MAFES • RESEARCH Highlights

Fall 2000

MISSISSIPPI AGRICULTURAL AND FORESTRY EXPERIMENT STATION

CONTENTS

4 **Delta Holds Cotton, Rice and Soybean Field Days**

Back-to-back Field Days provide producers with information on variety trials and new technologies in disease and pest control.

6 **MSU Plans Two New R & E Centers in Mississippi**

MAFES and Extension employees will have new regional headquarters in Raymond and Biloxi.

7 **Remote Sensing Uncovers Pesky Insects**

Remote sensing technologies allow MAFES researchers to detect wild host plant areas harboring cotton pests and to control destructive insects in Mississippi's top row crop.

8 **Research Tries to Cool Dairy Cows**

Mississippi's heat and humidity reduce milk production in the summer; MAFES animal and dairy scientists are finding the best ways to cool cows.

9 **New Rice Irrigation Offers Many Benefits**

MAFES rice researchers are improving soil fertility in precision-leveled rice fields.

10 **Field Days**

Hundreds toured the annual Row Crops, Dairy, and Beef and Forage Field Days held throughout Mississippi.

12 **MAFES Makes Five-A-Day Safer**

MAFES food researchers are reducing the presence of food-borne pathogens on fresh produce.

14 **Updates**

Meet award-winning MAFES researchers.

15 **In Brief**

Learn about the new Life Sciences and Biotechnology Institute at MSU.

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FRONT COVER: The North Mississippi Research and Extension Center hosted the annual Garden Expo on Sept. 22 and 23. Visitors learned about new plants and plant varieties that perform well in Mississippi, and received tips on landscaping and irrigation. See related story on page 11.

Volume 63, Number 4
Fall 2000

Highlights

MISSISSIPPI AGRICULTURAL AND FORESTRY EXPERIMENT STATION

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HIGHLIGHTS
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Mississippi State, MS 39762-9625

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FROM THE DIRECTOR

In the 1930s, 12 Southerners published "I'll Take My Stand" to defend the agrarian tradition of the South.

Known as the Nashville Agrarians, these budding writers, poets, novelists and literary critics argued against the spread of the North's industrialization and mechanization into the South, and against the progress associated with it that would erode individualism. They advocated the pastoral lifestyle of a simpler, more elementary and less acquisitive time, and questioned values of an emerging mindset focused on the pursuit of wealth, power and plenty from a land of untapped natural resources of forests, rivers and usable lands.

These agrarian beliefs developed from the culture of the region. For almost 300 years, agriculture has been the livelihood of many residents in the 13 Southern states, and agricultural production has been deeply implanted in the South. In a region comparable in size to several European countries, the South was made up of plantations and small farms, and major crops included "King Cotton," rice, sugar and tobacco.

After the Civil War, several imminent Southerners encouraged industrialization to help the battered region recover from the war's devastation. The North was also interested because the abundant supply of Southern labor could support textile factories and tobacco mills. Yet, today's contemporary South remains one of the major agricultural regions in the country.

MAFES research includes these "traditional" southern crops, as well as poultry, catfish, livestock, soybeans, corn, hay, sweet potatoes, wheat, grain sorghum and horticulture crops. MAFES scientists and staff are committed to keeping Mississippi's agricultural tradition alive.

The Delta Research and Extension Center in Stoneville held back-to-back Cotton, and Rice and Soybean Field Days this fall. Learn what's new in the areas of disease and pest control in these crops beginning on page 4.

MAFES and the Mississippi State University Extension Service have plans for two new Research and Extension Centers in central and coastal Mississippi (see page 6).

Postdoctoral researcher Don Sudbrink and MAFES entomologist Aubrey Harris use an eye in the sky to track plant bug infestations and plant damage in cotton and other plant hosts (page 7).

MAFES animal and dairy science researcher Scott Willard joins forces with visiting scientist Peter Hillman to research the best way to cool cows off during the hot summer months. Their research is described on page 8.

On page 9, MAFES rice researchers examine methods to improve soil fertility in precision-leveled rice paddies.

Field Days showcase Mississippi's strengths in row crops, dairy and cattle (page 9).

Good Agricultural Practices and Good Manufacturing Practices are the first line of defense against food-borne pathogens carried on fresh produce. Find out why on page 12.

I am proud of the contribution MAFES research has made toward keeping Mississippi a leader in agriculture.

Vance H. Watson

Vance H. Watson
Director

Delta Holds COTTON, RICE & SOYBEAN Field Days

By Rebekah Ray

Cotton, rice and soybean producers met with MAFES, Mississippi State University Extension Service and U.S. Department of Agriculture experts at the Aug. 15 Cotton Field Day and the Aug. 16 Rice and Soybean Field Day at the Delta Research and Extension Center (DREC) in Stoneville.

In previous years, these two field days were held in late August about a week apart, as opposed to the new back-to-back approach.

"The new arrangement for these two major events allows us to offer an afternoon seminar for producers that we hope will add to their knowledge," said James W. Smith, head of the DREC.

The inaugural seminar was "Site-Specific Farming in the 21st Century," which featured discussions of various applications of satellite technology in agriculture. Presentations included an overview of global positioning systems (GPS) and global information systems (GIS) at DREC, site-specific management strategies applicable to Delta production, precision farming equipment, using remote sensing in irrigation, remote sensing from agricultural aircraft, applying GPS and GIS technologies in cotton and corn production, and uses of remote sensing to control insects in cotton.

Jim Lytle

Cotton was Mississippi's top row crop in 1999. Producers at Cotton Field Day tour research plots at the Stoneville to learn about cotton varieties developed specifically for Mississippi.

