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A charm of hummingbirds hovers around a feeder in a Mississippi garden. Unique to the Americas, these miniature marvels winter in Central and South America. Only ruby-throated hummingbirds, the most extensive travelers, are known to breed east of the Mississippi River. (Photo by Tom Thompson)

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Vice President’s Letter

Fall marks the passing of another season and signals the start of a new academic year. Fall enrollment numbers hit record highs for our division. We had a record student enrollment of 3,113, with 2,152 in the College of Agriculture and Life Sciences (also a record), 330 in the College of Forest Resources, and 431 in the College of Veterinary Medicine.

With so many sharp young minds on campus, we need to find new ways to recruit and reward excellent faculty. I am proud to note we recently recognized five professors with Regions Bank–DAFVM Superior Faculty Awards.

The honorees for 2013 are James Warnock in biomedical engineering (teaching), Phillip Steele in sustainable bioproducts (research), Louise Davis in human sciences and Extension (outreach), Keith Coble in agricultural economics (service), and Henry Wan in basic veterinary science (international award).

We continue to acknowledge faculty excellence while we improve our campus facilities. We have prioritized the construction of five new buildings and renovation or renewal of another five in the next several years, at a cost of more than $65 million. Topping our list is a new classroom building at the Wise Center; a meat science and muscle biology laboratory; and a new animal, dairy, and poultry science complex. Meanwhile, the necropsy lab renovation in the College of Veterinary Medicine is scheduled for completion in spring 2014.

Top students, superior faculty, and excellent facilities help us retain our high rankings among our sister universities. Just before classes began, we learned that MSU ranks ninth among more than 700 public and private institutions for research and development expenditures in agricultural sciences in the National Science Foundation’s Higher Education Research and Development Survey. MSU and our division have been in the top 10 of this category for 14 consecutive years, providing ample evidence that the almost $100 million we spend annually on agriculture-related research is an excellent investment. Record crop yields in 2012 and 2013 also confirm that our research and extension efforts are benefiting many of our clientele.

We have also been busy in the field. In mid-July, we saluted the lifelong contributions of Frank T. “Butch” Withers Jr. by naming our research and extension facility in Raymond after him. Butch helped create that facility, and his hard work and vision will not be forgotten in central Mississippi.

Our partnerships came front and center in September, when Extension, MAFES, and Forest and Wildlife Research Center personnel helped organize a summit for legislators in Jackson. The summit addressed an emerging wildlife challenge—how to control the wild hog population blamed with damaging millions of dollars of agriculture, wildlife, water, and landscape resources. The legislators who attended now have the information they need to discuss legislation to help rural and urban Mississippians combat this threat.

We also confirmed the long-standing partnership between MSU’s Extension Service and Alcorn State University’s Extension Program when Gary Jackson and I presented a commemorative football to Alcorn administrators Dalton McAfee and Anthony Reed at MSU’s home opener football game. In a later game against Alabama, I had the honor of presenting a football to MAFES Director George Hopper to help commemorate the 75th anniversary of Edam cheese production at MSU.

We are also proud of our global partnerships. Mark Lawrence, associate dean of research in the College of Veterinary Medicine, leads our effort to establish the Global Aquatic Health Center for Food Security. CVM faculty, staff, and students are working with the Food and Agriculture Organization of the United Nations to establish a strategic partnership to increase our participation in efforts to improve global food security. Our contributions will help many nations provide adequate food to help feed a growing population.

Our teaching, research, and extension excellence often puts the division, and the university, in the spotlight. U.S. Secretary of Agriculture Tom Vilsack visited campus recently to review several of our research projects and to meet with faculty and students. During a whirlwind afternoon, President Mark Keenum demonstrated how MSU is applying its $28 million in federal research funding. Afterward, the secretary met with 25 graduate and undergraduate students to discuss issues and trends in agriculture.

I hope you enjoy this edition of LandMarks. We wish you and yours a joyous holiday season.
When veterinarian Dr. Alicia Olivier arrives for work, she isn’t greeted by wagging tails and nervous meows. Instead, she spends her days behind a microscope conducting research on disease processes and therapy development.

Olivier is a member of a diverse group of veterinary scientists who conduct a variety of biomedical research that impacts animal and human health.

“Veterinarians are ideal candidates for research careers,” said Dr. Mark Lawrence, associate dean for research and graduate studies at the Mississippi State University College of Veterinary Medicine. “They study many different species and have the ability to see the bigger picture because they have studied comparative medicine. It is not uncommon for veterinary graduates to end up doing research related to human medicine.”

Lawrence codirects the college’s Summer Research Experience Program with Dr. Jeffrey Eells, associate professor in the CVM Department of Basic Sciences. The program introduces first- and second-year veterinary medicine students to the wide variety of research fields available to them.

The 12-week program pairs the students, who attend MSU and other veterinary colleges across the country, with faculty mentors in each student’s area of interest. After students choose a specific research project, they formulate a plan, conduct research, analyze the results, and present their findings at a national symposium.

Olivier chose her career track largely because of her involvement in the summer research program.

“I had an interest in research before veterinary school, but I didn’t quite know how that would fit with being a veterinarian,” said Olivier, a comparative pathologist who studies animal models of human diseases at the University of Iowa Carver College of Medicine. “It wasn’t until I started veterinary school that I learned about the numerous research opportunities that were available to veterinarians in various career paths.”

Awareness of the field and the opportunity to discover the field in a hands-on environment are important for students.

“Whether or not the students choose to pursue research as a career, they all develop an appreciation for and understanding of research,” Lawrence added. “But for some, the program will impact their career choice, leading them to either pursue research as the major focus or include it as an important aspect.”

The program also helped Dr. Camille Harris discover her career passion. Her interest in diseases that can cross between humans and wildlife led her to practice clinical wildlife medicine. She is currently investigating the impact of environmental changes on La Crosse encephalitis, a virus native to temperate hardwood forests and the leading cause of viral pediatric encephalitis in the United States.

“When people think of veterinarians, they picture a small-animal veterinarian giving vaccines,” noted Harris, a 2004 MSU veterinary college graduate who is a doctoral candidate in disease ecology at Virginia Tech. “Rarely do they realize there are veterinary scientists studying animal and human diseases in basic and applied research.”

Veterinary researchers are in high demand, according to an article in the spring 2009 edition of the Journal of Veterinary Medical Education. The demand is expected to continue to increase as new diseases and challenges surface in veterinary medicine, Lawrence indicated.

Now in its 13th year, the summer research program makes a significant contribution to animal and human medicine. Approximately 27 percent of the program’s alumni are now working in research or academia, pursuing graduate degrees, or receiving advanced clinical training.

“The program’s success is based on its structure,” Lawrence explained. “We find the best and brightest students to admit to the program and couple them with our dedicated and productive faculty mentors, who share their time and expertise and offer students valuable career advice.”

Grants from the National Institutes of Health, the Merial Veterinary Scholars Program, and the MSU College of Veterinary Medicine fund the summer research program.
Every summer, Mississippi State University offers its forestry majors an opportunity to get out of the classroom and into the woods. For many of them, this field program is their first taste of the profession they’ve chosen to pursue.

The program, dubbed “summer camp,” consists of four classes taught over a 9-week period from the end of May to mid-July.

“The summer field program is usually taken between the sophomore and junior year and immerses students in field forestry,” explained Paul Jeffreys, MSU forestry research associate and coordinator of the program. “It is an eye-opening experience for many of our students because they grew up in an urban setting and haven’t had the opportunity to participate in field forestry.”

The program is not new to MSU. It began in 1935 in timberlands owned by the University of Mississippi. In the early 1960s, the camp was held in Wiggins for a few years. Today, it is held in the John W. Starr Memorial Forest on the MSU campus.

While the program has a lengthy history, MSU is one of the few universities still offering the hands-on experience for students who major in forestry.

“At one time, most universities offered summer camp as part of the forestry curriculum, but over the last decade many universities have dropped the program,” Jeffreys noted.

The uniqueness of the summer field program and the practical field experience it offers make it a positive learning experience for students, he added.

“The summer field program is designed to give students a background and understanding of forestry procedures, such as the use of a compass, GPS, GIS, tree measurement, timber cruising, and forest inventory,” Jeffreys said.

The four summer classes are Introduction to Forest Communities, Forest Description and Analysis, Forest Operations and Harvesting, and Wildlife and Fisheries Practices.

The summer field program provided senior forestry major Martin Sweeney an opportunity to bond with fellow students and apply concepts he had learned in the classroom.

“Summer camp provided new perspectives on topics I had taken in class, as well as those I am currently taking,” Sweeney explained. “I can visualize what the professors and text are referring to because of my summer camp experiences.”

Sweeney grew up hunting and fishing, so being in the woods was not new to this native of Loxley, Alabama. However, the long hours did prove to be a learning experience for the aspiring forester.

“We spent all day in the woods and late nights in the computer lab, which was challenging physically and mentally,” Sweeney noted. “But since we were such a close group, we helped each other, and we all learned the importance of teamwork.”

Others who have completed the summer field program have had similar experiences, dating back to when it first began.

“I frequently speak with alumni who tell me about their summer camp experience and the importance of the program to their profession,” said Jeff Little, director of development in the College of Forest Resources. “They frequently tell me of their fond memories of days spent in the woods and nights poring over measurements taken during summer camp.”

Those memories and the unique learning opportunities the summer field program provides mean the future looks bright for the program at Mississippi State University. Despite financial challenges, the university has committed to keeping the program intact, Little added.

