldfinch, Robin and Nightingale. Varieties in the Swan series are Blue White, Burgundy White, Pink Yellow, Red White, Rose White, Violet White, White and Yellow. The Swan series is a Louisiana Super Plant selection for the fall of 2011.

Although tall-growing delphiniums are better known, there is a smaller variety for landscape beds. Diamonds Blue delphinium has intense blue flowers and is a new seed-propagated variety. This plant is considered a first-year-flowering perennial but should be treated as an annual. It should be planted in full sun in the fall for great flowering performance from February through May. Plants reach a height of 18 inches with a 10- to 12-inch spread so should

The new pansy for the past two years has been the trailing series called Plentifall, such as this Plentifall Purple Wing. Photo by Allen Owings

be planted 12-14 inches apart. The LSU AgCenter has also evaluated the taller growing Guardian series delphinium. These are 36-inch tall plants with 24-inch flower plumes. Colors available are white, lavender and blue.

There is renewed interest in foliage plants for the landscape, and edible kale is a good selection for the cool season. Redbor is popular and a proven performer in the South. It was a Mississippi Medallion winner in 2005 and a Louisiana Super Plant for the fall of 2011. It is one of the most vigorous-growing and heat-tolerant kales on the market. Extremely curly foliage, early dark purple foliage and a spring height of 3 feet are characteristics of this plant. Plants seldom flower – a downfall of many of the ornamental kale plants. Green-foliaged ornamental kales closely related to Redbor include Starbor and Winterbor.

Camelot foxgloves, also known as digitalis, are new to the market. For best results, these flowers should be planted in the fall. They produce 2-foot spikes of flowers in the spring. Flowers bloom two to three weeks before the popular Foxy variety and last two to three weeks longer. Flowers in the Camelot foxglove are lavender, cream, rose and white, with lavender, cream and rose being the better-performing colors.

The flowers of the African daisy are similar to Shasta daisies. They started being sold about 10 years ago, and new, better performing varieties continue to be developed. These plants do best when planted mid to late winter, and they last in the landscape until early summer. These transition plants can tolerate temperatures down to the upper 20s and go downhill during 90-degree days and 70-degree nights in May but still last until June. You will usually see blooms by late February to early March, and blooming continues in cyclic patterns. If you want to try to carry the plants through the summer, they need some shade and no fertilizer. Remove old flowers as they fade to extend the bloom. New flower colors and shades are available – mostly in the white, purple and lavender color ranges. The Akila series is new and has been a great performer in cool-season landscape trials. Colors in the Akila series are lavender, white and purple. ■

Diamonds Blue delphinium has intense blue flowers and is a new seed-propagated variety. Photo by Ball Horticultural Company

The Guardian series delphinium are 36-inch tall plants with 24-inch flower plumes. Colors available are white, lavender and blue. Photo by Ball Horticultural Company

The best of new dianthus is the Amazon series. This is the Amazon Rose Magic. Photo by Allen Owings

Colors in the Akila series of daisies include lavender, white and purple. Photo by Allen Owings

Allen D. Owings, Professor, Hammond Research Station, Hammond, La.

Smooth Cordgrass for Large-scale Coastal Restoration

Herry Utomo at Marsh Island with some cordgrass. Photo by Bruce Schultz

Herry S. Utomo, Ida Wenefrida, Steve D. Linscombe, Michael D. Materne, Stephen A. Harrison and Carrie Knott

Preventing coastal land loss represents a major technological challenge. Between 1932 and 2000, more than 1,875 square miles of coastal Louisiana land was lost. Without intervention to stop continuing conversion of productive wetlands into open water, an additional 513 square miles will be lost by 2050. Successful efforts to reduce coastal wetland losses depend on improving the efficiency and effectiveness of vegetative restoration technology. Successful seed-based deployment can help reclaim eroding land and rejuvenate distressed habitats following destruction from natural disasters, such as hurricanes, or re-occurring dieback. In addition, planting seed is an effective way to manage the entire Louisiana ecosystem for maximum productivity.

Significant advancement in coastal engineering, such as the beneficial use of dredged materials, can help increase the speed and size of new marsh construction. Consequently, improving seed versatility, production and application is crucial in establishing efficient revegetation.

Seed-producing varieties of smooth cordgrass (*Spartina alterniflora*) are critical for providing not only an alternative to hand-transplanting but also the means to increase efficiency of large-scale restoration. For a number of years, the LSU AgCenter has conducted extensive research to develop seed-producing varieties of smooth cordgrass.

PolyC15 is the most advanced seed-based smooth cordgrass being developed. It is produced from free pollination of 15 selected native smooth cordgrass lines. This is the first seed-based production system developed specifically for this coastal plant species for superior performance, fertility and high genetic diversity. Multi-location trials were conducted under natural marsh conditions at Rockefeller Wildlife Refuge, Bayou DuPont and Lake Pontchartrain. Control plots were established under freshwater conditions at the Rice Research Station in Crowley.

PolyC15 yielded an average of 631 pounds of seed per acre over eight environments at four trial locations. As a comparison, the variety Vermilion produced 261 pounds of seed per acre. Higher seed yield is attributed to improved seed set and increased fertility. In addition to higher seed yield, PolyC15 also has higher germination rates, averaging 74 percent compared with 35 percent for Vermilion. Seed yield and germination rates combined have more than a five-fold increase.

PolyC15 is genetically diverse as a result of random crosses of 15 genetically different parental lines. DNA markers were used to identify genetic diversity among parents. This level of diversity provided a genetic foundation that closely mimics the natural population of smooth cordgrass.

To further improve seed yield, new polycross sets containing four, five and six parental lines are being evaluated. Based on two-year preliminary yield trials, two of the most promising polycross sets have average seed yields of 1,081 and 984 pounds per acre. The overall goal is to improve seed production while maintaining high levels of genetic diversity using fewer parents to reduce the complexity in field management.

