Body Walk encourages health and fun...Page 16

Research, Education and Outreach in the Division of Agriculture, Forestry and Veterinary Medicine

Mississippi State University
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Winston County 4-H youth agent Sandra Jackson serves as a Body Walk volunteer. At her station, students learn about how the heart works and what they can do to keep it healthy. The story is on page 16. (Photo by Marco Nicovich)

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The Crosby Arboretum serves as a habitat for many plant and animal species like this turtle. (Photo by Robin Veecamp)

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At Mississippi State University, outreach is not just something we talk about; it's something we do every day. Outreach, educational services outside the traditional classroom setting that bring the university to Mississippians throughout the state, is an important part of the mission of the Division of Agriculture, Forestry and Veterinary Medicine.

Body Walk is one of the newest outreach programs in the division. The traveling exhibit is part of an effort to improve nutrition and health decisions by Mississippi's kindergarten through fifth-grade children. Sponsored by the MSU Extension Service, this program began in 2006 and reaches about 20,000 children each year.

The College of Veterinary Medicine held its annual open house in April for a crowd of 3,800. This was the 25th year that the college has welcomed children and families to tour its facilities and to learn about animal care and welfare. While the open house is an outreach program, it also is part of the educational process for CVM students because they plan and conduct the event.

There is more about Body Walk, the 2009 CVM open house and other division outreach programs beginning on page 16 of this issue of Landmarks.

Reduced state funding for Mississippi's institutions of higher learning have impacted budgets in the units that make up the division during the past year. Additional budget reductions are likely during the upcoming fiscal year, but outreach activities, especially those that involve youth development and those that help deliver research results to agricultural producers, will remain a priority.
Time and location are crucial factors in managing medical emergencies, but there always have been fewer nearby critical-care facilities when the victim is the family pet.

In 1985, several private practitioners in Metro Jackson opened the Animal Emergency Clinic at 607 Monroe Street in the city’s downtown district. As more people moved into the Jackson-Vicksburg-Hattiesburg area, emergency caseloads increased for each veterinarian.

“We started with about eight members who felt a strong need for an emergency-care clinic that would operate after hours, on weekends and on holidays when regular veterinary practices were closed,” said Dr. Jim Anderson, one of the clinic’s founders. “We found a suitable property and building to rent, and we moved forward from that point in time.”

The veterinarians were correct in their assessment. The emergency clinic has seen strong growth over the years as pet owners became aware of its existence. Interest within the community of veterinary medical professionals also has increased. More than 32 veterinarians in the metro area allocate time to practice emergency medicine there.

The facility has aged and is cramped for space because of the high volume of patients and clientele who seek help. The founding veterinarians, along with those who participate in service delivery, met to discuss these problems.
“We simply outgrew where we are,” said Anderson. “We needed to modernize the facility to be able to handle more emergencies, but we wanted to consider the process toward that goal one step at a time.”

One suggestion the group entertained was to relocate and build a bigger facility. Nine of the veterinarians decided to become partners in a new corporation. They searched the area for an ideal location and purchased a site at 1009 Treetop Boulevard in Flowood. Enthusiasm for the facility was contagious, and a ground-breaking ceremony was held in 2008.

“We hope to open the facility in the fall of 2009,” Anderson said. “We will have a 5,200-square-foot building that will allow us to offer clients the best after-hours emergency health care for pets that they can find in this area.”

But the group was not finished with expansion plans. Many of the practitioners were familiar with the clinical services and facilities at the College of Veterinary Medicine. They often consulted with faculty on the more difficult cases and referred patients to campus for specialized care. Located in northeast Mississippi, the college is at least a 3-hour drive from various points in the Jackson area. The ride can be physically rough on critically ill or injured patients and mentally exhausting for their owners.

The group devised a way to shorten the distance. They approached CVM Dean Kent Hoblet with a proposal for the college to become a cooperative partner by operating a referral specialty practice in conjunction with the new facility.

According to the initial plan, the specialty referral practice will use the emergency clinic while it is unoccupied during the day. The college has purchased land next to the emergency clinic and plans to build a facility to house the specialty practice and provide living space for veterinary students who will participate in both practices. The referral clinic will continue day-to-day intensive management of the emergency clinic’s critical cases and serve referring veterinarians in south Mississippi who want to minimize travel distance for clients.

“A sizable portion of our referral base comes from Jackson and the surrounding area because of the number of pets there,” said Dr. Ron McLaughlin, head of the CVM Department of Clinical Sciences. “We have established a cooperative relationship with the practitioners in south Mississippi, and we want to provide service and support that will help them improve emergency care for patients and clients.”

There is an additional benefit for CVM. By participating in the venture, the college can expand its rotation electives for veterinary medical students. The partnership will allow students to practice referral management and emergency care for the high volume of patients at the facility. They also will gain experience by interacting with staff at the Mississippi Veterinary Research and Diagnostic Laboratory in Pearl, located only 8 miles away from the Flowood facility.

“We are an academic institution with a teaching hospital,” Hoblet said. “We have some graduates who are interested in careers as emergency-care specialists and may locate in a densely populated area with high numbers of clientele. We want to show the world that CVM prepares its students to function within a multitude of environments. This invitation from the veterinarians to enter into partnership was an opportunity we were eager to pursue.”

Animal Health Center Director Lee Tyner, who has assumed duties as CVM special projects coordinator, will oversee the college’s involvement in the partnership.

“In the beginning, our success will depend upon our ability to attract qualified specialists,” Tyner said. “Through this effort, we feel we can enhance our land-grant mission to serve the state, serve our veterinarians who need the support we can provide, and serve our clients and the companion animal population.”

Tyner will hold a seat on the corporation’s board of directors and guide the development of future expansion. The various skills he honed during his veterinary career as an anesthesiologist, corporate and private practice manager, clinical instructor and administrator will be advantageous for CVM and the emergency-care facility.

“Dr. Tyner will provide the leadership we need to be successful,” Hoblet said. “He has the skills and experience required to integrate with the group in Jackson and serve as a role model for our students in instilling the high ideals of veterinary medicine.”

The college hopes to secure funding for this new venture through private donations.

“Our very presence in this partnership should assure the public that we will work with veterinarians to provide the highest level of quality emergency care for companion animals,” Hoblet said. “The public support in Mississippi that CVM has received is phenomenal, and we want to continue to show that we appreciate their trust.”
Fishing for red snapper in the Gulf of Mexico is an important commercial venture and an exciting recreational pursuit.

Commercial fishery contributes approximately $40 million to the Gulf Coast economy, and more than 500,000 anglers participate in recreational saltwater fishing in Alabama, Mississippi and Louisiana, according to a 2006 survey by the U.S. Fish and Wildlife Service. These individuals provide income to Gulf Coast states through trip-related expenditures, including food, lodging, transportation and equipment.

While the red snapper is an economically and culturally important fish species, the delectable reef dwellers’ numbers are in decline throughout the Gulf of Mexico and the Atlantic.

“In the last two decades, red snapper stocks are estimated to have declined by as much as 90 percent in the northern Gulf of Mexico,” said Don Jackson, professor and fisheries biologist in the MSU Forest and Wildlife Research Center.

Overfishing and high juvenile by-catch mortality in the shrimp trawl industry are most likely to blame for the red snapper stock reduction, Jackson said. Commercially, red snapper are typically caught with multihook gear and reels. However, because red snapper travel in schools, they are also caught in shrimp trawls.

To help address this problem, MSU scientists, in collaboration with the Mississippi Department of Marine Resources, are examining how artificial reefs might slow red snapper decline and possibly assist in its recovery.

This research is particularly important as the Mississippi Gulf Coast works to recover its fisheries after Hurricane Katrina. During that storm, many of the artificial reefs that were in place and functioning along the coast were destroyed.

“The use of artificial reefs is not a new concept,” Jackson said. “They have been deployed for the last 20 years in the northern Gulf of Mexico with the intent of enhancing Gulf fisheries and fish stocks.”

However, their placement with regard to depth and positioning of individual structures has not been addressed previously on the Mississippi Gulf Coast.

“The reefs provide a place of refuge and forage for reef fish like red snapper,” Jackson said. “We believe that artificial reefs may play an important role in enhancing the fisheries that target red snapper. What we don’t know is how the placement or design of these reefs affect red snapper stocks.”

To determine the best approach for placing artificial reef structures, wildlife and fisheries graduate student Jason Brandt has been working with fisheries biologists in the Mississippi Department of Marine Resources.