To help with this endeavor, the college has established scholarships to help fund students attending the summer field program, as well as a permanent funding mechanism for the camp.

“Summer camp is such a unique experience for our students and prepares them for their future careers,” Jeffreys concluded. “I don’t know of a better way to immerse students in field forestry than through the summer field program.”
New Cropping Systems are not a Magic Wand

By Tim W. McAlavy

Crop producers will soon have two new systems to add to their weed control toolboxes, but recent research at Mississippi State University indicates that they should handle these tools with care.

“Enlist by Dow AgroSciences and Roundup Ready Xtend by Monsanto will soon be available,” explained Dan Reynolds, a weed scientist with the Mississippi Agricultural and Forestry Experiment Station and MSU Extension Service. “We want producers to keep in mind that these products do not contain new active ingredients, but are actually new formulations of existing herbicides.

“They are new products in that they are designed to work in cropping systems where crop types and varieties are transgenically modified to be compatible with them.”

The new herbicide products were created in response to herbicide resistance developed by some weeds, especially Palmer amaranth (pigweed) and ryegrass, Reynolds added.

“Herbicide resistance is the biggest factor in the future of weed control,” he stressed. “Although new herbicides may become available, most are new formulations of existing herbicides or are of the same mode of action as existing herbicides. The basic modes of action remain the same, and no new modes of action are on the horizon.”

The Enlist weed control system is designed for use in corn, cotton, and soybeans. The Enlist system will be centered on Enlist Duo herbicide, which is a new formulation of glyphosate and 2,4-D choline.

The Xtend weed control system is designed for soybeans and cotton and will rely upon Roundup Xtend—a premix of glyphosate with a new formulation of dicamba.

Reynolds pointed out that both systems will also allow the use of glufosinate in cotton, but only the Enlist system will allow the use of glufosinate in soybeans.

Producers should handle both products with care due to spray drift, sprayer hygiene, and chemical volatility concerns that come with any auxin weed control product or system, he said.

“These are still valid concerns,” he explained. “If I had to rate them, I would put drift first, sprayer hygiene second, and volatility third.

“These products are very efficacious. They will work well as long as you read and follow the label directions carefully. But they can and will cause crop damage if you don’t respect the label directions.”

Reynolds and several graduate students have conducted field trials with both products at four locations in three states. The Mississippi Soybean Promotion Board and other groups support their work.

“We’ve been testing for efficacy for a long time,” Reynolds said. “Our latest trials focused on drift, accidental cross-contamination in the sprayer, and volatility.”

All three problems can cause crop damage.

“Drift is when a product goes off-target and contacts other plants,” he explained. “Cross-contamination is when chemicals are accidentally mixed in the sprayer due to incomplete cleanout of the sprayer between applications of different herbicides. Volatility is when a chemical is applied to its target in liquid form and then turns to a gas due to environmental conditions and then moves off-target.”

The trials tested both products in labeled crops at four locations, using different application rates and different application timing. Evaluations of sprayer hygiene used different sprayers and different types of sprayer hoses.

“Our results lead us to several conclusions,” Reynolds continued. “These technologies are not cross-resistant. They will harm crops that aren’t designed to work within the system.

“Even a small amount of either product that goes off-target may cause a drastic reduction in yield. And both are very hard to clean out of a sprayer; residues left in the sprayer will cross-contaminate another chemical application to a sensitive crop. Sprayer hygiene is going to be critical with both products.”

He says that best management practices specific to the new herbicides are still being developed. When ready, these BMPs will include specific spray tips and buffer zones based on different environmental conditions.

Producers who would like to learn more about how these products fared in MSU field trials can view two video presentations online. Both are available at the Mississippi Soybean Promotion Board website. Click on Media, and then click on Videos.

“We really appreciate the board funding this research,” Reynolds said. “It really stepped up to the plate, and that support enables us to provide some cautionary recommendations for using both of these new technologies.”

On the web: http://www.mssoy.org

Above left: Dan Reynolds adjusts a spray boom during herbicide field tests. More information about MSU research on crop sprayer cleanout, herbicide drift, and volatilization is available in two online videos hosted by the Mississippi Soybean Promotion Board. Click on Media and then Videos. (Photo submitted)
By Linda Breazeale

Energy beets could provide off-season income to Mississippi farmers and offer an alternative energy source to the nation’s expanding biofuels markets.

Mississippi State University researchers and MSU Extension Service agents are examining the growth and profit potential for varieties of the energy beet, an inedible relative of the sugar beet used only in biofuel production.

“Because they are traditionally grown in much cooler climates, energy beets will grow best during Mississippi’s winter months as cover crops on fields between fall harvests and spring plantings,” explained Wayne Ebelhar, a researcher with the Mississippi Agricultural and Forestry Experiment Station.

Researchers at the MSU Delta Research and Extension Center in Stoneville have grown energy beets at the center for the past 3 years. They have evaluated the beets’ growth performance over both summer and winter months. Ebelhar said the first issue to resolve is whether energy beets will grow in Mississippi at all. The second issue is whether farmers can make money growing them.

“I’m a farmer at heart,” he added. “I know what farmers want to know: What’s it going to cost me, and what am I going to make?”

The 33-year veteran researcher pointed out that he has been approached about almost every crop fertility question under the sun.

“I see the potential in this crop, but we still need evidence the crop can produce a profit,” Ebelhar continued. “We want measurable results.”

Lester Stephens, Extension agronomy agent in Washington County, is enlisting innovative farmers willing to try growing the crop.

“We need a handful of farmers to begin with 20 to 40 acres of energy beets to see how they perform agronomically and financially on Mississippi farms,” he explained. “While they are not a cheap crop to grow—about $700 per acre—the break-even point would be yields around 20 tons per acre. We think they could yield as much as 50 tons per acre, so the profit potential is there.”

Energy beets require standard farming equipment until harvest, according to Stephens. Then, growers will rely on commercial harvesters from other regions until they can determine the long-term profit potential of the crop in Mississippi and consider making equipment investments.

Betaseed, a Minnesota-based company that supplies more than 70 percent of the country’s sugar beet seeds, is funding the research in hopes of attracting more growers.

“If we don’t get energy beets started here, the company will get them started somewhere else,” Stephens noted.

Ryan Gompert, Betaseed bioenergy technical leader, reported that researchers and farmers in Missouri, Arkansas, Kentucky, Louisiana, Alabama, Georgia, and Florida are also having success growing energy beets. Most of the nation’s 1.2 million acres of sugar beets are grown across the Northern Plains from Idaho to Michigan. This crop is the primary source of granulated sugar.

Gompert, who grew up on a Nebraska sugar beet farm, admitted he was initially skeptical about growing beets in the South.

“When we were driving around Mississippi in the winter, we saw a lot of dormant fields not growing anything,” he pointed out. “After a few years of testing the beets’ performance, we are confident they will make an excellent winter crop, with minimal insect, disease, and weed pressure during the cold months.”

For information about participating in energy beet trials, contact Stephens at (662) 332-0524 or lesters@ext.msstate.edu, or Ebelhar at (662) 686-3247 or webelhar@drec.msstate.edu.
Mississippi State University’s Frank T. (Butch) Withers Jr. Central Mississippi Research and Extension Center in Raymond serves as the hub of specialized research, education, and public service for central and southwest Mississippi.

Recently named in honor of Withers, the 18,000-square-foot facility was completed in 2001 and houses research and Extension personnel from MSU and Alcorn State University on the Hinds Community College campus. The center has 30 offices, a 150-seat auditorium, and well-equipped laboratories, classrooms, and meeting spaces with video-conferencing technology.

“The collaborative relationship we have with Alcorn State University and Hinds Community College enhances our ability to serve the overall clientele base in our region,” said Sherry Surrette, current head of the center. “By working together, we ensure that we reach all area citizens with research-based educational programs.”

Withers, who died in 2012, worked for the MSU Division of Agriculture, Forestry, and Veterinary Medicine for 40 years. He was head of the center from 1996 until his retirement in 2006 and oversaw its establishment and construction.

Like Withers’, Surrette’s goal is to continue strengthening MSU’s positive influence on the economic well-being of agricultural producers, industry, and rural and urban citizens in the region.

“Since joining the MSU Extension Service in January 2012, we have worked extremely hard to reestablish the producer advisory council for the southwest region,” Surrette added. “In February, 200 producers participated in our council meeting, which guides our future research and extension programming.

“With a new Extension structure in place, we also are working diligently to ensure that each county Extension office has at least two county agents to provide expertise in agriculture, family and consumer sciences, community resource development, and 4-H youth programming.”

This center is one of four district offices in the state focused on conducting region-specific agricultural and forestry research and training. In 1988, MSU administrators established a plan that placed regional centers in Verona, Raymond, and Biloxi. The Delta Research and Extension Center in Stoneville has been in operation since 1904. These centers provide their clients with better access to the university’s research, technology, and education.

Research efforts of the Withers Center take place at three branch stations, which are units of the Mississippi Agricultural and Forestry Experiment Station.

The 1,700-acre Brown Loam Branch Experiment Station, southwest of Raymond in Hinds County, concentrates on beef cattle and pasture systems research. Brown Loam scientists study cattle behavior, influences on growth performance, immunity and production efficiency, animal breed-
ing, nutrition, heifer development, artificial insemination synchro-
nization, stocker cattle management, grazing management, and
forage production systems. Station specialists and staff manage
about 900 head of cattle each year.

