MAFES RESEARCH

# HIGHlights

Volume 66, Number 2

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**Mississippi Agricultural and Forestry Experiment Station**

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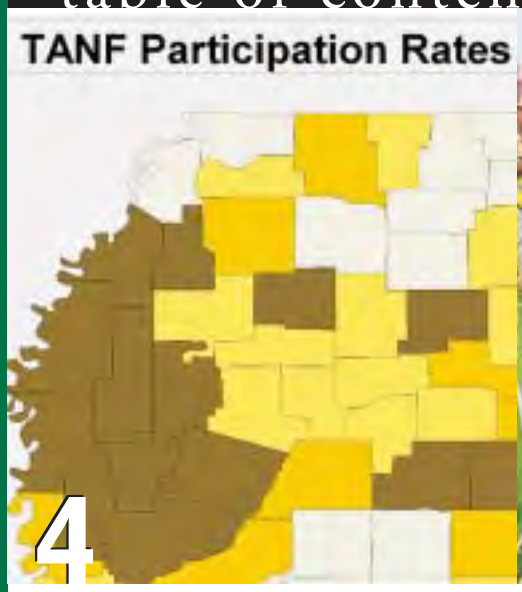


# from the DIRECTOR

Agriculture is the ultimate service industry, helping fulfill the basic needs for food, clothing, and shelter, while also providing opportunities for recreational activities.

Research in support of the farms and the multitude of businesses that make farming possible is a primary mission of MAFES. Our research scientists also are involved in activities that help improve the quality of life for all Mississippians, whether they are directly engaged in farming or just need better access to the goods and services provided by agricultural enterprises.

One project addressing quality-of-life issues is being conducted with MAFES support by the Social Science Research Center. Personnel at the center are pulling together information on jobs, transportation and social services in rural areas of the state and putting it into a form that can be used by community leaders and state agencies to better serve the needs of Mississippians, especially those in economically depressed areas. The story begins on page four.

Adding value to basic food crops through new uses and products has long been an important part of the work of MAFES scientists. Determining how consumers will react to new food products is a key part of that work, and a new lab on the MSU campus is equipped to do just that.

The James E. Garrison Sensory Evaluation Laboratory was dedicated in April and expands the capabilities of our scientists to determine consumer reactions to the products they are working with. The story begins on page 12.

This issue of Highlights also contains articles on how aquaculture has become a major part of the Mississippi economy and a report on the work MAFES scientists are doing in support of a crop that plays an important economic role in several north Mississippi communities—sweetpotatoes.

Horses are no longer the engines that drive agriculture, but they are a favorite source of recreation in Mississippi. MAFES animal scientists and other Mississippi State personnel conduct research in support of equine activities, and one outgrowth of this research is the availability of stallions with impressive bloodlines. The story on page eight explains why these animals are mutually beneficial to the university and the state's equine industry.

These are just some of the projects under way at MSU and branch stations throughout the state that ultimately benefit all Mississippians, whether they are directly involved in production agriculture or depend on those who are there to help meet their needs.

Vance H. Watson
Director

Volume 66, Number 2 SPRING2003

MAFES RESEARCH HIGHlights

MISSISSIPPI AGRICULTURAL AND FORESTRY EXPERIMENT STATION



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# DATA RESEARCH: Generating opportunities for

Jim Lytle

*SSRC research scientists, L-R, Steven Grice, Michael Taguino, Domenico Parisi and Duane Gill.*

"Although each has a specific research agenda, they all work toward improving the quality of life in Mississippi."

**ARTHUR COSBY, SSRC DIRECTOR**

Statistical data probably don't mean a lot to a single mother struggling to raise two children in the Mississippi Delta on the income from a minimum wage job. Analysis of statistical data by scientists at Mississippi State University's Social Science Research Center may, however, help her obtain the healthcare and other services her children need, or even a better paying job.

The data—including the number and type of jobs available in specific locations, workforce information, availability of healthcare and childcare services—are being collected as part of the effort to reduce the dependence on welfare in some of Mississippi's poorest communities. The work is supported by MAFES and through the U.S. Department of Agriculture's National Research Initiative to study welfare-related data in the Southeast.

"In 1996, Congress replaced previous welfare legislation with Temporary Assistance for Needy Families, or TANF," said SSRC research scientist and project coprincipal investigator Domenico Parisi. "TANF provides monthly cash assistance to poor families with children under age 18, but there is a five-year lifetime limit on cash assistance."

The goal of TANF is to move families from welfare to work, but in some areas, including much of the Mississippi Delta, finding employment providing enough income to support a family can be difficult.

"The state is doing a good job of trying to overcome the barriers TANF recipients face in finding employment within the four-year time limit and in accessing healthcare and other services," Parisi said. "What we're doing is providing information that will help various state agencies make better use of resources available to their clients."

In addition to Parisi, the project team includes SSRC research scientists Duane A. Gill, Steven M. Grice and Michael Taquino. Much of the raw data they work with are obtained with the assistance of Mississippi Department of Human Services data manager Chris Christmas. The research team also includes personnel at MSU's Southern Rural Development Center under the leadership of director Lionel J. Beaulieu and Penn State University associate professor of rural sociology and demography Diane McLaughlin, who serves as coprincipal investigator.

The goal of the project, Gill said, is to bring together information currently available, but scattered through a multitude of agencies.

"Various agencies collect data on land use, the workforce and other economic and human resource characteristics of communities, counties, and the state," he said. "By collecting and putting this information into a useable form, we can help communities better serve their residents."

The scientists began their work in 1999 by interviewing 1,500 community leaders across the state about what they need to promote economic development.

The SSRC data collection effort also has led to working relationships with the Mississippi Development Authority, the Mississippi Department of Human Services, the Mississippi Department of Health and North Mississippi Health Services.

The Mississippi Development Authority is using information generated by the SSRC project to help attract businesses to locations in the state with available workers who match their needs, according to deputy director Wanda Land.

# Mississippians

"The data provided by the SSRC is helping us create a unified system to recruit businesses to the state," she said. "This is especially helpful with our mission of assisting laid-off workers to find new employment because we're getting information on where there are pockets of skilled or trainable workers."