PolyC15 has been used extensively in aerial seeding using a fixed wing airplane on newly constructed marshes at Bayou DuPont and Marsh Island and distributed by airboat on bare soils along Lake Pontchartrain shorelines. The progeny of PolyC15 perform well under coastal conditions. The seed produced a robust population in a single season, providing rapid revegetation and an excellent protection for newly constructed marshes. Detailed observations on individual plants revealed a high variability for various traits, including plant stature, stem color, plant height, leaf type, leaf size, leaf color, panicle length, panicle size and heading date. The diversity displayed verified the DNA

fingerprinting profiles used in the development of high seed-producing PolyC15.

Production system, weed control and mechanical harvest

Smooth cordgrass grows well across a large range of soil types from sandy to clay, with pH ranging from 3.7 to 7.9, and is adaptable to various salinity levels from freshwater to seawater. It has been successfully cultivated for more than 10 years under freshwater environments at the Rice Research Station in Crowley, La., using cultural practices similar to those for rice. Smooth cordgrass seedlings have excellent tolerance to some herbicides commonly used in rice. These provide an ample way for developing effective strategies for weed management and control under freshwater environments. Some of these herbicides have been labeled for use in aquatic environments. Currently, permits for use of three herbicides on smooth cordgrass are being filed to support the seed production system.

Plant culture, fertilization management, weed control and mechanical seed harvesting are being established to support a commercial seed production system for smooth cordgrass. Since smooth cordgrass has a great adaptation to a wide range of soil types and salinity levels, large-scale commercial seed production is probable. Because of increasing salt contamination of inland groundwater, many areas historically used for rice production have been abandoned. These could be used for the production of PolyC15 as an alternative crop with little modification to existing equipment or land.

Beyond seed production

Unlike an agricultural system where most critical growing conditions can be optimized, little intervention can be done to improve the conditions during planting and stand establishment in the coastal regions. Therefore, the capability of seed to adapt to these conditions has to be improved. Under favorable conditions, smooth cordgrass seedlings need about four weeks following germination to produce a root system to hold the soil. During this period, seeds or seedlings in a relatively calm environment – such as suspended within a thin layer of mud or biomass, trapped inside soil crevices protecting them from wave actions or landed on moist soil that experiences low-energy waves – will have a better chance to become established and produce vegetation.

Because conditions in coastal regions can change rapidly due to tides, winds, waves and rain, smooth cordgrass seed used in aerial seeding must adapt to the spikes of adverse micro temperatures, prolonged lack of moisture, prolonged inundation, high winds, wave energy and other variables. One strategy to enhance seed versatility and capability is to improve the seed properties to respond better to less-optimum growing conditions and a wide range of environmental fluctuations.

Experience has shown that applying bare seed can result in uneven stands because the seed is so light. To compensate, researchers have investigated adding a seed coating to provide weight. In addition to adding weight, various components with specific functions can be incorporated into seed pellets. For example, water-attracting materials can be added to absorb moisture and help seed survive on higher elevations that have less exposure to water during low tides. Materials can be added to the pellet to help seed stick to the soil, also.

Even though smooth cordgrass seedlings can withstand more than 14 continuous days under water, oxygen-generating materials might further help seed withstand prolonged inundation. Other seed enhancement materials, such as fungicides, insecticides and micronutrients, can be placed directly in the seed pellet to decrease disease susceptibility during germination. Seed coating also is effective in controlling mold-induced diseases.

Smooth cordgrass seed applied by air has attracted a large number of local birds to feed on it, causing a tremendous seed loss. Because smooth cordgrass seed is not hard-coated, it will not pass through a bird's digestive process. Coating or pelletizing, therefore, could include protective measures to minimize seed palatability. Otherwise, nontoxic bird repellents can be incorporated to reduce palatability. ■

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An alligator in the shadow of some cordgrass. Photo by Bruce Schultz

Economic Profile of

Louisiana Agriculture and Farming Households

Ashok K. Mishra and Aditya Khanal

The agricultural sector in Louisiana differs in several ways from the rest of the United States and even the rest of the Delta region. Louisiana shows a marked difference in socioeconomic variables compared to other regions, and this appears to be due to a variety of factors. The following analysis of Louisiana agriculture is based on the 2010 Agricultural Resource Management Survey (ARMS) conducted by the National Agricultural Statistics Service (NASS) and Economic Research Service (ERS). Attributes of Louisiana agriculture are compared with agriculture in the Delta and the rest of the United States. This analysis may aid policy makers in evaluating and designing policies that will enhance the well-being of farm households; extension agents in targeting gaps in their educational programs that can be addressed; and farm operators as they look to the future.

Louisiana is home to about 30,000 farms. These farms average around 370 acres in size. Farms grossing more than $250,000 annually constitute less than four percent of the total. Of the 2 million farms in the contiguous United States, and specifically the 90,000 farms in the Delta, however, the share of farms grossing over $250,000 is significantly higher, with 12 percent in the Delta, and 11 percent nationwide. In addition, the majority (58 percent) of Louisiana farm land is operated by owners of the land. The tenancy of farms in Louisiana is three times that of the Delta region and almost double the national average. This speaks to the greater prevalence of rural culture in the state. It may also indicate that farm operations in Louisiana are at a smaller scale; therefore, the acreage may not be managed as expertly or exploited as completely as those operations grossing more than $250,000 annually.

Farm operators in Louisiana are some of the poorest in the nation on average. The average net worth of farms in Louisiana comes in at around $520,000, which is 40 percent lower than the national average of nearly $900,000. The Delta region does not do much better, though it still ranks higher than Louisiana with an average net worth of about $604,000. Even more telling, however, is a comparison of average farm income. Louisiana farms make about $12,500 per year on average, whereas farms in the Delta bring in more than $22,000, and farms across the United States average more than $34,000, which is nearly triple the income of the average Louisiana farmer. The Midwest is likely the driver behind this wide discrepancy with its high volume of valuable commodities like corn and soybeans.

