from the DIRECTOR

Agriculture has played a large role in our state's economy and has provided our farmers a good livelihood. Small wonder then that Mississippi farmers were using farming practices designed to leave minimal impact on the environment long before the term "sustainable agriculture" was coined.

Being good stewards of our environment has never been more critical. A recent study conducted by the United Nations Population Fund has shown that humans as a race are fast using up the Earth's natural resources. This study suggests our world will be unable to support us in future years unless a balance between human and environmental needs is reached.

According to the report, *The State of World Population 2001,* "to accommodate the nearly 8 billion people expected on Earth by 2025 and improve their diets, the world will have to double food production and improve distribution. Most production will have to come from higher yields rather than new cultivation."

This report reaffirms the basic philosophy that has guided MAFES research programs: to conduct sound science that enhances food production efficiency and provides good stewardship to the natural resources entrusted to us. As part of our research efforts, we have turned to agricultural biotechnology to reduce the use of pesticides and improve the health, yield and quality of our crops and livestock.

At the same time, we at MAFES recognize that putting more pressure on our land to produce higher yields may disturb an already fragile ecological balance. Consequently, Experiment Station scientists are also working with Mississippi producers to find the next generation of best management practices for our environment.

We have directed research designed to manage, reuse and recycle waste products of food production. Waste management is an issue that has been the center of much public debate, both here in Mississippi and elsewhere in our nation. To address public concerns and to help farmers continue to meet consumer demand, we're working with environmentalists, government representatives and livestock producers to meet this challenge.

Because water quality is essential not only for agriculture, but for our very survival, MAFES researchers are identifying strategies to limit pesticide, fertilizer, nutrient and sediment runoff. Some of these strategies include the use of site-specific management practices, or precision farming, that ensure proper rates of fertilizer and herbicide application.

We're also working to reduce the effect of human activities on water supplies. At the Coastal Research and Extension Center, water quality projects focus on the impact of nonpoint sources of pollution — including effluent from failing septic systems and untreated storm water runoff — and methods to control them. Mississippi's Gulf Coast continues to grow, raising some concerns about adverse consequences for coastal wetland areas. CREC scientists are learning more about these wetlands to protect these sensitive environments.

We invite you in this issue of *Highlights* to find out more about the environmental research conducted at the Experiment Station. While it provides a description of only a small number of environmental projects that MAFES scientists are involved in, we think you'll see that they reflect our commitment to preserving our environment, while ensuring food security.

Vance H. Watson

Vance H. Watson
Director

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MAFES RESEARCH HIGHlights

MISSISSIPPI AGRICULTURAL AND FORESTRY EXPERIMENT STATION

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Jim Lytle

Water from an adjacent catfish pond flows into the sawdroponics system.

center's rese Promotes Better

By Charmain Tan Courcelle

For almost 15 years, the Coastal Research and Extension Center (CREC) has served residents of Mississippi's Gulf Coast through research and education programs in the areas of aquaculture, the environment, marine resource management, natural resource economics and horticulture.

CREC's research has helped coastal residents improve their quality of life by building the knowledge base necessary to ensure a balance between resource conservation and economic growth. In addition to their research activities, CREC personnel have also been involved in a number of outreach programs that bring research information to the public.

Following is a description of some of the research programs at the CREC.

PONDS MAY YIELD MORE THAN CATFISH

Jim Lytle

MSU Extension specialist Mark LaSalle, right, and research assistant Christine Walters examine Chinese water spinach grown by hydroponics.

CREC researchers are developing effluent discharge options for the catfish and horticulture industries.

Environmental standards for pond effluents and horticultural runoffs have not been passed yet, but the Environmental Protection Agency has actively considered a national set of regulations to limit the release of nutrients from these operations for several years. MSU Extension specialist Mark LaSalle, MAFES scientist Cecil Pounders, MAFES economist Ben Posadas and research assistant Christine Walters are looking for ways to help catfish and horticultural growers meet more stringent effluent regulations in the future.

The team is evaluating the use of hydroponic and "sawdroponic" systems as potential pond effluent treatment methods. In hydroponic systems, plants are grown in a bath or flow of nutrient-rich solution. Sawdroponics is a variation of hydroponics that uses sawdust as a soil-free planting medium. In both systems, plants take up available nutrients from the solution for growth.

LaSalle said plants growing in hydroponic and sawdroponic systems could remove excess nutrients found in pond effluents. The treated effluent could then be discharged into the environment or recirculated into the pond production system.

"We think linking the catfish and horticulture industries through hydroponics or sawdroponics will help minimize the environmental impacts from both types of operations," LaSalle said. "Effluent released from ponds could serve as a water and nutrient source for horticultural plants, while the catfish ponds receive water that has been 'cleaned up' to ensure good water quality."

LaSalle and Posadas had previously assessed the use of constructed wetlands to treat pond effluent. The constructed wetlands significantly improved water quality, but they also required higher investments and led to higher operating costs for catfish production, Posadas said.

"We found that constructed wetlands cost an extra 7 cents per pound of catfish harvested. This included the cost of constructing and maintaining the wetland," Posadas said. "But there's also a cost from not being able to grow catfish on this productive land."

The group hopes hydroponic or sawdroponic production of a food or landscape crop will offset effluent treatment costs and generate extra revenue for the catfish grower.

earch
Use of coastal resources

LaSalle said adding crop production to a catfish operation requires additional labor, but a catfish grower might be able to partner with a truck farmer to produce food crops for local markets.

In the hydroponic system, LaSalle and colleagues have tried growing tomatoes, beans, Chinese water spinach and lettuce. They are trying to grow rooted plants, including daylilies and mondo grass (*Ophiopogon japonicus*), in the sawdroponic system, which supports root propagation. The team will evaluate which plants grow best under each system and determine best management practices.

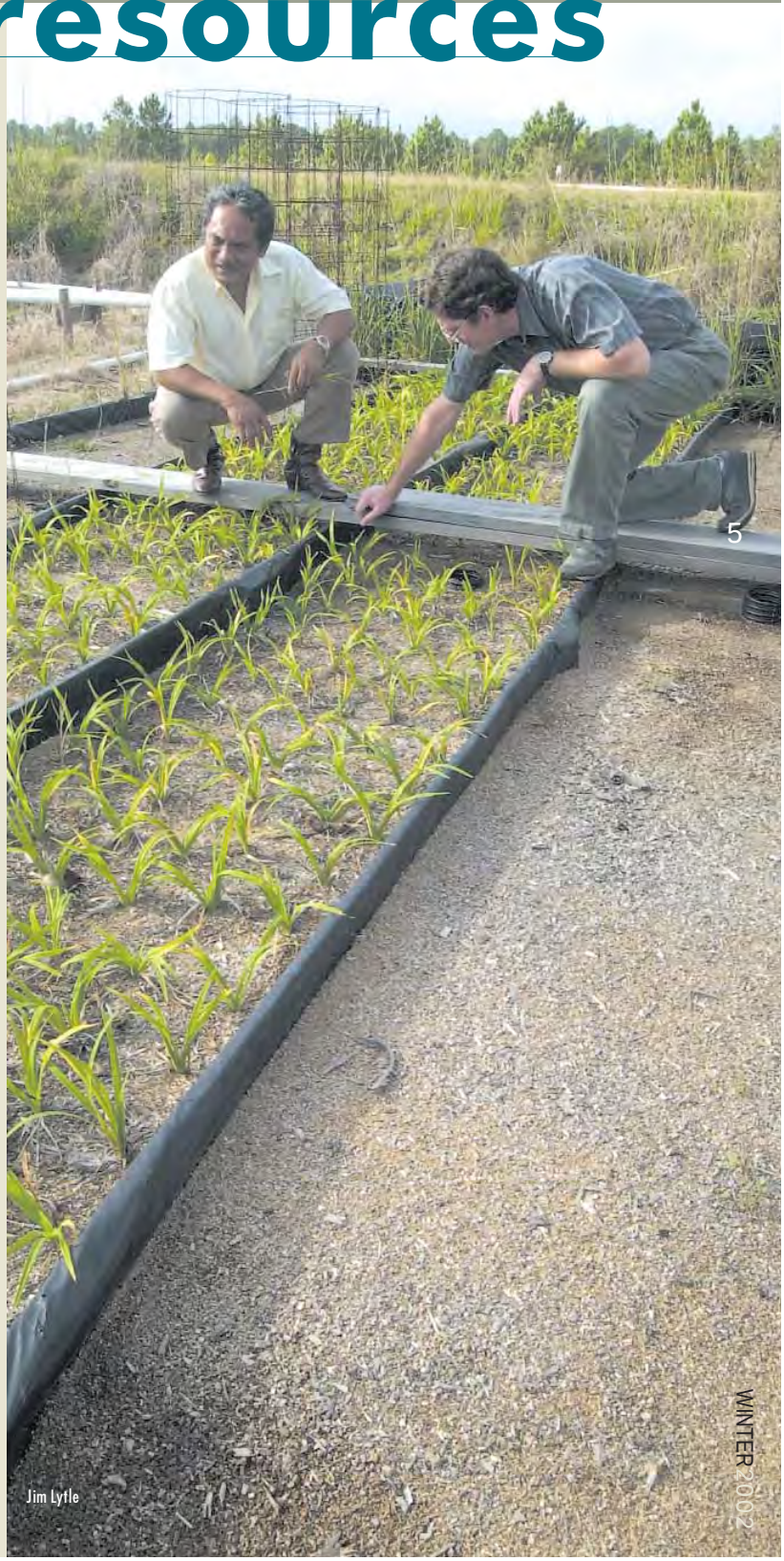
"We've already seen that we have to redesign the sawdroponic system," LaSalle said. "The sawdust we used was too fine, and it prevented water from flowing through. We'll try a coarser bark material underneath the sawdust layer next to see if that works better."

