

# MAFES Research Highlights

Winter 1997 60:01

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### From the Editor:

With this issue of Highlights we welcome a new MAFES Director and say farewell to the administrator who guided Mississippi State University's agricultural research programs for almost 10 years.

Dr. Vance H. Watson assumed the duties of MAFES Director December 15, replacing Dr. Verner G. Hurt. There's more about Watson on page 4, and a tribute to Hurt begins on page 6.

This issue's cover story focuses on some of the off-station projects MAFES researchers are involved with. One of the things I learned while working on that story is the amount of effort individual farmers around Mississippi are willing to devote in assisting scientists with projects that will benefit the entire agricultural community.

Another aspect of the off-station research is the opportunity for scientists to learn about

the "real world" needs of farmers. The lessons learned in that area are often the key to developing research programs that will provide usable solutions to the problems faced by Mississippi farmers.

I also saw firsthand the amount of cooperation that exists among the various organizations involved with these projects. USDA/ARS personnel, Extension agents, Natural Resource Service scientists, and others contribute to the success of the off-station projects.

Another feature in this issue of Highlights is a report on the 1996 Fall Garden Day at the Truck Crops Branch in Crystal Springs. Fall Garden Day is a blend of educational activities and pure enjoyment for anyone with an interest in home gardening. The annual event is a combination field day and open house for the Truck Crops Branch and showcases its work with vegetables, flowers, and herbs. The report on the 1996 event begins on page 12 and contains our first aerial photo of the activities, thanks to Fall Garden Day volunteer and private pilot Hubert Ratliff and the willingness of Office of Agricultural Communications Editor Ned Browning to lean out the window of a small plane at 1,000 feet.

## **Challenges facing research focus of annual meeting**

New technology and a new farm bill are among the challenges facing agricultural research. Those topics also were the focus of the 1996 MAFES annual meeting. The meeting was held November 7 at the Bost Cooperative Extension Center on the Mississippi State University campus.

Mark Keenum, agricultural assistant to U.S. Senator Thad Cochran, discussed the 1996 Farm Bill and its implications for agricultural research.

"The days of production control are gone," Keenum said in explaining the bill's impact on agriculture. "Farmers pretty much have the flexibility to plant whatever they like, fence row to fence row."

Keenum also explained that for the first time, the farm bill established a set of criteria for research funding. One of the provisions is that states must provide part of the funding for new research facilities. He added that there will be an overall review of all research programs during 1997.

The Senate aide noted that Congress will continue to focus on balancing the federal budget, but added that the good news for agriculture is that there is congressional support for agricultural research and extension programs. He noted that evidence of that support is that there was basically no reduction in research funding during 1996.

Additional updates on the 1996 Farm Bill were presented by Extension Agricultural Economist John Robinson and John Lee, head of the Department of Agricultural Economics at Mississippi State.

Robinson noted that the goal of the new farm legislation is to stabilize and support the income of people involved in agriculture. He added that under the new bill, producers are more responsible for making market-based decisions. Also, producers and farm product suppliers are more exposed to financial risks from commodity price swings.

Among the implications for MAFES and other agricultural programs at Mississippi State are an increased need for risk management strategies and risk-reducing agricultural technologies, according to Robinson.

Lee added that current trends will ultimately lead to stronger agriculture, but he cautioned that producers should not assume recent high commodity prices will continue. Basing long-term decisions on the recent strength of agriculture product prices could trigger a situation similar to the early 1980's, when many farmers were forced out of business by crushing debt loads, he said.

Ed Robinson, aquaculture research program leader for the Delta Research and Extension Center, presented an update on activities at the National Warmwater Aquaculture Research Center at Stoneville.

Researchers at the Center are already working on projects in the areas of nutrition and water quality, Robinson said. He added that there are plans for additional work dealing with applied fish disease research, nutritional and environmental studies, management strategies, aquacultural engineering, and fish behavior.

MAFES Agricultural Economist David Laughlin presented a summary of MAFES activities in the area of advanced spatial technologies for agriculture. MAFES scientists are working on a variety of projects involving advanced spatial technology, including global positioning systems, geographic information systems, variable rate technology, yield monitors, and remote sensing.

All of those projects are part of efforts to make computer technology work for agriculture, according to Laughlin.

Also included in the program was an overview of the services offered by Mississippi State's Office of Sponsored Programs. Bob Palmer, director of technology transfer, summarized the University's intellectual property policies, and Matt Ronning, sponsored programs administrator, discussed the services of his office.

## **Tucker named outstanding MAFES worker**

Research Fishery Biologist Craig Tucker has been named the Outstanding MAFES Worker for 1996. The award, given annually by the First Mississippi Corporation, was presented by First Mississippi Vice President Bob Barker at the MAFES annual meeting.

Tucker joined the staff of the Delta Branch Experiment Station in 1980 as an assistant fishery biologist following completion of a B.S. in zoology at California State University, an M.S. in fisheries, and a Ph.D. in microbiology at Auburn University. He also completed postgraduate training at Woods Hole Oceanographic Institution.

As a researcher at the Delta Branch, Tucker has found practical solutions to some of the problems facing catfish producers in Mississippi and other states. His research focuses on the nitrite toxicity problem in catfish ponds, ways of managing ponds to counteract the problem of off-flavor in catfish, and explanations of phytoplankton dynamics in catfish ponds.

Another industry problem is related to discharge of water and materials from catfish

ponds. Recognizing the likelihood of future catfish pond effluent regulations, Tucker has developed baseline information that will help both producers and regulators develop reasonable policies.

His emphasis on the practical side of catfish production has earned him wide-ranging respect in the industry.

"He understands our industry because he has worked in it from the pond bottom up," explains Roger Yant, manager of aquaculture development for Gold Kist in Inverness, MS. "I have seen him checking oxygen, treating ponds, and harvesting fish. Craig is not afraid to get his hands dirty or spend the hours it takes to get the job done."

Tucker literally wrote the book on channel catfish farming. The Channel Catfish Farming Handbook, coauthored by Tucker and Fishery Biologist Ed Robinson, can be found on the bookshelves of commercial producers, research scientists and policy makers throughout the nation. He also serves as the managing editor of the Journal of the World Aquaculture Society and as associate editor of the Journal of Applied Aquaculture.

He was recently named director of the Southern Regional Aquaculture Center, which awards more than \$600,000 in grants to universities and nonprofit organizations each year.

The MAFES scientist has received the Catfish Farmers of America's Research Achievement Award and was the organization's Researcher of the Year in 1988. He also has received the Catfish Farmers of Mississippi's Research Recognition Award and Distinguished Service Award, as well as Delta Council's Agricultural Researcher of the Year Award.