COTTON FIELD DAY

Almost 250 cotton producers, suppliers and others attended the Cotton Field Day. Participants, including 23 Mexican agricultural producers hosted by Delta and Pine Land in nearby Scott, boarded tractor-wagon rigs to tour research plots and learn about production of the state's white gold.

✦ **Finger and Brush-Roll Harvesting of 15-inch Cotton.** MAFES agricultural engineer Gordon Tupper reported on a new strain of cotton with very close fruiting habits that former MAFES cotton breeder Bob Bridge crossed in 1988. Tupper also reported that modifications have been made to fingers of an Allis Chalmers finger harvester to reduce bark in narrow-row cotton, and a new brush roll harvester for 15-inch rows has been designed and built at DREC.

✦ **Management of Nitrogen and Potassium in Cotton and Corn Rotations.** Many years of cotton production may deplete soils of essential nutrients. MAFES agronomist Wayne Ebelhar discussed management of nitrogen and potassium in cotton and corn rotations.

✦ **Over-the-top Roundup for Morningglory Control.** Morningglory is perhaps the most bothersome annual weed faced by Mississippi cotton producers. To help reduce appearances of this invasive pest, MAFES plant physiologist Harold Hurst compared over-the-top applications of Roundup with directed applications at various time intervals and various rates of application.

✦ **Developments of Variety Trials in DREC Lines.** The Cotton Improvement Program develops varieties of cotton specifically for Mississippi production. MAFES cotton breeder John Creech spoke about the 2000 Variety Trials and the DREC breeding program. Research at DREC includes development of improved cotton varieties with high-yielding traits such as insect resistance, glandular improvement, nectarlessness, reduced attraction to insects, improved lint yield, improved fiber quality, adaptation to ultra-narrow rows and nematode resistance.

The Mississippi Cotton Variety Trial consists of two

regions: the Delta, with locations in Tunica, Clarksdale, Choctaw, Stoneville, Tribbett and Rolling Fork; and the Hills, with sites in Holly Springs, Nesbit, Verona, Starkville, Durant, Raymond and Aberdeen.

✦ **Cotton Disease and Nematode Control.** Research by MAFES plant pathologist Gabe Sciumbato showed the benefits of planting treated seeds and using hopper box treatments to help control nematodes.

Jim Lytle

Cotton stem infested with the fungus *Phomophsis*.

✦ **Comparison of Roundup Ready Cotton Varieties to Nontreated Conventional Varieties.** MAFES plant physiologist Charles Snipes compared RR cotton varieties to untreated conventional varieties for crop tolerance, fruit set and yield.

✦ **Using Remote Sensing to Detect Host Plants for Pests.** MAFES entomologist Aubrey Harris discussed using remote sensing, site-specific management, prescription spraying and other spatial technologies to locate wild host plants where tarnished plant bugs overwinter. The MAFES Advanced Spatial Technologies Center partially funded this project.

RICE AND SOYBEAN FIELD DAY

Almost 200 participants attended the Rice and Soybean Field Day, which featured a display of farm equipment and a nine-stop research plot tour.

✦ **Economic Effects of Planting Dates, Row Spacing and Herbicides on Maturity Group IV Soybeans.** MAFES weed scientist Dan Poston presented his results from evaluations of the economic effects of planting dates, row spacing and herbicide programs on MG IV soybeans.

✦ **Nitrogen Management of New Rice Varieties.** MAFES agronomist Wayne Ebelhar shared research results on nitrogen management and its effects on new rice varieties.

✦ **Soybean and Rice Disease Control.** MAFES plant pathologist Gabe Sciumbato discussed resistance of new rice varieties to sheath blight, blast, kernel smut and false smut, and susceptibility of soybean varieties to various diseases like stem canker, soybean mosaic virus, *Phomophsis* canker, frogeye leaf spot and *Phytophthera* root rot.

✦ **Early MG IV and Late MG III Soybeans under Delta Conditions.** MAFES agronomist Ling Zhang discussed production potential of early MG IV and late MG III soybeans in the Delta. Because growers want to increase yields, Zhang investigated earlier planting dates of the two varieties to give longer production seasons. The optimum planting dates are mid-April to mid-May for irrigated beans, while nonirrigated beans should be planted a little earlier.

Jim Lytle

Participants examine a conventional soybean variety that was evaluated for disease resistance and production yield.

✦ **Conventional and Transgenic, Irrigated and Nonirrigated Soybean Varieties.** MAFES variety evaluation manager Bernie White discussed Mississippi soybean variety testing. Trials included 175 varieties; 68 percent were Roundup Ready, while 32 percent were conventional varieties.

✦ **Evaluations of Promising Rice Breeding Lines.** MAFES rice breeder Dwight Kanter shared research on several promising rice breeding lines. His plots include Jacinto, Jefferson, Wells, Cocodrie, Priscilla, Lamont, Cypress, Dixiebelle and Kaybonnet varieties. Kanter's research includes increasing grain yield, enhancing disease resistance and improving milling quality.

Jim Lytle

Lunch features another Delta specialty—catfish.

Jim Lytle

MAFES agronomist Ling Zhang discusses the production potential of two varieties of soybeans.

MSU PLANS TWO NEW R&E Center Buildings IN MISSISSIPPI

By Crystel Bailey

Ned Browning

Construction continues on the 18,500-square-foot facility in Raymond that will become home to MAFES and Central Mississippi Research and Extension Center workers in January 2001.

Some MAFES and Extension employees in central and coastal Mississippi will have new headquarters when modern facilities designed for the specialized work of local agriculture and forestry are completed.

Marty Fuller, associate MAFES director, said construction of the Central Mississippi Research and Extension Center building in Raymond was scheduled for completion in January 2001. Work on the Coastal Research and Extension Center building in Biloxi should begin by late 2001 and be completed in the fall of 2002.