The group is also determining what size hydroponic system is required for effluent treatment. LaSalle and Posadas' results from their constructed wetland study suggested an area equal to 25 percent of catfish pond size was required for the greatest improvements in water quality.

"It might be less for hydroponic-based systems," LaSalle said.

To answer this question, the team will collect water entering the sawdroponic setup and water that has passed one-third, two-thirds and all of the way through the plant production system for water quality analysis.

"We're hopeful that these systems will act as a type of filter for aquaculture effluents that will improve water quality in ponds and simultaneously reduce fertilizer and pesticide runoff from horticulture," LaSalle said.



LaSalle, right, and MAFES economist Ben Posadas assess the growth of daylilies in a sawdroponic system.

Jim Lytle

PARTNERSHIP WITH INDUSTRY BENEFITS ENVIRONMENT

Rock rubble shores up a failed tire breakwater adjacent to Chevron's Pascagoula Refinery outfall canal in 1996.

Scientists, industry and government representatives have worked together for the last three decades to undo past environmental damage and to limit future harm to our natural resources. One such partnership between CREC researchers and industry has resulted in environmental gains for a wetland habitat along the Mississippi Sound.

LaSalle and MAFES environmental scientist Cathy Hollomon worked with Chevron to redesign a breakwater adjacent to the company's Pascagoula Refinery outfall canal. The new breakwater has helped protect the area's shoreline and allowed reestablishment of a marsh ecosystem.

Between 10 and 12 million gallons of water are used every day to drive the oil-refining process. Wastewater from oil refining is treated to remove nutrients and metals, and then discharged into the environment.

Before 1993, water from Chevron's Pascagoula Refinery traveled out from its 1.2-mile outfall canal and mixed with water in the Mississippi Sound. However, new water "mixing zone" standards passed in 1993 required the company to install a weir (dam) across the mouth of its outfall canal to control water flow into the Sound. Chevron was also asked to protect a patch of eroding marsh located at the mouth of the canal through the construction of a breakwater adjacent to this site.

"The idea was that the breakwater would protect the shoreline from the action of waves and allow recovery of vegetation," LaSalle explained. "The quiet area of water behind the breakwater would also promote the accumulation of sediment and lead to the development of marsh."

The first breakwater was built by Chevron in 1994 out of tires. However, the effort met with minimal success.

"There was just too much energy from the wind and waves to keep the tire breakwater intact, and within six months, it failed," LaSalle said.

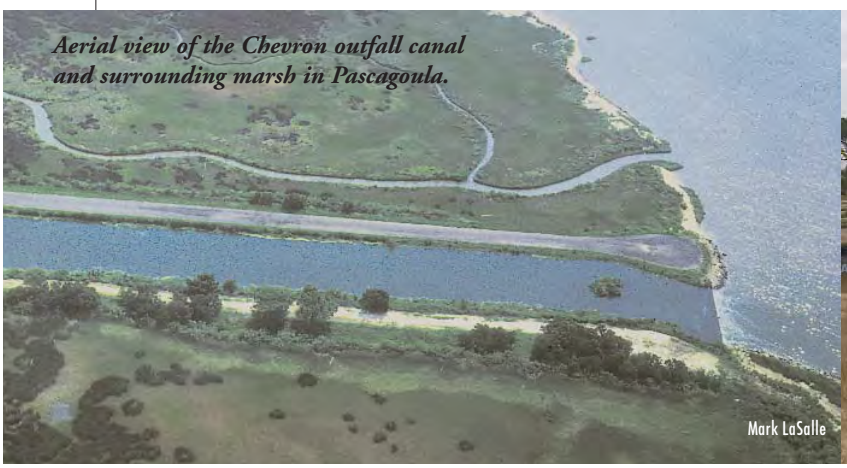
Despite repair attempts, the shoreline that was to be protected by the tire breakwater continued to erode and the sediment that had accumulated was lost, he said.

LaSalle and Hollomon, who were monitoring vegetation, wildlife and sediment accumulation behind the tire breakwater for Chevron at the time, discussed alternate strategies for redesigning and repairing the breakwater with company representatives. Together, they decided to use rock rubble to repair the tire breakwater.

"Sediment started coming into the area as fast as the breakwater was fixed," LaSalle said. "We found that plants started to move out onto the newly deposited sediments and naturally colonized the area. The fish community also expanded with marsh development, and we saw fauna typical of marshes."

LaSalle and Hollomon's research and monitoring project with Chevron was completed in 1999. LaSalle said the marsh restoration has been a success.

"The breakwater and marsh even survived Hurricane Georges, which passed through the area in September 1998," he added.



Aerial view of the Chevron outfall canal and surrounding marsh in Pascagoula.

Mark LaSalle

LaSalle discusses environmental studies at the Chevron site with a group of high school students.

Jim Lyfle

Jim Lytle

Marine resources specialist Dave Burrage installs a bycatch reduction device into a shrimp net.

Jim Lytle

Shrimp boats dock following a night's fishing.

BRDS REDUCE FISH BYCATCH

Any visitor to Mississippi's Gulf Coast can attest to the quality of its seafood. Scientists at the CREC are involved in projects to ensure the continued availability of this food crop and the sustainability of the seafood industry in Mississippi. One such effort is led by marine resources specialist Dave Burrage, who is studying the inshore shrimp industry.

Approximately 10 million pounds of shrimp (heads-on weight) are caught by Mississippi fishermen every year. Burrage said this number does not include shrimp landed by smaller, inshore or nonresident commercial boats, which are not required to document their catch.

"It's common for a lot of inshore shrimp fishermen to go out every evening and then sell the night's catch from the back of the boat the next morning," Burrage said. "A lot of shrimp are bought and sold in this way, and the numbers can really add up."

For the past two years, Burrage has worked with the owners of 10 shrimp vessels to determine the size of the inshore shrimp industry. The fishermen keep track of the dates they depart and catch shrimp, the length of time they fished, where they caught shrimp and how many pounds of shrimp they caught.

"Shrimp don't grow at the same rate at the same location for the same amount of time," Burrage said. "If we're to manage shrimp fisheries properly, we have to know what we're working with."

Burrage said the work should help determine the impact of the inshore shrimp fishing industry on shrimp stocks and ensure the long-term viability of shrimp fisheries.

As part of this effort, Burrage is also assessing harvesting gear used by the inshore shrimp fleet. He is determining the amount and type of bycatch (nontarget fish species) that is brought in and evaluating the ability of bycatch reduction devices (BRDs) to limit the harvest of these fish.

"Inshore shrimp fishermen have not been required to use BRDs, but the issue of bycatch has gained prominence," Burrage said. "In the offshore shrimp industry, the accidental catch of juvenile red snapper, which are in poor shape numbers-wise, has driven the mandatory use of BRDs. Red snapper is not a problem for the inshore industry, but a lot of other fish are brought in with the shrimp haul, most of which are returned to the water dead.