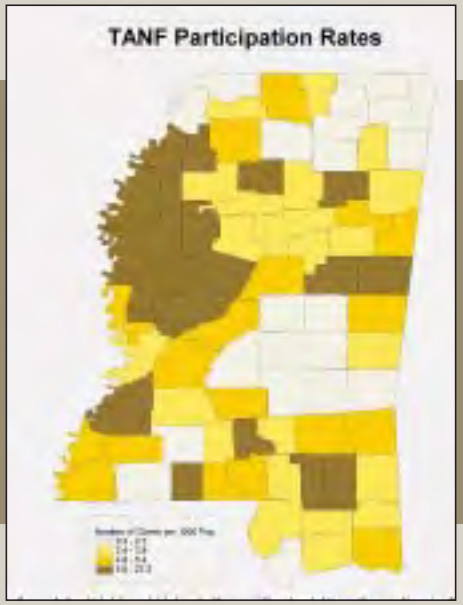
The researchers are building a statewide community database that will be available via the Internet. The information will include population figures and employment data, as well as the availability and location of healthcare and other social services.

Once the database is online, it will be available to the public and can help individuals with locating employment opportunities or social services, as well as mayors and other local leaders in planning programs for their communities.

"We don't limit our study to political boundaries, such as county lines," Gill said. "This allows us to use geographic information systems to produce maps and other information that helps all the communities in an area recognize that they have common social and environmental interests."

The project is the first of its type at the statewide level, and as such is receiving national attention.

"What we're learning here in Mississippi about collecting and making available social and environmental information will likely become the model for other states," Parisi said.




For more than half a century, scientists at MSU's Social Science Research Center have conducted research on social, economic, political, human resource and social-environmental problems facing the state, nation, and world.

Support from MAFES is helping the center target ways Mississippi communities can better provide services and environmental quality to their citizens.

SSRC research units receiving MAFES support include the Survey Research Laboratory, the Monitor Laboratory, the Evaluation and Decision Support Laboratory, the Family and Children Research Unit and the Unit for Community and Environmental Research.

"Although each has a specific research agenda, they all work toward improving the quality of life in Mississippi," said SSRC Director Arthur Cosby.

*Marco Nicovich*

# Branch's work helps save North Mississippi soil

*By Bob Ratliff*

When the North Mississippi Branch Experiment Station was established near Holly Springs in 1904, it was much like other farmland in the hill areas of the state: severely eroded from years of cotton production.

A section of the 1913 North Mississippi Branch Station report headed "SOIL EROSION" states: "The desire to ascertain a practical and satisfactory method of controlling soil erosion in the northern section of Mississippi no doubt had more to do with the location of this Branch Agricultural Experiment Station in this section of the state than any one thing. Soil erosion is the curse of the land surrounding the station." As a result, erosion control became an important part of the branch's work.

*Agronomist Joe Johnson compares erosion from conventional and no-till research plots.*

Almost a century later, soil loss from north Mississippi fields has been greatly reduced by the use of terraces, conservation tillage and other practices introduced to the region through research at the branch.

The study of new conservation tillage and other soil erosion management practices suitable for the area's brown loam soils remains a major emphasis at the branch, according to MAFES agronomist Joe Johnson.

"In 1983, we began collecting data on soybean yields in conventional versus no-tillage situations," he said. "Yields were better with conventional tillage the first two years, but no-till yields have been better than conventional ever since."

Johnson and MAFES research associate James Saunders also study erosion control methods for corn and cotton.

In 2000 they modified the project, comparing soybean yields in no-till plots with those in long-term tillage plots using a cover crop in combination with conventional tillage.

"Cover crops are a vital tool in conservation tillage," Johnson said. "In addition to helping prevent erosion, they can be used to help manage nutrients in the soil."

In the project, crimson clover and wheat are used as cover crops in the conventional tillage and no-till plots during the winter and spring. In addition to reducing erosion, the clover adds nitrogen to the soil.

Henbit, chickweed, and other winter plants native to north Mississippi are allowed to grow in the no-till plots.

"Plots having a no-till history produced better yields the first two years after modifying the study," Johnson said. "The no-till plots have 20 years of built-up organic matter and that appears to be the deciding factor in the better yields."

Johnson and Saunders are continuing to evaluate the no-till versus conventional tillage plus a cover crop for soybeans and for cotton. Their erosion control studies with corn also are ongoing at the North Mississippi Branch.

*Photos by Bob Ratliff*

# MAFES research helps produce new variety of native grass

*By Bob Ratliff*

When great herds of buffalo roamed what is today the eastern United States, a staple of their existence was eastern gamagrass. Following European settlement, overgrazing by domestic animals and the introduction of nonnative grasses largely displaced the warm-season bunch grass. Eastern gamagrass can, however, still be found in small colonies from Massachusetts, west to Nebraska and as far south as Brazil.

Recent developments in breeding eastern gamagrass have resulted in commercially available varieties. The newest of these is "Highlander," developed at the U.S. Department of Agriculture-National Resource Conservation Service Jamie L. Whitten Plant Materials Center in Coffeeville and MAFES research plots on the Mississippi State University campus.

"Eastern gamagrass is a perennial relative of field corn and is an excellent source of forage during the period of the year when cool-season grasses are relatively dormant," said MAFES agronomist David Lang. "It is more digestible than bermuda grass and will produce about the same amount of silage as corn if harvested two to three times during the growing season."

USDA/NRCS personnel instrumental in the development of the "Highlander" variety include agronomist Janet Grabowski and Joel Douglas, manager of the plant materials center at Coffeeville. Work on the variety has been under way since 1994, and Lang said it overcomes some of the problems associated with earlier releases.

"Highlander has superior vigor, growth form and development, and persistence compared to the earlier varieties," he said. "Slow seed germination also has been a problem with gamagrass, but our research has shown that stratification significantly improves germination rates."

Stratification is a cool, moist treatment of the seed for about 3 weeks, which breaks dormancy.

He added that the variety has a high degree of tolerance to environmental stresses and will tolerate wet, heavy soils. It will grow to a height of about 6 feet, but harvesting at the recommended 45-day intervals during the growing season will keep plants to about 4 feet in height.

The variety has been released to commercial breeders, and seed are expected to be commercially available in early 2004.

"Proper management, including clipping plants no lower than 4 to 6 inches to avoid damaging above-ground rhizomes, will provide an excellent forage crop," Lang said. "The research at MSU and Coffeeville also show Highlander can be used for grazing, hay and silage, as well as erosion control, wildlife habitat and water quality improvement."

*Photos by Bob Ratliff*

# MSU stallions available for service

*By Linda Breazeale*

Five stallions at Mississippi State University, including a grandson of Triple Crown winner Seattle Slew, stand ready to provide a mutually beneficial service to the university and to Mississippi's equine industry.

"This is a win-win situation for MSU and for the horse breeders of this state," said MAFES animal scientist Peter Ryan. "These stallions help our research and teaching program as we study equine reproduction. The industry will benefit from top-quality stallions available for reasonable fees."