"We're extremely excited about the new centers in Raymond and Biloxi. These facilities should enhance research, technology and educational programs in Mississippi and create a central location for MAFES and Extension staff and other researchers in similar programs to work together," Fuller said.

MAFES and the Mississippi State University Extension Service began setting up regional facilities in Mississippi in 1988 to extend agriculture and forestry research and education across the state. More modern facilities were needed to improve clientele service and the use of new technologies.

In 1996, the North Mississippi Research and Extension Center in Verona became home to the first modern facility constructed with bond money provided by the state. It was also during 1996 that MSU initiated plans for the 18,500-square-foot, $2.5-million facility in Raymond. The university completed plans for building a new 20,000-square-foot, $3.75-million facility in Biloxi in 1997.

The central and coastal centers will benefit from modern facilities, efficient laboratories for off-campus scientists, more research and education capabilities, opportunities for commodity-related technology transferred through distance learning, two-way faculty meetings in interactive auditoriums, offices for 30 people and a 150-person conference room.

Butch Withers, head of the Central Mississippi R&E Center, said the new centers were needed to accommodate expansions of research and extension staff and programs.

Staff at the Central Mississippi R&E Center had been housed in modular office facilities at Hinds Community College. The new facility, also on the Hinds campus, will provide staff plenty of space for meetings and other activities without having to rent additional offices.

"Hinds Community College and MSU developed a partnership in 1988 to have the Central Mississippi R&E Center located on the Hinds campus," Withers said. "Mississippi State and Hinds work together on educational programs for area clients, using the latest agricultural technologies."

MSU will also work with Alcorn State University, the 1890 land-grant university for Mississippi, on certain programs in the southwestern part of the state. The new Central Mississippi R&E Center will house MSU, Hinds and Alcorn staff working on research and extension projects.

"Combining work space with Alcorn State and Hinds will allow all three schools to work more efficiently and not duplicate services," Fuller said.

Likewise, MAFES researchers and Extension specialists will work with Alcorn staff at the Coastal R&E Center.

"This new center will consolidate all research and extension staff in south Mississippi," said David Veal, head of the Coastal R&E Center.

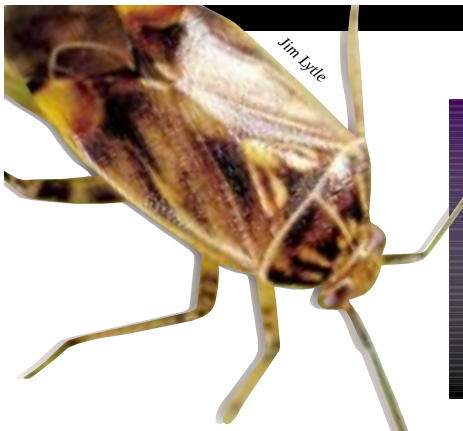
Property for the new facility, which is valued at $1.8 million, is on about 30 acres off Popps Ferry Road in Biloxi near Interstate 10. It was leased at no charge from the Biloxi school district.

Veal said the facility, like the new central Mississippi office, will contain microbiology labs, wet labs, dry labs and prep labs for raw materials.

Accommodations for distance learning will allow groups, such as nursery or cattle associations, to have meetings and invite guests without the guests having to be on-site.

"We can have guest lecturers from the Mississippi State campus speak to us without them leaving Starkville," Veal said.

Like the north Mississippi center in Verona, the new R&E centers will be able to host meetings, commodity groups, service training, field days and other events.



Jim Lytle

REMOTE SENSING UNCOVERS

Pesky Insects

By Rebekah Ray

Jody Stowall

Postdoctoral researcher Don Sudbrink inspects a field of radish for tarnished plant bug infestation. Tarnished plant bugs and other pests destroy more than 16,600 bales of cotton in the Mississippi Delta every year.

Wild radish, winter peas, wild mustard, vetch and curly dock may sound like ingredients of a savory green salad, but these wild host plants harbor bugs that are unsavory for Mississippi crops.

Identifying and controlling these plants can prevent early-season salad days for pests and save cotton producers dollars later in the season. Researchers with MAFES and the U.S. Department of Agriculture are exploring the use of remote-sensing techniques to detect infestations of insects in broadleaf wild host plants, as well as in broadleaf crops like cotton and soybeans. Together, these crops contributed more than $668 million to the state's economy last year, with cotton generating more than $440 million.

"Remote-sensing technologies can provide quicker responses than customary manual scouting methods for determining the presence of cotton pests like plant bugs, mites and worms. We're using remote-sensing technologies to detect wild host plant areas early in the season and also to detect pest infestations within cotton fields and crop maturity levels related to these pest infestations during the cropping season," said Don Sudbrink, a postdoctoral researcher working with MAFES entomologist Aubrey Harris at the Delta Research and Extension Center in Stoneville.

Sudbrink and Harris, along with MAFES entomologist Jim Robbins and USDA collaborators Gordon Snodgrass, Jeff Willers and Steve Thompson, are conducting a three-part evaluation using remote sensing for cotton insect pests in the Mississippi Delta, where tarnished plant bugs (TPB) and other pests destroy more than 16,600 bales of cotton per year.