"Consequently, state and federal fishery management agencies may mandate the use of BRDs for inshore shrimp fishermen in the near future."

BRDs are installed 8 1/2 to 12 feet from a net's tie-off rings. Burrage said location within a net is critical because of the potential for BRDs to lose shrimp catch.

"Where a BRD is in a net also determines whether it will be effective at 'getting rid' of nontarget fish," he added.

Burrage has found that installing a BRD 8 1/2 feet from the tie rings of a net reduces fish bycatch by 50 percent with no effect on the amount of shrimp harvested. Still, Burrage said he would urge state and federal management agencies to recommend but not require the use of BRDs for inshore shrimp fishermen.

"The majority of bycatch is composed of short-lived species that are not in danger of being overfished," he said. "Also, a lot of savvy fishermen are already using these devices voluntarily because it reduces the amount of time they have to spend separating shrimp from the catch and improves the quality of their shrimp. Making BRD use mandatory would require resources to be allocated for technology transfer."

Burrage received support for this project from the Mississippi Department of Marine Resources.

Jim Lytle

Closeup of a bycatch reduction device.

BULLISH FOR BAITFISH

Aquaculture systems, such as the one pictured here, are being evaluated for bull minnow production.

A new project at the Coastal Aquaculture Unit of the CREC may keep Mississippi saltwater anglers in fish year-round.

Posadas and LaSalle have initiated a study to develop an economically viable baitfish production system that will provide a year-round supply of live bait to the state's saltwater recreational fishing industry.

Mississippi's sportfishing industry makes a large economic contribution to the state every year. In 1996, the most recent year for which figures are available, the industry had an economic impact of more than $293 million and generated close to 4,000 jobs. Posadas said driving this economic output was retail sales of more than $155 million.

In spite of its popularity, the sport has not grown to be a year-round activity due to the lack of a dependable source of live bait. Most of the live bait purchased by recreational fishermen is caught in the wild.

"From Louisiana to Florida, the supply of live bait is nonexistent in winter," Posadas said. "So even though there is a demand, there are not enough baitfish to go around."

Christine Walters

Posadas said he and his colleagues hope to change that. He, LaSalle, Walters and research assistant Mark Peterman are designing a tank-pond production system for bull minnows, or Gulf killifish, which are popular as live bait. They are determining the factors that influence the survival, growth and yield of these fish and assessing the costs of production.

This year, the group has evaluated one-pond and two-pond production systems. In a one-pond system, the fish population is expanded from brood fish that are stocked at a 2-1 ratio of females to males. Hatching and grow-out phases of production all occur in the same pond.

In a two-pond system, brood fish are stocked as for the one-pond system, but spawning mats are installed along four sides of the pond. The mats attract females to lay their eggs on them. After a week, the mats are removed and placed in a second pond which serves as a hatchery and grow-out facility.

The team used brood stocking densities of 10,000, 20,000 and 40,000 fish per acre.

"After a 12-week period this year, we managed to harvest bull minnows that were 2 1/2 inches long and weighed 3 grams each. We aim to get our baitfish up to 5 or 6 grams per fish, which is what retail bait dealers sell," Posadas said.

To get their numbers up and to optimize their growth conditions, the team will try a three-pond system next. They will also determine optimal brood stocking density.

"We're hoping to figure out the optimal brood stocking density for optimal fry production," Posadas said. "Right now, we don't know how many fry we obtained from the spawning mats. Not all the eggs laid by a female are deposited on the mats.

"By including a third pond, or tank hatchery, for fry development, we will be able to more accurately determine how many fish to stock."

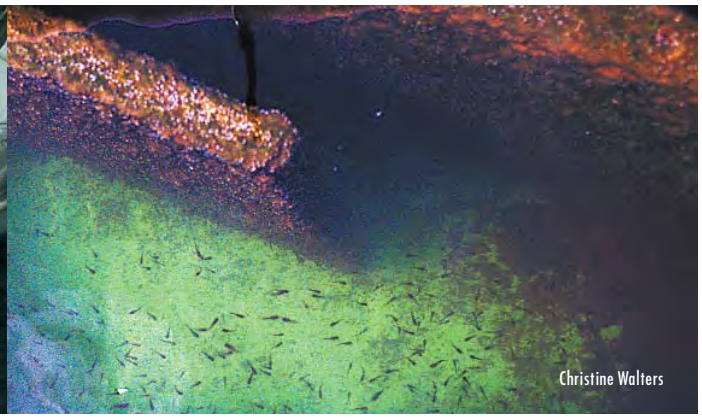
The group has found water temperature to be a critical factor affecting spawning and hatching.

"There is an upper limit of temperature that strains spawning and hatching success," Posadas said. "We found temperatures from 24 to 28 degrees (Celsius) give optimal spawning and hatching."

When the bull minnow production system is optimized, it should be capable of providing a year-round supply of live bait, which could give farmers a new aquaculture product to grow as well, Posadas said.

The bull minnow is a popular live-bait choice for recreational fishermen.

A tank hatchery is used for fry development.



Tunnel exhaust fans pull cool air through an enclosed dairy facility.

Angelica Chapa

Researchers Focus on air quality in Dairy Cattle Housing

By Charmain Tan Courcelle

MAFES researchers have initiated a new study to examine the effect of air quality on the health, performance and productivity of dairy cows.

Angelica Chapa, MAFES dairy scientist and MSU Extension dairy specialist, said enclosed free-stall barns with tunnel ventilation may help keep cows cool in Mississippi's hot and humid weather, but little is known about the effect of air quality on the performance of dairy cows in confined housing.

Gases, dust, odors and microbes can lower air quality within improperly ventilated, enclosed animal quarters. During the winter, the level of these air contaminants can increase as houses are further secured for heat conservation.

Chapa said previous research in the swine and poultry industries has shown gases, such as ammonia, and dust particles in the air can adversely affect the health of both the animals that are housed in enclosed facilities and the humans who work in these buildings.

"Exposure to ammonia and dust has been shown to increase the risk of respiratory diseases, including pneumonia, in pigs and chickens and to decrease animal productivity," Chapa said. "We want to know how environmental ammonia and dust affect dairy cow performance."

Ammonia is produced when nitrogen compounds in the urine and feces of livestock come in contact with air. Dust sources include both the housed animals and their feed. In free-stall barns, which are opened on all sides, circulation of fresh air prevents buildup of ammonia and dust. However, even with fans and sprinklers installed, dairy cows housed in free-stall barns in the South often suffer from heat stress because of hot and humid conditions. When cows experience prolonged periods of heat stress, they produce significantly lower quantities of milk.

Chapa will determine whether enclosed housing facilities with tunnel ventilation provide an economically practical alternative to traditional housing that ensures peak animal performance and productivity. She and her colleagues are establishing environmental and waste management practices to provide optimum cow comfort and performance within tunnel-ventilated dairy facilities.

In a tunnel ventilation system, air is cooled over cooling cells as it is pulled through the facility by fans. The system allows continuous air exchange, resulting in a cooler environment. Chapa said tunnel ventilation systems are used extensively in the swine and poultry industries, where they have been effective in cooling livestock and improving air quality. She said the benefit to dairy cattle is unclear because the confinement period for cows could be longer depending on the length of the lactation.

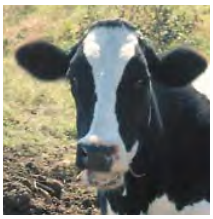
To answer this question, Chapa and other investigators will work with Holstein cows housed in the MAFES North Mississippi Dairy Housing and Environmental Quality Research Facility in Holly Springs. In this enclosed, tunnel-ventilated facility, they will monitor the effect of changing environmental ammonia levels on dairy cow physiology.

"Elevated levels of ammonia (in blood) can affect the metabolism of glucose, which is required for growth and milk production," Chapa said. "We'd like to see how naturally occurring environmental ammonia concentrations influence ammonia levels in plasma — the fluid component of blood — and animal productivity."

Blood samples from dairy cows housed in the tunnel-ventilated facility or in conventional free-stall barns will be collected to assess the overall health of the animals. This information will be compared with environmental data — temperature, humidity, ammonia, dust and odor levels — from the two types of housing to determine the impact of air quality on cow health.

Chapa and her colleagues will also evaluate seasonal effects on air quality and milk production and quality. As part of this work, they will determine whether additional management steps are required for a tunnel-ventilated dairy facility and whether it will be cost-effective.