“We have been placing artificial reef material, such as concrete rubble and decommissioned shrimp boats, in the coastal waters off of Mississippi for a number of years without giving much thought to how we were placing the material and how that might affect our desired results,” said Kerwin Cuevas, head of the Artificial Reef Bureau at the Department of Marine Resources. “Now we are trying to determine which pattern of artificial reefs will provide the best habitat for the recruitment of juvenile red snapper.”

Researchers are testing four different patterns for placement of pyramid-shaped artificial reefs. The different patterns address reef spacing and horizontal extension. So far, researchers have completed 26 sampling trips on the reefs that have been placed in various experimental configurations. They use baited fish traps to collect samples.

“We have collected 927 juvenile red snapper, which is fantastic. Juvenile red snapper are recruiting to the structures and using them for foraging and refuge,” Cuevas said.

From the recaptures of tagged red snapper, Cuevas said it is evident that once the fish have recruited to the structures, they are staying there. Whether a particular reef pattern is best at recruiting juvenile red snapper is yet to be determined, but the researchers said they are optimistic about their initial findings.

“Hopefully, we will see these juvenile red snapper that have recruited to the structures and are staying on the structures grow to spawning size and aid in the rehabilitation of red snapper stocks in the northern Gulf of Mexico,” Cuevas said.
Grass Habitat Improve Fisheries

By Jonathan Paul Fleming and Karen Brasher

For a bass fisherman, there is nothing more thrilling than pulling a spinner-bait along a weed edge and getting a strike. Many anglers have long lived by the motto that “grass equals bass.”

While simple, this motto is true; aquatic vegetation in lakes and reservoirs can improve the fishing opportunities, as long as it is the right type of vegetation.

“As long as the ‘grass’ is a native form of aquatic plant that does not choke out the water in large areas of the lake, it does improve the fishery,” said Eric Dibble, wildlife and fisheries professor and fish ecologist.

However, many reservoirs have grass but not the native aquatic plants needed. This was the case in the Little Bear Creek Reservoir in northwest Alabama.

To improve the reservoir and fisheries, scientists in Mississippi State’s Forest and Wildlife Research Center and Geosystems Research Institute began working with a local conservation group, the Bear Creek Millennium Project, to re-establish aquatic vegetation. Additional funding was provided by the Alabama Department of Conservation and Natural Resources.

“In natural lakes, aquatic plants establish a seed bank so that sudden environmental changes do not disrupt the natural cycle of plant growth,” Dibble said. “However, in man-made reservoirs like Little Bear, oftentimes the seed bank is not present or is not well established.”

Since aquatic plants are such important parts of the aquatic community, sometimes they need a little help to get established so the lake stays productive, Dibble added.

In addition to improving recreational fishing opportunities, the plants improve water quality and habitat. Aquatic plants form the basis of the food chain and are self-renewing, unlike man-made structures such as stake-beds or sunken dead trees, which rot after only a few years.

“Submerged vegetation is home to a large variety of aquatic insects and animals, which forms a good food base for sportfish such as bluegill and largemouth bass,” Dibble said. “The fish also use these areas to hide when threats of larger predators are lurking in deeper, less protected areas.”

The plants improve water quality by stabilizing the bottom of a lake and preventing silt and mud from staining the water when boat traffic or wind causes a disturbance.

However, establishing this grassy fish habitat can be challenging. There were plants growing in the reservoir before, but they did not survive over a period of time.

Phillip Cooper, leader of the Bear Creek Millennium Program, contacted the university about assisting with the project.

“Our group largely consists of fishermen looking to improve habitat in the Bear Creek Lakes,” Cooper said. “We knew from the beginning, to improve habitat and fishing, you must get plants back into the lake.

“That is why we contacted Mississippi State, to make sure we were doing the right things to make our lakes better,” Cooper added.

Wildlife and fisheries graduate student Jonathan Paul Fleming began by planting several different plants in the lake. His objective was to identify the species that would grow the best.

“We want to make sure we are as efficient as possible so that we are not wasting time with species that just won’t grow,” said John Madsen, assistant professor in Geosystems Research Institute and principal investigator. “Once we establish the right plants for the reservoir, we will increase the rate of planting.”

Some anglers and recreationists do not always appreciate aquatic plants because of the thick mats they form that can block boat channels and docks, Madsen added. However, this usually only occurs with exotic invasive plant species.

“Although some anglers like to fish in any type of vegetation, it is important to realize there are some plants and invasive species that can actually hurt fishing,” Madsen said. “That is why we are working with several native species to determine what works best in the reservoir.”

Once established, the aquatic vegetation will provide great fishing opportunities and habitat at Little Bear Creek Reservoir.
What was once a Depression-era strawberry farm now provides protection to some of the Southeast’s most diverse but endangered habitats.

The Crosby Arboretum, located in Picayune, was established in 1980 as a living memorial to timber pioneer and philanthropist L.O. Crosby Jr. It is part of Mississippi State University’s Coastal Research and Extension Center and provides protection to the native plant species of the Pearl River Drainage Basin of south-central Mississippi and Louisiana.

Visitors can view plants in their natural setting as they walk through the 104-acre native plant center. The arboretum also manages more than 700 acres in seven associated natural areas that protect 300 species of indigenous trees, shrubs, wildflowers and grasses.

“What sets the arboretum apart is that it was the first in the country to be designed based on taking a holistic look at the regional environment,” said Bob Brzuszek, assistant professor in MSU’s Department of Landscape Architecture. “It wasn’t about bringing in plants from other regions. The focus was on protecting and nurturing what was already in the area.”

Ed Blake Jr., founding principal of The Landscape Studio in Hattiesburg, was a professor in the Department of Landscape Architecture in 1981 when he was asked to lead a team in designing the arboretum.

“The South is a one-of-a-kind place, and we wanted to highlight what sets us apart from the rest of the botanical world,” Blake said. “The founders asked us to seek a balance between science, arts and the humanities in our design. We also wanted to provide a deeper understanding of the human place in nature.”

To achieve these goals, Blake used the published work of historians and cultural geographers to generate ideas, while botanists provided an inventory of the existing plants and their habitats.

“I wanted to understand what brought people to the piney woods of the region, how they changed the woods and how the woods changed them,” Blake said. “Then we developed a master plan capturing that relationship and Mr. Crosby’s love for the outdoors.”

Blake said the result was that the piney woods landscape itself became the real exhibit.

“The land and natural setting is the display; our work was in choreographing how visitors would move through the landscape so they could follow the story of the area,” Blake said. “Walking the pond journey,
strolling the savanna and visiting the pitcher plant bogs — each experience builds on the previous experience so that people end up seeing the landscape in a synergistic, ‘bigger picture’ kind of way.”

Brzuszek, who was the first curator of the arboretum, said the need for sustainability was well understood in the development of the original plans.

“The arboretum was ahead of the curve in the sustainability movement,” Brzuszek said. “We aimed for maintaining a natural environment visitors could enjoy and then go home and translate in their own gardens.”

Blake said the sustainability ideas came about early on in the design process.

“We hear ‘green’ all the time now, but this concept was already a part of what we were doing right here in Mississippi,” Blake said. “The landscape isn’t meant to be just a backdrop and attractive scenery; we looked at it for what it really is — a green infrastructure that makes life possible.”

Not only does the natural landscape provide visitors with beautiful views, it also protects rare and threatened plant and animal species and disappearing habitats. The arboretum is a biologically diverse, rich system of natural communities providing a safe haven for these species.

“There are certain insects and animals that depend on the plants at Crosby,” Brzuszek said. “The piney forests serve as much-needed habitat for the quickly declining gopher tortoises and black pine snakes.”

The arboretum’s piney forests are dominated by longleaf pines, which depend on fire for their development. Prescribed burning as a maintenance technique was planned in the initial design of the arboretum to mimic the natural wildfires that allow the piney woods to take root and thrive. Development pressure and the suppression of fire have led to the decline of more than 95 percent of the longleaf pines’ former habitat.

The arboretum’s design also incorporated water to preserve the disappearing habitat of the once-abundant carnivorous pitcher plants native to the Southeast. The arboretum provides a portion of this plant’s remaining habitat, estimated at only 3 percent of its former range.

Brzuszek said keeping native plants at the arboretum helps maintain the biological richness of the state and provides protection from natural disasters.

“Hurricane Katrina caused some tree damage and loss, but it did not interrupt the integrity of the arboretum,” Brzuszek said. “Native plants have a genetic resilience to natural disasters that occur in their habitat. Plant species from other parts of the country would not have fared as well.”

