

Field Station

Our mission :

to foster ecosystem stewardship by providing a natural laboratory for research, education and service

Semiannual Newsletter

Fall 2007



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photo by Michelle Edwards

THE JOURNEY BEGINS...

Many changes are occurring at the Field Station that are both exciting and challenging. One is the new format and schedule for publishing this newsletter in order to improve communications. We want our colleagues, friends and neighbors to have a better understanding of the UM Field Station, what makes it tick and the great research and teaching that occur here. As part of this effort to reach out to the University and the broader community, we are also working on new brochures, pamphlets and posters and will be generating regular news releases. Perhaps you've already seen some of our recent articles in the newspaper, in special publications and on the Internet.

I wear another hat for the University as executive director of the National Institute for Undersea Science and Technology (NIUST). This dual responsibility has made it possible to

advance both programs through administrative and financial efficiencies. Because of this partnership, we will also share some interesting developments in NIUST that involve the Field Station in future newsletters – stay tuned.

I became director of the Field Station in early 2005, one of the changes alluded to above. Previously, I was a professor of marine science and director of an undersea research program and a coastal marine laboratory at the University of Alaska Fairbanks. Yes, Alaska! And, yes, it's been a major change in my life in just about every respect. Change is inherently interesting and the move has been an enriching experience. Change is also one of the things I like about the Field Station; the challenge is to make positive changes that contribute to achievement of the major goal I have set for the Field Station.

My goal is to develop the Field Station into the leading research and teaching field station in the Mid-South. Achieving this goal will not be easy and we will need all the help we can get from existing and new friends of the Field Station. I

hope you will join us on this exciting journey!

Ray Highsmith

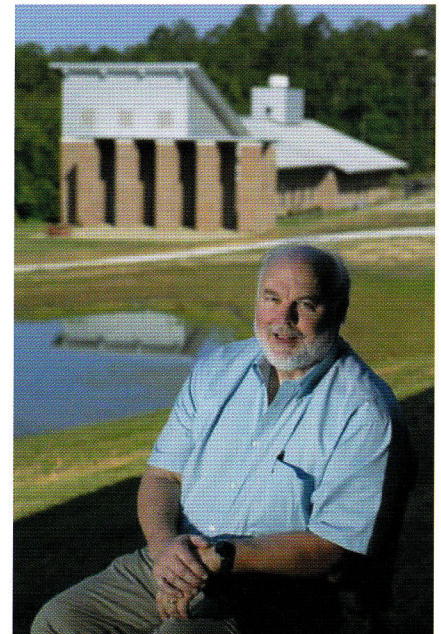


photo by Robert Jordan

Field Station Staff

(sitting from left)

Dr. Ray Highsmith - Executive Director
ray@olemiss.edu

David Mathis - Water Systems
 Coordinator

Mark Baker - Resident Director
jbaker@olemiss.edu

Dr. James Anderson - Research Scientist
jandersn@olemiss.edu

(standing from left)

Michelle Edwards - Assistant to the
 Executive Director - Business and
 Marketing, edwardsm@olemiss.edu

Sarah Lovett - Manager of Project
 Resources smholter@olemiss.edu

Linda Williams - Senior Staff Assistant
lechols@olemiss.edu



Staff Accolades

Dr. Ray Highsmith got a big surprise when he returned to Kasitsna Bay, Alaska, recently for an open house celebrating the grand opening of a laboratory he directed for more than 20 years. They named the marine laboratory at the renovated facility in his honor.

Highsmith, executive director of the National Institute for Undersea Science and Technology and director of the UM Field Station, was honored for establishing university research and teaching programs at the lab and helping raise more than \$12 million for needed improvements. The Kasitsna Bay Laboratory is owned by the National Oceanic and Atmospheric Administration's National Centers for



Coastal Ocean Science and operated in partnership with the School of Fisheries and Ocean Sciences at the University of Alaska Fairbanks.

The facility, on Alaska's Kenai Peninsula, was renamed Dr. Raymond C. Highsmith Laboratory. Highsmith cut the ribbon (made of sea kelp) for the renovated facility as about 130 people cheered.

"I was surprised and honored," said Highsmith, who directed the facility's operation from 1983 to 2005. "Seeing this wonderful new facility, after so many years of hard work even just to survive, really is a dream come true and should benefit students, teachers and researchers for decades to come."

The upgraded complex includes a 48-person dormitory and bunkhouse, scuba locker, shop, classrooms and a 5,000-square-foot laboratory building with five dry labs and a 1,400-square-foot wet lab. The new facilities should enable NOAA and UAF to expand research and education in marine science and monitor the response of coastal ecosystems to change.

The open house also celebrated the 200th anniversary of NOAA, which started as the Coast and Geodetic Survey.