"Cows housed in a tunnel-ventilated dairy facility have to perform at a level that justifies the economic investment," Chapa said.



MAFES Assesses metal contami*in*

By Charmain Tan Courcelle

A study of the practice of land application of poultry litter suggests copper and zinc may accumulate in amended soils using current nutrient management strategies.

Billy Kingery, MAFES soil scientist, has completed a study to determine the effect of long-term application of poultry litter on the amount and distribution of these metals in soil.

Metals, such as copper and zinc, and the metalloid arsenic, are added to poultry feed in trace amounts as part of a diet designed to optimize bird growth and performance. Because these compounds are excreted in poultry waste, there have been concerns that long-term land application of poultry litter could lead to metal contamination of surface and groundwater supplies through runoff and leaching, Kingery said.

"Copper and zinc can accumulate in the food chain and are potentially toxic to organisms at high levels," Kingery said. "We began this work because the potential for copper and zinc to accumulate at high levels in soils amended with poultry litter over long periods warranted study."

To determine the effect of litter application on the accumulation and mobility of metals in soil, Kingery and postdoctoral researcher Feng Xiang Han compared soil samples from a pasture that had been amended with poultry litter for 25 years with that from an adjacent, nonamended forest soil. They worked with the help of a poultry producer in Neshoba County, who owns the land surveyed in this study.

The team collected soil from 130 sites in the pasture and forest. Soil samples were analyzed for concentrations of copper and zinc, as well as nickel, chromium, lead and manganese — metals that also cause environmental and health problems at high levels.

"We found that metals do accumulate in waste-amended soil over time," Kingery said. "But even with recent heavy applications of litter on this farm, the total concentration of these elements was still below limits set by the Environmental Protection Agency."

Kingery said these results were encouraging, but total metal concentrations only provide one piece of the puzzle.

Soil samples collected from different depths provide information about metal availability to plants.

"To fully understand metal behavior in soil, you need to know where metals partition to — are they in the organic or inorganic components? Are they available to plants? Or, are they bound strongly to soil particles?" Kingery explained.

Kingery's team collected soil samples at different depths up to 180 centimeters (72 inches) to determine the location and levels of metals in the profiles of litter-amended soils. They also passed the soil samples through a series of chemical assays to evaluate metal mobility into the environment and availability to plants.

"Copper and zinc accumulated in fractions of amended soil that indicate they may be available for plant uptake," Kingery said. "We also found that copper and zinc move to more strongly bound fractions in amended soils over time, so that they are less able to move into the environment.

"Our results so far suggest that current recommended nutrient management practices allow safe management of metals. No extra lengths seem to be required," Kingery added.

But different soil characteristics and climate, can have an effect on metal accumulation. Consequently, Kingery has begun a collaboration with Agricultural Research Service scientist Karamat Sistani and the Natural Resources Conservation Service to examine metal accumulation following long-term litter application on farms located in other counties.

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Amended Soils

Postdoctoral research assistant Feng Xiang Han performs chemical extractions on soil samples from an amended pasture.

"Soil components can affect metal availability to plants and mobility in the environment. Some components, like chelators, make metals more available to an organism; others bind metals strongly and prevent metal absorption," Kingery said.

Kingery is also working with National Sedimentation Laboratory scientists to evaluate metal mobility in different agronomic systems that use poultry litter.

"We're looking at the actual runoff from plots planted with different row crops," he said. "Management can have a strong influence on what happens to metals. These studies will give us an idea of the economics and sustainability of litter application using different management practices."

Kingery's research is funded by the MAFES Special Research Initiative program. In addition, this project has received backing from the Mississippi Poultry Association and the Mississippi Farm Bureau.

Nutrient Management Meetings Bring Research to Educators and Stakeholders

By Charmain Tan Courcelle

A group of district conservationists, extension specialists and county agents tour experimental field plots during an in-service nutrient management training session in Newton.

The question of what to do with the byproducts from poultry production has brought together a team of researchers, educators, producers and government and industry personnel. The group met at the Coastal Plain Branch in Newton to discuss research results and to identify future research and extension priorities.

Poultry litter — a mixture of bedding material and poultry manure — is a rich source of nutrients. In the 34 Mississippi poultry-producing counties, poultry litter is commonly used as a fertilizer for hayfields and pastures. Unfortunately, as more land in these counties has been taken out of forage production, the amount of litter resulting from poultry production has become an issue.

Scientists affiliated with MAFES and the U.S. Department of Agriculture's Agricultural Research Service (ARS) are working together to find new uses for poultry litter; to evaluate the economics of poultry litter use; and to determine the impact of different management practices on water quality, nutrient runoff potential and fertilizer value. They presented preliminary results from these studies to district conservationists, extension specialists and county agents at an in-service session on Sept. 5 and to producers and industry stakeholders at a separate producer advisory council meeting on Sept. 6.

The Southwest Mississippi Resource Conservation and Development Council, Inc., has assisted in providing funding for the research and extension efforts at Mississippi State University. Other cooperating agencies include the MSU Extension Service, the U.S. Department of Agriculture's Natural Resources Conservation Service (NRCS), Mississippi Farm Bureau and the Mississippi Soil and Water Conservation Commission.

Larry Oldham, MSU Extension nutrient management specialist, has led the team effort to reach a better understanding of the factors affecting litter quality and use. The team's other main objective is to devise producer- and environment-friendly regulatory standards based on research information. Oldham and his team implemented the Newton meetings.

"These meetings represent our total program approach of research and educational outreach," said Butch Withers, head of the Central Mississippi Research and Extension Center. "The technology transfer meeting gave us an opportunity to provide personnel at regulatory agencies and our extension staff at the state and county levels the kind of technical updates they need to help producers, and to make them aware of new management practices that can help with developing nutrient management plans.

"At our advisory council meeting, producers helped us identify what kind of topics need to still be addressed from the research, educational and regulatory standpoints."

Representatives from NRCS, who develop nutrient management plans, were also present at the meetings.

"This research group is providing local, state-specific information about water quality and phosphorus levels that will be included in NRCS standards as part of poultry nutrient management plans," said Kim Harris, NRCS state engineer. "NRCS wants to balance agribusiness with the environment by allowing poultry producers to continue to produce birds in an environmentally sound way."

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"At our advisory council meeting, producers helped us identify what kind of topics need to still be addressed from the research, educational and regulatory standpoints."

Representatives from NRCS, who develop nutrient management plans, were also present at the meetings.

"This research group is providing local, state-specific information about water quality and phosphorus levels that will be included in NRCS standards as part of poultry nutrient management plans," said Kim Harris, NRCS state engineer. "NRCS wants to balance agribusiness with the environment by allowing poultry producers to continue to produce birds in an environmentally sound way."

Evaluating The economics *of Litter Use*

MAFES agricultural economist Diane Hite, left, and graduate research assistant Ashley Renck discuss results from a poultry litter market analysis.

By Charmain Tan Courcelle

MAFES researchers are evaluating the environmental and economic impacts of land application of poultry litter as part of an ongoing effort to support the poultry industry.

A team led by Diane Hite, MAFES agricultural economist, has developed several economic models that will aid the search for an environmentally sound and economically practicable solution to litter disposal. The work complements research projects underway at the Coastal Plain Branch Experiment Station in Newton.

Most litter from Mississippi broiler farms is used on-site as a fertilizer or soil amendment in hayfields and pastures. However, the soil storage capacity for nutrients can become exhausted with continued large applications of poultry litter, leading to potential environmental problems from runoff events.

"Runoff from overapplication of phosphorus — one nutrient found in poultry litter — has long been recognized to have a major environmental impact on waterways," Hite said.

"When litter is overapplied to one site, not only is there an environmental cost, but the value of this fertilizer is lost as well. We're trying to create a market for poultry litter that will allow this byproduct to be taken away from a point where it has negative value and used at another point where it has value."

One analysis that Hite's group has performed is based on a simulation program that incorporates local physical data — including soil types, meteorological conditions and topography — and fertilizer and tillage practice information. Research assistant Tasha Maupin and postdoctoral research assistant Walaiporn Intarapapong are using this biophysical modeling program to predict the amount of nutrient, fertilizer, sediment and pesticide runoff under various cropping and management systems over a 25-year period.