Pat Drackett, senior arboretum curator, said visitors appreciate the original vision for the Crosby Arboretum that is still alive today. The arboretum staff invites the public to learn about the beauty of its natural environment and native plants through educational and outreach activities. Classes, workshops and recreational activities are offered to all ages on topics such as landscape design, nature photography, yoga and pine needle basket making. It also hosts two large annual events, Wildlife Day and the Heritage Festival.

“We have a variety of programs demonstrating how native plants can be incorporated into home landscapes,” Drackett said. “The educational and recreational activities we provide here apply to a broad spectrum of people, everyone from home gardeners and photographers to those interested in botany and entomology. We want them to appreciate our site and the native plants here in any way that appeals to them, whether it is butterfly gardening, nature sketching or taking a pleasant walk in the woods.”

Drackett said programs and events focus on helping visitors reflect on and interact with the natural surroundings.

“Mr. Crosby’s daughter, Lynn Crosby Gammill, reminds us that this place is to be a ‘celebration of nature.’ She is right, and I see that idea alive and well every day,” Drackett said.
Goddard, JAMA
Team Up To Uncover Bed Bug Issues

By Patti Drapala

A medical entomologist and a physician spent several months researching a small bloodsucker on the comeback trail, and their findings are bringing extensive national attention to the problem.

Jerome Goddard is a medical and veterinary entomologist with the MSU Extension Service. His colleague, Dr. Richard deShazo, is a physician in the Department of Medicine at the University of Mississippi Medical Center. The two have been reviewing literature on species of bed bugs that feed primarily on human blood.

They uncovered a wealth of information for an article they felt would help physicians and public health officials dealing with public concerns about this parasite. This paper is the lead piece in the April 1 issue of the Journal of the American Medical Association (JAMA).

National and world media outlets picked up on the hot topic of bed bug reappearance. Goddard has been swamped with interview requests from Reuters and Bloomberg News Syndicate to Scientific American and several large newspapers in metropolitan markets.

“Bed bugs were common in the United States decades ago and thought to be eradicated with the advent of modern pesticides,” Goddard said. “The pests have reappeared in various states, and their numbers are increasing.”

JAMA chose Goddard’s paper as its lead article because it addresses bite reactions, treatment and control issues, and the potential for disease transmission, all which concern health officials. The paper discussed these issues at length, noting that treatments vary in effectiveness and control is challenging. Goddard found little evidence to suggest bed bug bites transmit disease.

“The consensus is that bed bugs don’t carry human disease, but more work needs to be done to evaluate their potential for disease transmission,” Goddard said.

Bed bugs often make a series of bites on their victims and leave a trail of feces and shed skin on mattresses, bedding, cracks, gaps and bedboards. Many physicians are seeing patients with mysterious bites, blisters, blotches and rashes. Those who recognize bed bug bites can treat symptoms but may need more information on pest control.

“Bed bugs are not a sanitation issue,” Goddard said. “It has nothing to do with uncleanliness. They are seeking a blood meal, so they take advantage of human habits. They naturally go to places, such as hotels, apartments and dormitories, where people come and go.”

Bed bugs have become harder to control because they have developed resistance to many pesticides.

“Bed bug populations can build up to tremendous levels because they are hard to catch and they scatter quickly when people turn on lights,” Goddard said. “The babies are smaller in size than an ant.”

Bed bugs also can live for up to 1 year without feeding, a characteristic that makes control difficult.

Goddard said he thought the decision by JAMA to feature the article will help physicians reassure patients that bed bugs are not a disease threat. He said he also was amazed by JAMA’s effective promotion of the article through news releases and television and radio spots to media outlets in the United States and Canada.

“Bed bugs are a hot topic for our readers,” said Columbus (Ohio) Dispatch science writer Misti Crane, who contacted Goddard when JAMA released the issue. “They want to know what to do to fight this pest.”

Goddard is no stranger to the publishing world. He has written more than 160 scientific articles and six books on medical entomology. His textbook, The Physician’s Guide to Arthropods of Medical Importance, is now in its fifth edition. He is writing an Extension publication about bed bugs.

“There is real truth in the old saying of ‘sleep tight and don’t let the bed bugs bite’ because they often hid in bedding and bit people,” Goddard said. “They weren’t welcome back then, and we certainly don’t want them now.”
Cattle and dairy producers stand to benefit from cutting-edge genetic research conducted by scientists around the world and at Mississippi State University.

More than 300 scientists from 25 countries formed a consortium to fully map the bovine genome. The study, partially funded by the Mississippi Agricultural and Forestry Experiment Station, was conducted over 6 years and has proven successful as researchers developed a blueprint of the bovine’s DNA.

The blueprint helps lay the groundwork for a better understanding of the species. The new information can be used to help produce cattle with valuable traits and possibly aid in better understanding human disease and development. The study received international attention and was published in the April 24 issue of the scientific journal Science Magazine.

Erdogan Memili, assistant professor in MSU’s Department of Animal and Dairy Sciences, and his former graduate student, Nelida Rodriguez-Osorio, had key roles in the study. They coordinated the analyses of specific characteristics of bovine genes affecting reproductive traits and early embryo development. They also collaborated with other researchers in writing the study’s final report.

Memili’s research group and collaborators also published three companion papers to the cow genome study in the Journal of BMC Genomics.

“Now that the genetic blueprint of the cow is known, researchers can identify the specific genes and gene products needed to produce economically important traits in cattle,” Memili said.

He said the blueprint holds new information about what pieces of the cow’s DNA are responsible for traits such as milk or meat production and disease resistance. Scientists use a technique called marker-assisted breeding to identify the animals carrying these important traits and breed them to produce the desired traits in their offspring.

“This has worldwide significance because a bull with a superior genetic trait can be bred with thousands of cows around the world through artificial insemination technology,” Memili said. “The result is producers being able to pinpoint what traits they need and find the specific animals that can provide them.”

Abdullah Kaya, a researcher with AltaGenetics — the world’s largest privately owned reproduction and genetic improvement company — said that fully understanding the cow genome is sure to have a significant impact on the industry. The blueprint not only provides information about economically important traits, but also leads scientists to the most fertile animals.

By Karen Templeton

“Fertility among dairy cows has declined 28 to 30 percent, and as a result, producers are breeding their cattle three to four times as often,” Kaya said. “Knowing the specifics of the genome allows us to identify the most fertile cattle. Pinpointing those with the highest fertility cuts down on the time and expense associated with repeated breeding.”

Memili said better breeding strategies resulting from the genome mapping can enhance production efficiencies and the sustainability of cattle production systems.

Researchers also found that cattle and humans are more alike than previously thought. Humans have more in common with cattle than with mice.

“This means the cow can be used as a model organism to help answer important questions related to human reproduction, development and disease,” he said.

Memili said there is still more knowledge to be gained from the new genome research.

“This is really the beginning,” Memili said. “With this blueprint, we can finally answer questions related to cattle and the future of the industry.”

The full study is available at http://www.sciencemag.org.
Aquatics researchers at Mississippi State University study the natural mechanisms at work in lake ecosystems so they can find better ways to manage habitats, but large bodies of water do not always make good laboratories.

Different lakes can have different sets of variables and environmental conditions that influence outdoor studies. Scientists at the Forest and Wildlife Research Center in MSU’s College of Forest Resources can account for these factors by conducting their experiments in a newly constructed mesocosm (pronounced mee-so-cah-zim) on MSU’s South Farm.

A mesocosm is an experimental system of large, drainable tanks that simulate real-life conditions and allow manipulation commonly done in a laboratory. The college’s Department of Wildlife and Fisheries built the mesocosm with funding from the Mississippi Agriculture and Forestry Experiment Station. Construction began in 2007, and the facility opened a year later.

“If we attempt to conduct an experiment in a large lake, we often lose control over the factors that can influence the outcome,” said aquatic ecologist Eric Dibble, MSU wildlife and fisheries professor. “If we conduct an experiment in the laboratory with test tubes, we often lose the realism of the lake system.”

The mesocosm gives researchers the control they need and the ability to incorporate realism into the experiment. It contains several...
fiberglass tanks, each holding up to 1,800 gallons of water. Researchers manipulate the plumbing, electricity and tank capacity to replicate different environmental conditions.

The facility has a porous, curved-in roof over the tanks to allow sunlight to enter. The roof also provides protection and security for experiments. Researchers drain the tanks into a secure lagoon that is treated with various control agents.

“Some of our research involves invasive plant species that cause problems for native plants and threaten food sources for fish, birds and animals,” Dibble said. “We incorporated a security system to prevent these invaders from escaping into the environment.”

Invasive plants are a major area of research in Mississippi because they are found in some of Mississippi’s river basins and waterways. Dibble has collaborated with MSU Geosystems Research Institute assistant professor John Madsen on the effect of invasive plants on aquatic ecosystems and the additional effect of managing these plants.