Louisiana receives more government payments per farm operator than the Delta region or the rest of the nation. This is due in large part to the higher percentage of rice farms, cotton operations, and farmland eligible for Conservation Reserve Program payments. Louisiana farm operators on average receive just under $5,000 per year, while those in the Delta receive about $4,800, and farmers nationwide average a payment of only $4,200.

Farm Household Attributes

Education

Educational attainment of farm operators tends to be a telling factor in the prediction of professional and financial success. In Louisiana, this appears to hold true. A substantially greater number of farm operators in the state have only a high school diploma, as compared with the rest of the United States and the Delta region. Out of all farm operators in Louisiana, 85 percent do not hold a college degree. In the Delta and the rest of the United States, around a quarter of farmer operators have graduated from a four-year university, and an equal number have attained some level of college education.

Spouses of farm operators in the Delta are by far the best educated, compared to Louisiana and the rest of the nation, with more than 50 percent having some college or a college degree. This is the only area in this analysis in which the Delta region outperformed both Louisiana and the United States overall.

Age

In addition to having less formal education, Louisiana farm operators are older on average than those in the rest of the nation. Almost 40 percent are 65 years old or older. The Delta region has an older demographic of farm operators as well, with its highest share being between 55 and 64 years old. Nationwide, however, fewer than 30 percent of all farm operators fall into that age bracket and even fewer (about 27 percent) are 65 or older.

Time Allocation

Nationwide, approximately 40 percent of farm operators work off the farm in some measure. A similar share of their spouses work off-farm as well (38 percent). In Louisiana, the percentages are not too far off the national average, with 42 percent of operators and 34 percent of their spouses reporting off-farm labor. The Delta region has a higher share of off-farm labor overall and equal levels for spouse and operator (43 percent for each). This may be due to several factors, including educational attainment by farm operators and spouses and lack of off-farm job opportunities.

Of the farm operators also employed elsewhere, the vast majority work full-time (over 35 hours): 74 percent in the United States as a whole, 83 percent in Louisiana, and 85 percent in the Delta region.

The spousal off-farm labor follows a somewhat different distribution, how-

ever, with 69 percent nationwide working more than 35 hours, 74 percent in Louisiana, and 72 percent in the rest of the Delta region. With more smaller farms operating in Louisiana than in the rest of the nation, nonfarm income is an important resource to farm households.

A table of time allocations of farm households is in the Web version of the magazine.

Type of Farming Operation

Diversity in farming enterprises can help in reducing income variability. Louisiana farmers grow corn, soybeans, wheat, cotton, grain sorghum, sugarcane, fruits and vegetables. They raise beef cattle, poultry and dairy cattle. In the United States, the greatest share of farms (34 percent) raises cattle for beef. In Louisiana and the Delta, the share of cattle operations is even higher at 55 percent and 52 percent, respectively. Dairy operations vie for last place in both Louisiana and the Delta, holding under 2 percent of the total.

Conclusion

The agricultural sector in Louisiana is a vital component of the state economy, contributing nearly $26 billion. This analysis demonstrates that Louisiana is lagging behind the national average and the rest of the Delta region in some categories such as income, farm size and household education. In addition, Louisiana farm households seem to place a greater importance on farming operations as residences and supplemental income, with more farm operators and spouses working full time off the farm than anywhere else in the United States. Given the additional observation that farm operators and spouses are the oldest in the nation, educators interested in supporting agriculture in Louisiana may take into advisement the need to prepare the next generation of farmers on how to better leverage farming assets (land, machinery and equipment), increase farm size to exploit economies of scale, and increase income earned through the farming business. ■

Ashok K. Mishra, Professor, and Aditya Khanal, Graduate Research Assistant, Department of Agricultural Economics and Agribusiness, LSU AgCenter, Baton Rouge, La.

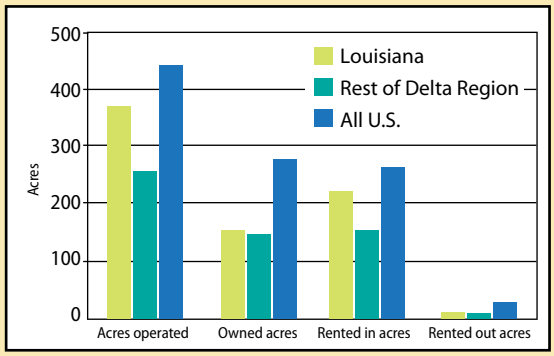


Figure 1. Louisiana farmers rent more land than farmers in the rest of the Delta (Mississippi and Arkansas) and the rest of the United States, excluding the Delta region. The numbers are averages.

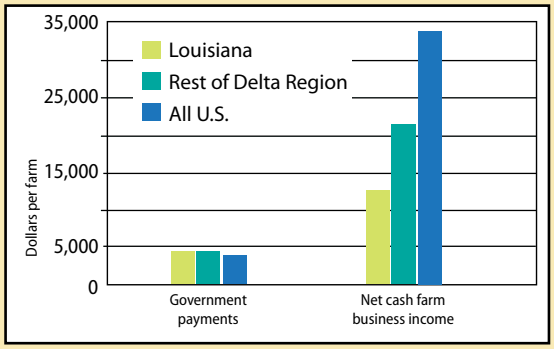


Figure 2. Louisiana farms earn less from farming than farms in the rest of the Delta and the United States.

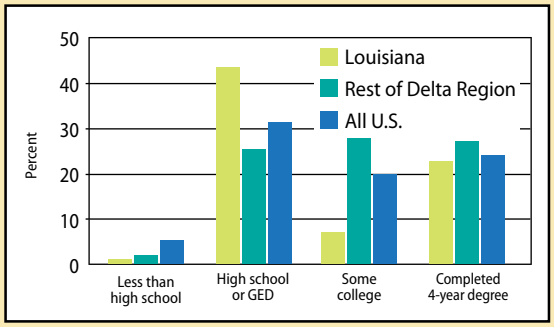


Figure 3. Higher percentage of Louisiana farmers have completed high school compared to farmers in the rest of the Delta region and the United States.