Field-crop research conducted at this station focuses on spe-
cific issues affecting corn, cotton, soybeans, wheat, and oats grown
in the brown loam soils of the region. Since 2006, several studies
have evaluated the adaptability and agronomic characteristics of
biomass feedstock crops, such as switchgrass, energy cane, forage,
sweet sorghum, and miscanthus.

The Coastal Plain Branch Experiment Station near Newton
was established in 1946. It provides clients with hands-on demon-
stration areas and in-depth curricula focused on natural resources
conservation and enterprise development. The 1,085-acre station
provides educational workshops for children, adults, profession-
als, and landowners at demonstration sites that include recently
developed nature trails, forestry research areas, a backyard habitat,
and supplemental wildlife food plots.

Coastal Plain researchers also conduct variety trials for wheat,
oats, peanuts, and native warm-season forages. A small beef cattle
research herd also resides at the station.

“This facility is used mostly for wildlife-, forestry-, and natu-
ral resources-related presentations,” explained Billy Johnson,
Coastal Plain station manager and researcher. “We have local
sixth-graders out here twice a year for field days.

“In the spring, we focus on aquaculture and let the kids fish in
the pond. In the fall, we teach them about land-dwelling wildlife
and habitats, and have several hands-on activities available.”

In 2006, MSU donated 90 acres of the original 1,175 acres at
the Newton station for use as Mississippi’s first state veterans’
cemetery.

Established in 1938, the Truck Crops Branch Experiment Sta-
ton south of Crystal Springs is home to MSU’s largest horticulture
research site. The 175-acre station has a 13-member staff, nine
greenhouses, two laboratories, and several shops, fields, and
raised production beds.

Truck Crops researchers conduct extensive studies on vegeta-
bles, fruits, ornamental plants, and pecans that impact homeowners
and industry. The station also conducts variety trials, as well
as research on cover crops, high-tunnel technologies, greenhouse
tomato production, fertilizer management, and organic growing
methods.

Experiment station faculty Bill Evans and Rick Snyder re-
cently received a grant from the Walmart Foundation to study
methods for improving strawberry production in Mississippi.
Evans is a MAFES associate research professor, and Snyder is a
MAFES and Extension research professor.

The Fall Flower and Garden Fest, one of the Southeast’s
largest fall ornamental and vegetable field days, is held at the sta-
tion in October. The 35-year-old festival attracts an average of
6,000 visitors annually to view more than 350 fruit and vegetable
variety trials, as well as extensive displays of ornamental flowers,
shrubs, and trees.

The Withers Center and its three branch stations encompass
about 3,000 acres of land and 51 buildings. Mississippians in 20
southwestern counties are the primary beneficiaries of the center.
Its service area includes Adams, Amite, Attala, Claiborne, Copiah,
Franklin, Hinds, Jefferson, Lawrence, Leake, Lincoln, Madison,
Pike, Rankin, Scott, Simpson, Smith, Walthall, Warren, and Wilkin-
son Counties.
About 50 percent of salamander species worldwide are threatened. Researchers at Mississippi State University are working with tiger salamanders and other threatened salamanders to help them breed in captivity. (Photo by Kat Lawrence)
A tough bunch of salamanders found a home in a brand new lab at Mississippi State University, where they are helping researchers learn how to keep populations of these amphabians from declining worldwide.

The 62 tiger salamanders took a long, hard road before reaching MSU. They came from Nevada by way of Iowa and the Omaha Zoo before arriving at a Mississippi Agricultural and Forestry Experiment Station laboratory.

Amphibian populations are shrinking, and scientists don’t know why. Globally, 50 percent of salamanders and 30 percent of frogs are threatened, which could be a sign of diminishing ecosystem health.

Scientists and avid salamander fans Dr. Ruth Marcce and Hannah Bement are studying and caring for the new amphibian colony through a research program in partnership with the Memphis Zoo. Marcce, who is a veterinarian, and Bement are both working on doctoral degrees in animal physiology in the College of Agriculture and Life Sciences at MSU. They are using the amphibians as models in an investigation that could help protect salamanders in the wild.

“Salamanders are an important part of the overall environmental picture,” Bement explained. “They help regulate pest insects and help move nutrients up the food chain. They also are important in several areas of medical research.”

Compared with birds and mammals, scientists know relatively little about salamanders and other amphibians, Marcce noted. While knowledge about amphibian populations is limited, there is evidence that many species are declining.

“We are trying to establish captive breeding protocols,” she added. “The protocols available are only partially successful and were written for highly inbred lab species. They may not work with wild species.”

Marcce, who is originally from Georgia and Illinois, earned an undergraduate degree from Florida State University and a Doctor of Veterinary Medicine degree from the University of Illinois. Her love for salamanders drew her to MSU.

“I have a lifelong obsession with salamanders,” Marcce said. “When I was young, I always told people I wanted to be a salamander veterinarian. I heard about this research at MSU and came June 1, 2012.”

Marcce and Bement built the amphibian lab from the ground up. They designed and constructed the habitats, bringing together the water sources, filtering systems, and chillers needed to create a salamander sanctuary in a laboratory.

Photographs of the salamanders are posted on the edges of each habitat, along with their names.

“We identify salamanders by their chins,” Marcce explained. “They have very unique patterns of spots and marks on their chins.”

Marcce and Bement drew on a variety of sources to give each salamander a name, such as Captain Hook, Alibaba, Tulip, and Olaf.

In the lab, the amphibians eat a carefully monitored diet of earthworms, mealworms, and wax worms. Wild salamanders have a more varied diet.

“In the wild, they eat anything that fits in their mouths,” Marcce said. “They are ambush predators who bury themselves under the soil with just their eyes out until prey walks by.”

The MSU salamanders were part of a migrating group in Iowa whose path intersected a construction site. At breeding time, salamanders migrate sometimes hundreds of miles back to the ponds where they hatched. While moving across the construction site, dozens of the amphibians fell into ground-level window wells and were trapped.

The well-intentioned homeowner kept the salamanders in small wading pools, but the colony contracted the contagious and deadly *Ambystoma tigrinum* virus (ATV). So many died that he contacted the Omaha Zoo for help.

MSU received the survivors of this ordeal. Because they carry ATV, these salamanders cannot be released into the wild. This and their status as threatened, not endangered, made them ideal candidates for research to increase the population of their species.

Marcce and Bement keep this species of salamander, as well as aquatic salamanders called mudpuppies, in off-the-shelf plastic tubs that are either filled with moss or fitted with piping that brings in fresh, chilled water and carries away water to be filtered.

The MSU scientists are addressing the fact that very little is known about salamanders in general and their reproduction in particular. Aside from providing subjects for research, captive colonies also preserve genetic diversity and serve as source populations for possible future reintroduction into the wild.

“There are efforts by scientists and governmental organizations to save these species in the wild or bring them into captivity to keep them alive,” Bement said. “The problem in captivity is if you can’t get them to breed, you can still lose the species.”

Salamanders fertilize their eggs internally. The male creates a spermatophore, or ball of sperm, which he deposits for the female he is attracting. She picks up the spermatophore and later lays fertilized eggs.

In the lab, the researchers are using hormone therapy to encourage breeding. Until this process happens naturally in captivity, a simple form of in vitro fertilization keeps the salamanders reproducing.

“We put the eggs in a dish, squirt the semen on top of the eggs, let it sit 5 minutes, and then add water,” Marcce said.

She focuses her efforts on the males.

“We’re trying to get a dose-response curve so we can know how to stimulate the boys and girls to provide gametes at the same time,” Marcce said.

Bement is specifically working with females, using hormone therapy to get them ready to lay eggs.

“If they have eggs ready to go, I can get them to lay their eggs,” Bement said. “My challenge seems to be to get them to go through the cycle and be ready to drop eggs.”
Research has shown that after-school programs can have lasting impacts on children. After-school programs can foster children’s self-esteem and encourage them to set high goals, including college attendance. Studies also show that children in quality settings are less likely to become involved in illegal activities or drop out of school.

“The Out-of-School Project was established to work with the school systems and child care programs to encourage positive growth and foster enduring understanding and lifelong learning,” Rye explained.

The Out-of-School Project also offers a Quality Rating and Improvement System, awarding centers stars based on quality indicators. It offers technical assistance so centers can reach the goals they set for themselves.

“Out-of-School providers have the opportunity to expand on the learning that happens in the regular classroom through hands-on activities, field trips, and other community involvement,” Rye added. “These activities help children have a more enduring understanding of what is being taught in the classroom and how to apply it to their everyday lives.”

The Out-of-School Project also offers training sessions on topics such as nutrition, physical activity, bully-free environments, and language and reading development. By participating in these sessions, providers gain knowledge to enhance children’s learning through activities and their surroundings.

“Programs can improve learning environments by creating interest centers using the materials that are already on hand,” explained Tara Dickerson, technical assistant with the Resource and Referral Network.

One of the most valuable aspects of the Out-of-School Project is that its staff remains available to the centers for any questions.

“If I have any questions, I know Tara is available,” Smith said.

For more information about the Out-of-School Project, contact the Mississippi Child Care Resource and Referral Network at (800) 706-8827. The network is funded by the Mississippi Department of Human Services, Division of Early Childhood Care and Development.
A partnership between two Mississippi State University alumni and the Mississippi Band of Choctaw Indians is bearing fruit under three hoop houses next to Canehatta Elementary School.