Ryan said stud fees will be lower than on comparable stallions this introductory year as the program becomes established. The fees, ranging from $500 to $1,000, are expected to increase in the years to come. Available stallions include one Thoroughbred, one Trakehner, one Tennessee walking horse and two quarter horses.

*MSU vet David Christiansen and Minister Slew.*

Minister Slew (registration number 9902965) leads the other MSU stallions in the pedigree competition. His maternal grandsire was Seattle Slew, the winner of the 1977 Triple Crown races. Bold Ruler, the father of Secretariat, is another great horse in Minister Slew's maternal lineage. The paternal side of his family includes notables such as Deputy Minister, Vice Regent, Northern Dancer and Native Dancer.

A Kentucky partnership purchased Minister Slew for $500,000 in 2000 at Keeneland Yearling Sales. A foot problem made him unsuitable for future racing but is not expected to affect his offspring. His owners donated him to the university because of a personal connection with a MSU faculty member.

"Minister Slew is a magnificent-looking horse that will offer Thoroughbred breeders in this region access to a stallion with an excellent pedigree at a very low cost," Ryan said.

All mares will have live foal guarantees, and Thoroughbred mares will be bred according to Jockey Club rules (no artificial insemination) for registration purposes.

Other stallions include Eikon, a gray Trakehner (registration number ORB-A-S741 NA); Copy's Magic Marker, a black Tennessee walking horse (registration number 824486); Cuttin Touch, a chestnut quarter horse (registration number 2629146); and Skip A Cheer, a palomino quarter horse (registration number 3349301).

"All of these stallions have excellent confirmation and should produce outstanding foals," Ryan said. "Making these stallions available is in part a response to a request made by people involved in Mississippi's equine industry."

Money from the stud fees will help support MSU's equine research and teaching programs in the College of Veterinary Medicine, the Department of Animal and Dairy Sciences and MAFES. Other universities with similar breeding efforts include the University of Georgia, Michigan State University and the University of California at Davis.

"This type of service has been very successful in other states. We're anxious to see how our stallions' offspring perform," Ryan said.

*Photos by Linda Breazeale*

A partnership between the Mississippi Department of Transportation and MAFES scientists is helping keep roadways attractive for visitors and residents alike by management of rights-of-way vegetation.

"Since 1990, MAFES weed scientists have worked with MDOT personnel to find the right combination of herbicides and the most effective timing of applications to control grassy and broadleaf weeds along highways," said MAFES weed scientist John Byrd. "We also try to accomplish those goals without harming the desirable grasses along the rights-of-way."

# Research helps keep roadsides attractive

*By Bob Ratliff*

FIRST IMPRESSIONS COUNT. FOR MANY VISITORS TO MISSISSIPPI, THE STATE'S HIGHWAYS ARE THE FIRST THING THEY SEE AND THE CONDITION OF THE ROADSIDES CAN MAKE A LASTING IMPRESSION.

Bob Ratliff

*MDOT personnel, county officials and others had the opportunity to visit the cogongrass research plots and roadside weed research plots during the 2003 Highway Vegetation Management Tour.*

Herbicides are tested on plots about 1,000 feet long and 100 feet wide along state highways. The researchers conduct about 15 to 20 experiments at locations throughout the state each year. Each plot is marked with "Do Not Mow or Spray" signs. The project also includes research with control methods for the invasive grass species cogongrass on plots near Preston in Kemper County.

Before the project, MDOT was using a combination of products to manage winter/spring weeds and applying them about the time the plants broke dormancy in the spring. The result was unsightly dead and dying vegetation along the state's highways.

The university research provides an independent source for information about products, according to MDOT state maintenance engineer John Vance.

"The research evaluates available chemicals and provides us with information such as rates and application timing," he said. "That's a real advantage for us."

The project also helps MDOT personnel stay abreast of developments in the chemical industry, such as when companies start manufacturing generic versions of formulations that have come off patent.

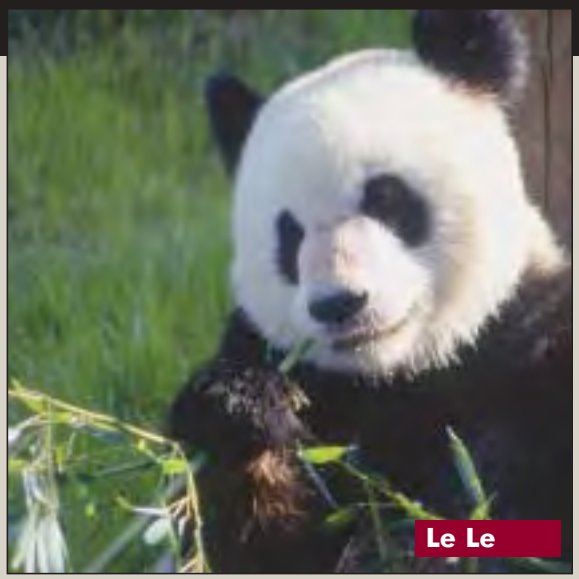
"MSU tests generic labels to see that we get the content we need, as well as the best price," said MDOT roadside development manager Dave Thompson. "The university work also has helped expedite label approval for products we need."

In addition to Byrd, current MAFES personnel working with the highway vegetation management project include research associates R. Scott Wright and James M. Taylor, graduate research assistants Keith D. Burnell and Bryan S. Peyton and several student workers.

Their work also helps MDOT engineers with improved methods of removing vegetation that might impair visibility for drivers.

"With only about 1,000 pandas living in the wild, it is extremely important that we examine their habitat, behavior, reproduction and nutrition in order to save future generations."

MEGHAN CARR
**MEMPHIS ZOO**


Le Le

*Jay Adkins*

# Researchers apply expertise to panda reproduction

*By Laura Whelan*

It's not unusual for MAFES animal and dairy scientist Scott Willard to find himself working with black and white animals, but they are usually Holstein dairy cattle. His latest project, however, is with more exotic subjects—the Memphis Zoo's newest residents, giant pandas Ya Ya and Le Le.

Willard leads a team conducting reproductive research on Ya Ya, a 2-year-old female on loan from China's Beijing Zoo, and Le Le, a 4-year-old male on loan from the Shanghai Zoo.

"Studying the reproductive status of pandas is essential in helping this endangered animal breed. Female pandas are only able to get pregnant three or four days out of the year, which is a very small window for reproductive success," Willard said.


Ya Ya

*Jay Adkins*

Willard and Brian Rude, also a MAFES animal and dairy scientist, used their expertise in livestock reproduction and nutrition to create a panda research proposal, which was accepted and funded by the Memphis Zoo and implemented when the pandas arrived from China in early April.