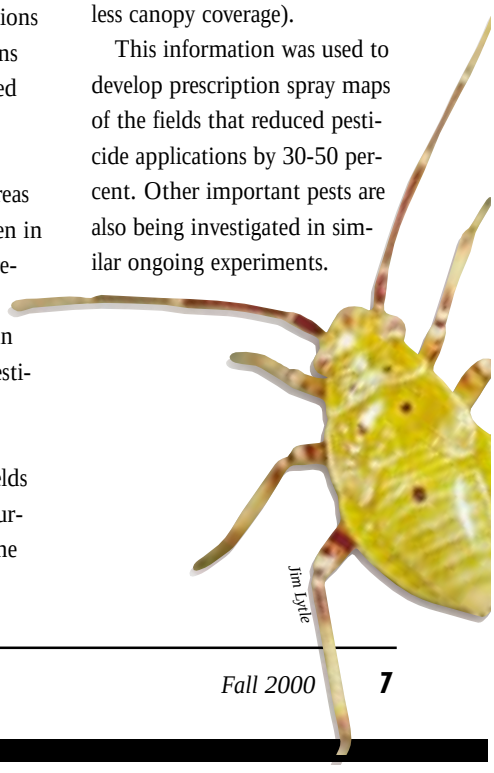
Early detection of pest infestations could reduce overall applications of pesticides using variable rate application technology, thus saving producers money. During noncropping periods, TPBs feed and reproduce on broadleaf wild host plants. Remote-sensing technologies that provide geospatial detection of these wild host plant areas could help an area-wide program find and control them in early spring, and thereby reduce TPB populations before the cropping season begins.

❖ Wild Host Plant Study. Several sites were sampled for TPB on wild host plants and nonhost grasses at Stoneville and Tribbett. Developing TPB populations were collected from broadleaf wild host plants, including vetch, mustard, dock, wild radish, winter peas, bur clover, aster, goldenrod, giant ragweed and Pennsylvania smartweed. Although TPBs were not previously known to develop on grasses, this study has revealed limited survival on ryegrass when the favored broadleaf host plants were destroyed. Remote sensing and spectro-radiometry showed distinct differences between broadleaf hosts and nonhost grasses. This information will be useful in development of prescription maps for vegetation management practices.

❖ Pest Damage Study. Preliminary remote sensing revealed spider mite infestations in reddish "hot spot" patterns in cotton fields and discerned them from healthy and drought-stressed cotton in 1999. Nematode-infested areas in the field could also be seen in the images based on very preliminary sample data. This information may be useful in the targeting of precision pesticide applications.

Researchers took remote-sensing data from cotton fields at Stoneville and Tribbett during the summer of 2000. The data revealed distinct areas of more vigorous crop growth in cotton fields that correlated with TPB infestations. Lower plant bug infestations were found in the visibly less vigorous growth (shorter plants and less canopy coverage).

This information was used to develop prescription spray maps of the fields that reduced pesticide applications by 30-50 percent. Other important pests are also being investigated in similar ongoing experiments.



Jim Lytle

Research Tries to Cool DAIRY COWS

By Bonnie Coblentz

Heat is an enemy of dairy production, and Mississippi's heat and humidity combine to cut milk production during the summer significantly.

When outside temperatures reach 75 to 80 degrees, dairy cattle experience mild heat stress. At 90 degrees and higher, they experience severe heat stress. During heat stress, a cow's normal body temperature of 101.5 degrees can reach 105 to 106 degrees.

Bonnie Coblentz

John Fuquay, animal and dairy science professor emeritus, measures heat loss from a cow's hair coat surface.

Bonnie Coblentz

Research assistants Laurent Jacquiau, foreground, and Scott Gandy record infrared measurements of a cow's hair coat surface temperature.

Scott Willard, MAFES animal and dairy scientist, said managing heat stress is important because of Mississippi's hot and humid conditions, which can stress cows from mid-May to mid-September.

Dairy cows show heat stress by increased respiration rates, higher internal body temperatures and reduced milk production. Willard said daily milk production in dairy cattle can drop 20 percent or more when temperatures soar during the summer.

"Such a drop in milk production directly affects the producer economically. This is on top of other impacts of heat stress on dairy cattle, which can include reduced milk quality and the added expenses of trying to cool cows," Willard said.

Willard recently joined forces with visiting scientist Peter Hillman, environmental physiologist at Cornell University, to study heat stress in dairy cows.

"Ways to cool the animal are important for economic reasons and for the cow's well-being," Hillman said. "A comfortable cow is an economical cow."

In his tests, Hillman cooled the cows with fans and water spray. Using three Holsteins, he tested various combinations of wind speed and spray treatments. Results were compared with one cow that was not cooled. He measured the cows' internal temperature, respiration rate, evaporation rate from the skin and the relative humidity of the air.

Hillman said cows do not cool themselves efficiently. The two ways to cool cattle are to spray them with water and blow air over them. The water-and-fans method increases the rate of evaporation and is the most economically feasible method to cool cows.

"Cows are lousy at panting and have only about 25 percent heat loss through panting," Hillman said. "The rest of the heat loss is through the skin. Cows sweat, but they don't do this efficiently, either."

Sweating cools the animal by drawing heat off the surface as water evaporates from the skin. High humidity and limited air movement slow evaporation. Hillman's test system got the cows hides wet, then blew them dry with a fan. This process was repeated several times, drawing down the cows internal temperature 1 to 1.5 degrees in an hour.

"A wet cow holds a lot of water on its hide and takes about 20 minutes to dry off in Mississippi's humidity," Hillman said. "During that time, they're cooling off faster than they would without the extra water."

Hillman and Willard's findings will be combined with data collected from similar experiments on dairy cows in Arizona. While Arizona is hotter than Mississippi, it has much lower humidity. Data from the two states can be combined to determine ideal cooling methods for cows in other areas.

"It is important to try to find the most efficient way to cool the animals," Hillman said.

This research is part of a U.S. Department of Agriculture multistate project to examine the effects of stress on livestock production. Locally, the research is being conducted by MAFES through MSU's Animal and Dairy Science Department.