For 10 years, Dick Hoy, Class of 1976, and Jim McAdory, Class of 1998 and an MSU Extension Service agent for the tribe, have been exchanging tips on agriculture and greenhouse operations. This year, they broke ground on the first of at least three school-based farms designed to teach students about gardening and healthier eating.

“If we can get the kids to eat these blueberries, tomatoes, and squash instead of junk food, we’ve been successful,” Hoy explained. “The opportunity is too good to miss. They’ll learn how plants grow and how they can grow their own fruits and vegetables. I believe that if we can develop their interest in gardening, they’ll want to eat what they grow.”

Hoy left a 30-year career in the horticulture business to work for the Choctaws’ vocational rehabilitation program. Over time, his labors resulted in several greenhouses that provided colorful seasonal plants for the resorts, tribal grounds, and schools. Then he expanded the project to grow produce for the restaurants.

As more people within the tribe realized the benefits of eating locally grown foods, Choctaw leaders asked Hoy to lead a project designed to make a difference in tribal members’ health. The result is a new company, Choctaw Fresh Produce.

“About 45 percent of the tribe is diabetic, the highest rate in the country,” Hoy pointed out. “The Oneida Tribe of Indians in Wisconsin saw a significant decrease in diabetes and related amputations when they became ‘food sovereign’ and focused on growing their own food. The tribal leaders here are committed to embracing the positive aspects of agriculture in their heritage to make a difference in the future health of the tribe.”

According to Hoy, the tribe was able to launch Choctaw Fresh Produce because of a 3-year grant from the Administration for Native Americans. The tribe’s Office of Economic Development applied for the grant to help cover some of the costs of high tunnels, farming equipment, and operating expenses. Economic development officials are already pursuing additional funding opportunities to continue growing and diversifying this new commercial farming operation.

Getting young people excited about healthier food choices and gardening is only one part of the hoop house project, Hoy stressed.

“Our goal is to build 18 high tunnels that are productive on a square-foot basis,” he reported. “We already sell at the tribal farmers’ market, but we want to sell to the schools through the Farm to School Program, also.”

Based on information gleaned from Extension workshops and his local agent, Hoy and his three-person team employ sound agricultural practices, including a perimeter fence for animal exclusion. They have a food defense plan in place to address potential threats to food safety.

“We’re trying to stay pesticide free and want to be certified naturally grown,” he noted. “This first season we’ve experimented with row spacing, different varieties, and different types of fruits and vegetables, such as bok choy, which was very popular with the restaurants, and ground cherries, which a lot of people liked, but they take up too much space to continue to grow in future seasons.”

Hoy relies on Extension agent McAdory for agricultural production strategies, food safety information, soil testing, disease identification, and integrated pest management tips. McAdory also serves as a cheerleader.

“Hoy has been a catalyst for the tribe seeing the potential in agriculture again,” McAdory explained. “His proven success with the greenhouses gave them the confidence that food sovereignty could become a reality.”

McAdory says the tribe is looking beyond the 18 grant-funded hoop houses to growing their own chickens, beef, and even more produce.

“Agriculture has an established past and a bright future with the tribe, and it’s exciting that the MSU Extension Service gets to be part of the journey,” he concluded.
Farmers’ incomes are often tied to variables beyond their control, such as weather, prices, and yield. To help alleviate the risk farmers face each growing season, the federal government provides aid through a collection of programs commonly known as the Farm Bill.

Mississippians have an advantage in understanding this key piece of legislation because two experts at Mississippi State University have spent more than 20 years studying agricultural policy and risk assessment.

Though agricultural economists Keith Coble and Barry Barnett have spent decades studying farm policies, perhaps their greatest achievement is teaching students who go on to influence state and national policy. They follow a long MSU tradition of preparing future leaders.

“It seems like every time I am in Washington, I run into one of our alumni,” explained Coble, W. L. Giles Distinguished Professor in the Department of Agricultural Economics. “Even some of my peers at other universities have noticed that we have a lot of alumni influencing agricultural policy.”

Three alumni who have been instrumental in the development of farm policy include Mark Keenum, Hunt Shipman, and Hunter Moorhead.
Keenum worked as chief of staff to U.S. Senator Thad Cochran and was undersecretary of the U.S. Department of Agriculture before becoming Mississippi State’s 19th president. He was heavily involved in developing bills that became farm law in 1990, 1996, and 2002.

Shipman worked as an agricultural legislative assistant for Senator Cochran and went on to serve as deputy undersecretary for Farm and Foreign Agricultural Services and acting deputy undersecretary for Marketing and Regulatory Programs in the USDA. Shipman now works for a government affairs group.

Moorhead worked on the 2008 Farm Bill as a domestic policy adviser to President George W. Bush. He also now works for a government affairs group.

“There are many more who work in government or advocacy groups, influencing agricultural policy,” Coble added.

In addition, many international students have taken their policy training back to their home countries to develop and improve agricultural risk management programs.

While training future leaders is important, the research and outreach conducted by Coble and Barnett also bring positive recognition to the state.

“In Washington, I often calculate the cost of the different components of the Farm Bill and its many programs for the minority leadership of the Senate Agricultural Committee,” Coble noted.

The choices farmers are given with each new Farm Bill become more and more complex, he added.

Coble and Barnett work together on computer models that help farmers make the best decisions to alleviate their production and marketing risks. Their work has garnered international attention and has been cited throughout the world.

Interestingly, their experience in the field began when the U.S. Federal Crop Insurance Program was in its infancy.

“Both Keith and I completed our dissertations on the crop insurance program when it was a relatively minor government program,” Barnett said. “It is really uncanny that we were both working on crop insurance at different universities and then both landed jobs at Mississippi State only a couple of years apart.”

Barnett is in high demand for his expertise on the Federal Crop Insurance Program. In fact, he was part of the team of economists that developed the area yield index insurance product some 20 years ago. Today, much of the farm policy debate centers on shallow-loss versions of that design.

“Much of my work involves conducting analysis and making recommendations for the Risk Management Agency of the U.S. Department of Agriculture,” Barnett said.

He also advises agricultural agencies in lower-income countries.

“Working in lower-income countries poses some distinctive challenges,” Barnett stated. “But in wrestling with those challenges, I am forced to reconsider implicit assumptions and think carefully about aspects of insurance design that I may have never fully understood had I worked solely in a U.S. context.

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“These international experiences stimulate new research interests and allow me to bring unique insights to my role as an adviser for the U.S. Federal Crop Insurance Program.”

While Coble and Barnett are nationally and internationally known for their work on farm policy and crop insurance, they are quick to point out that they are part of a larger team of many people with different skills.

“We are fortunate to work in a department that has so many talented faculty with interests related to risk and policy,” Coble stressed. “Research colleagues, such as Ardian Harri and Jesse Tack, contribute strong qualitative skills, and Extension colleagues, such as John Michael Riley and Brian Williams, help us communicate with farmers on the various products and choices involving crop insurance and other risk management tools.”

As the Department of Agricultural Economics celebrates its 100-year anniversary, the policy and risk assessment group will continue to educate future leaders, provide assistance to policymakers, and inform Mississippi producers about choices that help the agricultural economy remain prosperous.

As Washington lawmakers work on new agricultural policies, these agricultural economists are already thinking about how those policies may affect Mississippians and how they can help producers make informed decisions to improve their risk management skills.

“It is nice to see the big picture on farm policy but then be able to come home and teach our students and to develop models for producers that help them through the maze of programs offered,” Barnett concluded.
State Alumnus Enjoys His Dairy Career

Mike Ferguson has been dairying for a long time: more than 50 years, to be exact. He has seen a lot of change in the Mississippi dairy industry in that time, but he is more than content with his chosen career.

“I was born and raised near here on a family dairy farm,” Ferguson said. “I was the youngest of five kids. Dad raised row crops and milked cows. Mom was a schoolteacher. Dad died young, so it was up to us four boys to take over and run the dairy. I’m the only one who stuck with it.”

Ferguson and his wife, Jill, live in Senatobia, Mississippi, about 25 miles south of Memphis, Tennessee. Their daughter, Jennie Dill, and son, Wesley Ferguson, are grown and gone from home. He graduated from MSU in 1973 with a bachelor’s degree in dairy science. Both of the younger Fergusons also attended MSU.

Ferguson Farms operates near Independence, Mississippi, and is home to a herd of about 125 commercial Holstein and crossbred cows. About 105 cows are in the milking herd most of the time. The farm operates year-round, and two employees help care for the herd and milk twice a day. Ferguson’s milking parlor, a double-four herringbone style, is nothing fancy, but it gets the job done.

Ferguson’s milk is hauled to a processor in Memphis and sold as fluid milk through Lonestar Dairy Producers.

“Our rolling herd average is between 18,000 and 19,000 pounds of milk per cow per year,” he noted. “This operation is about as close to a New Zealand-style, grass-based operation as you can get.

“This size herd requires about 300 acres, but I have a little more than that. Eighty percent of what our cows eat comes from our pastures—either as fresh grazing or hay. We also feed some 18 percent protein, high-energy supplement to the cows when they are in the milking parlor.”

His pasture forage mix consists of ryegrass, Tifton bermuda-grass, and some fescue. The milking herd eats primarily ryegrass...
FOCUS

and Tifton forage, while dry and replacement cows normally graze on bermudagrass and fescue.

Whatever forage the cattle leave behind is cut and baled. There is no forage available for grazing from about December 15 to February 15. During that time, the herd is fed from the 400 to 500 bales of hay that Ferguson stockpiles each year. He also buys a little bit of hay when necessary and may sell a few bales when production is good.