## **Caulder gives adaptive biotechnology lecture**

No use of funds has paid off better than the returns from agricultural research, according to Jerry Caulder, president and CEO of Mycogen Corporation, one of the world's 10 largest seed companies. Caulder came to Mississippi State University at the invitation of the Adaptive Biotechnology Committee, MAFES, and the Division of Agriculture, Forestry, and Veterinary Medicine to give the 1996 Will Carpenter Adaptive Biotechnology Seminar lecture.

Speaking to agriculture students, faculty, administrators, and legislators, Caulder noted that as a percentage of the national research budget, agricultural research funding has dropped from 80 percent in 1940 to its current level of 2 percent. The reduced funding has forced a shift from basic research, which looks into the unknown to expand general scientific knowledge, to applied research, or research aimed at a specific outcome.

Knowledge gained through basic research led to Bt cotton and other recent advances in adaptive biotechnology, Caulder noted. He called for increased emphasis on basic research funding and noted that misunderstandings of biotech research applications have caused government regulatory agencies to unnecessarily slow the progress of biotech research.

The MAFES Adaptive Technology Committee established the Will Carpenter Adaptive Biotechnology Seminar Series to honor the contributions of Dr. Will Carpenter, a

distinguished MSU alumnus and former vice president and general manager, New Products Division of the Agricultural Group of Monsanto.

## **Dairy construction underway at Holly Springs**

Construction has begun on a new dairy facility at the North Mississippi Branch in Holly Springs. The new building will house the Branch's milking parlor and will replace the 25-year-old parlor currently in use.

"The milking parlor we have now was built in 1971 and still has the technology that was in use at that time," explains North Mississippi Branch Assistant Superintendent Donald Pogue. "The new facility will allow us to do research using the same technology currently in use by this area's dairy producers."

Funding for the new dairy is being provided by a bond issue approved by the 1993 session of the Mississippi Legislature.

## **Research reveals muscadines' potential**

By Bonnie Coblentz

Faced with so many snack foods that taste wonderful but aren't, muscadine grapes are a welcome option for the health conscious.

Studies on muscadine grapes show that this fruit has many nutritional benefits.

MAFES Nutritionist Betty Ector is studying the physiological effects of adding muscadine products to laboratory rats' diets. She found that the grapes are a good source of dietary fiber, ellagic acid and resveratrol.

Ector has been studying the nutritional benefits of muscadines for nearly 12 years. She got interested in them after noticing that half the fruit is wasted when the grape is used only for its juices.

What remains after the juice is pressed out is a mixture of skins, seeds, and pulp known as pomace. Ector developed a way to remove the seeds from the pomace and then made a puree out of what was left.

"I thought that surely there are things we could do with the pomace, and I realized what a valuable source of dietary fiber this could be," Ector said.

By finding uses for the pomace, her muscadine research has increased the raw product that can be used for food and decreased waste disposal costs.

"On top of that, it's very nutritious," Ector said.

With the help of graduate students, she fed laboratory rats high cholesterol diets combined with either muscadine puree or oat bran.

The team found increased levels of HDL cholesterol, which the body needs, in rats fed muscadine puree and decreased levels of LDL cholesterol, which is harmful. These

effects were better than those found in rats fed the oat bran, Ector said.

These results are significant because the higher the HDL levels, the lower the risk of heart disease, according to the National Institutes of Health.

A new study is focusing on the possible reduction of cancer-causing agents in laboratory rats fed muscadine products. Muscadines are an excellent source of dietary fiber and ellagic acid, substances found to have preventative effects in the colon of laboratory rats.

Muscadine grapes are also a good source of resveratrol, a compound with many health benefits. Resveratrol consumption lowers cholesterol levels in mammals and has been linked to lower risks of coronary heart disease, Ector said.

In most grapes, resveratrol is found in the skins, but in muscadines, it is found both in the skin and in the seeds. Muscadine wine and juice have higher levels of resveratrol than do other types, but foods made with muscadine puree have even higher resveratrol levels, she said.

Ector has taken the nutrient-rich muscadine puree and used it as an ingredient in fruit cakes, doughnut fillings, jams, granola cereals, ice creams, candies, and more. She does not market any of these products, but she demonstrates uses for the puree.

Interest in Ector's muscadine research has been high, both for its nutritional benefits as well as for its marketing possibilities. Next spring, she intends to expand the scope of her nutritional research by working with human subjects.

Ector will need 20 to 30 people to take part in the study and is already looking for volunteers. For more information on this project, contact Ector at (601) 325-8090.

## **Fall Garden Day '96**

The 18th annual Fall Garden Day brought more than 2,500 visitors to the Truck Crops Branch Experiment Station at Crystal Springs. They came from all areas of Mississippi and several surrounding states to see firsthand what vegetable production and horticulture are all about.

Activities ranged from educational exhibits under a big-top tent to wagon tours of the Truck Crops Branch.

A main attraction at the field day was the Fall Garden, containing more than 40 different kinds of vegetables and raised beds filled with herbs and annual and perennial flowers. In all, there were more than 400 varieties of vegetables, flowers, and herbs.

Master Gardeners from Warren, Hinds, Rankin, and Madison Counties also provided horticultural exhibits for the Fall Garden Day. One of the Master Gardener displays was a container garden with examples of how to grow herbs, vegetables, and flowers in containers ranging from traditional flower pots to a pirogue filled with herbs. The Master Gardener Program is an educational activity of the Mississippi Cooperative Extension Service designed to train volunteers in horticultural skills to aid Extension agents in answering gardening questions and to encourage involvement in community projects.

MAFES researchers and Extension specialists and agents were on hand to answer questions about vegetable production and other aspects of horticulture. Additional activities included cooking demonstrations, outdoor classroom sessions for 4-H'ers and other youth, and tours of the MAFES and Natural Resource Conservation Service research projects being conducted at the Truck Crops Branch.

During the week following Fall Garden Day, the site was used for garden tours and educational programs dealing with agriculture for 2,400 school children.

Fall Garden Day is sponsored each year by MAFES, the Mississippi Cooperative Extension Service, the Truck Crops Branch Experiment Station, and Mississippi State University.

## **Vegetable trials determine best varieties for Mississippi**

The Truck Crops Branch Experiment Station was established by the Mississippi Legislature in 1938 with the mission of "doing experimental work with truck crops." The basic mission of the Branch remains the same, but its scope has expanded to meet the diverse needs of the state's homeowners and horticultural enterprises.

Research with new vegetable and fruit varieties is an important part of the work underway at the Branch. An example of that work is the cabbage variety trial that was conducted during 1996.

"Seed companies release a lot of new cabbage varieties each year," explains Truck Crops Superintendent Boyett Graves. "During the 1996 season, we conducted trials with 11 fall cabbage varieties, including some that are new and some that are standard varieties for Mississippi."

The trial at the Truck Crops Branch and a similar project at the Beaumont Unit were conducted using a raised bed, black plastic mulch, and drip irrigation, which are recommended practices for fall cabbage production in Mississippi.