"There is only about two years of physical data from agronomy studies with poultry litter at the Newton branch station, so we don't have a good understanding of the effect of different cropping practices on nutrient runoff over time," Hite said. "The simulations give us an idea of this long-term effect and allow us to take into account different crops, various application rates of litter and other inputs to establish the best and most profitable combinations of litter, fertilizer and cropping practices."

Hite said the simulation results are compared with field data collected from the Newton research plots to ensure the accuracy of this model. The modeling program is then calibrated accordingly.

Litter application rates can be calculated on a nitrogen or a phosphorus basis. Maupin and graduate research assistant Ashley Renck have compared the land use requirements and associated costs for each of these standards.

"We found with a nitrogen standard that much more phosphorus is applied than can be used by crops, so there is a cost from potential damage to the environment from runoff," Renck said. "With a phosphorus standard, which allows litter to be applied 'safely,' at least twice as much land is needed for litter application as with a nitrogen standard."

Maupin and Renck's results suggest there is not enough land in poultry-producing Mississippi counties to sustain indefinitely the practice of litter application on poultry farms. And keeping litter in its "source

county" could cost poultry producers an average of $21 or $23 per ton of litter in labor, equipment and land expenditures based on a nitrogen or a phosphorus standard, respectively.

Because proper utilization of litter within Mississippi poultry-producing counties is limited by land availability, finding uses for litter outside these areas is regarded as one solution to this situation. To determine whether this approach will be economically feasible, Renck has examined the value and demand for poultry litter as a fertilizer at sites outside of the poultry-producing counties and the least cost for transporting litter from its source to these markets. She has also developed a goal-programming model that has allowed environmental goals to be included in her market analyses.

"The goal-programming model was set up to consider two diametrically opposed options — to get rid of litter safely and to do this as cheaply as possible," Renck said.

Renck established the value of litter in counties outside of the poultry production area from the value of litter nutrients (nitrogen, phosphorus and potassium), crop acreage, the types of crops grown and farm structure, or size, in these counties. She then determined the minimum cost for adopting this practice based on county-to-county distances, transportation cost per mile, transportation cost per ton of litter and litter application costs.

Results from this model suggest that the average value of litter in off-site counties is $34.40 or $35.76 per ton of litter using a nitrogen or a phosphorus standard, respectively.

"This suggests that a grower could realize a net gain of $13.40 or $12.76 per ton of litter (the difference between value of litter off-site and cost to keep litter) on a nitrogen or a phosphorus basis, respectively, by transporting litter to distant counties," Renck said.

In another study, Hite's group is assessing consumer willingness to pay more for "eco-labeled poultry products."

"An eco-label is a seal of environmental approval awarded by public or private organizations," Hite explained. In this study, the eco-labeled product would be poultry from a farm that uses additional environmental standards which are more stringent than currently required to utilize and dispose of litter.

Hite said poultry producers will incur costs for litter disposal as government regulatory policies for poultry and livestock production change to address potential environmental problems associated with these industries. By Hite's calculations, the cost of this regulation would be about 3 cents per pound of chicken. Renck has designed a survey to determine whether a green marketing approach using eco-labels could help producers cover this extra regulatory cost.

"We want to find out whether consumers would be willing to share the burden of environmental regulations with producers, and how much more they would pay for chicken grown under environmentally friendly conditions," Hite said.

The survey has been sent to approximately 7,200 consumers nationwide. Results from this study will give the researchers an idea of the price that consumers are willing to pay for whole and cut chicken grown in an environmentally sound way and predict changes in demand due to price increases.

Renck said that previous green marketing studies on diverse goods, such as cosmetics, fish, fruit and forestry products, have shown that consumers are willing to pay for environmentally friendly products. She cited consumers' willingness to pay more per can of "dolphin-safe" tuna as an example of this.

"Green labeling for poultry raised in an environmentally friendly way could be a real economic benefit — a win-win situation," Hite concluded. "The consumer benefits from a very small price increase for cleaner waterways, and the producer benefits because he doesn't have to bear all of the burden of meeting environmental regulations."

Karamat Sistani

This pond shows visual signs of eutrophication — algal blooms and muddied, discolored water — which is caused by excessive nutrients in the water.

Poultry Diets Get scent-sitive Treatment

By Charmain Tan Courcelle

Supplementing poultry diets with activated carbon or other odor absorbers may help take the stink out of chicken manure.

Russell Bazemore, MAFES aroma chemist, is working on methods to control the odor of poultry manure using absorbers, deodorizers and other chemical compounds. His research may provide relief from unwanted odors for farmers and their neighbors.

"Mississippi and the state's poultry industry continue to grow, and as more people move to areas where poultry is raised, there's increased concern about foul odors," Bazemore said.

His group has examined the odor-reducing ability of three absorbent materials — chitosan, copper chlorophyllin complex (CCC) and activated carbon — when added as poultry diet supplements. Chitosan is produced from chitin that forms the hard outer skeleton, or shell, of crabs and shrimp. It is often used in agriculture as a fertilizer or food preservative, but it also has odor-absorbing traits.

CCC is a derivative of chlorophyll, which is found in green plants. It can bind to nitrogen-containing compounds such as ammonia. Activated carbon is a highly porous material that can bind and absorb different compounds.

Smells are composed of a mixture of volatile, or easily evaporable, chemical molecules called odorants. More than 70 odorants contribute to the smell of poultry manure. Because the ability to smell an aroma depends on odorants entering the nasal passages and binding to olfactory receptors, odor control strategies are based on capturing these molecules before they get to the nose. Examples of odor management practices for livestock facilities include treating manure and manure pits with odor absorbers, filtering exhaust from enclosed animal operations and trapping odors from waste lagoons with manure covers.

"Alternatively, we can try to trap odorous compounds before they exit the animal," Bazemore said.

Bazemore's team raised chicks on a standard poultry diet for their first three weeks. For four additional weeks, the birds received either the standard, control diet or one of five diets that included the standard feed supplemented with various odor absorbent treatments. These treatments included 3 percent medium-molecular-weight chitosan, 3 percent high-molecular-weight chitosan, 0.1 percent CCC, 0.01 percent CCC, or 0.1 percent activated carbon.

The researchers collected manure every week after the treatments were started for odor analysis. Odor intensity and unpleasantness were judged by a human "sniff" panel. Manure samples were also analyzed using gas chromatography-olfactometry and gas chromatography-mass spectrometry — techniques that allow individual odorants to be identified and scored for importance as odorous components. The group recorded the live weight of the chickens to determine bird health with and without treatment.

"The treatments did not appear to have a physiological effect on the birds," Bazemore said. "Weight gain was similar for birds fed diets with added supplements and those fed standard diets."

Results from the odor analysis showed treatment with 0.1 percent CCC and 3 percent high-molecular-weight chitosan were most effective at lowering odor intensity and decreasing odor unpleasantness of poultry manure. However, all of the other treatments tested had some effect on odor abatement.

"We saw a cumulative effect with the supplements," Bazemore said. "The longer the birds were on the supplemented diets, the better the odors became."

Jim Lytle

Jim Lytle

◀◀ ***MAFES aroma chemist Russell Bazemore, right, and graduate research assistant Youngmo Yoon use the gas chromatography-mass spectrometry technique to determine odorants in a manure sample.***

◀ ***Yoon prepares a sample for chemical analysis on a gas chromatograph.***

Further work will be required to determine whether additional odor reduction can be obtained if birds are fed supplemented diets before three weeks of age, Bazemore said.

Because most odor complaints are made after manure is applied to fields as a fertilizer, the scientists evaluated the effect of soil properties on odor.

"One important component in the odor of poultry manure is butyric acid. At low pH (acidic conditions), butyric acid is more volatile and is released into the environment," Bazemore explained. "We were interested to see whether acidic soils had an effect on manure odor."

Soils in north central Mississippi are mildly acidic. Therefore, manure samples from chickens fed a standard diet were adjusted from their natural pH (pH 6.98) to a pH that mimicked these acidic soil conditions (pH 5.58). Results from this study showed that manure odor is more intense and unpleasant when pH values are low.

"The pH of soil may account, in part, for the overpowering odor of manure after it's initially spread onto a field," Bazemore said. "The degree of odor intensity and unpleasantness can be affected by adjusting the pH."