“A mesocosm can be used to address ecology and management of invasive plant species, the effect of nutrient loading from fertilizer runoff, toxicity of natural and synthetic chemicals, and manipulation of various food chains,” Madsen said.

In one current study at the mesocosm, Dibble is working with other researchers to investigate three control methods for invasive plants: herbicides, plant-eating fish and mechanical harvesting.

“We need to understand how each control method may affect the growth, diets and movement of fish that live in that habitat,” Dibble said. “We also need to know how these methods influence water quality and the microbial organisms living in the water.”

Another primary research opportunity the mesocosm presents is the reintroduction of rare, threatened and native fish species into Mississippi lakes and rivers. The mesocosm functions as a hatchery and gives researchers a reference point around which to develop good conservation strategies.

“We use the mesocosm to alter plant materials and manipulate microbial activity to see how these actions affect the ability of fish to survive and reproduce,” Dibble said. “Wildlife managers can use this information to improve natural habitats and keep them healthy.”

The presence of the mesocosm also enhances MSU’s ability to successfully obtain research grants for investigations of water quality and aquatic resources. Funding for such projects is becoming more readily available, an opportunity that MSU researchers can now pursue, said MSU Wildlife and Fisheries Department Head Bruce Leopold.

“Many water-related questions that need to be addressed through science-based research require controlled and replicated experiments that earthen ponds just do not allow,” Leopold said. “We needed this capability to be competitive for research grants.”

The mesocosm was initially begun to assist aquatic researchers in the Wildlife and Fisheries Department, but other faculty members in the Division of Agriculture, Forestry and Veterinary Medicine also can use the facility.

“Demand to use our mesocosm has grown so swiftly that we are now planning to expand the existing facility by adding more tanks,” Leopold said. “We also plan to design a facility with smaller tanks to examine water flow dynamics that can influence sedimentation and erosion.”

Erica Schlickeisen uses a tube instrument to collect sediment core samples. The samples will be analyzed for content in the laboratory. (Photo by Eric Dibble)

Invasive Plant Control May Affect Lake Health

Some scientists researching invasive water plants look at the direct effects of these plants, and others assess different control methods.

MSU graduate student Erica Schlickeisen wanted to know about the indirect and sometimes unanticipated effects invasive plants have on water quality and microbial activity.

“Invasive plant infestations create problems because they can take over a lake and spread to other undisturbed water systems,” she said. “We need to know how these plants alter the processes within a lake system to keep from making a problem worse or causing additional problems.”

Schlickeisen is working on a doctoral degree with an emphasis in aquatic ecology in the Department of Wildlife and Fisheries. Her study is being funded through the Biological Resources Invasive Species Program of the U.S. Geological Survey in collaboration with the MSU Geosystems Research Institute.

Schlickeisen conducted her experiments at MSU’s mesocosm facility on the South Farm. The facility has a series of tanks, each with a holding capacity of 1,800 gallons of water. She created 24 different ecosystem settings with freshwater nuisance plants in these tanks. The settings were grouped according to treatment method: herbicides, biological control, mechanical removal and no manipulation.

“The MSU facility for establishing mesocosms was essential to this research because the tanks are large enough to represent natural processes occurring in lakes and small enough to manipulate and replicate for greater experimental rigor,” she said. “It would not have been possible to plant invasive species in 24 real-life ponds as it would have been irresponsible to release them into the natural systems.”

Schlickeisen measured water quality and microbial composition on a weekly and monthly basis. She found water quality and microbial activity varied with the techniques used.

“Even small, indirect changes in a lake ecosystem may affect the food supply and living conditions for fish and plants,” Schlickeisen said. “My initial results suggest that managers may need to monitor water quality following treatments to ensure that acceptable conditions persist in the water after treatments for invasive species.”
Decades have passed since surface coal mines left land scarred and bare, and expertise from Mississippi State University is helping the lignite mine in Choctaw County leave the land in even better shape than it was before.

North American Coal Corporation’s Red Hills Mine is a 5,800-acre surface coal mine, commonly called a strip mine. Gently rolling hills covered by pastureland and pine forests are replacing what recently was an open pit where the coal was mined. The land was mostly undeveloped forests, some of which were growing on land exhausted years ago by extensive row-crop farming.

“The Red Hills Mine is very different from the Appalachian strip mine concept,” said David Lang, an agronomist with the Mississippi Agricultural and Forestry Experiment Station.

Lang has been working with the Red Hills Mine for 5 years conducting research on suitable topsoil substitute materials and verifying the productivity and restoration of the land. Much of his work is making sure that the reclaimed land is suitable for future use and the soils are capable of sustaining the desired plant life.

More than 200 feet deep, the mine uncovers six layers of coal in the hilly region near Ackerman in north-central Mississippi.

“Mining is a constant process of digging the coal out and putting the earth back in the hole,” Lang said.

Reclamation is the process of restoring the land to its original or better shape once the coal has been removed.

In areas where prime farm land soil exists, the topsoil extends only about 1 foot deep, and this layer is carefully removed and set aside. The next 10–20 feet is oxidized, red sandy-loam subsoil that is common in this part of the state and can sustain healthy pasture and forest growth. Below that is the gray interburden, the material that surrounds the layers of coal.

The sandy subsoil and the interburden are hauled in a continuous process from where they are dug out of the ground to the other end of the pit where land is being reclaimed. Once all the coal is removed from an area, the interburden is placed first in the hole, filling it to within about 4 feet of its previous level. Sandy subsoil fills in the rest.

“The red, oxidized material becomes topsoil if the land was not already prime farmland,” Lang said. “If it was prime farmland, they put back the topsoil. The goal is to restore the land to equal or better productivity.”

The area is reshaped to approximate the original contours of the land with care given to creating gently rolling hills rather than the steep, unusable slopes previously found in many areas.

“They take out 12–20 feet of coal in those six layers, so you’d think that would lower the land, but the elevation is actually higher afterward because the soils are not as compacted as before,” Lang said. “The land is much more useful after it has been mined and reclaimed.”
Ownership of the land remains with the original landowners, and the Red Hills Mine pays for their mineral rights through royalty payments for coal that is mined from their land.

“At the end of the time period, Red Hills Mine will have restored whatever they asked for in the original contract,” Lang said. “Most landowners have asked for pastures or pine plantations.”

Judd Sanborn, environmental specialist with Red Hills Mine, said the reclamation work is an attempt to do what is best for the landowners who leased to the coal company.

“We want to make sure we get the right soil back on top that will benefit the landowners for what they want to grow,” Sanborn said.

Lang’s responsibility with the Red Hills Mine includes vegetation monitoring, soil sampling and productivity verification.

“Mississippi State is a credible third party. Even though you can come to our mine and look for yourself, it always seems better when a third party says it’s OK,” Sanborn said. “We have done land reclamation before, but there may be concepts out there that we don’t know about. Our partnership with Mississippi State keeps us current with any new and better ways of doing things.”

Sanborn said the company mines and reclaims between 100 and 120 acres a year. As stated in the contract landowners signed before the work began, landowners lose access and control of their property for 10–12 years, but they regain their property with established new growth.

“Before mining, we send out landowners’ preference statements that say we will reclaim your land to loblolly pine forest with wildlife habitat,” Sanborn said. “If landowners want something else, they tell us. The vast majority of the mine area will be pine plantation when we’re finished with it.”

The Department of Environmental Quality regulates the mining and land reclamation process. Sanborn said the mine is required to maintain the trees for 7 years before returning control of the property to the landowners.

“We have to reach certain tree and ground cover counts per acre, and we have to submit this information to DEQ,” Sanborn said.

In addition to his work establishing loblolly pine plantations, Lang’s research also focuses on the successful establishment of Bermudagrass for pastures and ground cover.

“My data indicates that the Red Hills Mine is meeting and exceeding standards for Bermudagrass productivity and ground cover, including a number of volunteer native species and tree establishment,” Lang said. “A healthy ecosystem is being reestablished.”

(Center Photo) MAFES agronomist David Lang, left, talks with North American Coal environmental specialist Judd Sanborn about preparations for planting switchgrass on reclaimed mine land. The Red Hills Mine near Ackerman mines and reclaims about 100 acres of land a year, and the majority is turned into managed pine plantations for the landowners who leased property to the coal company.