Frost tolerance is one of the characteristics researchers at the Branch look for in cabbage. Graves explains that frost does little real damage to cabbage, but the appearance of some varieties can be hurt by frost. That can be a significant problem for commercial growers.

Planting date is another factor in the research conducted with cabbage and other horticultural crops. The cabbage plots at the Truck Crops Branch and at the Beaumont Unit were planted 10 days apart during August.

"The plants here at Truck Crops were 3 weeks later than those at the Beaumont Unit, although they were only planted a week later," Graves says. "That's the result of the rapid decline in heat units during the fall."

Graves and Horticulturist Richard Snyder also work with other horticultural crops, including tomatoes, sweet corn, pumpkins, cucumbers, watermelons, and squash, as well as a number of greenhouse vegetables. Their goal is to determine the best varieties and cultural practices for central and south Mississippi.

## **Triplett named Fellow by ASA**

The American Society of Agronomy (ASA) has bestowed its highest honor on MAFES Agronomist Glover Triplett. The MAFES researcher has been named a Fellow of the ASA for his outstanding contributions to agronomy.

Triplett earned the B.S. degree in general agriculture and the M.S. degree in agronomy at Mississippi State. He completed the Ph.D. in agronomy at Michigan State University.

He became a pioneer in the area of no-till crop production while an agronomist at the Ohio Agricultural Experiment Station in the early 1960's. During that time, he made demonstration plantings on farmers' fields that increased awareness of no-till practices. By the late 1970's, more than 50 percent of the corn acreage in several eastern Ohio counties was planted with no-tillage.

"The abandonment of the plow was not a popular topic during his early career, but as a result of writings by pioneers such as Dr. Triplett, attitudes towards no-tillage farming began slowly changing," says MAFES Soil Scientist Jac Varco. "The significance of his writings is measured by the widespread adoption and acceptance of no-tillage practices by farmers."

Triplett came to Mississippi State as professor of agronomy and agronomist in 1983. Since that time, he has worked toward the development of cropping systems for Mississippi's highly erosive soils. Much of that work has been done in cooperation with the USDA/ARS Sedimentation Laboratory at Oxford, MS.

Triplett is just one of 31 Fellows named by the ASA in 1996. The organization has almost 12,000 members.

## **Service to agriculture hallmark of Hurt's career**

When Verner G. Hurt retired from his post as Director of the Mississippi Agricultural and Forestry Experiment Station on June 30, 1996, it culminated a career of service at Mississippi State University bridging more than four decades. His career epitomizes the land-grant mission of teaching, research, and service and generated immeasurable benefits for agriculture in Mississippi and throughout the nation.

Verner Hurt was born in December 1929, the oldest of two children of James Verner and Eugenia Hurt. He grew up on a farm near Yazoo City, where he completed his elementary and secondary education and then attended Holmes Junior College. Hurt began his long association with Mississippi State in 1948 as a junior, majoring in agricultural economics. He earned the B.S. degree and was commissioned a 2nd Lt. in the U.S. Army in 1950. Following 3 years of active military service, he returned to Mississippi State, earning his M.S. degree in 1955.

He worked as an auditor for the Mississippi Department of Agriculture and Commerce for a year, then was named assistant professor and assistant economist in the Department of Agricultural Economics at Mississippi State. In 1958, he went to Oklahoma State University as a graduate research assistant, completing his doctorate in 1960 and returning to Mississippi State as an associate professor. He was promoted to professor in

1962.

Hurt was an excellent and demanding teacher of agricultural economics, statistics, and mathematical programming. He earned a national reputation as a researcher and for his efforts in the development and application of mathematical programming techniques to problems in the agricultural sector. He was named assistant department head in 1971 and became head of the department in 1972.

While building his career as an educator, Hurt continued his military service as an active U.S. Army reservist, receiving a diploma from the U.S. Army Command School and General Staff College in 1972. He taught several courses for the Army, served as president and secretary-treasurer of the local reserve officers association, and eventually retired with the rank of Colonel.

Hurt's appointment as Director of the Mississippi Agricultural and Forestry Experiment Station in 1987 signaled a new era in his administrative and service roles. He helped plan and celebrate the 100th birthday of MAFES in early 1988, then focused his attention on streamlining the Experiment Station to prepare it for responding to the challenges of the 21st century.

Throughout his career, Hurt has been active in professional agricultural economics associations. He's a career-long member of the American Agricultural Economics Association. He was a charter member and played a major role in the formation of the Southern Agricultural Economics Association (SAEA), serving as its president in 1973-74. He was awarded an honorary life membership in SAEA in 1990. He also was a founder and charter member of the Mississippi Agricultural Economics Association, serving many years as a director.

As a member of the Southern Association of Agricultural Experiment Station Directors, Hurt served on committees and planning groups and chaired the Economic and Social Issues Planning Group and the Strategic Planning Committee.

Two recent awards are a testament to how others outside the university system value Hurt's contributions. In 1994, he was given the Mississippi Farm Bureau's Distinguished Service Award, which cited his "significant contributions to agriculture in the State and to an improved quality of life for rural residents." In 1996, the Delta Council honored him with an Achievement Award for Outstanding Contributions to Aquaculture. The Delta Council award recognized his role in making aquaculture "possibly the most dynamic growth story in American agriculture during the past quarter century."

While his accomplishments and successes have been many, Verner Hurt will be recognized most as a coworker, a friend, and a leader. He shares this tribute with his wife, Norma; daughter, Susan; sons, Gene, John, and Mike; and four grandchildren.

## **Hurt's Career Highlights**

Verner Hurt's career has paralleled an era of rapid change and exploding technology in agriculture and throughout society. A brief listing of some of the highlights of his career provides evidence of how he responded to the challenges of change, providing leadership for successes that have far-reaching impacts and benefits today and for future

generations.

**Technology** - Hurt was a pioneer in computer technology. He was among the first to develop computer applications for agriculture. In 1964, he published an integer linear programming algorithm capable of solving many previously unsolvable problems of production agriculture. A few years later, he developed programs for the solutions of transportation problems in the fluid milk industry and for problems related to cotton and other commodity price support programs. He was a regular and innovative user of the IBM 650, the first computer used on the Mississippi State campus and has been a campus leader in moving the University into the computer-based "information age."

**Research** - Hurt planned and conducted research in farm management decision making, dairy industry regulation, and agricultural growth and development problems. He addressed planning for small farms, implemented demand analyses for numerous agricultural commodities, and conducted programming research in interregional competition, structure, and performance of the dairy industry.

**Teaching** - He was a "master teacher" with the uncommon ability to make the theoretical applicable and understood by students. He directed programs for 5 doctoral students, 11 masters students, and many undergraduates during the relatively short period before his career direction focused more on administration.