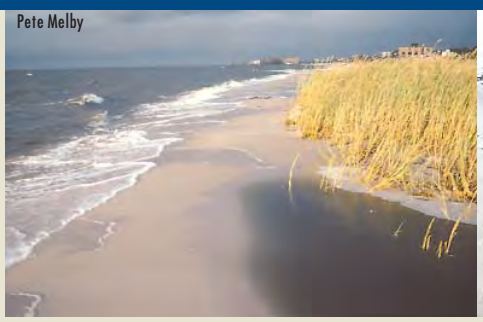
The smell of ammonia within poultry houses is another common odor complaint. However, the manure samples collected for this study did not smell strongly of ammonia. Bazemore found the cause of this difference to lie in the pH of the manure — more alkaline conditions in poultry houses seemed to result in higher ammonia levels.

Bazemore said unwanted odors are not the only reason farmers should be concerned about the pH conditions in their poultry houses. Conditions that favor high ammonia levels are potentially dangerous to the health of humans and chickens.

Bazemore and Yoon judge the odor intensity and unpleasantness of manure samples.

Team Spreads the Message of Sustainable Design

By Charmain Tan Courcelle



Sustainable design balances human needs with the environment. Members of the Center for Sustainable Design built a salt marsh, left, to replace a storm drain carrying runoff into the Mississippi Sound.

Global warming, eutrophication (nutrient enrichment) of water bodies, deforestation, the mass extinction of species — all are well-known examples of our ability to alter the environment both temporarily and permanently, often to the verge of destroying the very natural resources we need for survival.

A new book, which is in its final stages of writing by MAFES biological engineer Tom Cathcart and MSU landscape architect Pete Melby, suggests that far from being at an impasse, we have the ability to meet our basic needs, while living within the constraints of our environment. The key? Sustainable design.

"The need for sustainable design is inevitable," Cathcart said. "We've gone from a population of less than 3 billion people 50 years ago to 6 billion today. By the year 2050, our population is projected to reach between 9 and 12 billion. We will eventually crowd the natural, cyclical systems we depend on if we don't learn to live within the rules of these processes."

Cathcart and Melby's book, which has the tentative title *Regenerative Technologies in the Sustainable Landscape*, outlines the rules of sustainable living and discusses "the systems and processes that we need for survival, the ways that we can disrupt them and how we might avoid such disruptions." Each chapter of the book describes methods for incorporating sustainable design into human practices.

Sustainable practices fulfill human needs but leave minimum impact on the environment. Cathcart said sustainable systems blend the human landscape with natural ecological systems.

Examples of Sustainable Practices

1. Harvesting rain water for irrigation or household needs.

2. Composting of biodegradable wastes including newspapers, magazines, food waste, leaves and other plant materials.

3. Use of renewable energy resources, such as solar, wind and geothermal systems, to meet energy demands.

4. Designing and siting buildings to reflect climate conditions. Some examples to reduce dependence on artificial cooling systems in hot and humid climates include situating the broad surfaces of buildings away from the hot afternoon sun, using trees and other vegetation for shade, and incorporating overhangs and other shading devices into building design.

"Sustainable technologies are not difficult to implement. In fact, many sustainable practices are older technologies that we have abandoned," he said.

Some examples of these practices include planting trees for sun and wind control, using insulation to control heat transfer into and out of buildings and harvesting rain water for household and irrigation purposes.

Living within the rules of our environment requires only that we be willing to change our habits, Cathcart said. He and Melby hope to provide readers with the information they need to adopt sustainable practices into everyday life.

"Ocean liners don't turn on a dime. They can't make a 90-degree turn without planning ahead. Human cultures and practices are also like that," Cathcart said. "If we're to become sustainable, we have to do it soon. We can't wait until temperatures rise by 3 degrees because by then, we're like the Titanic heading for an iceberg."

Regenerative Technologies will promote the message of sustainability through demonstrations of sustainable design concepts. Cathcart said the book is written in nontechnical language and is aimed at readers in high school and up.

Cathcart and Melby are no strangers to the use of sustainable design in human landscapes. They are cofounders of the Center for Sustainable Design, which they established in 1997. However, their partnership dates back to 1990, when they began to bring biological engineering and landscape architecture students together to address engineering problems in biological systems.

"The idea for the center was to create an umbrella group that would allow like-minded professionals to come together and be involved in the area of sustainable design," Melby said. "There is a lot of potential for sustainable design in the man-made environment. In the future, we will have to create sustainable environments that reflect natural ecological processes."

Members of the Center for Sustainable Design have been involved in a number of projects around the state. These projects include the restoration of a beach in Biloxi, the development of management practices to minimize effluent release from commercial catfish ponds, and the completion of a master plan for the Stennis Space Center buffer zone and an interpretive plan for an interactive visitor center for the Gulf of Mexico Program.

"We've seen from our experiences that nature is resilient and a good partner," Melby said. "When we built a salt marsh to replace storm drains on the Biloxi beach, we saw the return of crabs and baitfish within the first two weeks. Now every time we go back, we see more and more wildlife in this restored beach, which contributes to the diversity of organisms in the area and adds to the enjoyment of visitors."

The team's book effort is an outgrowth of the work at the center. It encapsulates sustainable design principles used in the center's projects, Melby said.

"Sustainability is a new and different way to think about design and development, but it is no harder than traditional ways," he noted.

Marsh development plan

USDA, MSU form partnership for AQUACULTURE RISK MANAGEMENT

By Bob Ratliff, MSU University Relations

Jim Lytle

Uncertain fish harvests are one production challenge facing catfish and other aquaculture producers every year.

Managing a crop you can't see is risky business, but that's one of the challenges of growing catfish and other aquaculture products. Helping producers reduce their risks is the goal of a recently formed partnership between Mississippi State University and the U.S. Department of Agriculture.

Keith Coble and Terry Hanson, both MAFES agricultural economists, are the principal investigators for the four-year, $3.6 million national risk management feasibility program for aquaculture. They are working with USDA's Risk Management Agency and Federal Crop Insurance Corp.

Sen. Thad Cochran and Rep. Chip Pickering supported the agriculture department's funding of the risk management study. They note that the research will help USDA assess producer risks and develop risk management tools to help farmers meet production challenges.

"Once implemented, a well-suited risk management tool could help protect farmers from economic losses due to fish disease and poor water quality," Cochran said.

Producers of the nation's top farm-raised aquaculture species — catfish, salmon, trout and baitfish — received almost $700 million for their products in 1999, the most recent year with complete sales data. Catfish accounted for almost $500 million of that total and will be the initial focus of the research.

"Many aquaculture producers know they may lose about half of the fish they place in a pond to birds and other predators, disease, low oxygen levels and other causes," Coble said. "What they don't have is specific data on risks associated with each of the causes of losses."

In addition to assessing the risk factors for producers, the project will apply the expertise of MSU personnel to developing risk management plans for catfish and other aquaculture production systems.

"MSU has a long history of aquaculture research and currently has more than two dozen scientists working in the areas of nutrition, aquaculture disease management, water quality, fish behavior and economics," Hanson said. "This project will bring together these scientists, other nationally recognized personnel and producers to find ways to quantify the risk factors and develop affordable risk-reducing products."

One of the ways producers of cotton, corn and other crops manage their risks is through the purchase of federal crop insurance. However, traditional crop insurance is hard to apply to aquaculture, in part because the time it takes to produce a crop of fish is longer and because it is difficult to determine fish numbers and pounds in the pond.

"It takes about 18 months to grow a catfish to harvest size, so the risk factors are spread over a much longer time than with row crops," Hanson said.

Indianola catfish producer Seymour Johnson agrees that the types of crop insurance programs currently available to row-crop producers may not be the answer to the needs of the aquaculture industry, but he noted that some protection against losses is needed.

"There is a need for catastrophic insurance, particularly for power failure and disease epidemics," he said, adding that those factors can threaten millions of dollars' worth of fish at almost any location in Mississippi's Delta counties.

The agricultural economists hope to find ways of reducing the risks associated with those and other factors that are acceptable to producers.

"We're looking at all aspects of the production systems and will be applying all the available expertise to making those systems less vulnerable to disease and other threats to fish," Hanson said. "This is a new approach to risk management in agriculture and one we think will work well for aquaculture enterprises."

Imaging Facility *to be a first for* animal & veterinary sciences

Tom Thompson

CVM researcher Mark Lawrence, left, and MAFES animal and dairy scientist Scott Willard use biophotonics to study enteric septicemia in catfish.