Willard monitors the many hormones present in the pandas' urine and fecal samples, analyzing them for influence by reproductive behavior, time of year, and environmental factors. This noninvasive approach will not require handling the animals to obtain blood samples, and it will be tied to Rude's nutrition studies.

"It is everyone's hope that Ya Ya and Le Le will mate, and hopefully our research efforts will aid in that process," Willard said. "Examining the pandas' hormones may help us understand the prime conditions for reproduction, enabling us to make reproductive management plans for Ya Ya and Le Le, as well as pandas in other zoos or conservation facilities."

Meghan Carr, a research biologist at the Memphis Zoo said the importance of studying giant pandas is to better understand why they are endangered and to see what can be done to preserve their species and habitat.

"With only about 1,000 pandas living in the wild, it is extremely important that we examine their habitat, behavior, reproduction, and nutrition in order to save future generations," she said.

Only about 150 pandas live in zoos or breeding centers around the world, and the establishment of breeding programs has long been a challenge for zookeepers, veterinarians, and researchers. Chinese facilities in Beijing, Shanghai and Chungqing have had the most success, with 34 surviving cubs, but few cubs have been born or survived outside of China.

The nutritional research conducted by Rude may determine ways pandas in the wild can be helped to survive and reproduce more successfully. He is studying the animals' nutrient requirements and how bamboo selection meets these

requirements. Remote monitoring of panda eating habits in the wild through fecal nutrient profiling also is part of the study.

"This species is quite different than the animals traditionally studied in this area of the country, but we can draw from our research and experience to study the nutritional habits and preferences of the pandas, hopefully opening doors to help protect and preserve them," Rude said. "We get to use local tools and research to study concerns with a global impact."

Brian Utley

*Bamboo grove at USDA/ARS Whitten Plant Materials center in Cofeeville.*

Pandas consume a tremendous amount of bamboo, each eating about 15,000 pounds per year. Rude said the Memphis Zoo allots about 70 pounds of bamboo per day for each panda. The pandas also receive a daily supplemental biscuit fortified with vitamins and nutrients.

Seven species of bamboo from various Southeastern locations, including Coffeeville, Miss., are being grown for Ya Ya and Le Le. Each type is being evaluated for nutrient quality. Rude also is studying which types of bamboo Ya Ya and Le Le prefer under different circumstances.

By coordinating reproductive and nutritional research, the scientists hope to establish techniques for monitoring the health and demographics of wild panda populations, including the number of males and females in a population and determining if any females are pregnant.

Willard and Rude have made a three-year research commitment with their current research plan, but they hope these efforts will continue throughout the pandas' 10-year stay in Memphis.

"Conservation efforts are long-term, so we hope to go down new paths and use new findings to assist with panda preservation," Rude said.



## New Fishy software available for catfish producers

Marco Nicovich

*Wallace Killcreas*

For more than two decades, catfish producers across the Southeast have used Mississippi State University-produced software to help manage their operations. The latest version, Fishy 2003 Version 4.0 is now available through Catfish Farmers of America.

"A licensure agreement between Mississippi State and Catfish Farmers of America to market Fishy 4.0 was signed in April," said Fishy programmer and MAFES agricultural economist Wallace Killcreas. "So far, farmers owning more than 24,000 water acres have bought one-year licenses."

First developed in 1982, the Fishy program keeps records of all aspects of fish production, and analyzes and makes reports that allow producers to track fish numbers, feedings, weights, and sizes. The program can also predict harvests and feed needs. Version 4.0 has refined some of those operations, according to Killcreas.

"We've added improvements to make the operation of multiple farms safe and seamless and reports more flexible and easier to read," he said. "Conversion of existing Fishy operations to Fishy 4.0 is usually just a 5-10 minute chore. Detailed information that comes with the program should make the learning curve for new users short."

For new users with less than 1,000 water acres, setup is usually a 1-2 day process of installing the program, checking out Fishy background information, entering local user pond data, learning how to feed fish with the program, and checking out the 38 different reports available in Fishy.

Killcreas is available for help if Fishy 4.0 licensees encounter a problem with the program.

Fishy 4.0 costs $125 per year for operations with 160 water acres or less. Costs for producers with more than 160 water acres are on a sliding scale, with a cap of $550 per year for operations with more than 1,280 water acres.

Call Killcreas at (662) 325-2672 for more information or visit **http://www.agecon.msstate.edu/wek** on the web. To order a Fishy 4.0 license, call Catfish Farmers of America at (662) 887-2699.

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Marco Nicovich

# Lab gives new taste to MSU food research



*By Bob Ratliff*

Sensory evaluation is not on the minds of most people as they do the weekly grocery shopping. It is, however, what determines which new food products reach the store shelves and the focus of a new laboratory at Mississippi State University.

The James E. Garrison Sensory Evaluation Laboratory was dedicated April 4 by MSU's Department of Food Science and Technology. The almost 3,000 square-foot facility contains offices, fully equipped kitchens and areas to conduct a variety of sensory evaluations on food products.

"Sensory evaluation is the process of forming an opinion about a food or any other product using one or more of the five senses: taste, touch, smell, sight and hearing," said Patti Coggins, manager of the lab and an assistant professor of food science and technology. "Sensory evaluation of a food product in a designated lab strengthens the research that's gone into its development."

Several methods can be used to do food product evaluations, including supermarket taste tests and mail questionnaires, but Coggins said the most reliable and scientific approach is using a selected panel in a laboratory setting.

Marco Nicovich

*Testing booths are equipped with "breadbox" doors.*

The Mississippi State lab uses panelists selected from volunteers within the university and from women's clubs and other groups. Evaluations are usually set up in booths with trays containing samples of the food products to be tested, a glass of water for rinsing between samples, crackers for neutralizing the mouth after each sample and an evaluation form.

The most unique feature of the new lab is the testing booths equipped with "breadbox" doors for passing food samples to panelists. The doors can be raised, a sample placed inside and then closed. The panelist can then remove the sample without ever seeing the room or people on the other side.

"This is a European design and the only one of its type in use in the South," Coggins said. "We chose it because it allows for the fewest possible outside factors influencing an evaluation."

Even the color of the light in the testing booths can be changed to help prevent panelists from being influenced by the color of the sample they are evaluating.

In addition, the lab contains two kitchens equipped with appliances provided by Viking Range Corp. of Greenwood and rooms with several different seating arrangements for panel discussions of products under evaluation.

The facility is used in food product research by MSU faculty and students. It also is available for contract use by private companies for independent, professional evaluations of their new food products.