**Leadership** - While he was department head, agricultural economics undergraduate student enrollment increased from 99 in 1971 to 145 in 1986, graduate student enrollment increased from 26 to 48, and grants and contracts to the department increased more than fourfold. During those 15 years, the faculty increased from 10 to 22, research associates from 0 to 7, and new programs for B.S. and Master of Agriculture degrees were initiated.

**Administration** - As director, Hurt established fiscal stability for the Experiment Station after a number of bad budget years. He helped establish four regional research and extension centers to provide stronger research-extension links and better serve the people of Mississippi. He provided for selection and training of new department heads and a middle-management team, and he helped in consolidation and reorganization efforts for more efficient and cost-effective operation in the Experiment Station and throughout the Division of Agriculture, Forestry, and Veterinary Medicine.

**Modernization** - Hurt initiated an equipment analysis, identifying and selling obsolete equipment, with the proceeds used for modern equipment and tools needed for efficient and effective research, both at MAFES headquarters and throughout the outlying branch stations. A long-range plan for modernization of field and laboratory equipment is now in place. Hurt was instrumental in getting legislative support that resulted in new facilities for branch stations at Verona, Holly Springs, and Raymond.

**Aquaculture** - Hurt helped establish the Catfish Industry Liaison Committee and helped lead the effort that resulted in the establishment of the National Warmwater Aquaculture Research Center at the Delta Branch Experiment Station. The Center, which includes 203 ponds and aquaria and office/laboratory buildings, coordinates research efforts to keep the catfish industry on the leading edge of technology.

**Alternative Crops** - Realizing the need to seek potential alternative crops for production in Mississippi, Hurt supported extensive research to develop production techniques and a

wide range of new products for kenaf.

Biotechnology - New technology and discoveries in genetic engineering have created an agricultural revolution in just the past dozen years. As a result, MAFES scientists have teamed with USDA and industry researchers to develop new transgenic crops -- cotton with genetic resistance to certain insects and soybeans that have tolerance to weed-control chemicals are already being marketed, and the technology is only in its infancy. Within the past year, three new genetically engineered varieties of turfgrass developed by MAFES agronomists have become commercially available.

Legislation - Hurt has been instrumental in developing national farm legislation and has often presented testimony before committees of the U.S. Congress and the Mississippi Legislature.

## **Off-station projects bring research to the real world**

The branch station is one of the strongest tools agricultural researchers have in their efforts to find new and more efficient ways to produce food and fiber. However, there are some projects that need the type of setting found only on an actual working farm.

MAFES scientists have off-station projects on farms in virtually every area of Mississippi. Producer participation in the research ranges from providing just the land for a project to performing most normal farming practices.

Variety evaluations are among the research projects conducted with cooperating producers. During the 1996 season, 12 on-farm cooperators provided land for corn, wheat, and soybeans. Those producers play a major role in the success of Mississippi's variety evaluation program, according to Variety Evaluations Manager Joe Askew.

"Space is sometimes too limited on the branch stations to rotate plots the way you need to," he explains. "Another advantage to going off-station with variety evaluations is that producers feel more comfortable with results from those studies."

Monroe County producer Tommy Coggins agrees with Askew's assessment of the advantages of on-farm variety tests.

"Farmers will sometimes plant some different varieties in with their regular crop to see how they perform," he says. "But that's not like being able to come out here and see a lot of varieties growing side by side on a real farm."

The farm operated by Coggins and his father Buddy Coggins was the site of a 1996 evaluation of 180 soybean varieties. The Monroe County producers provided about 2.5 acres for the test plot and prepared it for planting. The variety evaluations staff handled the other production jobs, with an eye toward using the same management practices as the producers.

Most soybean variety tests are planted on 30-inch rows, but the trial on the Coggins farm was planted on 7-inch rows to simulate drill planting of beans on narrow rows.

County Extension agents also play an important role in the on-farm variety tests and other off-station research conducted by MAFES scientists. The county agents help locate

producers who are willing to participate in research projects and whose farms have the soil types and other requirements for the variety tests. The county agents also assist the variety testing staff by keeping detailed records on the progress of the test plots during the growing season.

Monroe County Agent David Roberts works with the project on the Coggins farm, and he says an advantage of an off-station location for variety tests is the opportunity to select soil types that represent an area.

"The variety test on the Coggins farm is in a soil that is typical of the Black Belt Prairie soils in Monroe County and this entire area of the state," he explains.

Other county agents assisting with the 1996 program include Art Smith, DeSoto; Charlie Estess, Coahoma; Dennis Reginelli, Noxubee; Robert Martin, Issaquena; Eddie Harris, Humphreys; and Mack Young, Quitman.

A technical advisory committee that includes breeders, company representatives, agronomists, growers, Extension agents, plant pathologists, entomologists, and nematologists also helps select off-station sites.

MAFES Cotton Breeder Steve Calhoun at the Delta Branch conducts off-station cotton variety evaluations on several farms each season. The same farms are not used every season.

"We try to maintain a balance between producers who have been long-term cooperators, such as Frank Mitchener in Sunflower County, and new participants in the program," says Calhoun.

Cooperators in the 1996 cotton variety tests were Steve Skelton, Bolivar County; Keys Arnold, Tunica; Clark Carter, Sharkey; and Charles McClintock, Humphreys. Three of the 1996 cotton trials were variety trials and one was a Cotton Incorporated supported large-plot study of insect resistance traits of transgenic varieties.

Although MAFES researchers plant and harvest the cotton variety trial plots, the producers prepare the land and make management decisions during the growing season. As with the grain and soybean trials, Extension county agents help keep records on management practices and the progress of the trials.

"Cooperators with on-farm research provide a real service," Calhoun explains. "They also make some sacrifices because they have to work around us at certain times during the growing season."

Most on-farm research involves just a few acres, but there are producers who provide a much higher level of support. An example is the insect control project conducted on the Reece Makamson farm in Leflore County during 1996. The 1996 work on the Makamson farm was a scientific evaluation of current insect management options with the purpose of developing more cost-efficient strategies for Mississippi cotton growers. More than 500 acres on the farm were involved in the study.

"The amount of acreage Mr. Makamson allowed us to work with is unique," explains MAFES Entomologist Randy Luttrell. "I know of no other research programs across the

cotton belt that involve this level of grower support. The opportunity to work on field-size management units has led to the development of a coordinated, on-farm project between scientists at the Delta Research and Extension Center, on campus at Mississippi state, at the Northeast Research and Extension Center in Verona, and at the Central Mississippi Research and Extension Center in Raymond. There are many questions we still need to address, but the background information collected during 1996 will allow us to focus our research toward real world problems."

The Makamson farm also has been used for several other studies during the past 10 years, including the first on-farm studies of Bt cotton in the United States and the first on-farm field tests of Bt corn.