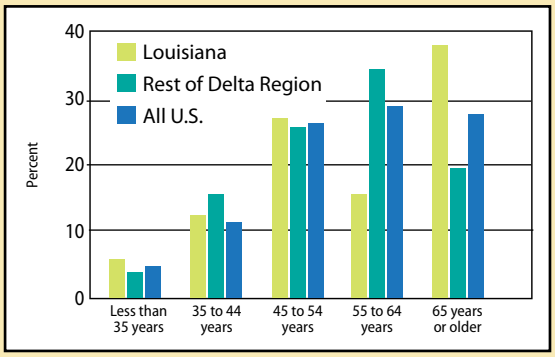


Figure 4. Louisiana farm operators tend to be older than farm operators in the Delta region and the rest of the United States.

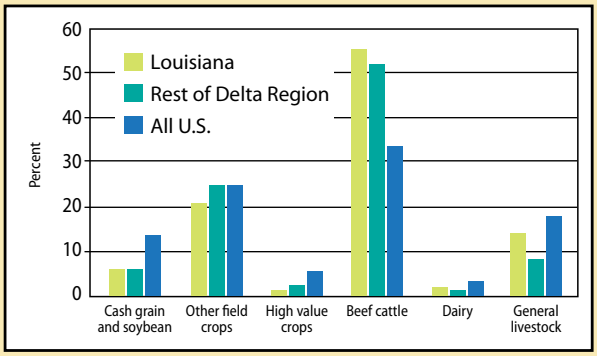


Figure 5. Louisiana farms are more diverse than farms in the rest of the Delta region and the United States.

Genetics and Management of

Birds, Reptiles and Mammals

Sabrina Taylor

Gopher tortoise. Photo by Jean Elbers

In recent years the role of genetics has become increasingly important for the management of a wide variety of wildlife species. Every individual has several thousand genes with different functions as well as sections of DNA with no known function, which are known as neutral markers. By measuring genetic diversity at several of these genes or markers, scientists can determine whether a species has the potential to adapt to change and persist over the long term. Additionally, these measures can give managers insight into animal behavior, movement patterns, inbreeding and population structure. Here are some examples of genetic projects under way in the LSU AgCenter School of Renewable Natural Resources.

Bachman's Sparrow

Bachman's sparrows are a species at risk that live in longleaf pine habitat, a forest type once extensive in the southeastern United States. Since the early 1900s, most longleaf pine forests have been lost or fragmented. Consequently, Bachman's sparrow populations have declined and become fragmented. Birds may have trouble dispersing and so may be prone to inbreeding because they can only find and breed with kin in the same fragment.

AgCenter researchers are using highly variable DNA markers to figure out the amount of gene flow among fragments, the amount of inbreeding within fragments, and whether a natural break in longleaf pine habitat caused by the Mississippi River and its surrounding bottomland hardwood habitat has caused birds on either side of the river to become distinct.

If gene flow among fragments is low and inbreeding is high, moving birds among fragments may be necessary to ensure high reproductive success and survivorship over the long term. Prior to genetic techniques, researchers were reliant on radiotags (tags that emit a frequency and allow researchers with a receiver to relocate individuals) or the recovery of metal leg bands to monitor dispersal, methods that are expensive and rely on detecting rare events. Genetic techniques, on the other hand, can reveal where a bird came from even if the bird isn't caught in the act of dispersing.

Gopher Tortoise

Like Bachman's sparrows, gopher tortoises are associated with longleaf pine habitat and may also be experiencing problems caused by barriers to dispersal, leading to inbreeding and reduced levels of genetic variation. AgCenter researchers are employing two advanced techniques to assess the impact that forest fragmentation may have had on the tortoises' genetic health. The first is to measure genetic variation by using several genes that affect whether pathogens are detected and destroyed by the immune system. Although these genes can be technically difficult to sequence, high variation at these genes means that tortoises are resistant to a wider variety of pathogens. Using these genes to measure variation can provide information on the tortoises' ability to overcome infections, such as a bacterial infection currently plaguing some populations.

The second approach is to use gopher tortoise specimens collected by museums to obtain DNA. This allows historic levels of genetic variation to be compared to present-day levels, which lets researchers assess which areas have lost genetic variation and pinpoint areas where gene flow has been interrupted

by habitat fragmentation. Collectively, this information can be used to decide whether gopher tortoises should be moved among populations to create gene flow, an action that could simultaneously reduce problems associated with inbreeding and increase resistance to disease.

Seaside Sparrow

The 2010 Deepwater Horizon oil spill may have affected a number of species along the coast of the Gulf of Mexico, either through direct effects like oiling or indirect effects like the destruction of nesting habitat or contamination of prey. One potentially affected species is the seaside sparrow, a bird that is restricted to salt marsh habitat. As a top predator that feeds on insects, snails and small crabs, the seaside sparrow is often considered an indicator species of marsh ecosystem health.

AgCenter researchers are examining the response of these birds to oiled areas with standard field techniques like estimating population sizes and reproductive success. They are also assessing the activity of a gene that responds to the presence of toxins in oil. Genetic activity can reveal if any response is restricted to oiled areas or whether it is general throughout the salt marsh, as may be expected if the birds disperse widely or forage in both oiled and unoiled areas. This work includes a major effort in the field to find nests and mark birds with metal and colored leg bands, as well as state-of-the-art genetic techniques to examine gene expression and seaside sparrow dispersal.

Red Wolves

The red wolf is a federally listed endangered species that was removed from the wild in Louisiana and Texas, bred in captivity, and then returned to the wild in North Carolina. Since the release, coyotes have naturally expanded their range to North Carolina, and they have begun mating with red wolves. Hybridization between coyotes and red wolves is a concern because it can mean that coyote genes become incorporated into red wolf DNA to the extent that the identity of the red wolf is lost. Red wolves may be preferentially choosing coyotes as mates because other red wolves may be closely related, and wolves in general tend to avoid mating with kin.