"The Garrison Sensory Evaluation Lab expands the scope of the work we've been doing in this area for more than a decade," said Charles White, food science and technology department head. "It offers exciting new possibilities for research by our faculty and graduate students, as well as support for the food industry in Mississippi and the surrounding region."

The new lab is named in honor of 1949 Mississippi State dairy manufacturing graduate James E. Garrison. The Pontotoc County native is the retired president of Kentucky-based Ryan Milk Co., and MSU's 1997 National Alumnus of the Year.

Marco Nicovich

*Ribbon-cutting duties for the sensory evaluation lab were performed by, L-R, food science and technology Head Charles White, MAFES Director Vance Watson, James Garrison, MSU President Charles Lee and Lab Manager Patti Coggins.*

"This is a European design and the only one of its type in use in the South. We chose it because it allows for the fewest possible outside factors influencing an evaluation."

**PATTI COGGINS**

## Dairy Products Pioneer

James E. Garrison retired in 1987 as president of Ryan Milk Co., based in Murray, Ky. During more than three decades with the company, he became a leader in the field through his development of new practices for handling sterile milk products and for manufacturing special dairy products, including whipping cream and individual coffee creamers.

"The significance of Mr. Garrison's work is that he was a pioneer in the aseptic/sterile dairy products industry," said Charles H. White, food science and technology department head. "In fact, in 1968 he installed the first Gable-top aseptic filling machine in the United States. Jim Garrison is one of the main reasons why long-life coffee creamers, half-and-half and whipping creams are available in the U.S."

Garrison began his career in Chicago as a sales representative for Johnson & Johnson, the medical dressing and pharmaceutical manufacturer. He returned to his hometown in 1953 to manage Pontotoc Dairies, a milk condensing plant. Three years later, Garrison moved to Kentucky as Ryan Milk's general manager.

Under his leadership, Ryan received the U.S. Senate's 1985 Productivity Award for Kentucky in recognition of the firm's sustained growth, consistent plant moderation and successful marketing.

His support of Mississippi State includes contributions to a scholarship fund for graduate and undergraduate majors in dairy science who plan careers in the dairy foods industry.

Additionally, he chaired a committee of national business executives who established the Edward W. Custer Endowed Chair in Dairy Foods to honor the late professor emeritus who helped boost the university's dairy manufacturing plant. Garrison then made the initial donation to the Custer fund.

He and his wife, Edith, have also established the James Garrison Library Endowment Fund to enhance the Mitchell Memorial Library's collections, as well as to purchase state-of-the-art electronic information resources and provide other funds to maintain library operations.

*Photo by Marco Nicovich*

Bureau of Plant Industry

## RESEARCHERS KEY PART OF

# SWEETPOTATO TEAM

*By Bob Ratliff*

"It takes a team effort to produce a crop that is nationally known for its quality," said Benny Graves. The crop is Mississippi sweetpotatoes and Graves, sweetpotato specialist with the Mississippi Department of Agriculture and Commerce's Bureau of Plant Industry, is part of the team.

"Producers certainly do their part by working hard to grow a product they are proud to market labeled as 'Mississippi Sweet Potatoes'," he said. "The part of the team that helps them overcome potential barriers to quality production are the MAFES scientists working in areas ranging from sweetpotato breeding to insect control."

Sweetpotatoes as a commercial crop took root on a few acres in north Mississippi's Calhoun County in the 1930s. Today, Mississippi is the nation's third largest producer, with about 14,000 acres and 86 commercial operations. Most of the production remains in the northern areas of the state, but the tasty root is now a cash crop for a few Delta growers.

The Pontotoc Ridge-Flatwoods Branch Experiment Station is the headquarters for sweetpotato research in Mississippi because of its location in the major production area and its silt loam soils similar to those on most sweetpotato farms.

The work under way at the Pontotoc Branch is the lifeblood of Mississippi's sweetpotato industry, said Vardaman producer Danny Bailey.

"Twenty years ago, we didn't have to spray for anything, but maybe because of increased acreage, weeds and insects are now big problems," he said. "Without the research into ways to control those problems, we would have to shut down."

MAFES scientists working on sweetpotato projects at the Pontotoc Ridge-Flatwoods Branch include research professor Mark Shankle and research associates Jeff Main and Trevor Garrett. MAFES and Extension scientists at the MSU campus include entomologists Jack Reed and Mike Williams and agricultural engineer Alex Thomasson. This interdisciplinary research group is capable of addressing several issues concerning sweetpotato production, but an additional scientist is needed at the Pontotoc Branch to focus on breeding and fertility.

RECENT AND CURRENT PROJECTS INCLUDE:

### Effect of Macro and Micro Nutrients on the Growth, Development and Yield of Sweetpotato.

"Nutrient studies were conducted at Mr. Danny Clark's farm located in northwest Chickasaw County in 2002 to determine the effects of N, P, K, Zn, Cu, B, S and lime on sweetpotato production," Shankle said. "These nutrients were chosen for evaluation because previous spatial variability research indicated they were related to sweetpotato growth and development. The use of remotely sensed data collected from conventional aircraft and unmanned airborne vehicle platforms was used, along with ground-truthed data to help identify field-scale variability. This type of data collection is becoming more common with the integration of GPS and GIS technologies into farm management practices."

Field-scale soil nutrient content levels were measured by previous grid sample soil tests in 2000 and directive sampling points in 2001. Five different studies were established in areas of the field that were determined to be low for each nutrient.

This research is supported by the Advanced Spatial Technologies for Agriculture (ASTA) Program and the Mississippi Space Commerce Initiative.

### Image-Based Sweetpotato Yield and Grade Monitor.

An image-based system for monitoring yield and grade will help producers identify and manage spatial variability of marketable sweetpotatoes. In the lab, estimates of sweetpotato weights were highly correlated with actual weights, and grade classifications of marketable sweetpotatoes were more than 90% accurate. The system has also been tested on sweetpotatoes moving on a harvester's conveyor belt in the field. Estimates of weights were still highly correlated, although not as strongly, with actual weights. Grade classifications during harvesting were less accurate than in the laboratory.

This research is supported by the ASTA Program.

Bureau of Plant Industry

Marco Nicovich

Bureau of Plant Industry

## Evaluation of Foliar-Applied Nutrients in Sweetpotato.

A research trial supported by Helena Chemical Co. has been established in Mississippi, Louisiana, North Carolina and Alabama to evaluate a foliar nutrient management program recommended for sweetpotatoes by a Louisiana researcher. The goal is to determine the influence of the total program (all nutrients, rates and timings) on sweetpotato production as one treatment and to examine each nutrient in the program alone as separate treatments. Results from all states indicate that addition of foliar nutrients does not increase marketable sweetpotato yield compared with a standard soil fertilizer program when all other management practices are equal.