Willard said goals of the research included finding the most efficient way to cool animals using water and fans, and so help dairy farmers find better ways to cool their cows. The research also provided an opportunity to share expertise between the institutions.

New RICE IRRIGATION

Offers Many Benefits

By Bonnie Coblentz

Mississippi State University is researching ways to make a new cultivation practice used by many Mississippi rice farmers more profitable.

About 50 percent of Mississippi's rice acreage is farmed using precision leveling and straight levees as farmers have moved away from the traditional levees that curve to follow the natural contour of the land. These new rice paddies follow a constant slope of the land, with straight levees cutting through the land at right angles to the slope of the field.

MAFES rice researcher Tim Walker said precision-leveled fields with straight levees offer many advantages.

"Precision leveling addresses the environmental issue of water quality. With precision leveling, we can use 25 to 50 percent less water to flood our fields," Walker said. "We also have the ability to better manage the water once it's on the field."

Precision-leveled fields typically have a one-percent slope, or a one-foot drop for every 100 lateral feet, and have levees spaced between 150 and 300 feet apart. Risers at the high end allow water to flood the field, and gates are conveniently located at the turn-rows to either keep water on the field or let it escape.

The research originally was geared to reduce surface water contamination by limiting the amount of nutrients in the water allowed to drain off the rice fields. But as this work progressed, the issue of the fertility of the disturbed soil became more important.

"With precision leveling, you cut away the soil in high areas and put the cut soil in low areas, leveling the land to form the constant slope you want," Walker said. "The problem is that we end up with a lot of areas in the field where the topsoil is subsoil, which has a lower fertility status."

About a year ago Walker began trying to determine what fertilizer rates and amendments can be added to the soil to improve fertility and still remain cost-effective.

"We have to determine what we can do to limit the time it takes for some yields to come back to the levels they were before the field was leveled," Walker said. "We're trying to make sure we have enough fertilizer budgeted into our nutrient management plans for cut soils."

Precision leveling is a long-term investment. In addition to the cost of leveling the field, there is a reduction in yields for some time afterwards.

"With the water, diesel and labor savings that these fields offer, most growers see the benefit of precision leveling in five to 10 years," Walker said.

The Mississippi Rice Promotion Board is sponsoring this on-farm research, which is being conducted at MSU under the direction of MAFES rice researcher Billy Kingery.

Travis Satterfield, Rice Promotion Board member and rice farmer in Bolivar County, said the research was initiated after conventional tests could not determine why soil fertility was low on recently leveled land.

"In certain areas where we had cuts and a lot of dirt was removed, we were seeing some difference in plant heights, vigor and a reduction in yield, even though conventional soil tests showed the major nutrient levels were OK," Satterfield said. "We needed research done to see what could be done to bring those areas with deep cuts back to full capacity production."

Satterfield said he thinks most rice production soon will be on precision-leveled land, and this problem will continue to develop unless it is solved.

"This is one area where we identified the problem and the Mississippi Rice Promotion Board was able to put some money into trying to correct that problem," Satterfield said.

In 1999, rice production in Mississippi totaled more than $95 million.

Steve Prather

Traditional rice levees curve to follow the natural contour of the land.

Steve Prather

Straight levees cut at right angles to the slope of a precision-leveled field. Precision leveling allows rice producers to use 25 to 50 percent less water in their fields.

FIELD DAYS

Row Crops • Dairy Cattle • Beef Cattle • Gardens

By Rebekah Ray

Jim Lytle

Northeast Mississippi Branch Station Superintendent Normie Buehring, far right, explains new seed planter technology to participants at the Row Crops Field Day.

ROW CROPS FIELD DAY PROMOTES REDUCED TILLAGE

Reduced tillage was a major emphasis at the Aug. 17 Row Crops Field Day hosted by the North Mississippi Research and Extension Center (NMREC) in Verona. More than 200 participants learned several benefits of practicing reduced-tillage, including more timely planting of crops, conservation of soil moisture and good seedling emergence.

Participants toured various research sites on the 450-acre station. MAFES researchers and MSU Extension Service specialists gave updates on current investigations, including herbicide technology for corn weed control, cotton responses to corn residue in reduced tillage systems, and soybean responses to wide bed tillage practices.

For the last two years, NMREC has practiced a fall paratill bed-roll system with early March burndown and no-till for its production of cotton, corn and soybeans.

Each year, a fall paratill bed-roll system is applied with all crops planted no-till the following spring. The paratill bed-roller is a three-point hitch equipped with colters, paratill shanks for 10- to 16-inch-deep tillage that lifts the soil three to four inches but does not invert it, as a moldboard plow does. The buster sweeps pull a raised bed six to eight inches tall, and a roller flattens and firms the bed to four to six inches high, leaving a wide, smooth, firm bed for planting no-till in the spring.

Commenting on the value of agricultural research, Mississippi Farm Bureau President David Waide said at the field day, "We have the lowest-priced food in the world because of our outstanding agricultural production,"

DAIRY FIELD DAY MOVES TO CREAM PITCHER COUNTY

Walthall County has the most dairy farms in Mississippi and has been dubbed the Cream Pitcher of the state.

On May 19, more than 350 dairy producers, suppliers and researchers gathered for the statewide Dairy Field Day held at Conerly Farms, a third-generation dairy and timber farm in the southern part of Walthall County.

"This year, the field day is being held in the heart of Mississippi's dairy industry and for the first time, is on a private dairy farm," said Wesley Farmer, an MSU Extension Service dairy specialist in Brookhaven.

In the past, the annual event rotated among Bearden Research Facility at Mississippi State University and MSU's research branches in Holly Springs and Newton.