One of the oldest ongoing off-station projects involving MAFES scientists is work with the GOSSYM/COMAX expert system for cotton. The system uses a computer program designed to help cotton producers with irrigation, fertilization, and other management decisions. Off-station work with the program began on the Frank Mitchener farm in 1984.

Several other producers, including Kenneth Hood in Bolivar County, began cooperating with the research in 1986. GOSSYM/COMAX research is still being conducted on the Hood farm. In 1991, the farm also became the site of the first test of the GLYCIM crop model for soybeans. Off-station research with GLYCIM was expanded to the Delta farms of Ed Hester and Jay Mullens in 1992 and to the Fletcher Clark farm in 1993.

MAFES Soil Physicist Frank Whisler says farm trials have shown producers can achieve significant savings with the program, including up to a 400 percent improvement in irrigation efficiency. Whisler and MAFES Plant Physiologist Harry Hodges pioneered research with GOSSYM/COMAX and have worked with GLYCIM since 1978.

Whisler notes that off-station tests in commercial fields have helped the researchers improve GLYCIM's reliability and additional improvements in the program are underway.

The success of the off-station GLYCIM work in Mississippi encouraged the United Soybean Board to provide funding to test the program on five commercial farms in five adjacent states in 1995.

A different type of off-station research is being conducted on a 260-acre field that's part of the Bill Hawks farm in DeSoto County. The field was planted to corn followed by winter wheat in 1996. Soybeans will be planted following the wheat harvest next summer.

MAFES researchers are using the field to study precision farming methods for fertilizer and lime applications.

"Variable-rate fertilizer and lime applications have been a focus of precision farming since its inception," says MAFES Agronomist Michael Cox. "The idea behind variable-rate application is simply to add fertilizer and lime at rates needed by certain areas within a field rather than use one average rate for the whole field. The use of variable rate technology helps obtain the maximum efficiency from added fertilizer and lime. In addition to the obvious economics, the technology also helps minimize the movement of added nutrients to watersheds."

The agronomist notes that research is needed to answer questions about the effects on

crop yield and water quality of using GPS/GIS technology for precision fertilizer and lime applications. Also, grid size, depth of soil samples, subsample collection methods, and statistical interpretations are not well defined in precision soil sampling methods. The off-station research being conducted in DeSoto County will provide answers to the questions about those factors.

Cox used a global positioning system mounted on a four wheeler to map the field boundaries following the harvest of the 1996 corn crop from the field. He then used the same system to subdivide the field into 2.5- acre grids.

Natural Resource Service District Conservationist Wade Carter and Soil Scientist Max Robards are participating in the study. Robards has taken soil samples from each 2.5-acre grid and is classifying each sample for texture, color, and other qualities. Carter is developing a topography map for the field.

"The soil information obtained from the samples is being used to make precision fertilizer and lime applications," Cox explains.

As the study progresses, the soil information will be combined with crop yield in a GIS system database. The database will be used to produce accurate field maps and to refine data collection methods.

DeSoto County Agent Art Smith and MAFES Agronomist Joe Johnson at the North Mississippi Branch have assisted with coordinating the project and with the collection of soil information. Johnson notes that the data produced by the study will have applications to other projects he is conducting in the hill areas of the state.

"Work with spatial technology has been mostly confined to grain crops," he says. "We hope that some of the lessons learned with this project will help establish a data base for use with other crops in the hill areas, especially cotton. There can be a lot of variability in cotton yields across some of our hill fields, and precision application techniques could help eliminate that problem."

A 137-acre field on the Mark Curtis farm in Washington County is the site of a similar study. MAFES and Soil Conservation Service personnel are being assisted with that project by Washington County Agent Jon Rusco.

The projects referred to in this article represent just part of the work MAFES scientists are doing on farms in all areas of Mississippi.

## **MAFES Publications**

Single copies of MAFES publications are available at no cost while supplies last. This is a list of the titles published in 1996. Requests, including number and title, should be sent to MAFES Publications, Office of Agricultural Communications, Box 9625, Mississippi State, MS 39762-9625.

### **Bulletins**

1039--Rice Water Use and Costs in the Mississippi Delta. January 1996.

- 1040--Evaluation of Nectarine Cultivars in Northern and Southern Mississippi. February 1996.
- 1041--A Practical Guide to Nutrition, Feeds, and Feeding of Catfish (Revised). March 1996.
- 1042--Japanese Plum Cultivar Evaluations in Northern and Southern Mississippi. April 1996.
- 1043--Turf Performance of St. Augustinegrass Cultivars in North Mississippi. May 1996.
- 1044--USDA and MAFES Cooperative Soil Conservation Studies at Holly Springs, 1956-1996. June 1996.
- 1045--Broiler Litter as a Feed Supplement in Replacement Heifer Diets. May 1996.
- 1046--The Effect of Post-directed and Over-the-top Applications of Herbicides on Kenaf. June 1996.
- 1047--Evaluation of Kenaf Growth Media as a Substitute for Pine Bark. June 1996.
- 1048--Lime and Nitrogen for Bahiagrass Production. July 1996.
- 1049--Influence of Various Compounds and Temperature on Activity of Dropp Defoliant on Cotton. September 1996.
- 1050--Costs and Returns for Cotton, Rice, and Soybeans in the Delta Area of Mississippi, 1994. July 1996.
- 1051--Cost and Changes of Cotton Insect Control in Mississippi, 1992-1996. July 1996.
- 1052--Perceptions of Mississippians Concerning the Poultry Industry. August 1996 .
- 1053--Preemergence Herbicide Trials in Kenaf. August 1996.
- 1054--Productivity in Mississippi Delta Prime Farmlands Drastically Disturbed by Simulated Surface Mining. August 1996.
- 1055--Peach Bloom Delay and Tree Response to Fall Application of Ethephon. August 1996.
- 1056--Cost of Producing Narrow-Row Cotton in Mississippi. August 1996.
- 1057--Sharkey Soils in Mississippi. September 1996.
- 1058--Economic Evaluation of Overseeded Ryegrass and Hay Quality for Wintering Beef Cows in South Mississippi. October 1996.
- 1059--Bermudagrass Variety Evaluations in South Mississippi. October 1996.
- 1060--MS-Choice, MS-Express, and MS-Pride: Three New Turf-type Bermudagrasses. November 1996.

1061--Weather and Cotton Growth: Present and Future. November 1996.

1062--The Impact of the Turfgrass Industry on Mississippi's Economy. December 1996.

1063--An Economic Evaluation: Straight versus Contour Levee Rice Production Practices in Mississippi. December 1996.

1064--Pendimethalin as a Delayed Preemergence Herbicide in Rice. November 1996.

#### Technical Bulletins

210--Effect of a Long-Juvenile Trait upon Flowering in Soybeans Grown in Short and Long Periods. April 1996.

No. 211--Broadcast Fertilizer Losses in Runoff. May 1996.