Red wolf. Photo by Joey Hinton

AgCenter researchers are using genetic data to test whether red wolves avoid mating with close kin. The genes being used in the study produce proteins that are excreted in urine. Because wolves can potentially smell individuals that are genetically different, it may be a mechanism for mate choice. If red wolves do avoid mating with related individuals and breed with coyotes instead, managers may be able to supplement the wild red wolf population with minimally-related, captive-bred wolves to prevent hybridization and the possible loss of the red wolf species.

In summary, these and many other diverse projects have benefited from the application of genetic techniques. The collection of a simple tissue sample allows DNA to be examined at any number of genes, and by using a variety of statistical approaches, a broad range of questions can be answered including the degree of dispersal, mate choice, hybridization and population structure. Given their broad application, genetic analyses have become one of the most effective, practical and trusted ways of managing and protecting wildlife worldwide to secure species persistence over the long term. ■

Bachman's sparrow. Photo by Blain Cerame

Seaside sparrow. Photo by Stefan Woltmann

Blain Cerame, a graduate student in the School of Renewable Natural Resources, holds a Bachman's sparrow. Photo by Kia Williams

Sabrina Taylor, Assistant Professor, School of Renewable Natural Resources, LSU AgCenter, Baton Rouge, La.

A Novel Approach for Cost-effective Production of

Grafted Tomatoes

Hanna Y. Hanna

In the grafting process, both parts of the tomato plant are held together with a silicon clip.

Grafting tomato plants is an old cultural technique practiced since the early 1900s in Japan, South Korea, and other Asian and Middle Eastern countries. The use of grafted plants was not common in North America until late in the last century except in home gardens and by small organic tomato growers in the Southeastern United States. Surveys conducted in 2006 showed the number of grafted seedlings in North America was more than 40 million, indicating a change of this trend. Tomato growers want to grow grafted plants to control soil-borne diseases, increase yield, improve plant adaptation to less-than-optimum environmental conditions, and extend the harvest season.

Grafted tomatoes consist of two plants fused together. The bottom plant is the rootstock, which in most cases is a hybrid tomato variety that has diverse genetic makeup that makes it resistant to soil-borne diseases and nematodes. For example, it takes years to breed a tomato variety that is nematode-resistant. But with grafting a susceptible tomato variety on a nematode-resistant rootstock, the resistance is available immediately. The top part of the grafted plant is called the scion, and in most cases, it is a hybrid variety with desirable productive traits.

Home gardeners who have limited space and grow tomatoes in the same spot every year can benefit greatly from growing grafted plants to control soil-borne diseases that colonized the soil for a long time. Producing grafted tomato plants is costly, however, because of intensive labor input for propagation, optimizing the environmental conditions for healing the graft, longer periods needed for producing the transplants, and the additional costs of the rootstock. The high costs often discourage potential growers even with the additional benefits of increased yield and reduction of pest control costs.

The practice of grafting tomato plants leads to discarding the stumps of the scion cultivar after removing the tops for grafting. In most cases, the stumps are the remains of costly hybrid cultivars that were planted in multi-cell trays filled with commercial potting mixtures. The stumps have well-developed root systems that supported the scion plants for approximately three weeks before cutting the tops for grafting. If productive plants can be generated on the stumps, they can be used at the same farm or sold to other growers as nongrafted hybrids for returns that can defray part of the grafting costs.

A greenhouse study was conducted in 2010 and 2011 at the Red River Research Station in Bossier City to determine the feasibility of producing productive plants from the stumps. Seeds of the hybrid tomato varieties Geronimo, Quest and Starbuck (scions) and the hybrid tomato variety Maxifort (rootstock) were planted to produce seedlings for the grafting process. The tops of the three varieties and the rootstock were cut at three weeks of age above and under the cotyledon leaves. Both plant parts were held together using a silicon clip. The bottoms (stumps) of the three varieties were kept under the same growing conditions of the remaining seedlings to generate sprouts from the buds existing in the angle between the cotyledon leaves and the stump. One sprout was allowed to grow per stump for two to three weeks. The seedlings, grafted, and stump-sprout plants were transplanted into 5-gallon grow bags approximately five weeks following planting the seeds. Cultural practices consisted of standard recommendations for growing greenhouse tomatoes for fresh market production in Louisiana.

Fruit was harvested twice per week for 19 weeks. Marketable yield was determined by weighing fruit graded medium or larger during the first three weeks and during the remaining 16

Hanna Y. Hanna, Professor, Red River Research Station, Bossier City, La.

weeks of harvest to reflect the effects of the early growth interruption of grafted and stump-sprout plants on yield.

Results indicated that during the first three weeks of harvest, seedling plants produced greater yields than grafted or stump-sprout plants, and the differences were cultivar-related. Quest was the only variety that produced similar yields as a seedling or a grafted plant during the first three weeks of harvest. Tomato plants propagated by all three methods produced similar yields and fruit weight in the remaining 16 weeks of harvest. The apparent reason for yield advantages of the seedling plants during the first three weeks of harvest was their uninterrupted growth during the seedling stage. Propagation method had no specific influence on fruit quality attributes.

This study indicates that producing productive plants from the stump sprouts is feasible and can be used to reduce losses associated with discarding the bottoms of plants used in grafting. Plants grown from the stump sprouts and the seeds both produced similar yields after the first three weeks of harvest. The most apparent reason for reduced early-season yield of the stump-sprout plants was their late growth. A simple remedy for that is to allow the stump-sprout plants to grow for five weeks after initiation before transplanting in the grow bags or selling commercially. This technique is normally followed in producing transplants from seeds.