Surface coal mining is a continuous process of removing layers of soil to uncover the coal, and then putting the soil back in the pit after the coal has been removed. This machinery is moving the topsoil, red sandy-loam subsoil and interburden to expose the coal at the Red Hills Mine.
Outreach and Education

Mississippi State University’s Division of Agriculture, Forestry and Veterinary Medicine (DAFVM) provides outreach and educational services to children and their families throughout the state. The educational activities take students outside the traditional classroom and provide them with hands-on experiences. From understanding health and nutrition to learning financial management, DAFVM strives to provide interaction and activities that keep students engaged. Providing education is not only beneficial for the state’s children, but also for the DAFVM staff, students and volunteers.

Interactive Exhibit Encourages Health, Fun

Marco Novich
An interactive learning program administered by Mississippi State helps children get inside the human body and understand that lifestyle choices made at early ages have a direct impact on adult health.

Sponsored by MSU’s Extension Service, 4-H and Blue Cross/Blue Shield, Body Walk is a free, traveling exhibit of the human body with 10 interactive learning stations. Each station teaches children in a fun way about the human body and how to make healthy choices.

Body Walk, established in 2006, has been popular among the state’s schools. About 20,000 Mississippi school children visit the exhibit each year.

“The program is available for kindergarteners through fifth-graders, from September through the last week in May, and schools certainly take advantage of it. The schedule stays full,” said Vivian Cade, MSU Extension associate and Body Walk director.

Body Walk’s stations focus on the stomach, small intestines, heart, lungs, brain, mouth, bones, skin and muscles. At each of the stations, a volunteer presenter engages students in a 5-minute activity focused on making healthy choices. The students walk through a giant ear into the brain before entering the stomach station, where they are designated to be a certain food, such as a hamburger, carrot or piece of cheese. They learn how these foods are broken down and absorbed as they move through the intestines and into the bloodstream.

“Interactive learning helps the students understand how the body works,” Cade said. “If they are having fun, they tend to absorb and remember more of the lessons.”

Patricia Miller, kindergarten teacher at Sudduth Elementary School in Starkville, said Body Walk helps solidify the health lessons taught in the classroom.

“We presented a health unit before going to Body Walk, and it was great to see how the program helped the students recall the lessons on the body and nutrition,” Miller said. “It helps to have what we teach be reinforced in such a hands-on way.”

Teachers and parents are provided Body Walk handouts before and after the students participate to help reinforce the lessons taught in the program.

“We even encourage them to bring the information home to their parents, so the whole family can maintain a healthy lifestyle,” Cade said.

The schools and county Extension staff enlist volunteers to set up the exhibit and serve as presenters at each station. The volunteer presenters use a script and props to teach the students at their designated stations.

“Volunteers do a fantastic job and get the hang of it very quickly,” Cade said. “I think they enjoy it. When the adults have fun, the kids have fun.”

Volunteer and Clay County Extension Director Donna Cliett’s interests are in nutrition, health and food safety. She said participating in Body Walk is just as enjoyable for the volunteers as it is for the students.

“The kids are so receptive to the information, and I am impressed with how much knowledge they already have,” Cliett said. “Witnessing them understand important issues, such as heart disease and diabetes, is really promising.”

High school students with an interest in teaching, health and nutrition also participate as Body Walk volunteers. Cade said this is beneficial not only for the high school students, but also for their teachers.

“After working with excited younger children all day, the high school volunteers gain a new appreciation for the work their teachers do,” Cade said.

Cade said one of the most rewarding components of the program is that teachers embrace the lessons.

“It is nice to know that what we teach here follows the children back to the classroom and their homes,” Cade said. “Lessons learned here and in the classroom lay the groundwork for the children growing to be healthy adults.”
Mississippi State veterinary students learn in the classroom and in the laboratory, but the real test comes when they add in the responsibility of staging the spring open house and teaching the public about animal care and welfare.

For more than two decades, MSU’s College of Veterinary Medicine has welcomed children and families to its annual open house.

The open house, celebrating its 25th year, allows children and their families to learn about animal health and behavior while having fun. One of the primary goals of the program is to open the world of veterinary medicine to the community through exhibits, demonstrations and presentations.

In between classes and studying, first- and second-year CVM students plan the event, said Kylee Fent, open house chair and president of MSU’s Student Chapter of the American Veterinary Medical Association.

“We take it seriously,” Fent said. “The committee chairs start meeting in January and then at least every 2 weeks until the event. We balance our coursework with making sure we plan a successful open house program.”

CVM sophomores serve as event chairs, and freshmen serve as cochairs. The sophomores mentor the freshman cochairs so that they can pass the baton to them for a smooth transition to conducting the following year’s open house.

One of the committee chairs, CVM student Leslie Koenig, said that planning so far in advance eases the pressure.

“We have plenty of time to work out the details and also focus on our studies,” Koenig said. “It is a good learning experience for us, and we get to work as a team. We work together to choose the theme and the graphic design for the open house booklet.”

CVM faculty members participate by offering assistance and by filling positions the day of the event. CVM associate professor Dr. Carla Huston was on elevator duty at this year’s open house.

“We man the positions the students need filled, such as monitoring the hall and elevators, and they run the show,” Huston said. “Our vet students do a great job of juggling all of their responsibilities. They had three exams this week and still dedicated themselves to the event.”

Fent said their hard work paid off as visitors enjoyed this year’s program.

“Younger students really liked the variety of animals, the petting zoo and the dog Frisbee competition,” Fent said. “They also seemed to enjoy seeing animals they wouldn’t normally encounter, like unique and exotic pets.”

High school students took the opportunity to talk to veterinary students and faculty about career paths. They asked questions about CVM admission procedures, coursework and the types of careers that veterinarians pursue.

“We bring our 10th- through 12th-graders every year that we can,” said Melanie Ford, allied health teacher at McKellar Technology Center in Columbus. “The class I teach covers aspects of veterinary medicine, so the open house fits right into the curriculum.”

Ford said the students’ favorite exhibit is the “Holey Cow,” a research steer that teaches students about the digestive tract of ruminants.

The CVM open house not only teaches children and families about veterinary medicine, but it also educates CVM students about outreach, working with the community and time management.

“All the hard work pays off because it ends up being fun. We get to talk about what we love to do, get others interested in veterinary medicine and show off our school,” Koenig said.
A financial literacy program is leaving lasting impressions on high school students as they get a taste of the real world.

“Welcome to the Real World” introduces students to realistic scenarios and the budgeting challenges life can bring. Teresa Lyle, family resource management area agent with the MSU Extension Service, brings the program to school groups ranging from 10 students to 300 or more.

Each student is given a scenario that includes an occupation and entry-level salary, marital status and possibly children, and a check register. They must budget for a house, vehicle, utilities, food and other expenses such as child care. They also must pay taxes.

“They really don’t like to pay taxes because it takes away from their money. The whole experience is a real eye-opener,” Lyle said. “They have to live within the salary and have at least $1 left over. They also have to establish a savings account. Loans are not an option. If they run out of money, they have to get a second job.”

Lyle has been conducting the program in schools since 2006. She said students often walk away with a greater commitment to their education and a desire to delay marriage and children.

“Many of them gain new appreciation for their parents,” she said. “It impresses on kids the need to wait on starting their families. They realize that life is not cheap, so they want to pick the best career possible, be financially sound before having children and get a good education.”

Lyle said the program involves volunteers from the community, including bankers, insurance agents, car dealers, child-care workers, state government officials, Internal Revenue Service personnel, Better Business Bureau representatives, and Extension Service county directors, 4-H agents and area agents.

Minadene Waldrop, secondary curriculum specialist for the Rankin County School District, said they could not offer the program without the Extension Service pulling resources together.

“Students benefit from tying in with local organizations such as the Extension Service and the business community,” she
said, “Kids are pretty naive and don’t realize the importance of things like insurance.”

Waldrop said some students went through the program twice, first in ninth grade and again before graduation.

“The lessons serve both age groups well. Ninth-graders gain an appreciation of what their parents go through, and 12th-graders are about to go out into the real world,” she said. “This program provides a valuable learning strategy.”

Lyle said she enjoys the opportunity to watch students learn from the lessons.

“The kids really get involved in the project. It is interesting to see them trying to live within their assigned salaries,” Lyle said. “Many want to rely on families or agencies for assistance rather than taking care of their own needs. They get frustrated when we tell them parents are not options for child care or loans.”

A Magical Experience with Wood
From amazing termites to bubbling bazookas, fourth-graders from around the state learn something new at the Wood Magic Science Fair.

The fair, in its ninth season, is held in October each year on the university campus. Created by forest products faculty and staff, Wood Magic teaches the importance and use of wood as a renewable raw material.

“There are so many misconceptions about the depletion of trees and the ways we use our forest,” said David Jones, assistant Extension professor and fair coordinator. “Wood Magic gives us an opportunity to demonstrate to students the important uses of wood in our everyday lives.”