For more information on the lab, go to www.westnurc.uaf.edu/kbay/kbay_news.html.

photo by Kurt Byers, University of Alaska

The University of Mississippi Field Station Ralph Powe Research Award

The UM Field Station annually awards grants-in-aid for \$500 each to graduate students working on projects in which the majority of the research is conducted at the Field Station.

These research grants honor the numerous contributions of Dr. Ralph Powe, who was the first chair of the UM Field Station Advisory Board. Dr. Powe was also instrumental in forming the Mississippi Research Consortium (MRC), a coalition of state universities that includes Jackson University, Mississippi State University, the University of Mississippi and University of Southern Mississippi. While chair of the MRC from 1986 until 1996, the consortium developed more than 60 cooperative activities that generated \$60 million in research support activities. The consortium continues to expand educational and economic opportunities and enhance research capabilities for the state of Mississippi.

In addition to his service with the Field Station and the MRC, Dr. Powe was vice president of research at Mississippi State University from 1986 until his death in 1996.

Application deadline for 2008 is February 1. Please see www.baysprings.olemiss.edu for more information.



American Beautyberry also know as French Mulberry, *Callicarpa americana*

photo by Michelle Edwards

Current Research

Salamander Habitat

Patrick Yamnik, a graduate student in UM's Biology Department, is studying the ponds in which spotted salamanders choose to lay their eggs. By understanding the specific characteristics of the ponds and wetlands chosen, he hopes to better understand the ecology of salamanders and other amphibians, such as frogs, that have experienced a catastrophic population decline all over the world.

Because of the recent rapid declines, it is critical to understand all aspects of amphibian ecology. Of particular concern in the United States is the loss of wetlands that serve as breeding



photo by Ed Keiser

grounds for many amphibians. His research on the characteristics of wetlands used by the spotted salamander and related species will provide a guide to wetlands management by knowing which characteristics contribute to providing the best habitat.

2007 Ralph Powe Award Recipient



photo by Michelle Edwards

Honeysuckle Evolution

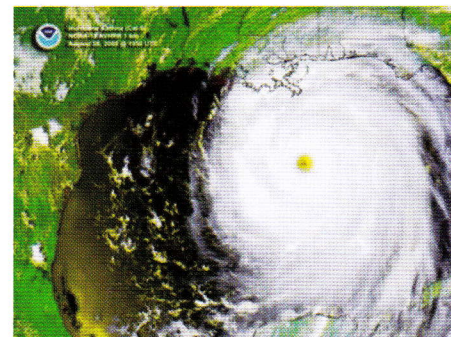
Francis Kilkenny, a graduate student in the Biology Department at the University of Virginia, is researching the honeysuckle vine. He has placed one of his four research sites at the UM Field Station. At these sites he is analyzing honeysuckle from different climatic regions of the United States to find out if honeysuckle has evolved since it's introduction to America from Asia in 1806. His test site includes vines from the South (MS, AL, GA) and from the North (IN, OH, PA). By comparing the vines from different regions, he hopes to see if honeysuckle from one region has better adapted than vines from another. In other words, have the Southern populations of honeysuckle evolved to be more adaptable than the Northern populations? This answer is just the first part of the equation. If honeysuckle evolution has occurred, will further evolution mean expansion into other regions? Stay tuned ...

The Sound of Hurricanes

Most people watch for storms, but Dr. Claus Hetzer is listening. Hetzer, research and development engineer at UM's National Center for Physical Acoustics, is gathering data by tracking hurricanes with specialized microphones that measure pressure in the atmosphere.

By placing the microphones in a clearing at the UM Field Station, he can pick up the infrasound that hurricanes emit. The low-frequency infrasounds are difficult for air to absorb, therefore they can be detected many hundreds of miles from the actual storm.

The variations in storm's intensity and path and the corresponding changes in the infrasound could help provide important information for forecasters in the future.





Fire Ants

Fire ants – if you live in the Southeastern U.S., you know what a problem these little invaders are. But did you know they cost the United States approximately \$6.5 billion per year?



Fire ants entered the U.S. from South America in 1929 through the port of Mobile, and no one has been able to stop their expansion yet. Longtime residents of the South, they are migrating to the West. Dr. James Anderson, research scientist at the Field Station's Center for Water and Wetland Resources, and biology graduate student Jake Marquess are researching ways to combat the destructive insects by studying how they communicate and recognize each other. If their communication and nest mate recognition abilities can be disrupted, then that knowledge can be used to control and/or eradicate the ever-encroaching fire ant.



photo by Michelle Edwards

Wild Turkey

The UM Department of Biology has built an Avian Research Facility at the Field Station that houses Dr. Rich Buchholz's wild turkey research.

The research facility's initial structure was upgraded last year with the help of National Science Foundation funding. This year's upgrade includes a new 50-by-100 foot outside pasture aviary to provide for a more naturalistic habitat for the captive birds.