In separate sessions, animal scientists, dairy specialists and veterinarians addressed dairy cow health, monitoring of milking system functions, synchronization of ovulation and procedures for milk pricing from the U.S. Department of Agriculture.

"This is a great opportunity for dairy producers to gather. It's encouraging to see younger producers entering dairy farming because that's who we'll be depending on in the future for milk," said Charles Carter, a retired dairy producer from Tylertown. Carter left the dairy business after losing his dairy farm to an outbreak of brucellosis, a disease of the bovine reproductive tract.

Rebekah Ray

Walthall County has more dairies than any other Mississippi county and is located in an arc that spreads across the southern portion of the state from New Orleans to Mobile. Milk production in Mississippi last year contributed almost $90 million to the state's coffers.

MAFES, MSU Extension Service, Mississippi Farm Bureau Federation, the American Dairy Association and Farmland Industries sponsored the field day.

BEEF AND FORAGE FIELD DAY HELD AT CMREC

At the Sept. 14 Beef and Forage Field Day, MAFES and MSU Extension Service specialists offered tips for handling cattle herds during this year's late summer drought. About 100 producers gathered for this year's late afternoon field day held at the Central Mississippi Research and Extension Center (CMREC) in Raymond. MAFES and MSU-ES hosted the event.

Bonnie Coblentz

MAFES animal and dairy science researcher Allen Williams, right, and research assistant Lance Jefcoat demonstrate ultrasound technology used to determine steer carcass quality.

"Even though we had one and a quarter inches of rain on Sept. 13, drought has been a big concern of many of the state's cattle producers. At this year's meeting, we offered management strategies and long-term solutions to help producers maintain healthy herds," said Butch Withers, head of the CMREC.

A tour included beef and cattle operations. Highlighted research included breeding program updates, forage variety testing, grazing program research, ryegrass stocker grazing research, heifer development, contract grazing and stocker developments.

Mississippi State University Extension specialists Larry DeMuth and Malcolm Broome offered tips to help producers keep their stock healthy in drought conditions. Suggestions included providing plenty of healthy forage to keep cattle from eating poisonous grasses during drought conditions when supplies of nutritious grasses for grazing are greatly depleted.

After dinner, MAFES animal researcher Terry Kiser spoke on upcoming industry technologies and their impact on the state's beef producers.

Mississippi has 24,000 beef cattle operators and about 630,000 head of cattle. Last year, cattle production was valued at more than $180 million.

The Beef and Forage Field Day has been held at CMREC for the last five years.

HOMEOWNERS FIND ANSWERS AT EXPO

Community and university experts banded together during the North Mississippi Garden Expo in Verona to give plant enthusiasts new ideas and answers for problems that challenge landscapes and gardens.

The Garden Expo on Sept. 22 and 23 was the fourth to be held at the North Mississippi Research and Extension Center. The previous field days were one-day events, and the last two were held in the spring.

Crofton Sloan, a research associate at the center, said the second day helped keep the crowd manageable and make the specialists more accessible to the public for individual questions. Visitors could stop and smell the roses or closely examine vegetables growing in the demonstration gardens.

"In addition to Mississippi State University experts, we had representatives of the Master Gardener program and the rose, native plant, iris and daylily societies," Sloan said. Visitors could purchase new plants from the Master Gardeners.

Lee County Master Gardener President Sara Harris said they wanted to encourage people to plant in the fall and to try new varieties. Proceeds from the plant sales go to fund community projects and special events by the Master Gardener Association.

"We have new varieties of daylilies and irises that are harder to find. Our plants are less expensive than what you would pay in a catalog," Harris said. "We also have the old-fashioned favorites such as weigelas, cannas and gardenias."

Extension horticulturist Norman Winter was also sharing the "try-it, you'll-like-it" attitude in a seminar, "Hot Flowers for a New Millennium." Winter told about new plants, some just new to the state, and varieties that perform well in Mississippi's climate. The fall of 2000 drove home the need for drought-resistant plants or irrigation.

"The research station looked great, but we couldn't have made it this year without irrigation," Sloan said.

Marco Nicovich

Jim Thomas, Extension irrigation specialist, showed visitors the types of tubing available through larger home centers, nurseries and special companies.

"Drip or emitter systems are best for scattered plantings and much more efficient than PVC pipe and sprinklers that can cost $2,000 per acre," Thomas told listeners at his 30-minute seminar.

Other seminars available during the two-day expo covered roses, butterfly gardening, turf, tomatoes, shade gardening, perennials and basic home landscape hints.

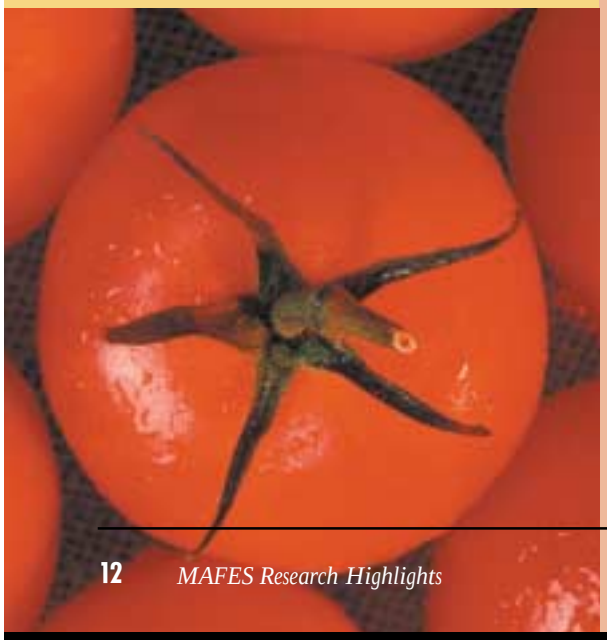
Lelia Kelly, a new Extension horticulture specialist, spoke on growing and using herbs in north Mississippi. She explained how growers can get around problems such as drainage and the state's climate. She addressed using herbs in cooking or for medicinal purposes.