No. 212--Virus and Virus-like Particles Found in Southern Pine Beetle Adults in Mississippi and Georgia. June 1996.

#### Research Reports

21:1--Survey of Plant-Parasitic Nematodes in Mississippi Cornfields. January 1996.

21:2--Slow-Release Fertilizer Evaluation with Container-Grown Plants. February 1996.

21:3--Effect of Cow Densities in a Year-Round Grazing System. April 1996.

21:4--Grazing Strategies for Developing Replacement Heifers on Endophyte-Free Fescue Pasture. May 1996.

21:5--Performance of Blackberry and Raspberry Cultivars in Northern Mississippi, 1992-1995. May 1996.

21:6--Crape Myrtle Cultivar Evaluation. July 1996.

21:7--Effect of Cultivar and Foliar Nutrients on Fire Blight Susceptibility in Apple. August 1996.

21:8--KENAF: A Guide for Production in Mississippi. October 1996.

21:9--Efficacy of Fungicides for Turfgrass Disease Control in Mississippi. December 1996.

### **MAFES researchers hope to get the red out of rice**

Red rice, a wild type of rice that produces grain with a reddish hue, is a major pest in rice fields because consumers assume it's trash when they see dark-colored grains in bags of rice at supermarkets.

MAFES Biochemist Dawn Luthé, Horticulturist Nancy Reichert, and postdoctoral assistant Sanchayita Kar are searching for ways to control red rice by modifying commercial rice with genetic engineering.

"Because red rice is the same genus and species as cultivated rice, it is impossible to control it with conventional herbicides, which may damage the commercial crop," explains Luthe.

The goal of the rice genetic engineering research at MSU is to introduce a Roundup resistance gene into commercial rice varieties. However, because red rice can sexually cross with commercial rice, it would take only a short period of time before populations of the weed would be resistant to the herbicide.

To overcome this problem, a modified Roundup resistance gene will be introduced into DNA contained in the chloroplasts of the plant. The trait cannot "escape" from commercial production fields via the wind because the Roundup resistance gene won't be present in the pollen.

"With scheduled applications of Roundup in production fields planted with Roundup resistance rice, any red rice growing in the production fields should either be killed or severely stunted," Luthe says.

The Mississippi Rice Promotion Board and MAFES provide funding for this research.

## **Buying interest strong at MSU production sale**

More than 150 buyers from throughout Mississippi and surrounding states registered for the 14th annual MSU/MAFES livestock production sale. The sale was held November 21 at the Leveck Animal Research Center's beef barn on MSU's South Farm.

There were 113 animals, including quarter horses, select heifers, bulls, bred heifers, and open heifers in the sale. The animals came from MAFES herds at MSU, Brown Loam Experiment Station, and the Prairie Research Unit.

There was strong demand for the horses at the sale, with an average sale price of \$937, up from \$816 at the 1995 sale. The average price for 2- to 3-year-old bulls was \$1,191, down from \$1,196 the previous year, but still a good price according to MAFES Animal Scientist Mike Boyd.

"The price received for bulls was fantastic, considering the overall weakness in the cattle market," Boyd says.

He adds that the reputation of animals from the MAFES herds generates a lot of buying interest at the annual sale.

"The livestock offered at the production sale each year are the type that should help any producer," explains Boyd. "Only the top animals from each participating branch station are chosen for this sale."

The production sale is planned and managed each year by students enrolled in the Department of Animal and Dairy Sciences' "Management of Livestock Sales" class. The students handle all the details of preparing for the sale. They also work the day of the sale grooming the animals, setting up the sale equipment, loading the animals, and handling the cleanup after the buyers have gone home.

"This course was developed to teach students the methods of setting up a sale and the costs and problems encountered in conducting a livestock auction," Boyd says. "They are responsible for almost every aspect of the production sale except the auctioning of the animals."

Animals at the 1996 sale brought a total of \$81,460, which will go back into MAFES livestock research programs.

## **New publications provide Mississippi soil information**

Anyone who has ever been in a Delta field following a rain can easily understand why the majority of the region's soil is often referred to as "gumbo." These clayey, sticky soils also are known as "buckshot," but their official classification is "Sharkey."

The Sharkey soil series, established by the Cooperative Soil Survey in Yazoo County in 1901, is one of the oldest soils recognized in the United States. Sharkey is the dominant soil in the Mississippi Delta, covering more than 3 million acres from the Gulf of Mexico northward to Kentucky. About 1 million of those acres are in 14 Mississippi counties.

Sharkey soils are typically dark gray to gray, with brownish, yellowish, or reddish mottles. These soils are currently classed as poorly drained with slow surface runoff and permeability. The Sharkey series also is designated as hydric, or having the water table at or near the surface.

"Farmers, developers, and others who work with the soil in the Delta have had a lot of questions in recent years about the designation of Sharkey soils as hydric," says MAFES Soil Scientist David Pettry. "Because of their classification as hydric, Sharkey soils are subject to the restrictions placed on areas designated as wetlands."

Pettry explains that the Sharkey soils in Mississippi were largely mapped and classified before modern classification methods were adopted as part of the Soil Taxonomy Soil Classification System in 1965. No field research had been conducted since 1965 to verify the classification of Sharkey soils.

Because of the indications that the Sharkey soils were misclassified, Pettry and Senior Research Assistant Richard Switzer conducted a study of the soils at four sites in Washington County between 1991 and 1995. Their findings are reported in the new MAFES bulletin *Sharkey Soils in Mississippi*. The National Council of the Paper Industry for Air and Stream Improvement provided support for the research project. The MAFES researchers also received assistance from the Soil Conservation Service.

The researchers excavated soil pits with hand shovels at each site. Soil characteristics examined included texture, structure, and mottling. Nondisturbed core samples also were taken for determination of bulk density, saturated hydraulic conductivity, and moisture retention.

In addition to the soil research, Mississippi State University Professor of Forestry John Hodges directed a vegetative survey of each of the research sites.

One of the major goals of the 4-year research project was to learn more about water table depths in the Delta.

"The hydrologic data collected during the study show the Sharkey soils at the research sites have average water-table depths below 100 inches," Pettry says. "Also, average soil moisture contents decreased with increased depth, and subsoils exhibited small seasonal variations."

The soil scientist adds that the information about water table depths and other data collected during the project indicate that the Sharkey soils should be reclassified.

"The research shows that the Sharkey soils have properties in common with Vertisols, which are soils that have a tendency to contract and expand, causing cracks up to 3 inches wide and 50 to 60 inches deep," Pettry explains. "Since the taxonomic classification affects soil interpretations for a variety of uses, the information provided by the study will be of immediate use to farmers, contractors, and others who work with soils."

The study's data are being provided to USDA's National Resources Conservation Service for use in reclassification of the Delta's Sharkey soils.