“We have to stay on top of our forage game in order to produce all that the cows need and then some,” Ferguson added. “Our operation is rainfall-dependent. We average between 40 and 50 inches of rain a year, plus a snow or two in winter. We’ve seen five snows in some years, but last year we only got one.”

He applies a complete fertilizer mix to his pastures in May, and the ryegrass gets a second shot in October. Nitrogen is top-dressed as needed, and he sprays for weeds sparingly.

Ferguson raises his own replacement cows and pasture breeds his cows with Holstein or Jersey bulls. The average replacement heifer enters the milking herd at 21 or 22 months of age.

“I like fooling with calves,” Ferguson continued. “We feed them whole milk starter and get them going on hay and a dry ration as soon as possible. We raise 25 to 30 replacement heifers a year, which is kind of unique for a grass and hay operation. I like raising my own replacements because dairies these days are under pressure to keep their somatic cell counts down.

“That’s not hard for us to do because we monitor the herd’s health from the time they are born. I help milk once a day just so I can visually check on each animal in the milking herd, and my hands are well trained to recognize sickness early on.”

Ferguson believes in early, on-farm treatment for sick animals but sees little of that because his cows receive a multispectrum seven- or nine-way vaccine, plus a blackleg vaccine each year. The multispectrum vaccinations are repeated as cows dry off and leave the milk herd, and they are wormed at that time, too.

Ferguson said that milk marketing today is much more complicated than it used to be and that dairy producers should receive a fair market price that includes hauling to the nearest processing plant.

“Right now, we are not getting a good price to supply the Southeast dairy market,” he pointed out. “We contract to sell our milk to processors, but we also pay to import about 50 percent of the milk supply that feeds the Southeast.

“My price is based on the blend price for fluid milk in the Atlanta market, but I don’t get anywhere near that. The federal milk
marketing order price for that market is $22 to $23 per hundredweight, but since I am at a distance, my price fluctuates between $16 and $17, and sometimes up to $18 per hundredweight.”

Ferguson indicated that higher prices for inputs, such as feed and fertilizer, have pushed the break-even price for most dairy producers to almost $20 per hundredweight. He said grass- or pasture-based dairies need a $5 to $6 per hundredweight margin over costs to remain profitable.

“I would love to get that Atlanta federal price, but we make it on the price we currently have,” he said. “The future doesn’t look too bright right now. You’ve got to love it to stay in this business, because it’s 24/7 and 365 days a year.

“If I were trying to start up right now, I’d need between $3,500 and $4,000 per cow. That’s a good estimate of what it would take to start this kind of operation today. Not many young people can come up with that much start-up money.”

He said that simple economics favor smaller, forage-based operations if someone is interested in starting a dairy today. But those who take the leap in Mississippi have sound advice and help that they can use to succeed.

“The researchers and Extension folks at State really listen to us producers,” Ferguson said. “And we appreciate that. But their programs need to include a ‘will it pay’ element—will it pencil-out and improve your financial bottom line?”

At 62, Ferguson said he has no plans to retire anytime soon. He said he will stay in the business he loves, the business he grew up with. 

Top: Ferguson uses some of his pasture to produce hay for his herd, but he also purchases hay for the winter months. Above: Michael Wilkerson and Larry Maxwell take care of the morning milking at Ferguson Farms.
Due to higher prices for everything from fuel to milking parlor supplies, some dairy producers are rethinking their operating strategies. In their quest to trim costs, they are taking a long, hard look at how their milking herds get the feed necessary to produce enough quality milk.

One of the systems they are studying is pasture-based, or New Zealand-style, dairying. In this system, producers rely on quality forages to supply homegrown, nutritious feed for most of the year.

Producers in New Zealand are credited with popularizing this system, which grew out of a traditional system of feeding milk cows a mixture of homegrown and purchased feed. Some say that dairy producers are, in effect, coming full circle in feeding strategies after embracing the use of total mixed rations (TMRs), which are feed mixtures grown off the farm and purchased for less than they would cost to produce on the farm.

Rocky Lemus, a Mississippi State University Extension Service forage specialist, told dairymen at this year’s MSU Dairy Field Days in Verona and Tylertown that pasture-based dairying can work in the Southeast.

“There are a few pasture-based dairies right here in Mississippi,” Lemus said. “We have the climate, rainfall, and forage productivity to do year-round grazing in our state.”

He noted that pasture-based dairies rely on intensive grazing to provide 50 to 75 percent of the milking herd’s total diet, normally in a 6- to 9-month grazing season.

“The way this is done varies from operation to operation,” he said. “In most of these operations, producers rely on forages to provide at least one-half of the total feed pyramid.

“Relying on your own forages means lower costs for fuel and equipment, and it may mean looking at herd production in terms of milk produced per pasture unit rather than milk produced per cow.”

There may be other benefits, too, such as higher returns due to lower operating costs, more fat and protein in milk thanks to high-quality forages, added flexibility in grazing and milking times, and more time to spend with the family rather than with the cows.

“But there is a downside, too,” Lemus said. “Pasture-based dairying may require more land—some of which has to be adjacent to the milking area. It will require anywhere from half an acre to 1 acre of pasture platform per cow in order to work nicely.

“It also requires a diverse inventory of forages with consistent nutritional value and storage space for some harvested forage that feeds the herd outside of the grazing season. It requires forage analysis so that producers can check feed quality often and adjust the ration to meet production goals. But it can provide more options in feed mixing and what we feed in the milking parlor.”

University studies in at least 10 states indicate that pasture- or grass-based dairies share some common traits.

(Continued on next page)
“Overall, these studies find lower production and feed costs, improved breeding health of the cows, and higher net farm income per cow,” Lemus said. “In order to achieve that, we have to have the right kind of forages for our climate. We need a mix of forages that yield well, with yields distributed across the grazing season. They must meet the cows’ breeding health and milk production dietary needs, and they should provide 15 to 16 percent protein in the ration.”

He said a mixture of alfalfa, annual ryegrass, tall fescue, Bermudagrass, and Bahiagrass could provide a quality forage base and an 8-month grazing season in the Southeast.

University studies have also shown that cows in a pasture-based system typically provide up to 85 percent of nutrient recycling, which translates into lower costs for fertilizer and equipment.

Lemus said these farms feed high-quality, low-fiber rations that are highly digestible. As a result, producers may find it a little more difficult to mix and balance the total ration to meet production goals, compared with more traditional alfalfa- or corn-based rations.

“There is a lot of information available online today about pasture-based systems,” Lemus said. “And there are several dairies operating this way in Mississippi today. But it’s not something you can do overnight. Converting to a pasture-based system could take several years.”

**Bulldog Dairy Camp Reaches Youths and Adults**

By Tim W. McAlavy

The 4-H Dairy Project is one of the most popular activities for 4-H’ers throughout the state. Even those with no dairy background, or daily contact with dairy cattle, have a chance to participate—with the help of a popular camp and some dedicated volunteers and teachers.

“Mississippi 4-H’ers can learn what they need to know to excel in the Dairy Project through several multicounty and regional day camps and workshops,” explained Lamar Adams, an MSU Extension Service dairy specialist based in Starkville. “By far the most popular of all our camps and workshops is the Bulldog Dairy Camp that we host right here in Starkville. We had 30 4-H youngsters, six parents, and seven Extension agents attend the camp this year.”

For two days in July, campers learn all about modern dairying, animal and herd health, the different dairy breeds, and dairy products and nutrition. They also learn the practical side of dairy cattle showing, grooming, judging, and showmanship through hands-on camp activities.

“We spend most of the first day in an orientation session,” Adams said. “We cover the rules and opportunities of the 4-H Dairy Project, some basic animal care such as feeding and grooming, and we have some fun activities, too. Most of the adults who attend are parents who want...
to be more involved with their child’s 4-H project or want to get involved as a local 4-H club volunteer back home.”

The second day of camp at MSU’s Bearden Dairy Research Center is almost a marathon event. Campers learn about dairy product quality and taste, and they tour the university’s dairy, which functions the same as any dairy farm. They learn about a day in the life of a dairy farmer from chief herdsman Kenneth Graves and then begin their hands-on experiences with grooming, showmanship, and judging.

“The dairy industry is not as populous as it used to be—the number of dairy farms is declining,” Adams said. “But we are seeing renewed interest and a modest growth in the 4-H Dairy Project statewide. We had 63 exhibitors with 159 dairy animals at this year’s Dixie National show, and about 57 exhibitors and 139 dairy animals at the 2012 Mississippi State Fair.

“We’ve scheduled our 2014 Bulldog Dairy Camp for July 7–8, and we hope to have some participants in from Louisiana and Alabama, too. It’s a great experience for them, and we enjoy hosting it.”

Adams said Mississippians who want more information on the 4-H Dairy Project should contact their county Extension office as a starting point, or contact Adams at (662) 325-2852 or lamara@ext.msstate.edu.

Top: Bob Robinson shows camp participants how to groom the topline on a dairy cow. Right: Kenneth Graves, manager of the MSU dairy herd at the Joe Bearden Dairy Research Center, provides some insight on a day in the life of an average dairy farmer.
The popularity of wildlife viewing is increasing across the nation. Every year, more than 71 million Americans enjoy observing the furry, feathered, and scaled wildlife that share their forests, fields, and backyards.

Each year, about 150,000 visitors come to Mississippi to watch wildlife, and they spend more than $52 million on trip-related expenses. Wildlife viewing as recreation generates approximately $829 million in total economic impact and supports more than 20,000 jobs in the state.