"The use of herbs is more widespread and interest is growing," she said. "They are even popular in crafts as people enjoy the smells in a potpourri or dried in a topiary or wreath."

Sloan said event organizers work hard each year to provide a variety of topics for visitors.

"We are learning more each year about hosting a successful field day," he said. "We work to provide new things for people to hear and new things for them to see. The new bridge between the vegetable gardens and the botanical garden was a striking addition this year."

MAFES MAKES FIVE-A-DAY SAFER



By Rebekah Ray and Charmain Tan Courcelle

For the last several years, the U.S. Department of Agriculture has recommended daily consumption of five to seven servings of fruits and vegetables, and MAFES food researcher Juan Silva is making consumption of fresh produce safer.

"As attractive as it is at a roadside fruit stand or in the produce section of a grocery store, fresh produce may be contaminated with pathogenic microorganisms like *Clostridium botulinum*, *Escherichia coli*, *Salmonella*, *Shigella* and others. In the past, washing fruits and vegetables with running water, or even soap and water, had been the primary line of defense to remove these pathogens and any chemical residues present," Silva said.

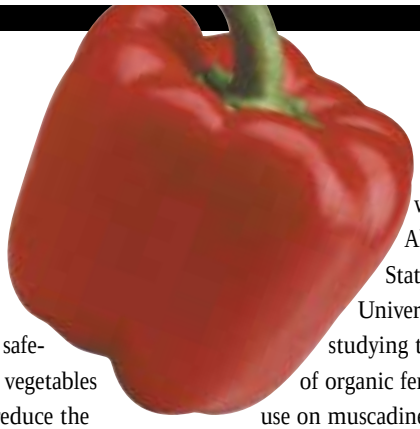
Now, better prevention mechanisms against contamination are needed. These mechanisms are divided into Good Agricultural Practices (GAPs) for on-farm application and Good Manufacturing Practices (GMPs) for packing houses and distributors, Silva said.

Silva is actively involved in a project that trains and educates extension agents and other personnel who provide information to producers about safe fresh food production.

"Previously, farmers were not made aware of how their farming practices would affect consumer health. There was more concern with quality and yield," Silva said.

However, ensuring that fresh fruits and vegetables are safe for consumption is difficult. There are no additional control and safety measures, such as salting and cooking to high temperatures, to eliminate food-borne pathogens from fresh produce. In addition, according to the Food and Drug Administration's (FDA) Guide to Minimize Microbial Food Safety Hazards for Fresh Fruits and Vegetables, preventing microorganism contamination is greatly favored over cleanup of tainted produce.

"GAPs were developed by the FDA and other participants to minimize the presence of pathogenic microorganisms in fruits and vegetables," Silva explained.



"GAPs are on-farm source controls that prevent as much as possible food-borne disease."

Fruit and vegetable processors already follow GMPs, including proper building sanitation and good employee hygiene. Now, produce growers and packers are encouraged to follow GAPs and GMPs in all aspects of fresh fruit and vegetable production and distribution. Practices include testing and maintaining the quality of water used for irrigation and washing, wastewater management and treatment, proper field hygiene and sanitation, and composting, which actively decreases the presence of microorganisms in untreated (raw) manure.

Potential sources of microbial contamination are agricultural water and soil, as well as farm workers themselves (see table), but any step in the process of moving produce from farm-to-table can introduce harmful microbes.

Fresh fruit and vegetable processing (canning) is one of many food processing areas included under the FDA's Hazard Analysis Critical Control Point (HACCP) system, a program that identifies and monitors specific biological, chemical or physical food-borne hazards that can adversely affect the safety of food.

Previous HACCP guidelines for the seafood, meat and poultry industries have led to significant reductions in the incidence of food-borne pathogens. New HACCP-like guidelines controlling the safety of fruits and vegetables may also help reduce the possibility of any food-borne disease stemming from consumption of raw fruits and vegetables.

Silva is also investigating the safety of organic fertilizer use. With Kent Cushman, a MAFES researcher at the Northeast Mississippi Branch Experiment Station, Silva is conducting research on the safety issues surrounding the application of swine waste as a fertilizer for different crops. In another project, conducted in collaboration with Alcorn State University, he is studying the safety of organic fertilizer use on muscadines.

Direct contact between the edible portions of produce and contaminated soils, including those fertilized with raw or improperly treated manure, greatly increases the risk of produce contamination. An understanding of this relationship and its effects is required to promote safe use of animal waste products in fruit and vegetable production.

Natural Reservoir	Pathogenic Microorganisms	Potential Sources of Contamination
Water	*Entamoeba histolytica, Vibrio cholerae, Cyclospora cayetanensis, Giardia lamblia,* hepatitis A virus, *Listeria monocytogenes*	• inadequate septic systems • sewage runoff • animal pasturing in crop fields • manure storage near growing areas • uncontrolled animal access to water • high concentrations of wild animals • improperly maintained processing and cooling facilities • rodent and insect infestations in harvesting and processing facilities • use of incompletely treated or raw manure • poor worker health, hygiene and sanitation practices during fresh food production and distribution
Soil	*Clostridium botulinum,* Ascaris or roundworms, *Listeria monocytogenes*	
Animals	*Campylobacter jejuni* (birds, especially chickens), *Cryptosporidium parvum, Escherichia coli* O157:H7 (healthy cattle), *Salmonella* species (including birds), *Toxoplasma gondii* (especially cats), *Staphylococcus aureus**	
Humans	Norwalk and Norwalk-like viruses, *Salmonella* species, *Shigella* species, *Staphylococcus aureus**	

** These pathogens are most commonly found in humans and animals, although they are also present in the environment (in water, for example).*

UPDATES

Withers Receives RCAS Honor

By Rebekah Ray

F.T. "Butch" Withers, head of the Central Mississippi Research and Extension Center in Raymond, received the 2000 Distinguished Service Award from the Research Center Administrators Society (RCAS).