"The availability of detailed information about the characteristics and performance of the Delta's dominant soil type will help address the region's soil information needs for the 21st century," Pettry says.

Another new bulletin coauthored by Pettry, *Productivity in Mississippi Delta Prime Farmland Drastically Disturbed by Simulated Surface Mining*, focuses on row-crop production on reclaimed surface-mined land. The publication is based on a 3-year study by Pettry and former MAFES Research Associate C.W. Wood.

Mississippi has vast reserves of lignite, a low-grade coal. In fact, the state contains more than 20 percent of the estimated 22.5 billion short tons of strippable lignite in the Gulf Coastal Region of the United States.

A lignite mining project is under development in Choctaw County. The project will involve construction of an electric power generating plant by the Tennessee Valley Authority to use lignite surfaced mined in the area by Phillips Coal Company.

Talk of surface mining of coal normally raises concerns about reclamation of the land where soil is stripped away in the mining process. However, several decades of experience in other states has led to reclamation technology for soils that restores mined land to a state equal to or better than before mining.

The research by Pettry and Wood, who is currently an associate professor of agronomy at Auburn University, found that soybean yields on plots reclaimed from simulated surface mining were significantly higher than those on undisturbed test plots.

During the study, research plots were excavated with a dragline to a depth of 11.5 feet. They were then restored using five different methods. The restoration methods ranged from replacing top soil and subsoil layers in their original positions to refilling the plots with a random mix of soil. There was no significant soybean yield differences among the five soil-handling treatments.

The researchers attribute the increased yields on the reclaimed plots to increased

effective rooting depth and improved moisture retention resulting from the drastic soil disturbances.

## **Study finds family farm alive and well**

The nation's family farms were in trouble during the 1980's, with skyrocketing interest rates and inflation squeezing many family-owned operations out of business. However, a recent Mississippi State University study concludes that the family farm has made a comeback .

"There has been an expansion of corporate farming since the 1980's, but there also has been an apparent resurgence of the family farm in some areas," says Sociologist Frank Howell of MSU's Social Science Research Center.

Howell and Texas A&M University Rural Sociologist John K. Thomas examined Census of Agriculture data for more than 3,000 U.S. counties. Using nearly 20 variables from the U.S. Census of Agriculture, they compared data from 3 successive census years: 1982, 1987, and 1992. Their findings were recently published in the Journal of Rural Sociology.

"We wanted to track the transformation of U.S. agriculture from the early 1980's, when the Midwest first began to show signs of crisis," says Howell.

Their work builds on earlier studies that classified types of farms. Unlike the earlier studies, the research by Howell and Thomas looks at changes in a business context and identifies three types of predominant farming organizations:

- \* The small farm, generally seen as the heart of farming and characterized by small acreage and family ownership. This type of farm is often a full-time operation.
- \* The farming firm, which involves operators who often lease land and outsource planting and production.
- \* The corporate-commercial farm, prevalent in California and Florida and characterized by high gross farm sales, many hired workers, and its own research and development operation.

Howell and Thomas discovered that the crisis of the 1980's, often perceived as the death knell of the family farm, actually signaled a transition. The analysis showed that farming, like other industries, adjusted to meet market demands.

"The crisis in agriculture in the 1980's can be described as a business shakeout, where the most competitive survived," Howell explains. "All types of farming were affected by the economic crisis. Corporate farming was able to expand, but family-owned enterprises remained the dominant form of farming in some areas of the nation."

In fact, small farms that went out of business often were acquired by other family farm operations, some of which moved into the farming firm category. Often the small farms continued to be operated by their previous owners under lease agreements.

The study shows that more than one-half of counties that were characterized by small farming operations in 1982 were still in that category a decade later. Only a small number

of counties actually made a revolutionary shift to another type of farming.

"We found that by 1992, farmland that had been acquired by farming firms during the 1980s was being bought by individual farmers," Howell says. "In some cases these were people who had previously been small farmers, but in others, they were first-time farm operators."

The report by Howell and Thomas has drawn the attention of farm policy makers in Washington, who will be studying the report for indications of how the 1996 Farm Bill may affect rural America.

Howell and Thomas will be continuing their work together with a study to assess the impact of different types of farming on a community's well-being. They also will be studying the impact of agricultural enterprises in metropolitan areas.

"A lot of city residents don't realize just how much agricultural activity there is in and adjacent to metropolitan areas," says Howell. "An example here in Mississippi is the Madison/Rankin County area, which has many types of farming enterprises in the shadow of Jackson."

The recent study by Howell and Thomas was supported by a National Research Institute grant through MAFES and the Texas Agricultural Experiment Station at Texas A&M.

The study can be accessed on the World Wide Web at <http://www.ssrc.msstate.edu/publications.html>. Point the browser to "The Dimensions of U.S. Agristructure: Visualizing Trends in the Farming Nebula, 1982 to 1992."

## **Management systems for soil conservation and sustainable crop productivity**

G.B. Triplett, S.M. Dabney, S.R. Spurlock, and L.L. Reinschmiedt

Results from a cooperative study between MAFES and the National Sedimentation Laboratory in Oxford, MS, have been summarized. The research was located in the Brown Loam Land Resource Area on Grenada soil. The objectives of the experiments were to develop cropping systems that would sustain crop productivity, minimize soil loss, and be economically profitable. NT (no-tillage), as a means of minimizing erosion, was compared with CT (conventional tillage-chisel, disk, and cultivate). Crops included cotton (7 years), grain sorghum (5 years), corn (7 years), and wheat-soybean doublecrop (8 years).

Profitable crop production is a function of yield level, commodity prices, and cost of production. During the term of the study (1988-95), yields of summer planted crops varied with growing season rainfall, and, in the last 1 or 2 years of the study, the prices of various commodities increased by 20 to 30 percent while production costs remained relatively constant. Production costs included purchased inputs, labor, interest on investment, and machinery costs but excluded charges for land rent, management, and general farm overhead. Historic prices for commodities represent average prices received by Mississippi producers during a specified marketing year but do not include government program payments.

CT cotton lint yields averaged slightly more than 1 bale/A, with a range from 0.5 to 2.0. Returns above specified costs averaged \$54/A and varied from a negative \$145/A to a positive return of \$227/A at historic prices. NT lint yields averaged 1.5 bales/A and returned an average of \$87/A during this period. Yields were lowest during years with below average July-August rainfall.

CT grain sorghum yields averaged 71 bu/A and NT averaged 77 bu/A. At this yield level, average returns were \$8/A for CT and \$12/A for NT, barely higher than the break-even level and included years with negative returns. CT corn yields averaged 122 bu/A and NT averaged 125 bu/A, with returns at historic price levels greater than \$100/A for both tillage systems. There were no years with negative returns for corn. Corn planted in late March or early April is mature in late July and escapes late-season drought that often limits cotton and grain-sorghum yields. Also, corn harvested and marketed in August commands old crop prices, usually at a premium. In 1996, this was as much as \$1/bu.