By Charmain Tan Courcelle

The pooled resources of the Department of Animal and Dairy Sciences and the College of Veterinary Medicine may help establish Mississippi State University as a leader in imaging technologies for the agricultural and veterinary sciences.

MSU scientists already apply satellite-based remote sensing imagery to agriculture. However, Scott Willard and Peter Ryan, MAFES animal scientists, want a much closer, earthbound view of the challenges facing the animal food production industry.

"We'd like to take microscopy and other imaging systems and apply them to areas in large animal agriculture — for example, animal health, food safety and pathogenesis (of microbes found in food animals)," Willard said.

Together with CVM researchers Hart Bailey and Mark Lawrence, Willard and Ryan are working to establish a core laboratory facility equipped with current imaging technologies that will help them do just that.

Two of these technologies — biophotonics and fluorescence microscopy — take advantage of molecular reporters that allow researchers to easily examine functions and structures within living cells, tissues or organs. Biophotonics captures the glow from cells that have received the firefly gene luciferase to reveal chemical reactions within biological systems. A gene from the jellyfish *Aequorea victoria* imparts vivid colors of green, yellow or blue-green to "transformed" cells that can be detected with a fluorescence microscope.

Infrared thermal imaging and ultrasound imaging, the two other techniques of interest to the team, are used commonly as noninvasive examination and diagnostic tools in medical and veterinary settings.

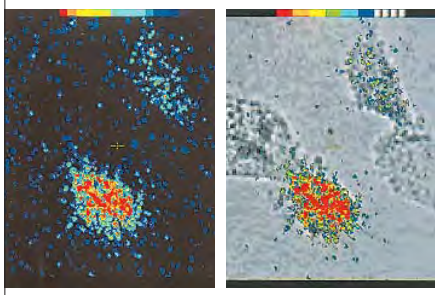
"The real beauty of these systems is that you can do dynamic, real-time analyses of living organisms," Willard said. "These techniques can be used to ask and answer questions related to how cells interact with each other or how they respond to external signals like environmental agents, toxins or disease organisms."

The team agreed that this type of understanding would help reveal more about animal physiology and provide clues to improving animal handling practices and to preventing animal disease.

The foundation for an imaging facility has been laid with existing ultrasound machines and with new biophotonics, fluorescence microscopy and infrared thermal imaging equipment. Much of this equipment was obtained as part of a current neuroscience collaboration among Willard, Ryan and CVM researchers Jan Chambers and Russell Carr, which is sponsored by the National Science Foundation. Willard, Ryan, Bailey and Lawrence plan to extend the application of this technology further to tackle questions in food animals.

To test this possibility, the team will initially use catfish as a model organism. The group hopes that by the end of this fall, they will have a clearer idea of the range of these imaging technologies. In the meantime, efforts continue to improve the facility's work space and to expand its imaging capabilities.

"We think setting up a core imaging facility on this campus will give us a jump in providing answers to animal production questions," Ryan said. "Imaging resources like this are usually found in medical schools, but we hope to change this by establishing one of the first centers in the agricultural and veterinary sciences."



Images provided by Scott Willard

Living porcine (swine) ovary cells respond to estrogen treatment by turning estrogen-sensitive genes on. Left: This panel shows gene expression in the ovary cells as detected by biophotonics. The intensity of each colorized dot indicates the level of gene expression, with red indicating an increase in activity. Right: This panel shows an overlay of the biophotonic emissions on the ovary cells. This technique is used to determine the level of estrogen-sensitive gene expression in individual cells.

garden events

Charmain Tan Courcelle

Charmain Tan Courcelle

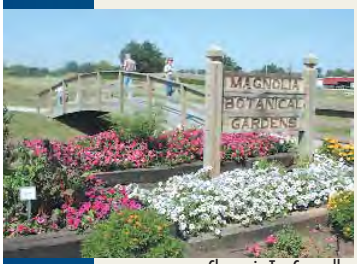
Provide Landscaping Gardening Answers

GARDEN EXPO

This year's North Mississippi Garden Expo was held Sept. 29 at the North Mississippi Research and Extension Center in Verona.

Plant enthusiasts were given an opportunity to learn more about daylilies, irises, roses and native plants and to find answers to composting, pesticide safety and pest control questions from university and community experts. Visitors toured NMREC vegetable plots, ornamental and vegetable greenhouses, demonstration beds, the Magnolia Botanical Gardens and the Pizza Farm.

In addition to the field tours, MAFES and MSU Extension personnel spoke at seminars held throughout the morning and early afternoon. Some seminar topics included home landscaping design, tree care, irrigation management, spring and fall gardening tips and adding color to the garden.



Charmain Tan Courcelle

FALL FLOWER & GARDEN FEST

By Ned Browning

Ned Browning

Despite a tornado warning that cancelled the second day of the Fall Flower and Garden Fest, nearly 2,000 visitors saw the latest horticulture, nutrition and health information available from MAFES.

The Truck Crops Branch Experiment Station, south of Crystal Springs, hosted the 23rd annual event on Oct. 12.

The educational centerpiece was a three-acre garden full of vegetables, herbs, annual and perennial plants, and landscape ideas.

The field day featured 15 seminars and 10 educational exhibits conducted by MSU Extension specialists and MAFES scientists. Commercial exhibitors rounded out the day with demonstrations of equipment and gardening products.

In the following days, Kids' Week served about 1,800 area school children. Five workshops and a corn maze taught the children about Mississippi's basic industry.

Teachers accompanying the school groups were treated to a model outdoor classroom where they learned how to use horticulture in their science courses.

Annual LIVESTOCK Production Sale

The 19th annual MSU-MAFES production sale brought 450 people to the Mississippi Horse Park, AgriCenter and Fairgrounds. Altogether, 125 animals were sold at the Nov. 15 auction.

"Sales at this event have been up for the last two years, with bulls and bred heifers showing the most improvement in price," said MAFES animal scientist Mike Boyd.

Animals at the 2001 sale brought a total of $121,240, which will go back into MAFES livestock research programs.

Marco Nicovich

Marco Nicovich

updates

Luthe Earns Outstanding MAFES Worker Award

Jim Lytle

Interim MSU President J. Charles Lee, right, congratulates MAFES biochemist Dawn Luthe on receiving Mississippi Chemical Corporation's Year 2001 Outstanding MAFES Worker Award.

By Ned Browning

The Outstanding MAFES Worker for 2001, Dawn Luthe, professor of biochemistry and microbiology, was recognized at the MAFES/Extension annual conference on Nov. 16.

One nominator cited Luthe's "ability to see the 'big picture' while pursuing a more immediate goal — successfully bridging the gap between basic science and field application."

Vance Watson, MAFES director, said, "Dr. Luthe's educating the public about bioscience developments, which often are misunderstood by consumers, is a fitting commitment to be recognized by the Mississippi Chemical Corporation award."

Luthe was a leader in efforts to establish the Life Sciences and Biotechnology Institute at Mississippi State University.

Several nominators lauded her ability to gain widespread consensus from disparate groups as part of the Hearin Biotechnology Steering Committee and Implementation Team. This first university-wide effort included and built on MSU's strengths in engineering, biological sciences, chemistry, education, business and veterinary medicine.

Luthe's 22-year MAFES career has centered on understanding how plants respond to stresses. Highlighted among her scientific pursuits are investigations into corn insect and aflatoxin resistance, heat tolerance in creeping bentgrass and flowering genes in flowering cottonwood.

She is the author of 26 refereed journal articles and four book chapters. She has also given numerous presentations to scientific groups. Her recent paper in the journal *Plant Cell* resulted in several invitations for international speaking engagements.

As party to a patent for a DNA molecule to provide insect resistance in maize, Luthe is bringing scientific and financial benefit to Mississippi State.

Professionally, she has served on the American Society of Plant Biologists' Public Affairs Committee and several USDA and National Science Foundation peer-review panels. She is a 1998 graduate of the National Experiment Station Committee on Policy Leadership Development program.

Luthe has been honored with the MSU Gamma Sigma Delta Research Award and the National Association of Colleges and Teachers of Agriculture Outstanding Teaching Award at the university.

Jim Lytle

MAFES Director Vance Watson, right, recognizes the year 2001 MAFES award winners, left to right : Outstanding Scientific Publication — Peter Ryan, MAFES animal scientist; Publication with Most Relevance and Potential Impact to Mississippi Agriculture — Darren Hudson, MAFES agricultural economist; Grantsmanship Award — Keith Coble, MAFES agricultural economist; and Special Service Award — David Laughlin, MAFES agricultural economist.