The botanical components for producing plants from the stump sprouts are similar to those for producing plants from seeds. The stumps are left with the root system and the cotyledon leaves, both essential components for producing plants from seeds. This technique should eliminate wasting a valuable part of a good hybrid tomato variety and allow for the repeated use of the seedling containers filled with valuable potting mixtures. The grafting process should be timed to allow both the grafted and stump-sprout plants to grow for at least five weeks before planting in the grow bags or selling commercially. Tomato plants produced from the stumps can be sold at market prices to generate substantial income for graft-producing businesses. ■

Heirloom Tomatoes Thought to Taste Better

The fascination with heirloom tomatoes has some backyard growers willing to give up the qualities that brought improvement to hybrid varieties in exchange for old-fashioned flavor.

"I think people tend to associate the tomatoes with the ones maybe their grandparents grew when they were young, and they believe the flavor is just better," said LSU AgCenter gardening specialist Kiki Fontenot.

Heirloom tomatoes have slowly been phased out of the market because the new hybrid varieties out-compete them. They are often misshapen and off-color, which are characteristics that make them hard to produce for today's market.

For the past 50 years or so, breeders have worked to overcome these deficiencies by developing hybrid varieties more acceptable to today's shopper.

"With the hybrid varieties, a grower may be able to make 30-40 pounds of tomatoes per plant, where you would do well to make 10 pounds with the heirloom varieties," Fontenot said.

One of the problems with hybrids is they are often picked green. Then gas is applied to force them to turn red. And then they have to be firm for shipping. The tomatoes are artificially ripened, so the flavor is often not there, Fontenot said.

"I think people associate hybrid with tomatoes from the grocery store," Fontenot said. "They sometimes don't have the flavor of those from the garden, but it really is a matter of opinion. Everybody's taste buds are different."

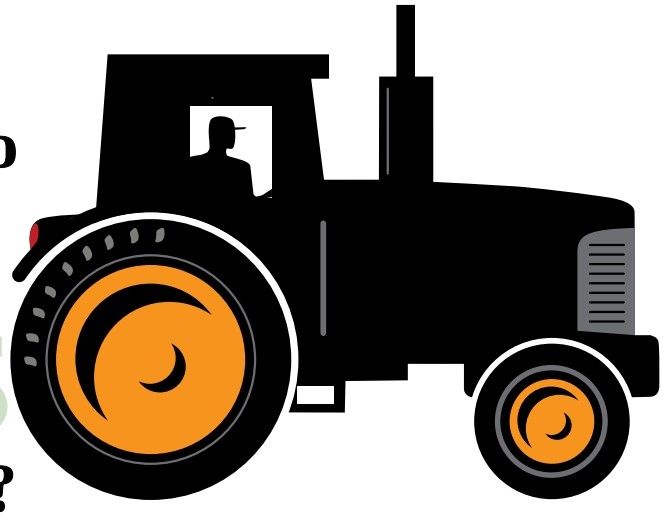
The real heirloom tomato growers say there are certain requirements that must be met to be called heirloom, and the main criterion is the tomato has to have at least a 40- to 50-generation history, Fontenot said.

People are looking for that old-time tomato flavor, but there is a trade-off, said Jimmy Boudreaux, retired LSU AgCenter horticulturist. "The problem is they won't hold up for commercial growers."

Heirloom tomatoes tend to be softer, and they have to be used soon after they ripen.

"We grew heirloom tomatoes in our research plots this year because of the high interest from backyard growers," Fontenot said. "But they are not varieties that we will spend much time on because we've been breeding for the hybrid traits that just aren't available with heirlooms." ■ **Johnny Morgan**

If Market Investors Turn to Agricultural Stocks, Why Shouldn't Farmers?



Joshua D. Detre and Hector Zapata

Louisiana farmers are constantly seeking to improve profitability and reduce business risk. To accomplish this, they often use futures markets, crop and livestock diversification, insurance, value-added agricultural enterprises, and other farm business management strategies. Of particular interest is the development of value-added enterprises that focus on healthy foods and agro-fuels such as ethanol and biodiesel. The growing consumer demand for locally sourced and organically raised food along with rising oil prices has made value-added activities economically viable for Louisiana farmers.

Indeed, given the unprecedented growth in these areas, agribusiness corporations are no longer ignoring these markets. Instead, they are making significant investments in these new ventures. For example, food processors and manufactures such as General Mills and Unilever have introduced their own organic product lines. Archer Daniels Midland (ADM) and ConAgra are investing in the agro-fuels market. Wall Street has taken notice and recognized that agribusinesses are involved in industries necessary for human survival and are rewarding them accordingly. For example, Standard and Poor's (S&P) is one of multiple investment houses that has developed thematic indices devoted to natural resources and agriculture. Investment in agribusiness and commodity indices allows farmers to have exposure to the supply chain of the agribusiness sector without having to make physical investments in facilities necessary to produce value-added agricultural products.

This begs the question: Do agribusiness stocks, similar to commodity futures markets, provide diversification potential for Louisiana farmers? The answer requires knowledge of the relationship of farm profitability measures to the returns from investing in publicly traded agribusiness firms. For example, if a farmer owned two assets, a corn operation and shares in ADM, and those two assets were perfectly negative correlated (when one asset is up, the other is down), all portfolio risk would be eliminated. However, if they happen to be perfectly positive correlated (both assets are up or down at the same time), the combination does not eliminate any risk in the farmer's portfolio. Thus, farmers through the combination of various on-farm enterprises and publicly traded agribusiness stocks would seek to maximize the risk-adjusted return in their portfolio, which would minimize risk for a given level of return through diversification.

The growing consumer demand for locally sourced and organically raised food along with rising oil prices has made value-added activities economically viable for Louisiana farmers.

Farm profitability is typically measured using two ratios: return on assets (ROA) and return on equity (ROE). For this study, profitability data for Louisiana farms was obtained from the U.S. Department of Agriculture's (USDA) ARMS database from 1991-2010.

Annual returns to publicly traded agribusiness firms are measured by the percentage by which the value of the stock has grown or declined from January 1 to December 31 for a year. This holding period return for the agribusiness stocks is calculated from data

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obtained from the Center for Research in Security Prices (CRSP). The CRSP database is the leading provider of the most comprehensive U.S. historical stock market databases.