A recent Mississippi State University study set out to determine why people participate in wildlife watching and to quantify the demand for this popular recreational activity. The study used data collected by the United States Department of Interior on hunting, fishing, and wildlife viewing in Mississippi and elsewhere in the country.

“We know that wildlife viewing is increasing in popularity, growing faster than hunting and fishing in number of participants,” said Daryl Jones, an MSU Extension Service associate professor in wildlife, fisheries, and aquaculture. “We wanted to find out who is participating in this recreational activity and how much demand exists for it.”

Scientists in the MSU Forest and Wildlife Research Center looked at how much money wildlife watchers are spending and what demographic factors influence this hobby.

“When we study the characteristics of individuals who participate in wildlife viewing, we can produce data for landowners to better target a specific market,” Jones explained. “The information also may assist public land managers develop outreach campaigns to reach those who are not participating.”
The national survey reported 23 million participants took trips at least 1 hour from home for the sole purpose of wildlife watching, while more than 68 million stayed within 1 mile of home to participate.

Using this information and demographic information on wildlife observers, the study found links between the frequency of wildlife watching and age, education, household income, and urban residence.

“An individual’s likelihood to participate in wildlife viewing increased with age, but it decreased once an individual reached a certain age,” Jones pointed out. “The average age of participants was 46.”

Individuals with some college education and those living in rural areas were more likely to observe wildlife as a hobby. Also, as household income increased, so did the likelihood of wildlife watching.

Scientists also looked at the effects of hunting and fishing on wildlife watching. Interestingly, the study found that individuals who had fished at least once in their lifetimes were less likely to participate, while those who hunt were more likely to take a wildlife-viewing trip.

“Our study found that hunting and wildlife watching are complementary activities,” Jones reported. “We also found that as hunting costs increased, the likelihood of an individual to participate in a wildlife-viewing trip also increased.”

The study suggested that landowners and policymakers should consider capitalizing on the growing interest in wildlife watching. In 2011, wildlife watchers spent $54.9 billion on trip-related expenses and equipment, among other items.

“The number of people watching wildlife is more than double that of individuals who hunt and fish,” said Edwin Sun, an MSU associate professor in forestry. “The value of wildlife viewing may be used to justify funding initiatives aimed at protecting or managing resources with the primary use of wildlife watching.”

For example, programs used to preserve and restore wildlife habitat often are funded by consumers who pay an excise tax on the purchase of shooting, archery, and angling equipment.

“Given the popularity of wildlife viewing, landowners could also benefit by providing areas within their properties for individuals to pay a fee to watch wildlife,” Jones added.

Considering the complementary nature of wildlife viewing and hunting, increasing opportunities for one of these recreational activities would likely increase the number of both hunting and wildlife viewing trips a participant takes, Jones pointed out.

Landowners interested in establishing a wildlife-viewing area should contact MSU’s Natural Resource Enterprises program or visit its website.

Homeowners who enjoy wildlife viewing may want to read the Extension publication Mississippi Recreational Gardens: Establishing a Backyard Wildlife Habitat.

“Mississippi has abundant natural resources and lots of public places and fee-based private lands to watch and photograph wildlife,” Jones concluded. “Explore the state and discover why this recreational activity is so popular.”

Grab some binoculars and find out why wildlife watching is so popular. There are many opportunities in the Magnolia State, which is home to more than 60 public land areas. Four of Mississippi’s state parks are ranked among the top 25 bird-watching spots in the nation.

Mississippi also boasts 14 national wildlife refuges. The National Wildlife Refuge System is a network of habitats that benefit wildlife, protect the environment, and provide outdoor experiences for visitors.

State parks offer everything from fishing and camping to hiking and golfing. There are 25 Mississippi state parks with numerous wildlife-viewing opportunities. The Interstate 55 Birding Trail features eight state parks, and the Natchez Trace Corridor Birding Trail features six state parks and one nature area.

Deer, turkey, quail, and other wildlife inhabit the 14 wildlife management areas operated by the Mississippi Department of Wildlife, Fisheries, and Parks. Mississippi also is home to nine national forests that offer many recreational opportunities, including wildlife watching.

On the web:
http://www.fws.gov/refuges
http://www.mdwfp.com/parks-destinations/
http://www.mdwfp.com/wildlife-hunting/
http://www.fs.usda.gov/mississippi
http://msucares.com
http://www.naturalresources.msstate.edu
Rewards Hard Work

By Susan Collins-Smith

To most people, showing horses seems a lot like work because of all the feeding, watering, stall cleaning, grooming, and training involved—not to mention the countless hours spent at shows. But to Mississippi 4-H’ers involved in the horse program, all that work is a lot of fun.

Each summer, 8- to 18-year-olds meet at the Mississippi State Fairgrounds for the 4-H Horse Championship to reap the rewards of a year’s worth of effort. This year, more than 600 4-H horse program members participated in six educational contests and 105 riding events.

“The horse program is one of our most popular 4-H livestock programs,” noted Dean Jousan, Mississippi State University Extension Service 4-H livestock specialist. “Over the last 10 years, entries for the riding contests have remained between 1,100 and 1,200. Contestants number between 200 and 250 in the educational competitions.”

Kristy and Michael Clark and their children Gentry, 16, and Quincee, 10, are among the faithful who spend their summer vacations at the event each year.

“We haven’t been anywhere other than horse shows in about 10 years,” reported Michael Clark of Bolivar County. “We really enjoy it, and our kids learn from it. 4-H provides a family environment where our kids can learn on a level that is appropriate for their age. It’s not a dog-eat-dog kind of experience. They put their own work in and get the reward for that.”

4-H members from across Mississippi qualify in their districts to compete in more than 100 riding events and educational contests offered during the state championship. Educational competitions include horse judging, horse quiz bowl, horse public speaking, horse individual demonstrations, horse team demonstrations, and hippology. The contests are designed to encourage participants to study the horse industry and learn techniques for proper horse care, nutrition, and training.

Individuals must own a horse to take part in the performance events, but the educational competitions are open to any interested individual.

“The educational contests are great for kids who are interested in horses but might not have the space or financial ability to have a horse of their own,” said Larry Alexander, Extension 4-H youth development specialist. “But the knowledge the kids gain from preparing for the competitions really enhances their overall experience if they do have a horse and compete in the performance events.”

Bobby May, Union County 4-H member, can vouch for that. This year marked the 17-year-old’s sixth annual trek to the statewide show, where he participated in horse public speaking, horse individual demonstration, horse bowl, and performance events.

“The things I’ve learned in horse bowl and doing other contests help me every day with my horses,” May explained. “I’ve learned good organizational and research skills, and having horses has taught me responsibility.”

He does not plan to work with horses for a living but knows his years spent in 4-H will come in handy when he gets the ranch he dreams of owning.

“But that will be after school,” added May, who plans to become a pharmacist.

Like May, Amite County 4-H’er Christian Nations, 12, loves horses and 4-H. She has been a member of the 4-H horse program for just 2 years but has had horses since she was 4. Horses have provided wonderful therapy for Nations, who weighed only 1.4 pounds at birth, reported her mom, Debra Nations.

Christian Nations says she spends most of her time at the barn, where she grooms, feeds, and works with 7-year-old Buddy, the horse she rides in speed events.

“When I first got him, he was afraid of everything,” she explained. “I started working with him on barrel riding, and one of the barrels had dirt on it. He wouldn’t go around it because of the dirt. But I just kept working with him until he could do it.”

Buddy is not the only one who has surpassed goals.

“4-H has helped Christian excel with kids in all kinds of settings, not just in horse competitions,” Debra Nations noted.

“I’ve really seen her self-confidence improve,” agreed Amite County 4-H agent Amy Walsh. “She has fun competing, and she’s good at it. I love to see the smile it puts on her face.”

And that is what the 4-H Horse Championship is all about, Jousan stressed.

“This event and the work that leads up to it give youth the opportunity to compete in an environment that fosters their development while showcasing their skills in educational contests and with their horses,” he concluded.

To become involved in Mississippi 4-H and the horse program, contact your local county Extension office.
Mississippi State University is enhancing its role as a conservationist in trying to increase the population of one of the most critically endangered species living in North America.

Mississippi gopher frogs are native to south Mississippi, and for a time, the only known colony in the wild was living near a Harrison County pond. They have since been found living near three other ponds in the DeSoto National Forest, bringing the total known wild population to an estimated 100 to 200 gopher frogs.

More than 700 additional gopher frogs live in captivity, and one Mississippi Agricultural and Forestry Experiment Station lab has 34 of the adult frogs.

Natalie Calatayud, a postdoctoral fellow, and Cecilia Langhorne, a graduate student pursuing her doctorate in animal physiology, care for these frogs. Their work is in partnership with the Memphis Zoo, which supplied the frogs to MSU.

“The problem with their dwindling numbers is a loss of habitat,” Calatayud explained.

In their natural habitat, the frogs are “explosive breeders,” Langhorne pointed out.

“They need an event, such as a torrential downpour, and then they all move in one night to the same pond and mate,” she said.

The ponds they choose to live near are ephemeral ponds. These temporary ponds, formed in wetland areas by rainfall, last for a few weeks and then disappear.

“The tadpoles must metamorphose by the time the pond dries up,” Langhorne noted.