Watson Named Interim Vice President, Dean

By Tom Knecht


Jim Lytle

Vance H. Watson

Vance H. Watson, director of the Mississippi Agricultural and Forestry Experiment Station, has been named interim vice president of the Division of Agriculture, Forestry and Veterinary Medicine (DAFVM) and interim dean of the College of Agriculture and Life Sciences (CALS) at Mississippi State University. He assumed his duties Jan. 1.

Watson will carry out responsibilities of the vice president and dean during the period that J. Charles Lee, former DAFVM vice president and CALS dean, serves as the university's interim president. In addition, Watson will continue his current responsibilities as MAFES director, with full authority for decision making, resource allocation and general management of the unit.

In making the appointment, Lee said, "Dr. Watson has a broad understanding of the issues and opportunities facing the division, the state and federal legislative processes, and the role of the division in serving the needs of our state. I am confident that he can provide the leadership needed during this interim period."

Watson, a Missouri native, has spent his entire career serving the people of Mississippi. He graduated from Southeast Missouri State University in 1964 with a degree in general agriculture and earned a master of science degree in agronomy at the University of Missouri in 1966. He completed a doctorate in agronomy with a minor in botany at MSU in 1969.

Starting his career as assistant agronomist with MAFES in 1966, Watson was appointed assistant professor of agronomy in 1969. He advanced to the rank of professor of agronomy and was appointed agronomist in 1977. He was chosen to serve as assistant to the MAFES director in 1982 with responsibility for coordination of forage programs.

In 1987 he assumed additional duties as head of the MAFES auxiliary units responsible for foundation seed stocks and variety evaluations. In 1990 he was appointed head of the MAFES main station, and in 1992 he became head of MAFES research support units. In 1995 he was appointed MAFES assistant director for research support and since 1996 has served as MAFES director.

Watson is the author of more than 300 publications, including six textbook chapters. He has traveled in more than 50 countries on a variety of agricultural missions. Leadership positions in addition to his university appointments include five years as executive vice president of the Association of Official Seed Certifying Agencies, an international organization for genetic standards and certification of 3,500 varieties of crops produced in nine countries.

He was a member of the official United States delegation for setting world policy on seed certification. He served as team leader for review of Peace Corps agricultural programs in Thailand for the U.S. State Department.

Watson's honors include selection as a Fellow of the American Society of Agronomy and the Crop Science Society of America. He has received the First Mississippi Corporation Award for outstanding MAFES worker and the MSU Alumni Award for excellence in research. He has been named professor of the year by two different student organizations and has received numerous other awards and honors.

Watson will serve as interim vice president and interim dean until a permanent replacement for former MSU President Malcolm Portera has been appointed.

updates

Beaulieu Honored by Rural Sociological Society

By Allison Matthews, SRDC

The Rural Sociological Society honored Lionel J. "Bo" Beaulieu with its 2001 Excellence in Extension and Public Service Award on Aug. 16 in Albuquerque, N.M., at the society's 2001 annual meeting.

Since 1997, Beaulieu has been director of the Southern Rural Development Center (SRDC) at Mississippi State University, where he is also a professor of rural sociology. He was cited for his work in focusing land-grant university research, education, and extension activities to benefit communities and families in the South. He has spearheaded e-commerce, entrepreneurial development and business retention; secured external funding for programs to empower rural citizens in the Delta; and built partnerships that leverage the land-grant system's contributions though regional development strategies across the country.

Lionel J. Beaulieu

Beaulieu has made SRDC an important resource for historically black colleges. He launched the Community Development Institute, Southern Rural Health Institute, the Millennium Series of applied research reports on emerging issues in the South and competitive grants programs to link research to rural development needs.

SRDC is jointly administered by MAFES and the MSU Extension Service.

Poultry Scientist Earns Professional Distinction

A Mississippi State University poultry scientist was recognized for his research accomplishments by the Poultry Science Association (PSA).

Michael Kidd, MAFES poultry scientist, was presented with the 2001 Hyline International Research Award at the society's 90th annual meeting in Indianapolis, Ind.

PSA is a professional organization with 3,500 members composed of poultry scientists, educators, extension specialists, administrators and producers. Founded in 1908 and based in Soboy, Ill., PSA promotes the poultry industry through support of research and education programs in the field of poultry science. Each year, the society honors "a young scientist who has made an outstanding research contribution in any discipline within poultry science."

Michael Kidd

"That Dr. Kidd has won this prestigious, international award speaks well of his ability as a scientist and to the quality of his research program," said Wallace Morgan, MSU's poultry science department head. "His research to date has greatly expanded our understanding of poultry nutritional requirements and is applicable to other species, including humans."

Kidd joined the MSU faculty in 2000, following five years as a nutritional researcher for Nutri-Quest, a manufacturer of poultry diet supplements. He holds bachelor's and master's degrees from the University of Arkansas and a doctoral degree from North Carolina State University.

CALENDAR OF UPCOMING EVENTS

Feb. 21, 2002
Central Miss. R&E Center Advisory Meeting, Raymond

Feb. 28, 2002
North Miss. R&E Center Advisory Meeting, Verona

April 9-11, 2002
School Days on the Farm, Miss. Horse Park, Agricenter and Fairgrounds, Starkville

April 30, 2002
Miss. Biomass Conference MSU (proposed)

May 23, 2002
Dairy Field Day, location to be announced

Sept. 28, 2002
North Miss. Garden Expo, North Miss. R&E Center, Verona

Oct. 18-19, 2002
Fall Flower & Garden Festival, Truck Crops Branch, Crystal Springs

Thaxton Named New Executive Editor of Poultry Magazine

By Bill McDowell, Marketing & Technology Group

Yvonne Vizzier Thaxton, MAFES poultry scientist and a 30-year veteran of the poultry processing industry, was named executive editor of *Poultry* magazine in August 2001.

In this role, Thaxton will advise on editorial content and direction, review contributed articles, write expert commentaries and represent the magazine at industry events.

Prior to joining the faculty at Mississippi State in 1999, Thaxton's career included a 23-year tenure at Marshall Durbin Companies, where she oversaw operations and regulatory affairs as vice president of science & quality assurance. Her expertise and training as a microbiologist led to three presidential appointments to the USDA Advisory Committee on Meat and Poultry Inspection during the 1980s.

Yvonne Vizzier Thaxton

During her career, Dr. Thaxton has held leadership roles in several industry groups, including the National Chicken Council, U.S. Poultry Association, Poultry Science Association and Southern Poultry Science Association.

Thaxton was chosen for the editor's position, in part, based on "her blend of hands-on industry experience and scientific research."

Poultry magazine is published on a bimonthly basis by Marketing & Technology Group, an integrated media company serving multiple channels of the meat and poultry processing industries. The company also owns the magazines *Meat Marketing & Technology* and *CarneTec* (serving the Latin American meat processors).

Dairy Scientist Nationally Recognized

By Linda Breazeale

John W. Fuquay, professor emeritus of dairy sciences at Mississippi State University, recently received recognition for his work from the American Dairy Science Association (ADSA).

Fuquay was named a 2001 Fellow by the ADSA at their national meeting in July in Indianapolis. The award honors members who have provided distinguished service to the dairy industry for more than 20 years and is one of the highest distinctions an ADSA member can achieve.

Fuquay has contributed to the dairy science profession for more than 35 years. He has worked significantly with the *Journal of Dairy Science* and is currently the editor-in-chief of the journal. His physiology of reproduction class was extremely popular among undergraduate students. He wrote *Applied Animal Reproduction* in cooperation with Joe Bearden in 1980. Now in its fifth edition, this text has been widely adopted for undergraduate instruction in the United States and has been translated into Spanish.

John W. Fuquay

Fuquay influenced the reproductive performance of dairy cows through his heat stress research and estrus synchronization programs. He also determined the importance of nighttime cooling for maintaining milk production in heat-stressed cows.

Fuquay currently serves as editor for the dairy production volumes of a major four-volume reference work, *Encyclopedia of Dairy Sciences*, to be published in 2002. The target audiences will be researchers, educators, students, agricultural advisors and government policy groups throughout the world.

Fuquay received his bachelor's and master's of science degrees from North Carolina State University and his doctorate from Pennsylvania State University. He came to MSU in 1969 and retired in 1999.

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