Approximately 3,000 students attend the fair each year, learning everything from how termites find each other to how strong wood is in a toothpick-sized piece of pine, Jones said. Most importantly, students learn that forest products industries are environmental conservationists. Faculty, staff, students and retirees conduct the fair.

Many young people are concerned about the planet and want to protect the environment. At Wood Magic, they learn that wood is the greenest thing around. It is renewable, recyclable, biodegradable and durable. We grow more trees today in the United States than ever before, Jones added.

The fair begins with a film about how a house is made. One message conveyed is that 25 trees are used in the construction of an average home.

“The take-home message is that all parts of the tree are used in the construction, and five trees are planted for every tree harvested,” Jones said.

The students get a class photo and then proceed through a fast-paced, hands-on adventure, which includes a pizza lunch and a popcorn snack. The fair takes about 3.5 hours to complete and is a self-guided tour to different stations. Each event last for 15 minutes, Jones added. Wood Magic includes several major displays:

- A portable sawmill that turns rough logs into lumber and helps introduce such terms as heartwood, sapwood and residues;
- “Wood sandwiches,” illustrating how plywood is made;
- Furniture testing, including computerized evaluations of seat cushions and frames;
- “Bubbling bazookas” that transform small oak billets into bubble blowers and illustrate wood’s density, permeability and other characteristics; and
- Wildlife skulls, antlers and horns, to better understand an animal’s distinctive biological features and lifestyles.

The fair has received numerous awards and has been adapted by other universities, including Virginia Tech, University of South Carolina, University Oregon and University of Kentucky. Sponsored by the College of Forest Resources and the forest products department, Wood Magic is indeed a magical experience for elementary students and their teachers, Jones said.
From light bulbs to lumber, more and more Americans are buying “green” products. In fact, about one-third of adults in the United States claim to regularly buy green products, according to a survey conducted by Mintel, a leading market research company. Many individuals are buying into green living, but how does one really know that the products they purchase are good for the planet?

“Certification is the ‘green light’ that indicates products have passed independent evaluation and are considered environmentally sound,” said Glenn Hughes, forestry Extension professor in the College of Forest Resources.

There are hundreds of items ranging from paints and cleaning products to coffee and wood products that have met the criteria to be called “green,” Hughes said. However, there are so many entities providing certification, a consumer can get lost in the emerald sea.

“Certification of forests is no different. Forest certification focuses on the process by which forests are regenerated, managed and harvested to protect soil, air, water, wildlife, biodiversity and other forest benefits,” Hughes said.

Forest certification seeks to ensure proper management of forestlands by establishing standards that protect ecosystems and their social
and economic benefits while encouraging sustainable production of consumptive
and nonconsumptive forest products.

Globally, there are more than 50 forest certification entities. In the U.S., there are
three major certification systems: the Forest Stewardship Council (FSC), Sustainable
Forestry Initiative (SFI), and American Tree Farm System. So how does someone
determine the best system?

“Forest certification is not ‘one-size fits-all,’ so it is difficult to say which one is
best for landowners,” said Steve Grado, forestry professor and economist in MSU’s
Forest and Wildlife Research Center. “Landowners must consider costs, management
practices, and compliance to certification standards, and the current market for their
products when considering the best forest certification program in which to enroll.”

Certification, which is a voluntary, nongovernmental process, provides numer-
ous benefits for landowners. It provides landowners with a means to demon-
strate responsible forest management that has a positive effect on the environment and is
consistent with their long-term goals. It may also provide access to new markets and
can provide nontimber benefits such as improved wildlife habitat, water quality and
aesthetics.

That does not mean landowners who are not certified do not practice sustain-
able forestry; however, it seems the tide is definitely turning towards an environm ent
where certification may be necessary when selling timber to many mills or lumber to
retail outlets, Grado said.

Many forces drive this green tide, including the forest industry, environmental
advocacy groups, architects, developers, consumers, companies and governmental
agencies, particularly at the state level.

“For example, author J.K. Rowling requested that the last Harry Potter book be
printed on recycled paper, and it was printed on FSC-mixed sources paper,” Hughes
said. “Additionally, Jeld-Wen, the world’s leading manufacturer of reliable windows
and doors, is now offering SFI-certified building products. Home Depot has sold
more than 200 million products from certified forests.”

While forest certification has numerous benefits, including credibility and
potential access to new markets, there are challenges for landowners throughout the
South. Some certification systems limit management practices and discourage the use
of fertilizers, herbicides, insecticides and genetically enhanced trees. It also can be
costly to become certified with some systems.

“In the South, forestland ownership consists of 5 million private nonindustrial
landowners who own 71 percent of the forestland,” Hughes said. “As a result, for for-
est certification to work in the South, it must be economically feasible for a majority
of these private landowners.”

Costs for certification are incurred both directly and indirectly and vary by the
system. Direct costs may include items related to a preassessment, initial assessment,
annual audits, 5-year reassessments and the certification fee. Operational costs
include a management plan, more intensive record keeping and compliance with
standards.

Private nonindustrial landowners can lessen the individual cost by joining
with other neighboring landowners to form a group and obtain certification. An
example of this would be a consulting forester who acts as a group manager and
holds a certificate for a multitude of landowners, Hughes said.

“The main benefit of forest certification is that the landowner has access to the
maximum number of markets. At this time, there is little indication that producers get
a premium price for their products,” Hughes said. “The key is to find the forest certi-
fication system that works best.”

For more information on the forest certification process, review the publication
Private Landowners’ Guide to Forest Certification in the South online at http://msu-
A new Mississippi State University study shows that when it comes to horticulture, the right combination of machinery and human laborers can cultivate positive results for this growing industry.

Many jobs in the nursery and greenhouse industry are labor-intensive and physically demanding. To improve production and prevent worker injuries, the industry is turning to mechanization and automation. Mechanization is the replacement of human tasks with machines. Automation is a larger process that involves the use of various mechanized systems in a facility.

Researchers with the Mississippi Agricultural and Forestry Experiment Station and MSU’s Extension Service conducted a study measuring the socioeconomic impact of automation and mechanization. They looked at sales, employment, safety, and worker earnings and retention in nurseries and greenhouses in the northern Gulf of Mexico region. Researchers collected data through personal interviews with 87 randomly selected nurseries and greenhouses in Mississippi, Alabama and Louisiana.

“There needs to be continuous improvements in the workforce and processes for the industry to succeed,” said Ben Posadas, MSU associate Extension and research professor and the study’s lead investigator. “We aimed to develop a socioeconomic profile of horticulture workers and specifically look at how new technology affects nursery and greenhouse workforce operations.”

Researchers found that a significant number of participating nurseries used new technology for filling containers, pruning plants, applying chemicals, transporting containers to fields and moving containers from potting to transport. A small number of businesses participating in the survey used technology for tasks such as cutting, harvesting, collecting seed, planting seed, placing plant liners, and grading production.

Study results showed that adding new systems to increase efficiency did not displace any workers but instead improved workers’ total earnings. Researchers also found that businesses taking advantage of mechanization and automation had higher sales.

Jeff Howell, owner of Rocky Creek Nursery in Lucedale, said mechanization has improved his operations.

“This business is very labor-intensive, but machines have made some of our processes easier,” Howell said. “We use potting machines and a conveyer system to move material from potting machines to the rows.”

Howell said the technology takes over some of the more strenuous tasks.

“The machines have made drastic improvements for our workers,” he said. “We do not have to do as much stooping down or lifting of heavy containers.”

Dan Batson, owner of GreenForest Nursery in Perkinston, agreed with Howell. Batson and his staff use pot-filling machines and a low trailer to move plant materials for shipping.

“Finding and using new technology has made our operations more efficient and boosts employee morale,” Batson said. “Workers are less burdened with bending over and carrying heavy materials.”

Study results also indicate that automation and mechanization enable businesses to hire more workers with less horticulture experience.

“With the use of technology, there is less need for the workers to be as skilled in horticulture,” Posadas said. “We did not find, however, that there was any impact on the time it took to train new workers or retain them.”

Posadas said the key to maintaining current workforces in the industry is creating good worker conditions.

“This can be achieved through providing benefits and a safe work environment and also by improving their productivity through the adoption of mechanized or automated systems,” Posadas said.
Growing produce and cut flowers year-round could offer a potentially significant economic opportunity, and Mississippi State University researchers are collecting data to determine if it is a feasible strategy for the state’s growers.

Bill Evans is the leader of a team that received a nearly $500,000 competitive grant for a 3-year project at two MSU and two growers’ sites. This project was supported by the National Research Initiative of the U.S. Department of Agriculture’s Cooperative State Research, Education and Extension Service.