In response to the frogs’ loss of habitat, the U.S. Forest Service, U.S. Fish and Wildlife Service, and other conservation groups have stepped in to protect the habitat that remains. These organizations also work to create new habitat the frogs will find suitable for breeding.

“They are trying to design ponds that form with trapped water and then dissipate,” Calatayud explained. “There is a lot of effort going into habitat restoration.”

At MSU and the 14 zoos studying gopher frogs, researchers are trying to get captive colonies to breed naturally—so far without success.

“Getting the females to lay eggs has been a little bit of a problem,” Calatayud reported. “All our breeding is done by in vitro fertilization, but we’re trying to figure out what conditions are necessary to get the captive colony to breed naturally.”

Mississippi State researchers are working to refine the hormone treatments used to get the females to lay eggs. They are also working to preserve the genetic diversity of the species by biobanking the frogs’ cryopreserved sperm.

“With only 100 to 200 in the wild and 700 in captivity, it is important to avoid genetic bottlenecks,” Calatayud stressed. “If we can’t make them breed naturally in captivity at the moment, then what we can do is to create a bank of genetic diversity so we can help that population out manually if we need to.”

MSU’s frogs are about 3 years old and are expected to live up to 9 years in captivity. The frogs’ gender must be determined by ultrasound. MSU is home to 19 females and 15 males.

Individual frogs are difficult to tell apart, but researchers identify them using passive integrated transponders inserted beneath the skin. These devices are smaller versions of the microchips used to identify dogs and cats. Langhorne and Calatayud plan to name the frogs after famous Mississippians.

Scott Willard, associate dean of the College of Agriculture and Life Sciences, said the work is important because the presence and health of gopher frogs and other amphibians are indicators of the overall well-being of some vital natural habitats in Mississippi.

“Our research is centered on understanding how to develop protocols to bring species back from the brink in the laboratory, but larger questions persist regarding habitat maintenance and restoration efforts,” Willard added.

This research has direct application to the propagation of endangered amphibian species, with far-reaching implications if technologies can be applied broadly, Willard explained.

“We hope that this work can be expanded to other species as well,” he said. “However, we often find that what works for one species may not work, or may be completely different, in another species. But these are the challenges we face when working with species on the brink of survival.”
Som e Mississippi State U niversity students tested their problem - solving skills w ith real challenges instead of hypothetical situations during the fall 2013 semester.

W hether graphic design students dream ing up a new logo for the Mississippi Sw eet Potato C ouncil’s boxes or com m unication stu - dents developing videos to help 4-H’ers im prove their public speak - ing skills, students worked with community partners to address existing needs.

The students were enrolled in classes that offer the opportunity to engage in service-learning projects through MSU’s C enter for the Advancem ent of Service-Learning Excellence.

A pril H eiselt, director of the new center, described it as a part - nership between MSU’s Extension Service and the Office of the Provost and Executive Vice President. She said she is like a broker between professors and Extension agents who serve as the university’s community outreach team.

“Som etim es faculty members bring me ideas for projects they want to do, but they need a real-world application,” H eiselt said.

Other times, Extension employees approach H eiselt with community-generated projects, and she finds professors willing to incorp orate them as part of a service-learning course.

“We bring people to the table and figure out what we can de - velop together,” she explained. “Service-learning is different from community service in that it is more than a one-time experience. It is integrated with academic course objectives and benefits everyone involved.”

H eiselt said students benefit from working with industry profes - sionals before graduating.

“Their work makes a difference and is meaningful to their cur - rent community, their career goals, and their futures,” she said.

The freshmen in Alta K nizley’s Introduction to Mechanical En gineering class chose one of five service-learning projects this sem - ester. Mariah Smith, a technology specialist with the Extension Center for Technology Outreach, offered the students a taste of what her project would entail when she handed them a bag of candy and a tough task.

“I gave them 2 minutes to build a tractor out of lollipops, Life - savers, and peppermint patties,” Smith said. “The students who worked with me this semester for the service-learning component of their class designed robotics activities and curriculum for the 4-H’ers we call Cloverbuds—the 5- to 8-year-olds. Creativity was required because the Cloverbuds judged the activities when the students presented them at the end of the semester.”

K nizley said she chose to get involved in service-learning because she believes it benefits her students.

“I hope my students enjoyed the service-learning project and that they are excited to continue in mechanical engineering,” she said. “I also hope they learned that a strong work ethic is required to complete the program, and that they experienced new environments and worked with people from different backgrounds.

“But these projects also helped them build strong relationships with our community and instilled a sense of purpose in our stu - dents. They learned they are capable of performing tasks that may, at first, seem daunting to such young college students.”

K nizley decided to offer a service-learning course for another reason, too: it gives her a chance to reach students even younger than those she teaches.

“Whether it’s robotics for young children or high school stu - dents, family engineering nights, an interactive art exhibit, or ele - mentary-level math and science demonstrations, all of these service-learning projects allowed young people to experience engineering and science-oriented subject matter,” K nizley said. “The best way to encourage students to pursue careers in math and science is by showing them role models in those fields. Between two classes, we sent about 170 role models into Mississippi communities.”

On the web: http://servicelearning.msstate.edu
County Seat: Lexington
Population: 18,796
Municipalities: Durant, Tchula, Lexington, Pickens, Goodman, Cruger, West
Commodities: Beef cattle, Corn, Cotton, Grain sorghum, Oats, Peanuts, Pine trees, Rice, Soybeans, Wheat
Higher Education: Home campus of Holmes Community College
Industries: Burrows Paper Corp., First Class Linen, Hammett Gravel Co., Hunter Engineering, Lexington Concrete and Block, Lexington Homes, Magnolia Cultured Marble, Inc.
Natural Resources: Rolling hills with native hardwood timber and wildlife (whitetail deer and turkey); thousands of acres of pine plantations; rich Delta farmland; 37 named creeks and bayous; Bee Lake, Horseshoe Lake, Tchula Lake, Big Black River; gravel and sand pits; large sandstone and other stone outcroppings; and wonderfully creative Southern people who cherish family and a sense of home.
History Notes: Castallian Springs and Owens Wells were popular destinations for those seeking mineral baths and water in the early 1900s. The Order of the Eastern Star was born here. Saints Industrial and Literary School was established by the Church of God in Christ in Lexington in 1918. Holmes County is known as the birthplace of 4-H. William Hall Smith implemented an education program that closely tied some schoolwork to the farm. His approach was noticed by USDA Secretary of Agriculture Seaman Knapp, who appointed him a USDA collaborator and gave him the first federal support for his corn club work. In 1910 the Holmes County Corn Club won the state fair with its corn project; earning club leader John M. Kimbrough a Ford Model T for his work with the club.
Attractions: Little Red School House--birthplace of The Order of the Eastern Star; St. Paul’s Church of God in Christ; Saints Academy, formerly Saints Industrial and Literacy School; Holmes County State Park; Hillside Refuge; Morgan Brake Refuge; Bee Lake; and productive hunting habitat for whitetail deer and wild turkey.
Did you know? Forestry professionals note that the largest living cypress tree in Mississippi stands on the Quafaloma Plantation near the Mileston community.

“Working for and with the wonderful people of Holmes County makes each day a joy to wake up to. To serve in the place where I was born and raised is a privilege that I don’t take lightly. Agriculture lies at my own roots, as well as Holmes County’s.”

Betsy Padgett, MSU Extension agent
Veterinary Expert Contributes to Global Efforts

Dr. Robert Wills, an epidemiologist and associate professor with the Mississippi State University College of Veterinary Medicine, has been appointed as an expert to the Food and Agriculture Organization (FAO) of the United Nations in Rome. Wills will share his knowledge on epidemiology and analytical methods to improve animal and food safety around the world.

Wills is working with representatives from the FAO in Rome, U.S. Department of Agriculture, World Organization for Animal Health (OIE), and Centers for Disease Control and Prevention in developing risk analysis models to determine the main drivers of animal disease. Specifically, Wills plans to develop targeted risk assessments for diseases such as avian influenza, swine influenza, and foot and mouth disease.

“This is a great opportunity for Dr. Wills, on behalf of the university, to facilitate new research relationships and to let the FAO, OIE, and other international organizations understand the resources available here at Mississippi State,” said Dr. Kent Hoblet, dean of the MSU College of Veterinary Medicine.

Associate Provost Receives Honorary Membership

The American College of Theriogenologists recently granted an honorary membership to a veteran MSU professor in recognition of his research and teaching career.

Peter Ryan, who specializes in equine reproduction, received the 38th certificate awarded in the organization’s 42-year history. He holds a doctorate in the physiology of reproduction and has served since 1999 as a professor in the MSU Department of Animal and Dairy Sciences with a cross-appointment in the College of Veterinary Medicine Department of Pathobiology and Population Medicine. He also serves as the associate provost for academic affairs.

Drs. Richard Hopper, Heath King, Kevin Walters, and Jack Smith, all CVM professors, nominated Ryan for the honor in recognition of his contributions to theriogenology, or animal reproduction.

Chang Named Society Fellow

A Mississippi State administrator has been named a fellow in the American Chemical Society’s Agricultural and Food Chemistry Division.

Sam Chang, head of the Department of Food Science, Nutrition, and Health Promotion, was honored at the 246th annual meeting of the American Chemical Society in Indianapolis. The honor recognizes Chang’s outstanding scientific contributions to the field of agricultural and food chemistry.

Chang is internationally renowned for his work with legumes.

Students Sweep Food Science Conference

Two MSU food science graduate students took top prizes for poster presentations at the Institute of Food Technologists Annual Meeting and Food Expo in Chicago.