## Effects of Sandea and Valor Herbicides for Weed Control in Sweetpotato.

"Producers need environmentally safe herbicides to control troublesome weeds in sweetpotatoes, so we've studied the effects of two new herbicides, Sandea and Valor, on sweetpotato injury, broadleaf weed control and yield," Shankle said. "Preliminary results indicate excellent broadleaf weed control and no injury to sweetpotatoes."

Future research will address application method, timing and tank-mix partners.

"Anticipation is high for these herbicides to be labeled for use in sweetpotatoes," Shankle said.

Gowan and Valent Companies support the research.

## Herbicide Systems For Sweetpotato in the Delta of Mississippi.

Conducted at the Alcorn State University Extension/Research Demonstration Farm and Technology Transfer Center in Mound Bayou during 2002, USDA/ARS-supported research demonstrated weed control and sweetpotato grade yield to producers in Bolivar County.

Treatments included herbicides currently labeled for use in sweetpotato and other weed management practices used by producers, such as a rotary mower. Herbicide efficacy was evaluated since the weed spectrum and soil type in the Delta are different from the hill region of Mississippi, where sweetpotatoes are typically grown.

## Mississippi Virus-Tested Foundation Seed Program.

The foundation seed program is designed to supply producers with seed that are free of disease and the sweetpotato weevil, genetically true-to-variety characteristics, and of good quality (color, fresh, firm and strong). These sweetpotatoes are grown according to virus-tested certification standards developed by the Mississippi Crop Improvement Association, Mississippi Sweet Potato Council and MSU.

Crop production starts during the fall with micro-propagated virus-tested meristems grown in a secured greenhouse under controlled environmental conditions. As the plants grow, they are cut and retransplanted through the winter and early spring to generate as many virus-tested plants as possible.

In the spring, cuttings are transplanted to the field in areas isolated from commercial crop production to produce virus-tested foundation seed. Sweetpotatoes are harvested in the fall, graded and stored. Each spring, 2,600 to 3,000 bushels of foundation seed are available to Mississippi producers.

## Sweetpotato Test Plots for Insecticide Evaluations.

In 2002, test plots for evaluation of insecticides for use in control of sweetpotato pests were planted in Calhoun and Pontotoc counties in north Mississippi and in Bolivar County in the Mississippi Delta. Although the insect populations were light during the first year of the project, the work helped support the issuing of a Section 18 permit for Capture, a pyrethroid needed for lepidopteran control in sweetpotato foliage.

An additional site near Stoneville has been added for 2003. This year's research also includes identification of the soil-borne insects that can damage sweetpotatoes.

## Pheromone Trap Line for Sweetpotato Pests.

For the 2003 season, traps with pheromone for attracting white grub adults will be set out in sweetpotato-growing areas of the state to monitor presence of May/June beetles and to determine the species present in the state's production areas. Newly developed pheromones also will be evaluated.

# STUDY: *Catfish industry*

# strong economic force

*By Keryn Page*

While catfish producers continue to struggle with low market prices, an economic-impact study shows the industry is a vital part of Mississippi's economy. MAFES agricultural economist Terry Hanson coauthored "Economic Impact of the Mississippi Farm-Raised Catfish Industry" with two MSU Extension Food and Fiber Center professors, Stuart Dean and Steve Murray. Hanson said he believes the many benefits of farm-raised catfish to consumers can create a demand that will more than make up for low market prices since 2000.

"Fish is proclaimed as being an essential part of a healthy diet, and farm-raised catfish is an environmentally friendly solution to overfishing of the oceans," Hanson explained, adding that another benefit of farm-raised catfish is the ability to produce a good-quality supply on a year-round basis.

"The answer to making the catfish industry profitable again seems to be expanding the consumer market for farm-raised catfish," he said.

"TODAY, MORE FRESHWATER AQUACULTURE IS FOUND IN THE MISSISSIPPI DELTA THAN IN ANY OTHER REGION OF THE UNITED STATES."
TERRY HANSON

The latest available figures show that Americans consume 1.04 pounds of fish per person annually, compared with 54 pounds of chicken per person.

But Hanson said Mississippians in particular should reconsider farm-raised catfish as a viable, healthy food choice.

"Today, more freshwater aquaculture is found in the Mississippi Delta than in any other region of the United States. It is vital that farmers, industry, researchers and government work together to ensure the industry continues to thrive," Hanson explained.

Besides its health benefits, Hanson said the catfish industry generated about 7,000 jobs in 2000, for a total of $102 million in wages. These figures represent jobs directly associated with the production and processing of catfish and do not include the many jobs created in local businesses that support the catfish industry.

"In Mississippi, firms manufacture seine nets, harvest equipment and aerators for use on farms. Many sell chemicals and supplies to support farm operations. Local firms construct catfish ponds and contract crews to custom harvest ponds on smaller farms," he said. "In addition, annual budgets for feed mills include major amounts for maintenance of equipment and transportation fleets. Various firms provide services and materials to construct, equip and maintain processing plants.

"Several hundred truck drivers are employed hauling feed and feed ingredients, hauling live fish from ponds to processing plants, delivering ingredients and other supplies to processors and delivering processed fish throughout the country," he added.

As a result of these numerous support positions created by the catfish industry, Hanson said estimating the total economic value is nearly impossible.

Several improvements in the Mississippi farm-raised catfish industry have allowed for a more efficient, consumer- and environmentally friendly product.

"Three of the most important developments in catfish farming over the last 25 years have been changes in the way low oxygen is managed through increased aeration on the farm; using salt to combat brown blood disease; and development of the multiple batch cropping system," Hanson's report states. One impact of these and other developments has been farmers' ability to increase stocking density and harvest yields.

Catfish productivity has more than doubled since the industry's early years, from 2,500 pounds to 4,635 pounds of fish per acre annually.

Feed accounts for half of the total expenses of catfish farms. Changes and advancements in feed over the years have resulted in a high-quality, economically viable product. In 1974, the first feed mill was built in Isola, beginning a trend among farmers of producing feed specifically for the local catfish industry at their own feed mills.

"Over the years, catfish rations have been reformulated many times. Farmers, feed mill operators and university researchers have worked together to develop cost-efficient and high-yielding diets," Hanson said.

As the No. 1 catfish producer in the United States, with $642 million invested in 2000, the future looks bright for the Mississippi farm-raised catfish industry.

"Mississippi's farm-raised catfish industry is a model world-class commercial aquaculture industry that is profitable, sustainable and environmentally sound," Hanson concluded.

