Public Relations
Plymouth, NH 03264
603-535-2276
603-535-2275 fax

Contact: Marcia Santore, (603) 535-3009

Date: August 17, 2005

FOR IMMEDIATE RELEASE

National Science Foundation Funds Plymouth State Research on Horseshoe Crabs

Plymouth, N.H. — The American horseshoe crab plays important roles in nature, commerce, even medicine. But in recent years their numbers have been declining. Could understanding how they respond to the tides and their own internal "clocks" help reverse that situation?

The National Science Foundation announced August 2 that it will provide a grant of $203,373 to Plymouth State University to fund research on *Limulus polyphemus* (the American horseshoe crab). Dr. Christopher C. Chabot, professor of biology at PSU, is the principal investigator on the project and Dr. Winsor H. Watson, professor of zoology at the University of New Hampshire is the co-principal investigator. The project will study how the crabs' internal "clocks" affect their behavior in the wild, and will provide research opportunities to enhance graduate and undergraduate education.

Many species of fish, turtles and migratory birds depend on horseshoe crab eggs for food, including the endangered loggerhead turtle. Commercial fishermen use the crabs for eel and conch bait, harvesting over 2 million horseshoe crabs in the year 2000 alone. The blood of this species of crab is used to find certain bacteria and toxins in such medical products as dialysis equipment, antibiotics and intravenous solutions. Better understanding how the animals behave in nature could prove crucial to their survival.

– more –

"As a biologist, my specific interests lie in the area of animal behavior—especially in the neural and hormonal control of behavior as well as the influence of the environment," Chabot explains. "Circadian rhythms are controlled by internal clocks—molecular, physiological or behavioral events that occur about once a day. These rhythms are found in animals from single-cell organisms to worms to insects to crustaceans to vertebrates and everything in between! This ubiquity suggests that having a circadian clock helps organisms to anticipate and synchronize to daily environmental changes and is of tremendous adaptive advantage." He continues, "While circadian rhythms have been documented in the laboratory, not much is known about how these rhythms affect behavior in the wild. This study builds upon recent published findings from our lab that horseshoe crabs also have internal circatidal clocks that may help them to coordinate their seasonal breeding activities. Dr. Watson, our students and I will use both lab and field techniques to investigate the interaction between tidal and circadian rhythms."

In this study, Chabot and Watson will use a sophisticated ultrasonic telemetry system to continuously monitor the activity of horseshoe crabs on and around their traditional "mating beaches" off the coast of New Hampshire for several weeks at a time. In the lab at Plymouth State University they will use activity cages to help to determine the relative contributions of their internal clocks and environmental factors such as light, temperature and salinity on their behavior.

Both Chabot and Watson have long records of involving undergraduates in their research. Students will be involved in every step of the scientific process on this project—everything from literature searches to conducting experiments to analysis to presentation and publication. "We are very excited to have received this grant from the Behavioral Systems Program of the National Science Foundation," Chabot says. "The fact that only 15 percent of the grants submitted to this program were funded suggests that the NSF recognizes the importance of the science that we are conducting here at PSU."

Plymouth State University has a long-standing commitment to teacher education. "Several of my former students are currently teaching high school and middle school science," Chabot notes. "Allowing future teachers of science to participate in the process of doing science helps them learn to do the same thing with their own students."

For more information, contact Dr. Christopher C. Chabot at (603) 535-2864 or chrisc@plymouth.edu

# # #