“We are working with high tunnels, which are unheated greenhouses that allow us to extend the growing season later into the fall and earlier into the spring,” said Evans, the grant’s primary investigator. “We’re trying to see if we can start crops in the fall and grow them through the winter without heat using multiple covers inside these tunnels.”

Evans and his team will be growing tomatoes and zinnias in high tunnels at the MAFES Truck Crops Branch Experiment Station in Crystal Springs, MSU South Farm in Starkville, Mayhew Tomato Farm in Lowndes County and Farm Fresh Produce in Stewart.

High tunnels, also known as hoop houses, work by using layers of plastic to trap warmer daytime air inside and minimize heat loss from the system at night. The layers of plastic insulate plants from cold temperatures outside the tunnel in much the same way that a person wears multiple layers of clothes to keep warm.

“If we can grow and produce a tomato in the winter in Mississippi without heat, then we can produce just about anything. These are also high-dollar crops with good market potential,” Evans said.

The grant will fund several research, graduate and laborer positions in the Department of Plant and Soil Sciences, Department of Agricultural Economics and Truck Crops Branch.

The high-tunnel greenhouses being used are 12 feet high at the peak, 30 feet wide and 96 feet long. They contain about 2,800 square feet each and can be built for between $1 and $4 per square foot for a total cost of about $4,400 each. While similar to a traditional greenhouse, these are not permanent structures, and each has an expected use of 5–10 years.

“All four sides can be raised to allow air inside to move freely,” Evans said. “The sides can open 4 feet high, while the ends can be completely opened to allow a tractor to plow through the tunnel.”

Plants are grown in the ground, and irrigation is necessary because the structure prevents rains from reaching the plants. Because the tunnels do not need electricity, they can be placed almost anywhere there is access to irrigation. Researchers don’t plan to screen the greenhouses to keep out pests.

“How a high-tunnel climate interacts with insects and diseases in unknown in the South,” Evans said. “That’s one of the big questions we have as researchers, and although it is not our primary focus, information we gather will be useful in answering this question.”

In addition to Evans, researchers and Extension specialists on this project are horticulturists Mengmeng Gu and Guihong Bi and agricultural economists Ken Hood and Randy Little.

Gu has the first Extension publication related to the project under review and is working on a Web site. These will provide a central location for information on high-tunnel production. She will be involved in the project as the liaison between researchers and growers and is in charge of outreach activities.

“There’s great interest among Mississippi producers in high-tunnel production,” Gu said. “I’m just back from a North Carolina tour sponsored by the Mississippi Fruit and Vegetable Growers Association where high-tunnel production was featured.

“There were about 30 producers from all around Mississippi on the trip. Some are a little suspicious about the technology and want to find out more, but I think most of them are very interested,” she said.

Gu said high-tunnel production is feasible in the state. “With high tunnels, we could grow a lot of crops with a longer growing season,” Gu said. “The fluctuation of temperatures, especially in early spring, makes it difficult to grow crops, but high tunnels help to minimize the fluctuation and increase nighttime temperature.”
1/82: Clay County

MSU in Clay County:
Clay County Extension Office
218 W. Broad Street, Suite D
West Point, MS 39773
Email: clay@ext.msstate.edu

County Seat: West Point
Population: 21,969
Municipalities: West Point
Commodities: Beef, timber, row crops and pecans
Industries: Mossy Oak Camouflage’s International Headquarters
The Babcock and Wilcox Company
Navistar Defense
Natural Resources: The Tenn-Tom Waterway and its tributaries provide abundant fishing and boating opportunities.

History Notes: Founded in 1871, it is named in honor of Henry Clay, a member of the U.S. Senate from Kentucky and later Secretary of State under John Quincy Adams. The county was organized on May 12, 1871, during the Mississippi Reconstruction.

Attractions: Town Creek Campgrounds, Waverly Landing, Howlin’ Wolf Museum and Memorial Blues Festival, Center Stage Performing Arts Auditorium, Sam Y. Wilhite Transportation Museum, Prairie Arts Festival, Old Waverly Plantation and Golf Course, and 30 listings on the National Register of Historic Places. The county looks forward to new attractions coming in the next year such as the 4-H Therapeutic Riding Center and the ATV Training Grounds.

Did you know?
The windmill is the unofficial landmark of West Point. It became a popular fixture on a local cattle ranch off of Highway 50 East. The windmill image was used to promote the Prairie Arts Festival in its early days. In 1992, West Point, Neb., donated a windmill to the city, and it has remained the symbol for the festival and a landmark for the town.

“Working for Clay County citizens and the MSU Extension Service is a great opportunity. There is never chance for boredom because there is something different going on every day. If anyone says they are bored or there isn’t enough to do here, they just haven’t been paying attention!”

Donna Cliett, Extension County Director

Editors note: 1/82 is a regular feature highlighting one of Mississippi’s 82 counties.
The National Science Foundation has just released its annual research rankings of the nation’s universities. In agricultural research, Mississippi State University is ranked fifth in the nation, based on total research expenditures. The top 10 are

1. University of Florida,
2. University of California at Davis,
3. Purdue University,
4. University of Georgia,
5. Mississippi State University,
6. Virginia Tech University,
7. Michigan State University,
8. Texas A&M University,
9. Cornell University and

What is very noticeable about this group? Most represent states with large populations. Most are large schools, in terms of both students and faculty. The University of Florida, Texas A&M, Michigan State and Purdue all rank in the largest 15 student populations in the nation.

Mississippi State’s enrollment is less than half the size of any of these schools. The state budget for agricultural research at the University of Florida is three times as large as that of MSU.

So how can MSU compete with a school with triple its resources? There are several answers.

First, MSU is dedicated to its land-grant mission of making university research results and educational programs available to the people of the state. The university’s administration and congressional delegation have a long history of working together to provide the resources to carry out that mission.

Second, Mississippi State has always had great strength in multidisciplinary research. Where another school might have an engineer, an economist and a biologist do separate research and give conflicting answers, Mississippi State is likely to have scientists from all three of these disciplines work together on a project, so research results are agreed on from all directions. Because of this philosophy, agriculture is defined very broadly, ranging from biochemistry to the social sciences.

Third, Mississippi State is much more closely tied to the people it serves. This happens through the Extension Service and the MSU experiment station facilities located throughout the state, as well as through support from agricultural producer organizations and input from advisory groups. For example, the Mississippi Soybean Promotion Board is in close contact with our researchers, so the soybean research they do will be what is most needed by producers. This type of relationship means that we are much more likely to give usable answers, not just articles in technical journals.

The federal government says that it wants “outcomes” not just “outputs” from research. I see a technical publication as an output. Improving the profitability of a producer is an outcome that has positive benefits for the individual and for the economy of the entire state.

Of course, the foundation for beneficial research outcomes is the dedicated men and women who work in the laboratories, branch stations and other facilities of the Mississippi Agricultural and Forestry Experiment Station.
Graduate Student Honored at Cotton Insect and Control Research Conference

MSU plant and entomology doctoral student John Frederick Smith was honored at the 2009 Beltwide Cotton Insect Research and Control Conference in San Antonio, Texas.

The Insect Research and Control Conference competition is designed to encourage outstanding graduate work in cotton entomology and promote graduate student attendance at the National Cotton Council-coordinated annual Beltwide Cotton Conferences.

Smith received an honorable mention in the Gary Herzog Memorial Ph.D. competition for his study, “Cotton Yield Loss from Mid- to Late-Season Two-Spotted Spider Mite Damage.” His major professor is Fred Musser, assistant professor of plant and entomology.

The Ph.D. competition was renamed in 2002 in honor of the late Gary Herzog, a University of Georgia professor and researcher.

Entomologist Transfers to Delta Research and Extension Center

MSU entomologist Don Cook recently moved to the Delta Research and Extension Center in Stoneville where he will continue his research on insects in soybeans and corn.

Before moving to Stoneville, Cook had worked for 2 years as an area Extension specialist at the North Mississippi Research and Extension Center in Verona.

“The position at DREC offered me an opportunity to return to entomological research, which is what I had done several years early in my career,” Cook said.

A graduate of Louisiana State University, Cook spent part of his early career working as an entomologist in the northeast Louisiana delta.

Pace Recognized by National Institute for Animal Agriculture

Dr. Lanny Pace, executive director of the Mississippi Veterinary Diagnostic and Research Laboratory System, was presented the National Institute for Animal Agriculture (NIAA) President’s Award at the annual meeting March 31 in Louisville, Ky.