*Photos by Marco Nicovich*

# Melons²

Christine Coker

Courtesy of BBC

*By Bob Ratliff*

Anyone who has ever tried to stack watermelons has probably thought to themselves, "Wouldn't it be great if these things were square?"It's an idea that's caught on in Japan, where small, square melons command premium prices—more than $80 each; about triple what traditional round melons cost in Japanese produce markets.

Is there a place for square watermelons in the normally round U.S. market? Some producers think so, and that's why MAFES horticulturist Christine Coker is studying production of the cube-shaped fruit at the Beaumont Horticultural Unit in Perry County.

"In Japan, the advantages to square melons include ease of transportation and storage in compact home refrigerators," Coker said. "For truck crop farmers in south Mississippi, they're a marketing tool."

People will stop and look, she added, at a roadside produce stand that has square melons, and even if they don't buy a square one at a premium price, they'll likely purchase an old-fashioned round one.

Proper "training" is the secret to growing square watermelons.

"At fruit set, the melons are placed into a square- or rectangular-shaped container," Coker said. "As the melons grow, they take on the shape of the container and are harvested when the container is filled, usually in about 90 days."

The MAFES researchers are working with several small varieties, including "Yellow Doll" and "Tiger Baby," that average about 5 to 15 pounds when mature.Japanese farmers use tempered glass containers to produce their square melons, but in 2002 Coker and her assistants at the Beaumont Unit experimented with several less costly types of boxes, including wood, Plexiglas and plastic. Their best success so far, however, has come from placing the young melons in the openings of plain 8-inch cinder blocks.

While there could be some economic benefits associated with the reduced shipping and storage space required for square melons, Coker said the biggest near-term benefit for Mississippi growers will likely be increased consumer interest in their traditional product.

"Large-scale square watermelon production may never be economically feasible for our producers because of the additional labor and materials required," she said. "But our research has drawn enthusiastic local interest, and we have heard from producers in other parts of the country that having some square melons on display does give a produce stand a marketing advantage."

Research into the production aspects of square melon production is continuing at the Beaumont Unit. Once optimum production practices are determined, economic feasibility will be studied and the Garrison Sensory Evaluation Laboratory at Mississippi State will measure consumer acceptance.

The research at the Beaumont Unit is supported by the USDA Agricultural Research Service through a MAFES internally competitive Alternative Crops and Value-Added Products grant and by a William White Special Project Award. The White Awards were established in 1988 by the now deceased Oktibbeha County dairy farmer to benefit Mississippi agriculture and agribusiness.

# MAFES Sales Store going online

Marco Nicovich

Tom Thompson

*By Bob Ratliff*

Ordering your favorite Mississippi State cheese or other food product will soon be just a click away.

The MAFES Sales Store is building a new website that will allow online ordering, according to Sales Store manager Debbie Huffman.

"For several years, the store has had an online order form that could be printed out and mailed in," she said. "The new site will offer the convenience of online ordering and credit card payment."

That's good news for the thousands of MSU alumni and others who each year purchase the university's famous 3-pound Edam cheese balls. The store's other MSU products, including Cheddar and jalapeño pepper cheese blocks, vallagret cheese, crocks of cheese spread, and muscadine grape juice also will be available for purchase online.

The Sales Store site is scheduled to go online in the fall.

"Of course, customers can still buy all of those items, as well as milk, butter and ice cream at the store," Huffman said. "The store is open 8 a.m. to 5 p.m. Monday through Friday and some home football weekends."

Marco Nicovich

*Manager Debbie Huffman, left, and data entry operator Kim Matta with some of the products available at the MAFES Sales Store.*

# Stoneville Pedigreed Seed Company and MSU Announce Marketing Agreement for Transgenic MISCOT 8839

Mississippi State University and Stoneville Pedigreed Seed Co. have signed an agreement allowing Stoneville to commercialize transgenic derivatives of the MSU-developed MISCOT 8839 cotton variety.

"We are really excited about this new collaborative development effort with Mississippi State University," said Stoneville vice president for research and development Don Panter. "Through this mutual agreement, Stoneville has the exclusive right to produce, distribute, market and develop transgenic derivatives of MISCOT 8839, a new medium maturity variety with premium fiber quality."

The company has begun the transgenic introgression process, and several MISCOT 8839-derived products may be released by 2007. Additionally, Stoneville's sales and marketing teams also have the commercialization rights for conventional MISCOT 8839.

The new variety is well adapted to the growing conditions and needs of Midsouth producers, according to MAFES cotton breeder Ted Wallace.

"MISCOT 8839 should contribute variability to what currently is commercially available, as well as add options to fiber quality," he said. "The ultimate goal of our research is to see producers benefit from the release of this new variety."

Wallace developed the variety through research at the MSU campus in Starkville and the Delta Research and Extension Center.



*Fred Faulk*

# MSU advances in national research rankings

Mississippi State continues to climb the ranks of the nation's top research universities.

According to statistics released in April by the National Science Foundation, the university rose from 84th to 82nd among American universities, both public and private, in total research and development expenditures for fiscal year 2001. In agricultural research, MSU remains at No. 5 in the nation, a level it attained in fiscal year 2000.

In agricultural sciences research, MSU trails only UC-Davis, Florida, Georgia and North Carolina State.

Among public universities, MSU retains its 57th ranking on the basis of FY 2001 expenditures of $146.9 million, up from $132.5 million during the previous year. Those figures are among the wealth of data included in the NSF publication "Academic Research and Development Expenditures: Fiscal Year 2001."

The full report is available at http://www.nsf.gov/sbe/srs/nsf03316/htmstart.htm.

# North Mississippi R&E Center named for first head


*Marco Nicovich*

*Dr. and Mrs. Hiram Palmertree*

When the North Mississippi Research and Extension Center was established in Verona in 1984, it marked the beginning of the research and extension center concept in Mississippi.

On May 30, the center was renamed the Hiram D. Palmertree North Mississippi Research and Extension Center in honor of its first head.

"It's more than fitting that the center be named for an individual who was a leader in promoting the establishment of research and extension centers statewide," said Reuben Moore, the center's current head. "His leadership was instrumental in obtaining internal and external support for funding and for legislative authorization to establish the center."

Palmertree earned his bachelor's at Mississippi State in 1962 and began his career that same year as a MAFES agronomist. He later completed a master's and doctorate at MSU.

From 1967-78, he was a statewide extension specialist in forage and turfgrass. He then served in leadership positions at several MAFES branches, including the Pontotoc Ridge-Flatwoods Branch and the Northeast Mississippi Branch.

He was named director of the Mississippi Cooperative Extension Service in 1988. In that position, he continued to promote the research and extension center concept.