The USDA's Economic Research Service provides a listing of industries closely related to farming by SIC code, which includes those industries having generally 50 percent or more of their national work force employed in providing goods and services necessary to satisfy demand for agricultural products. For this study these SIC codes were used to cull the S&P 500 to obtain a list of publicly traded firms with SIC codes that correspond to the Economic Research Service classification of agribusiness firms. For a firm to be eligible for inclusion in this analysis, it had to be an active member of the S&P 500 from 1991 to 2010.

Benefits to investing in agribusiness stocks go beyond diversification.

Results of the correlation analysis between the 29 publicly traded agribusiness firms and the two farm profitability measures reveal a changing story about the relationship between farm and agribusiness profitability. First, correlations over the entire 20-year period show that agribusiness stock returns and farm returns have a small positive average correlation across all stocks for ROA and ROE. In particular, 19 out of the 29 agribusiness stocks exhibited a positive correlation, which means that there is some evidence that farm profits move in the same direction as the returns to the agribusiness stocks, but they do not move in lockstep.

This positive relationship does not hold for the most recent 10-year and five-year periods. There is a dramatic shift in the average overall correlation value from being slightly positive for the 20-year period to large negative values of minus 0.38 and minus 0.39 for ROA and ROE, respectively, for the 10-year period, and minus 0.70 and minus 0.73 for ROA and ROE, respectively, during the five-year period. These results indicate that the profitability of farms and agribusiness no longer move in the same direction, but instead in opposite directions.

Louisiana farmers have a competitive knowledge advantage, relative to nonfarm investors, about market fundamentals influencing agribusinesses because they are consumers and producers.

At first, these results seem surprising because commodity prices reached record highs during the most recent five-year period. It is important to note that high revenues are not necessarily indicative of high farm profits, which were dampened by soaring input costs, both variable and fixed. Moreover, agribusiness stocks and commodity markets in a declining stock market have traditionally outperformed other industries because food prices typically increase during market downturns. Based upon the aforementioned results, it appears that diversification benefits of investing in publicly traded agribusiness by Louisiana farmers have increased over the past 20 years as the general market conditions became more favorable for both pre and post farm-gate agribusinesses relative to farms. Consequently, the overall return to a farm household would have been subject to less risk if the farm operator had incorporated publicly traded agribusiness stocks in his/her portfolio of assets.

Benefits to investing in agribusiness stocks go beyond diversification. First, with the increased emphasis being place upon capturing more of the consumer dollar beyond the farm gate, stocks offer a less expensive and a more liquid investment opportunity than traditional value-added investments. For example, a row-crop producer could buy shares in ADM or they could invest in physical facilities such as crushing facilities, wheat mills or grain elevators. By using an online brokerage service platform, the producer can quickly buy and sell at his/her convenience, and the transaction costs of conducting such trades are relatively small. Moreover, anyone across the globe can purchase the farmer's shares of ADM, whereas the market for buyers of a grain processing or procurement facility in Louisiana is relatively limited, and the transaction costs associated with such a sale can be extremely high.

Second, and related to the first, is that publicly traded agribusiness companies such as ADM have both proprietary knowledge about the end-users of agricultural products and established distribution channels. While it is true that a row-crop farmer might eventually develop these channels and acquire this knowledge, such an endeavor would likely be time and cost prohibitive.

The aforementioned example illustrates why the stock market may be an additional strategic management tool that Louisiana farmers can utilize to improve the profitability of their farm operation. Investing in the stock market involves the potential for substantial loss as well as significant gains, but this holds true for farming returns and returns to physical assets beyond the farm gate. Consequently, if farmers choose to use publicly traded agribusiness stocks as a source of diversification, they will need to devote time to understanding market fundamentals that can influence the share value of publicly traded agribusiness stocks. Louisiana farmers have a competitive knowledge advantage, relative to nonfarm investors, about market fundamentals influencing agribusinesses because they are both consumers (input buyers from agribusinesses) and producers (input suppliers to the value added sector). Many agribusiness stocks have been great investment opportunities over the past decade. While past performance may not be a predictor of future performance, agribusiness stock investments may be a lower risk hedging alternative for some Louisiana producers in the future. ■

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The New Marketing Reality for Louisiana Producers

Joshua D. Detre, Diego Javier Gavilanez Hernandez, Kurt M. Guidry and Hector O. Zapata

With rising levels and increased volatility in commodity prices, agricultural producers have begun to question if traditional marketing strategies can still be used to manage risk in the farm operation. Recent research supports the thoughts of those producers. For example, soybean hedging efficiency decreased 53 percent between 2001 and 2005. Consequently, recent LSU AgCenter research focused on several nontraditional factors besides supply and demand that may influence the volatility of soybeans futures market prices, such as energy markets and policy, exchange rates, and speculative investors.

Crude oil prices were examined because of their relationship to crop input costs – primarily fuel and fertilizer – as well as their effect on the demand for biofuels. Crop production costs have increased – up approximately 54 percent since 1999 – with a large portion of this increase directly attributable to the increase in crude oil prices. Higher crude oil prices have also placed renewed emphasis on biofuel production (ethanol and biodiesel). Recent U.S. renewable energy policies that resulted in increased ethanol consumption have helped establish a significant new market for corn that has created dramatic acreage shifts, as producers reacted to these market signals by shifting crop acreage into corn. This changing dynamic in planted acreage from year to year has introduced significant volatility into market prices for soybeans because we have fundamentally altered the supply and demand balance for commodities like soybeans.

Findings from LSU AgCenter research show that oil prices have influenced monthly soybean futures price volatility since 1999. High crude oil prices have been influential in creating competitive advantages for biofuel use, resulting in continued strong demand for ethanol despite the expiration of the corn-based ethanol tax credit. Because less than 1.5 percent of total world soybean acreage is devoted to biofuel production, major price swings in oil have added volatility to soybeans as the commodity competes with corn for acreage. Similarly, LSU AgCenter researchers highlight similar arguments for the decreasing acreage of cotton in Louisiana starting in 2007.