Wheat-soybean doublecrop systems averaged 25 bu/A of soybeans and 39 to 44 bu/A of wheat. The value of both crops, less specified production costs, averaged from \$74 to \$103/A at historic prices, with the greater amount from a system rotated with corn or grain sorghum. Thus, doublecrop systems provided average returns nearly equal to those from corn, although there were some years with negative returns. Rotating the doublecrop system with corn is desirable both because of increased return and because of the opportunity to control problem weeds in different crops.

Production costs average \$386/A for CT and \$429/A for NT cotton. Differences reflect greater harvest costs for the higher yield and the cost of establishing a wheat cover crop in the NT system. Cotton production costs were almost twice as much as for other crops because of greater harvest costs and the cost of pesticides and their application. Costs for other crops included \$210/A for corn; \$165/A for grain sorghum; and \$210/A for wheat-soybean doublecrop. The difference in costs between corn and grain sorghum reflects higher nitrogen rates for corn and increased cost of herbicides. Corn is better suited to NT production because a greater number of herbicides are available to control problem weeds.

If August 1996 commodity prices are used to calculate returns, cotton increases by \$75/A for CT and \$90/A for NT. Average returns for corn systems are greater than \$200/A, as is wheat-soybean doublecrop. Grain sorghum returns are \$71/A for CT and \$82/A for NT. At 1996 commodity prices, cotton and grain sorghum still had years with negative returns because of low crop yields.

As Conservation Reserve Program (CRP) contracts mature, some upland areas could be used for NT crop production without creating an unacceptable erosion hazard. Corn and wheat-soybean doublecrop systems would be desirable choices because of the profit potential and the amount of residue produced for soil cover. Relative crop yields reported here should be applicable to similar soils. Results from similar studies on some clay soils have reported different, lower yield patterns.

(G.B. Triplett is a MAFES agronomist, S.M. Dabney is an agronomist with the National Sedimentation Laboratory, and S.R. Spurlock and L.L. Reinschmiedt are MAFES economists.)

## **Low-till systems with reduced surface disturbance for cotton in the Mississippi Delta**

G.R. Tupper, H.R. Hurst, M.W. Ebelhar, and F.T. Cooke, Jr.

The development of the low-till parabolic subsoiler has allowed soils to be subsoiled in the row direction with minimal surface disturbance. Three production systems are being compared: no-till; low-till parabolic subsoiler in the row direction followed by do-all and plant; and low-till parabolic subsoiler in the row direction, hipping, do-all, plant, and conventional tillage with cultivation.

This study was initiated at Stoneville in 1994 on a Bosket very fine sandy loam and Souva silt loam soil using the three production systems. In addition, three areas of interdisciplinary research were emphasized: weed control for the production systems; placement of nutrients with limits of n-till imposed on the production system; and the economic viability of new production systems with no-till or limited soil disturbance compared to a more conventional production system.

Initially, soil samples were taken from 0 to 6 inches and 6 to 15 inches deep. Soil test recommendations suggested 80 pounds K<sub>2</sub>O/A for the 0- to 6-inch soil sample and 120 pounds K<sub>2</sub>O/A for the 6- to 15-inch soil sample. Applications were increased by 25 percent for both samples (100 pounds K<sub>2</sub>O/A and 150 pounds K<sub>2</sub>O/A) and applied as single and combination treatments. The surface 100 pound K<sub>2</sub>O/A treatment was broadcast applied and the deep 150 pound K<sub>2</sub>O/A treatment was deep banded 6 to 15 inches deep in the drill row with a continuous band 9 inches tall and 2 inches wide. All no-till potash treatments were surface broadcast. Deep banded potash with subsoiling produced somewhat higher yields than no-till with surface broadcast potash as shown in the graph.

Special research initiative funds in the area of water quality partially funded this study. A complete analysis and publication of the research data will be produced.

G.R. Tupper is a MAFES agricultural engineer, H.R. Hurst is a MAFES plant physiologist, M.W. Ebelhar is a MAFES agronomist, and F. T. Cooke, Jr. is a MAFES economist.

### **Watson named MAFES director**

Mississippi State - Mississippi State University has named Vance H. Watson Director of the Mississippi Agricultural and Forestry Experiment Station (MAFES).

Watson replaces Verner G. Hurt, who retired June 30 following a MAFES career that began in 1956. Hurt served as Director from 1987 until his retirement.

"We are fortunate to have a man of Dr. Watson's experience and commitment to MSU and to Mississippi in this leadership role," says R. Rodney Foil, vice president of the MSU Division of Agriculture, Forestry and Veterinary Medicine. "Dr. Watson's past success as a researcher, educator and administrator shows he has the dedication and skills necessary to guide Mississippi's agricultural research programs."

Watson, 54, is a native of Missouri. He earned the B.S. degree in general agriculture from

Southeast Missouri State University in 1964 and the M.S. degree in agronomy from the University of Missouri in 1966. He received an appointment as an assistant agronomist with MAFES in 1966 and earned the Ph.D. degree at MSU in 1969. He became an assistant professor of agronomy in 1969 and was promoted to associate professor in 1971 and to professor in 1977.

Watson's career as an administrator began in 1982, when he became assistant to the MAFES director for coordination of forage programs. In 1987, he was honored as First Mississippi Corporation's Outstanding MAFES Worker. That award recognized his accomplishments in forage research. Also in 1987, he assumed the duties of head of the MAFES Auxiliary Units. In that capacity, he provided leadership for Foundation Seed Stocks and Variety Evaluations, as well as continuing to serve as coordinator of forage programs.

In 1990, he was appointed head of the MAFES Main Station at MSU. In that position, he had administrative responsibility for the Animal Research Centers, Plant Science Research Center, MAFES Services, Foundation Seed and Variety Testing. Those units provide MAFES researchers with the land, equipment and maintenance needed to conduct their work.

In 1992, he became head of MAFES Research Support Units and was appointed executive vice president of the Association of Official Seed Certifying Agencies. He assumed additional administrative duties with his appointment.

Watson and his wife, Jo Ann, have a daughter, Heather Anne, and two sons, John Andrew and Joseph Shawn.

In his new post, Watson heads an extensive organization founded in 1888 as the agricultural research arm of Mississippi's land-grant university. Today, more than 250 scientists and more than 600 supporting workers in 15 separate disciplines conduct research at MSU and at four research and extension centers and their associated branch experiment stations throughout the state.

"The agricultural sector is faced with more opportunities and challenges than at any other time in history," Watson says. "My goal for MAFES is to meet those challenges with strong science and with technology development research programs that place Mississippi farmers at a competitive advantage in the global economy, while remaining sensitive to environmental and food-safety concerns."

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