Buchholz's research is investigating the mate choices in female turkeys that had been infected as juveniles with an intestinal parasite. The infected females grow up to inspect more males before choosing a mate and consider male characteristics (head ornamentation, etc.) in a different priority than other females that had never been infected.

Buchholz hopes to determine whether the females are making "smart" choices in mate selection based on their own health for example, are they compensating for their own poor health by picking the healthiest mate?

Healing Plants

Dr. Rita Moraes and colleagues Dr. Muhammad Ilias and Dr. Teresea Carithers are researching a low-calorie root crop, commonly called the yacon in other parts of the world. The yacon's root is sweet-tasting, a mixture of apple and watermelon flavors, yet the sweetness comes from inulin, not glucose. The body can't metabolize inulin so it has minimal effect on blood sugar, making it appealing for diabetics and dieters. "The proposed research aims to fight obesity and increase small- and mid-size farmer's profits by growing the yacon," said Dr. Moraes.

Dr. Moraes, in collaboration with Dr. David Pasco, Dr. Nirmal Pugh and Dr. Ikhlas Khan, has also studied the medicinal properties of purple coneflower, also known as echinacea, at the UM Field Station since 2002. The echinacea project is funded by the National Center for Complementary Medicine of the National Institutes of Health to optimize echinacea immune-enhancing agents.



photo by Michelle Edwards

Research Spotlight

Aquatic Plants as Pesticide Filters

Pesticides are an important part of modern agriculture, enabling farmers to grow vast amounts of food by keeping hungry insects away from the crops. But when those pesticides wash off the fields and into nearby lakes and streams, they pose a problem for wildlife and even people. Researchers at the UM Field Station are evaluating the possibility that another crop - rice - may provide a natural, effective way to prevent pesticide runoff from fouling freshwater resources.

A research team from the USDA-Agricultural Research Service National Sedimentation Lab is conducting tests and gathering samples in several rice fields growing at the Field Station. The study, led by ecologists Drs. Charlie Cooper and Matt Moore of the Sedimentation Lab's Water Quality and Ecology Unit and Dr. Robbie Kroger, a post-doctoral wetland ecologist at the Field Station, focuses on the ability of aquatic plants - in this case, rice plants - to decrease the contamination levels from pesticide runoff. "Rice is an interesting plant to use because it is an aquatic plant that also serves as a food source," Moore said.

Pesticide runoff generally occurs after rainstorms, so the team simulates a summer storm - minus thunder and lightning - and diverts insecticide-laden runoff water into a rice field. By taking samples at intervals as the water flows through the field and analyzing them in the lab, researchers can gauge the levels

of pesticides that leach off into plants, water and sediment.

The scientists are measuring the capability of rice plants to filter (or capture) insecticides from the water and to see how the insecticides affect the plant itself. As part of the project, Kroger is examining pesticide breakdown and potential release by dead rice plants over several months.

"An interesting contamination question that is often asked is, 'Will the pesticide that is on the rice plant be released back into the water and harm plants and organisms downstream?'" Kroger said. "We just don't know yet. Assessing decomposing rice as well as pesticide concentrations in the water over several months will tell us what we need to know."

However, early results from the project look promising. "It appears that in the decomposition experiment, the rice plants' pesticide concentrations decrease dramatically during decomposition, and that pesticide does not cycle from plant to water within the system," he said. "Most importantly, water released from these ponds has very small concentrations of pesticide, concentrations well below water quality standards."

The organo-phosphate insecticide used in the study is a commonly used pesticide for rice and corn. Rice was chosen for this project not only because

it is an aquatic plant but also because it is a major agricultural crop in the Delta and in California.

"Eventually I want to do a life cycle study from seed to seed," Moore said. "I want to see how much pesticide will be transferred to the rice plant during the entire growing season, ending with the harvesting of the seed. Of course, that includes the rice grain, which may be used for food if it is free from pesticides."

This is the second year of the rice study funded by the U.S. Department of Agriculture in cooperation with the Field Station. Dr. Ray Highsmith, director of the Field Station, and Dr. Marge Holland, professor of biology, are the university's principal investigators, and Charlie Cooper serves as the USDA's project coordinator.

"The National Sedimentation Lab scientists, in cooperation with Dr. Holland, have been very important partners for the Field Station," Highsmith said. "They have been conducting related studies at the Field Station for many years. This research is important not only for the agricultural industry and wildlife managers but also for society that depends upon sources of clean water."



Matt Moore, left, and Robbie Kroger, above, collect samples in the rice fields at UM Field Station.

photos by Michelle Edwards



Photo by Michelle Edwards

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University of Mississippi Field Station
15 CR 2078
Baysprings Road
Abbeville, MS 38601