RCAS, a separate national group under the Southern Association of Agricultural Scientists, selects an outstanding research center administrator each year. Selection is based on contributions to the society and the field.

F.T. "Butch" Withers

Withers has worked at Mississippi State University for more than 29 years and held various leadership positions in RCAS.

WILLS EARNS OUTSTANDING MAFES WORKER AWARD

By Ned Browning

Jim Lytle

MAFES plant physiologist/weed scientist Gene Wills, left, receives the Outstanding MAFES Worker Award from Dave Nicholas, director of research and development at Mississippi Chemical Corporation.

Gene Wills, plant physiologist/weed scientist, was recognized as Mississippi Chemical Corporation's Year 2000 Outstanding MAFES Worker during the joint Experiment Station and Extension annual conference.

Wills, stationed at the Delta Research and Extension Center (DREC) in Stoneville, Miss., conducts applied and basic research in three broad categories: herbicide physiology, biology and physiology of yellow and purple nutsedge, and herbicide absorption and translocation.

James Smith, DREC head, said, "Gene's world-renowned work with spray adjuvants has translated into significant savings to cotton producers and has established standard defoliation practices in much of the Delta."

Algae control in catfish ponds is the focus of Wills' current work.

"Gene's work will help deal with the problem of off-flavor in catfish, the industry in which Mississippi ranks number one nationally," said Vance Watson, MAFES director.

The Mississippi Chemical award nomination acknowledged Wills as a scientist who "can conduct basic research, then demonstrate to producers its use in a practical manner." It cited as an example the situation when a new herbicide-resistant cotton met with yield reduction problems. Wills' research from 20 years earlier provided the necessary insight to deal with the problem and minimize further damage.

Wills' 34-year research program in Mississippi's Delta has resulted in 52 refereed journal articles, research findings presented at more than 100 professional meetings, more than 25 of which were invited presentations; and more than 15 popular press publications or Experiment Station bulletins.

An original member of the Mississippi Weed Science Society, Wills also serves many roles in the Southern Weed Science Society, the Weed Science Society of America, and the International Weed Science Society. He has served his profession as associate editor and reviewer for *Weed Science*, and reviewer for *Weed Technology*.

Beyond professional organizations, Will serves as advisor to the joint Food and Agriculture Organization/International Atomic Energy Agency Coordinated Research Program on the use of radioisotopes in studying herbicide performance.

As a scholar, he is a member of Gamma Sigma Delta, Phi Kappa Phi, and Sigma Xi; holds bachelor's and master's degrees from Auburn University; and earned a Ph.D. from Oklahoma State University.

Beyond the laboratory and field plots, he is involved in Habitat for Humanity in Leland, is married to Malinda and is the father of Jeanette and Sherry.

Several MAFES-Affiliated Researchers Recognized

Dawn Luthe

Jerald Ainsworth

Roger King

By Rebekah Ray

The Office of Research at Mississippi State University recently recognized several MAFES researchers for their work during the past year.

MAFES biochemist Dawn Luthe, College of Veterinary Medicine director of research Jerald Ainsworth and RSTC chief engineer Roger King received Faculty/ Research Scientist/Engineer Awards.

Additionally, animal physiology student Wash Respess received a Graduate Student Research Award in the College of Agriculture and Life Sciences. In 1999, Respess was the first MAFES Cochran Research Fellow and spent a semester working in the Washington, D.C., office of Sen. Thad Cochran.

Jim Lytle

Vance Watson, right, recognizes the year 2000 MAFES winners (left to right): Grantsmanship Award—Lisa House, MAFES agricultural economist; Outstanding Scientific Publication—Dawn Luthe, MAFES plant biochemist; and Publication with Most Relevance and Potential Impact to Mississippi Agriculture—David Peebles, MAFES poultry scientist.

IN BRIEF

NEW MSU BIOSCIENCES INSTITUTE MADE POSSIBLE BY HEARIN FOUNDATION

By Bob Ratliff, University Relations

With a $1.2 million grant from a Jackson foundation, Mississippi State is establishing the Life Sciences and Biotechnology Institute.

The unit will enable the university to build on its strengths in the biological sciences and the use of biotechnology to improve agriculture, forestry, animal health, and environmental quality, said Charles Lee, vice president for agriculture, forestry and veterinary medicine.

The Robert M. Hearin Support Foundation grant will be used both to establish the institute and to attract a highly qualified staff, including a director who is an "internationally recognized scientist with expertise in commercialization of science," he said.

The institute will be "a key factor in making biotechnology a strategic economic asset for Mississippi," Lee added.

Current MSU biotechnology research involves the areas of human and animal health, disease- and insect-resistant crop development, natural resource protection, and computational biology.

Earlier support from the Hearin Foundation has allowed the university to establish biotechnology collaborations with other institutions and agencies.

"The Hearin Foundation's confidence in Mississippi State provides encouragement for others to invest in our programs," Lee said.

The foundation bears the name of the late Jackson business leader and philanthropist who created it in 1965.

MAFES has coordinated efforts to establish the biotechnology institute, secured external funds and developed a research and development plan for the new unit.

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