Yan Zhao placed first in the Muscle Foods Division competition for her research on food safety in aging dry-cured hams. Her research focused not only on keeping the food safe but also on the effects different processes have on flavor and sensory quality.

Monil Desai placed second in the same division for his research on red coloration in channel catfish fillets. His study identified the protein biomarkers that produce reddish coloring in catfish fillets.

Forestry Professor Named Society Fellow

Donald Grebner, an MSU forestry professor, was named a fellow by the Society of American Foresters for his contributions to the society and the forestry profession.

He is a researcher in the university’s Forest and Wildlife Research Center with studies in bioenergy, carbon sequestration, forest protection, and international forestry.

Grebner obtained his bachelor’s degree in forestry from the University of Maine, a master’s degree in forestry from Yale University, a master’s degree in economics from Virginia Tech, and a doctorate in forest economics from Virginia Tech.
Munn Serves as Associate Dean

A veteran MSU faculty member was named associate dean in the College of Forest Resources earlier this year. Ian Munn is a forest resource economist and professor.

MSU is the only university in the state that offers a bachelor’s degree in forestry and a bachelor’s degree in wildlife, fisheries, and aquaculture. As associate dean, Munn will coordinate all aspects of these undergraduate programs, including curriculum, student advising, and scholarships.

The college is home to the Department of Forestry, Department of Sustainable Bioproducts, and Department of Wildlife, Fisheries, and Aquaculture. It offers 11 academic concentrations within two majors. The college also offers master’s and doctoral degree programs in each department.

Munn has a distinguished career at MSU and has served as a forestry professor for more than 20 years. His research interests include natural resource economics.

New Leader at the Delta Center

Jeff Johnson, whose research interests include water policy, farm management, and natural resources management, is the new head of the Delta Research and Extension Center in Stoneville.

“Dr. Jeff Johnson is a well-known agricultural economist who has administrative experience at the Texas Tech and Texas A&M university systems,” said Gary Jackson, director of the MSU Extension Service. “He is highly respected by his peers, and he understands how to seek and obtain internal and external resources for research and Extension faculty, staff, and agents.”

Johnson formerly held a joint appointment as an associate professor at Texas Tech University and associate professor at Texas A&M AgriLife Research in Lubbock.

MSU Appoints New CALS Associate Dean

Scott Willard is the new associate dean in the College of Agriculture and Life Sciences. Willard, head of the Department of Biochemistry, Molecular Biology, Entomology, and Plant Pathology, assumed the post October 1.

Willard has been at MSU since 1999, first as a professor of reproductive and environmental physiology in the Department of Animal and Dairy Sciences before taking the helm in the Department of Biochemistry and Molecular Biology in 2007.

He earned a bachelor’s degree in animal, veterinary, and fisheries science at the University of Rhode Island, Kingston, and master’s and doctoral degrees in physiology of reproduction at Texas A&M University.

Students Receive National Award of Excellence

More than 100 students representing six Mississippi State University disciplines were recently recognized with the American Society of Landscape Architecture’s Award of Excellence in Student Collaboration.

Awards of Excellence are the highest honor bestowed by the ASLA, the national professional association for landscape architects, said faculty adviser Cory Gallo, assistant professor of landscape architecture at MSU.

The students received the award for their work at Oktibbeha County Heritage Museum, which is now a regional demonstration site for green infrastructure and sustainable building technologies.

Undergraduate landscape architecture students participated in each of five phases of work. In phase one, they designed and implemented a rain garden to mitigate stormwater runoff. They also introduced numerous new plants on the grounds.

Graduate landscape architecture and landscape contracting students joined with them in phase two to develop the sand filter to collect, clean, and absorb runoff, create an outdoor amphitheater around the filter, and redesign and build a new entrance.

In phase four, graphic design students designed kiosks using information developed by landscape architecture students in a watershed management seminar course. Phase five incorporated students from architecture, art, and building construction science with landscape architecture, as the team of students designed and built a pavilion, a formal lawn, and a new walkway.
Travis Tadlock has a reputation for excellence built on his years of community involvement and his work with the Mississippi State University Extension Service. For his achievements, the 91-year-old longtime Brookhaven resident is being honored with a special endowment at the university.

A $50,000 gift from Tadlock’s daughter has established the Travis Tadlock Outstanding Extension Agent Award in the MSU Extension Service. Susan Tadlock Williams created the endowed fund and provided a $2,000 initial award to recognize the inaugural recipient this fall.

The award allows Williams to honor both Extension’s past and its future.

“As a former Extension agent, I am honoring a retired Extension agent, my dad, with this endowment and allowing MSU to award a current Extension agent for a job well done,” said Williams, who resides in Shenandoah, Texas. “My dad is a humble, selfless man, and I believe this is a fitting way to honor his life’s work. Also, I wanted to thank him for putting me on a path toward a fulfilling career.”

The MSU Extension Service will select future recipients of the Travis Tadlock Award based on the individual’s contributions to the mission of Extension at Mississippi State. The award will be presented at the MSU Extension Service annual conference held each year on campus.

“Extension has been a huge success as a part of the land-grant university mission for almost 100 years,” said Gary B. Jackson, director of the MSU Extension Service.

“Our success in delivering educational programs to adults and 4-H youth has resulted from past Extension employees, like Travis Tadlock, who dedicated their lives to providing these educational programs in rural communities.

“Travis is one of those individuals who took Mississippi State educational programming to the local people. We are honored to have his name on our Outstanding Extension Agent Award to recognize those who are following in his steps as an excellent educator and leader.”

Tadlock became interested in a service-oriented career when he was a student at Burns High School in his native Smith County.

“An Extension agent named Joe C. Taylor visited our school and organized a 4-H club,” Tadlock recalled. “He impressed me as being a man who performed many service-oriented things, and I decided I also wanted to do those things to help other people.”

Tadlock began his career with the Extension Service as an assistant county agent with responsibilities for 4-H club youth in Lincoln County. It was during this time that he trained a dairy judging team that won the state contest, making them eligible for the National Congress in Waterloo, Iowa. In 1955, he was promoted to Extension agent. He retired in 1978, having served his entire 33-year career with the Lincoln County office.

During his tenure, Tadlock was cited for outstanding service on many occasions, including leading the Lincoln County staff to a superior service award from the U.S. Department of Agriculture in 1957; receiving the distinguished service...
award from the National Association of County Agriculture Agents in 1957; and serving as president of the Mississippi Association of County Agriculture Agents in 1969.

A native of Lorena, Mississippi, Tadlock completed 1 year at Jones County Junior College while working at a hosiery mill, and then he was drafted for military service. He entered the U.S. Navy in 1942 and served as corpsman on landing craft in the South Pacific until 1945. After military service, he enrolled at then-Mississippi State College and earned a bachelor’s degree in agriculture administration in 1948. He earned a master’s degree in Extension education from MSU in 1969.

During his Extension tenure, Lincoln County experienced much progress. Three hundred Grade A dairies operated in the county, and the overall agriculture program changed from a cotton and row crop system to livestock, forestry, and dairy programs. A livestock show facility, also used for 4-H contests, was made possible because of Tadlock’s efforts. He was also instrumental in creating the Lincoln County Livestock Association and the Lincoln County Forestry Association. Tadlock began and promoted new programs for improved pasture and feed crops, as well as for livestock breeding, feeding, and best management practices.

Well into his retirement, Tadlock remains active in his community. Just this year, he concluded a 24-year association with the State Water Commission and the Pearl River Basin Development District, which helped establish Lake Lincoln Park. His past leadership roles included serving as president of the Chamber of Commerce and helping establish the Brookhaven Beautiful Program. He also helped raise $350,000 in matching funds to develop the Lincoln County Civic Center.

Rebecca Bates, county Extension agent and coordinator in Lincoln County, speaks highly of Tadlock.

“Travis is one of the finest citizens in Lincoln County, and he is still a great resource for the MSU Extension Service and for me personally,” Bates said. “His legacy continues as many of the children he interacted with through 4-H during his career now hold dedicated roles with the Extension Service.”

Tadlock’s recent activities include working with Habitat for Humanity and Deaconess Hospice of Brookhaven. He is a 60-year Lions Club member who also served as the organization’s president. Tadlock was married for 60 years to his wife, Melba, before her death in 2007. In addition to Williams, the couple had two sons, Sid Tadlock of Forest, Mississippi, and Tommy Tadlock of Brandon, Mississippi. All three children attended MSU and chose agriculture-related careers. Tadlock has five grandchildren and three great-grandchildren.

“My children and I always enjoyed farming together, so I definitely think my occupation influenced their success on some level,” Tadlock said. Tadlock said he feels his most important career accomplishment was the rapport he established with leaders across the state. He is proud of the heritage of the Extension Service and the progress it has brought to his home state.

“Working together as a team for the greater good of the community and the state has always been important to me,” Tadlock added.

Williams said she is pleased her gift will benefit the MSU Extension Service that her dad cherishes.

“Dad is talented—almost gifted—in relating across the board to leaders and those involved, and he seemed to know exactly what direction to take farmers economically to benefit Lincoln County,” Williams said. “He has always lived his life as an example through service and dedication to his state, his university, his family, and his community.”

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A young Jersey heifer checks out the camera during a group feeding at MSU’s Joe Bearden Dairy Research Center. She may one day join the herd of Jersey cows that produce the university’s signature Edam cheese. (Photo by Kat Lawrence)