Another factor adding to volatility is the increased demand for soybeans by China over the past 10 years. Increased soybean sales to China reduced domestic stocks and generated increased market sensitivity to changes in supply and demand. Since 2002, annual soybean exports from the United States have increased 32.1 percent (1 billion to 1.32 billion bushels). This increase has been driven by China, whose increased soybean consumption has made them the world's largest importer.

Another factor that has been examined by LSU AgCenter researchers is the strength and weakness of the U.S. dollar. As the exchange rate between the dollar and foreign currencies changes, so does the relative costs of U.S. products for those countries. If the dollar loses value relative to other currencies, it makes U.S. products relatively cheaper, usually increasing U.S. exports. The weakness of the dollar since 2002 has also increased the interest in futures contracts of agricultural commodities as an alternative to bonds, stocks and currencies.

However, comparing the currencies of the peso (Argentina), real (Brazil) and yuan (China) to the U.S. dollar, we find no evidence that the changing strength and weakness of the dollar against these currencies influences soybeans futures prices. While the weakness between the dollar and these currencies reached a record level of 58 percent from 2002-2005, it rebounded significantly by 2011, reaching a level of 87 percent, likely negating the influence of the dollar on soybean futures price volatility.

The final factor examined and perhaps the most controversial is financial speculation. The evidence of whether commodity investing is increasing is not in doubt because the number of agricultural commodity funds (mutual and index) available for public investors increased from three before 2005 to 19 in 2012 (Table 1).

The study indicates that as the number of commodity index funds has increased, so has the volatility of prices in the soybeans futures market. Since 2007, investors are using speculative funds to diversify their portfolio investments. The combined increase in the number and use of these index funds along with the ability of investors to move in and out of these funds freely has introduced excessive volatility into the soybean futures market.

While the traditional fundamentals of supply and demand continue to be highly influential on long-term price movement, evidence has shown that nontraditional factors – crude oil prices, imports of soybeans to China and the number of commodity index funds – have become increasingly significant in recent years. In particular, short-term price movement appears to be influenced by these nontraditional factors as much as and probably more so than traditional supply and demand factors.

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The increased volatility in soybean futures markets has several implications for agricultural producers in Louisiana. First, the costs associated with hedging strategies have and will likely continue to increase as market volatility increases. Minimum margin account levels have increased in response to the greater probability of negative price movement against market positions. The higher costs associated with both futures and options markets may prevent many producers from using these strategies and may limit the level at which these can be used in overall risk management.

The second effect of higher market volatility on farmers is the increased risk associated with poor marketing decisions. In a more stable market environment, producers could use these tools with relatively minimal downside risk. But with greater price movement, placing a hedge too soon (too late) could have significant financial implications to the producer. Historically, producers could purchase options as a relatively cheap level of protection. But now option prices have increased to the point that they have become significant investments.

While increased volatility in commodity markets has created some significant challenges for agricultural producers, it does not mean that traditional risk management tools are no longer useful. Certainly, the costs and potential risks associated with using those tools have increased, but they can still be used effectively and efficiently in managing market risk. What it has done, however, is increase the importance of market information and the ability of the producer to use this information in forming future price movement projections. Having a better understanding of those factors that influence the market is crucial for producers in making informed marketing decisions and helping to reduce the financial risks associated with implementing marketing strategies in a volatile environment. By understanding these nontraditional market factors, farmers can determine what adjustments might be needed in their traditional marketing strategies. ■

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Table 1. Number of Mutual and Index Funds

	Mutual Funds	Ticker	Launch Year
1	Oppenheimer Commodity Strategy Real Asset	QRAAX	1997
2	PIMCO Commodity Real Return Strategy	PCRAX	1997
3	Credite Suisse Commodity Return Strategy	CRSAX	2004
4	DWS Enhanced Commodity Strategy	SKNRX	2005
5	Rydex Commodities Strategy	RYMEX	2005
6	Fidelity Series Commodity Strategy	FCSSX	2005
7	Goldman Sachs Commodity Strategy	GSCAX	2007
8	Invesco Balanced-Risk Commodity Strategy	BRCNX	2008
9	ING Goldman Sachs Commodity Strategy	IGCPX	2008
10	Coxe Commodity Strategy	CXCMF	2008
11	JP Morgan Highbridge Dynamic Commodity	HDCSX	2010
12	Direxion Commodity Trends Strategy	DXSCX	2010
13	Eaton Vance Parametric Structured Commodity	EIPCX	2010
14	MFS Commodity Strategy	MCSAX	2010
15	Jefferies Asset Management Commodity Strategy	JCRAX	2010
16	Russell Commodity Strategy Fund	RCSCX	2010
17	HC Capital Trust - The Commodity Real Strategy	HCCAX	2010
18	Harbor Commodity Real Return Strategy	HACMX	2010
19	Arrow Commodity Strategy	CSFFX	2010

	Index Funds	Ticker	Launch Year
1	Reuters Commodity Research Bureau	TR/J CRB	1986
2	S&P Goldman Sachs Commodity Index	S&P-GSCI	1992
3	Dow Jones Commodity Index	DJ-USB	1998
4	Rogers International Commodity Index	RICI	1998
5	Deutsche Bank Commodity Index	DBC	2003
6	Van Eck Cm Commodity Index Fund	COMIX	2010

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Don La Bonte, director of the School of Plant, Environmental & Soil Sciences and sweet potato breeder, introduced two new varieties at the Sweet Potato Research Station field day on Aug. 16. They are Orleans, which compares well with Beauregard and yields more U.S. No. 1 grade potatoes, and 07-146, which is licensed to ConAgra. Growers must get a license from ConAgra to grow 07-146 for the company's use in its processing plant at Delhi. Louisiana growers who want to produce 07-146 for the fresh market must get a license from the LSU AgCenter. 07-146 is a red-skinned variety with bright orange flesh and a sweet flavor, La Bonte said. Photo by Linda Foster Benedict