The President’s Award is given to an NIAA committee chairman in recognition of exemplary leadership and dedication to the institute. Pace heads NIAA’s Emerging Disease Committee.

Dr. Kent Hoblet, dean of MSU’s College of Veterinary Medicine, commended Pace, who serves the university as a professor in pathobiology and population medicine in addition to his duties with the state diagnostic lab.

“The award is a tribute to the work Dr. Pace has done in overseeing the expansion of our state diagnostic lab system since he became the executive director,” Hoblet said.

First J. Paul Thaxton Graduate Assistantship Awarded

J. Paul Thaxton Graduate Award recipient Nick Sallas, left; Mike Morris, KFC Manager of Poultry Health and Welfare; Mike Kidd, head of MSU’s Poultry Science department; Yvonne Vizzier Thaxton, Poultry Science professor.
A newly established poultry assistantship will help MSU expand its research of animal welfare issues.

KFC and the Yum! Brands Foundation are funding the assistantship at MSU’s Poultry Science Department in memory of J. Paul Thaxton, a former professor of poultry science at MSU and member of KFC’s Animal Welfare Advisory Council. Thaxton passed away in October 2007.

Nick Sallas of Columbiana, Ala., is the first recipient of the assistantship for the Study of Animal Welfare. Sallas received his undergraduate degree in poultry science from MSU and is working on a master of science degree with emphasis in animal welfare.

Faculty Articles Included in Policy-Based Magazine

Three faculty members from MSU’s Department of Agricultural Economics wrote articles included in Choices, a policy-oriented magazine published by the Agriculture and Applied Economics Association.

Barry Barnett, Keith Coble and Andrew Muhammad joined other economists from a variety of sectors to examine the economy and its relationship to agricultural markets. The issue of Choices in which their articles were included examines the impact of the world economy on U.S. agriculture and how current economic instability is affecting agriculture.

Agricultural Economics Professor Honored

Keith Coble, professor in the Department of Agricultural Economics, received the new William L. Giles Distinguished Professors honor, MSU’s highest honorary distinction.

Coble is a nationally recognized scholar in the area of crop insurance and risk management and his research findings have been published in the leading agricultural economics journals. Coble is recognized as an expert in agricultural crop insurance and risk management and was invited twice by the U.S. Congress to present testimony before their committees.

“The organization, discipline and passion Dr. Coble brings to his research efforts are magnified in his teaching endeavors,” said Steven C. Turner, head of MSU’s Department of Agricultural Economics. “His investment is in not only making sure students learn and understand the material, but also learn and understand the meaning of professionalism.”

Garrett Steede, left, is joined by Rodney Moore, donor of Steede’s $1,500 Animal and Dairy Sciences (ADS) scholarship. The two met during the Super Bulldog Weekend Ag Alumni Breakfast in April. The scholarship goes to an ADS production management student who maintains a 3.0 or higher grade point average. Moore, an ADS alumnus, is from Alpharetta, Ga. Steede is a senior from Lucedale and serves as a College of Agriculture and Life Sciences Ambassador.
Scholarships touch lives, start careers
Current economic conditions have increased the need for scholarships for well-qualified students at all institutions of higher education, including Mississippi State University.

“There is a need for additional dollars earmarked for scholarships for immediate use,” said Bo Hemphill, MSU Foundation executive director of development. “We understand economic conditions and how families are impacted and are trying to help as many students as possible.”

The Division of Agriculture, Forestry and Veterinary Medicine is among the areas where scholarships can make a difference for students. The division has strong academic programs in 17 major disciplines in the colleges of Agriculture and Life Sciences, Veterinary Medicine and Forest Resources.

“The division is fortunate to have some of the brightest, most talented students at MSU enrolled in our programs,” said Melissa Mixon, interim vice president for the division and dean of agriculture and life sciences. “MSU ranks first in retention and in the number of graduates among Southeastern Conference universities, and it is the generous gifts of our friends, alumni and others who make a college education a reality for many of our students.”

The following are the stories of some of the students for whom the availability of scholarships is making a significant difference.

The College of Agriculture and Life Sciences
Recent MSU graduate Rachel McBride Rayburn is headed back to her hometown of Lucedale to teach agriculture at the high school she attended. A special scholarship paved the way for Rayburn to pursue her lifelong dream.

“I always wanted to be a teacher, but it wasn’t until I was in my junior year of high school that I discovered I wanted to teach agriculture. Lucky for me, the Ainsworth Scholarship at MSU carried with it that preference,” said Rayburn.

A May 2009 graduate in agriculture information science and education, Rayburn was the first recipient of this scholastic award. She is substitute teaching at George County High School and hopes to secure a permanent position with the school for the upcoming academic year.

During her senior year at George County, Rayburn began showing cattle with the Future Farmers of America. She said she loved this experience.

“I thought if I want to be a teacher, then agriculture is what I want to teach,” explained Rayburn, who transferred to MSU from Jones County Junior College.

The late Ted Ainsworth, an MSU agriculture education graduate and a member of the Mississippi Agriculture Teachers Hall of Fame, shared Rayburn’s love of teaching and agriculture. His widow, Donna Ainsworth of Magee, established the Ted Ainsworth Memorial Endowed Scholarship in the College of Agriculture and Life Sciences as a tribute to her husband.

The College of Agriculture and Life Sciences at Mississippi State enrolls more than 1,345 undergraduate and graduate students in 10 academic departments. Many of those students, like Rayburn, are in need of scholarships to help them pursue their dreams.

The College of Forest Resources
Mitch Weegman followed his passion for waterfowl all the way to MSU from his native Minnesota.

In 2008, Weegman was led to MSU by the desire to study waterfowl under a well-known researcher and professor and the availability of a scholarship in his chosen field.

MSU is one of only a handful of universities in the nation offering programs in waterfowl and wetlands conservation. The program is in the College of Forest Resources and is led by Rick Kaminski, holder of the newly endowed James C. Kennedy Chair in Waterfowl and Wetlands. Kaminski is a nationally recognized North American waterfowl and wetlands scientist.

“It is phenomenal to work under someone in the forefront of research,” said Weegman, who is specializing in wildlife science and plans a career as a waterfowl biologist.

Assisting Weegman with his out-of-state tuition is the Scenic Homes/Dr. Richard M. Kaminski Scholarship in Waterfowl
and Wetlands. Scenic Homes, a Georgia-based business, established the endowment in honor of Kaminski, who also serves as associate dean for Forest Resources.

“I have met my benefactor, Paul Meng of Scenic Homes, and thanked him for funding my education. I continue to express my appreciation whenever possible because the scholarship is one of the reasons I was able to attend MSU,” Weegman explains.

Weegman was recently named MSU’s 12th Goldwater Scholar, a national distinction named in honor of the late Arizona senator, Barry Goldwater.

In addition to his academic achievements, Weegman also selected Mississippi State because of his love of athletics. He runs cross country as a member of the Bulldog track team.

The College of Veterinary Medicine

Talisha Moore began her graduate work at MSU in 2005 and was accepted into veterinary school in 2007. She is pursuing a doctor of veterinary medicine while also working on her Ph.D. in neurotoxology. During her first semester of veterinary school, she was enrolled in the programs simultaneously. At that time, CVM was developing a formal dual degree program to encompass students interested in medicine and graduate study. Moore became the first student enrolled in the new program.

Her program of study is both rigorous and rewarding. Before enrolling at MSU, Moore, a New Orleans native, worked as a zookeeper and sea lion trainer at the Memphis Zoo.

Moore said she was drawn to the medical field at an early age. The influence of her mother, a registered nurse, had a lot to do with her decision, she added.

“My mom worked in the operating room of the V.A. Medical Center in New Orleans, and I was able to view a cornea transplant and an open-heart surgical procedure,” she explained. “A fascination with medicine coupled with my love of animals made it an easy choice to pursue this career path.”

A scholarship is easing part of Moore’s educational expenses. She is the recipient of the Morgan Freeman Scholarship in Veterinary Medicine, an endowment created by the award-winning actor and director to ensure promising minority students are offered the opportunity to study veterinary medicine.

“The scholarship has certainly kept me from incurring debt and gives me peace of mind,” Moore said.

Moore’s love of animals is apparent as she has three adopted rescue dogs — two miniature dachshunds and a beagle.

Annual and endowed scholarships may be established at any time through the MSU Foundation. Many scholarships are open funds that may benefit from additional contributions. Scholarships at Mississippi State may be given in honor or in memory of a loved one, mentor, fellow classmate, family member or friend. For more information on establishing a scholarship or supplementing an existing scholarship, contact one of the following development officers:

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