"As Extension director, Dr. Palmertree brought a critical mass of extension specialists to the research and extension centers," said MAFES Director Vance Watson. "He promoted cooperation between extension and research personnel, resulting in a more efficient and productive operation."

Mississippi's research and extension centers also include the Delta Research and Extension Center in Stoneville, the Central Mississippi Research and Extension Center in Raymond, and the Coastal Research and Extension Center in Biloxi.

## CALENDAR OF UPCOMING EVENTS

| | |
|---|---|
| **Aug. 13** | **Cotton Field Day**<br>Delta Research and Extension Center / Stoneville |
| **Aug. 14** | **Rice/Soybean Field Day**<br>Delta Research and Extension Center / Stoneville |
| **Sept. 20** | **North Mississippi Garden Expo**<br>North Mississippi Research and Extension Center / Verona |
| **Oct. 17-18** | **Fall Flower and Garden Fest**<br>Truck Crops Branch / Crystal Springs |

# UPDATES

## MAFES personnel receive research awards

Evan Nebeker

*By Bob Ratliff*

Four MAFES employees are recipients of annual research awards presented by the MSU Office of the Vice President for Research.

MAFES forest entomologist T. Evan Nebeker is the 2003 Ralph E. Powe Research Excellence Award winner. His research areas include cottonwood leaf beetle prediction and monitoring, cottonwood leaf beetle remote sensing, and insect/plant interactions, among others.

Nebeker joined the MAFES staff in 1983. He earned a bachelor's in zoology-botany at Utah State College, a master's in entomology-forestry at Utah State University and a doctorate in entomology-ecology at Oregon State University.

The Ralph E. Powe Research Excellence Award honors the man who served as MSU's vice president for research from 1986 until his death in 1996. The award is reserved for outstanding, nationally recognized and competitive researchers.

Agricultural economist Keith H. Coble is the 2003 faculty research award winner for MAFES and the College of Agriculture and Life Sciences. His work includes a recent investigation of the fundamentals of risk management decision making, rainfall insurance and the implications of farm policy changes on risk management. He currently codirects the $3.6 million National Aquaculture Risk Management Feasibility Project.

Coble earned his bachelor's and master's in agricultural education at the University of Missouri. His doctorate is in agricultural economics from Texas A&M University.

Juliet D. Tang is the recipient of the 2003 Research Associate Award for MAFES and the College of Agriculture and Life Sciences. She works in the Department of Entomology and Plant Pathology. Her duties include DNA fingerprinting to follow local population dynamics of hybrid-imported fire ants in recently logged areas.

Tang earned her bachelor's and master's in zoology and entomology, respectively, at the University of Massachusetts.

Sandra Woolfolk is the 2003 Graduate Student Research Award winner for MAFES and the College of Agriculture and Life Sciences. She is a graduate research assistant in the Department of Entomology and Plant Pathology, conducting research on microorganisms associated with green lacewing, an important predator of insect pests in crops.

Woolfolk earned a bachelor's in agriculture at Gadjah Mada University in Indonesia and a master of entomology degree at North Carolina State University. She will receive a master's of science in entomology from MSU this summer.

## International aquaculture society recognizes MSU professor

Lou D'Abramo

*By Bob Ratliff*

A MAFES aquaculturist has received the highest honor bestowed by the World Aquaculture Society (WAS), the largest professional aquaculture society in the world.

Louis R. D'Abramo recently was honored by the international nonprofit organization headquartered in Baton Rouge, La. He was presented the Exemplary Service Award, one of only eight that have been awarded by WAS since its 1970 founding.

The society, which has more than 4,000 members in 94 countries, presented D'Abramo a three-ounce solid gold medallion honoring his outstanding research and service contributions to the development of aquaculture throughout the world.

A faculty member whose specialty is crustacean and fish aquaculture and ecology, D'Abramo also is a scientist in the Mississippi Agriculture and Forestry Experiment Station at MSU.

D'Abramo focuses primarily on the development of efficient and environmentally friendly management strategies for alternative species, including freshwater prawns, crayfish and hybrid striped bass. Several dietary regimens for shellfish and finfish that lower feed costs are among the outcomes of his work.

D'Abramo also has conducted breakthrough research in the use of formulated feeds to substitute for high-cost, labor-intensive live feeds in the culture of larval fish and shrimp. His work in this area is regarded by peers as a significant step in efforts to overcome a major limitation to the growth of a global aquaculture industry.

A much-in-demand speaker on sustainable aquaculture and feeding practices, D'Abramo is a John Grisham Master Teacher and a former two-term vice chair of the Robert Holland Faculty Senate. He holds bachelor's and master's degree from Assumption College in Worcester, Mass., and a doctorate from Yale University.

Fred Faulk

Robert Rogers

# Cattlemen's Association honors MAFES animal scientist

*By Bob Ratliff*

Research resulting in positive changes in the meat industry has earned Robert W. Rogers a place in the Mississippi Cattlemen's Hall of Fame. The MAFES animal scientist was recently inducted as the 48th member of the hall of fame, established in 1981 to honor individuals who have made outstanding contributions to the cattle industry.

"This honor recognizes Dr. Rogers' lifetime of service," said Sammy Blossom, executive vice president of the Mississippi Cattlemen's Association. "What he has done extends beyond Mississippi and has had a positive impact on the meat industry at the national level."

During his almost 40-year tenure at Mississippi State, Rogers has been at the forefront of research that has greatly expanded the quality and variety of meat products available at the supermarket and food service outlets, including:

- Development of the technology for the first fat-free hot dogs, bologna and similar products.
- Pioneering work with sound waves to destroy bacteria on meat surfaces.
- The initial work on the technology for deli loaves and similar restructured and cured meat items.
- The first publication on a sensory scale for meat tenderness that is now the recommended standard throughout the world.
- A solution to the problem of a "warmed over" flavor in many precooked meat items.

Rogers noted that he has adapted his research to consumer-driven changes in the meat industry.

"Since the 1960s, the focus of the research effort has changed from primarily carcass evaluation to production of more value-added items, such as the new fat-free products," he said.

Rogers, a Kentucky native, holds a bachelor's in animal husbandry and a master's and a doctorate in meat science, all from the University of Kentucky. He also has been honored with the title of Diplomate of the American College of Animal Food Science and has served as the organization's president.

Founded in 1946, the Mississippi Cattlemen's Association represents more than 3,400 members statewide.

*Mississippi Cattlemen's Association Executive Vice President Sammy Blossom, left, and President Larry Jefcoat congratulate Dr. Rogers on his induction into the association's Hall of Fame.*

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