

Saltwater News

A Monthly Newsletter for UNH Marine Program Faculty, Staff and Students
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Student News

URC 2004 - Congratulations to **Ingrid Nugent** the winner of the Undergraduate Research Conference competition in the Earth, Oceans & Space Symposium on April 28th. Ingrid, an



Environmental Conservation major, carried out her research under the direction of **Andy Rosenberg**. The title of her poster was 'Strategic and Tactical

Planning for Offshore Wind Power Facilities in the U.S.A.'.



TECH 797 - Congratulations to this year's TECH 797 winning team, Ian Patten and Jillian Lynch and advisor Anita Klein for their project, "Oyster Thief - Tracking the origins of invasive *Codium fragile* spp. *tomentosoides* populations in the Northwest Atlantic using molecular biology tools."

This project laid the foundation for a biogeographic study of the spread of invasive green algae. Ian and Jillian optimized

conditions for DNA extraction from both fresh specimens, and archival herbaria accessions, some up to 19 years



old. Ian and Jillian used the Polymerase Chain Reaction to amplify fragments of the *rbcL* chloroplast gene from samples isolated from Long Island Sound and the Gulf of Maine, and determined by DNA sequence analysis these are identical to known gene sequences for *C. fragile*. For his senior thesis next year Ian will study a hypervariable region of the *rbcL* gene, to essentially fingerprint different strains of the algae. This work may help us understand why the invasive green algae has spread very rapidly in the Gulf of Maine over the last 20 years.



Student Spotlight - In the spotlight this month is graduate student **Aaren Freeman**. Aaren is a PhD student in the Zoology Department who is currently supported by a Great Bay NERR Fellowship. This is what Aaren has to say.....For the past 6 years, I have been studying the trophic interactions between species (grazing and predation), particularly between native and invasive species. Prior to coming to UNH I received a Master's degree from Northeastern University (Boston, MA). During my Master's I researched grazing on *Codium fragile* where it is native (in Washington State) and an invasive population at the Isles of Shoals, NH. Since doing my Master's degree I have studied how trophic interactions between species can be altered by the presence of another species. For instance, in a side project I have found that sea urchins stop grazing when they sense waterborne cues from a sea star predator. These indirect interactions may be an important ecological force because they are mediated by waterborne cues and have the potential to affect many more individuals than would be affected by direct predation.

Since coming to the Zoology Department at the University of New Hampshire in 2001, I have been fortunate to be able to continue doing similar research in the lab of Dr. **Jeb Byers**. I have been able to continue investigating these indirect interactions, incorporating invasive species. As a model system for my dissertation I am focusing on induced defenses in blue mussels (*Mytilus edulis*). Although adult blue mussels do not show dynamic behaviors, they are capable of several morphological defenses. For instance, when these mussels sense waterborne cues from crabs they develop heavier shells; and in the presence of cues from sea stars they develop a larger adductor muscle (i.e. the muscle that keeps the shell closed against this prying predator). Currently, my research has emphasized two aspects of induced defenses: the ability of mussels to recognize invasive predators and the effects of multiple predators on induced defenses.



Numerous studies have shown that mussels respond to waterborne cues from the invasive European Green crab (*Carcinus maenas*), however no one had determined if mussels responded to the more recent invader, the Japanese Shore crab. Within the past 20 years this invader, the Japanese Shore crab (*Hemigrapsus sanguineus*) has spread up the coast of New England to Penobscot Bay, Maine. I have found that mussels from southern New England, having been in contact with the crab for almost 20 years, respond to waterborne cues from *Hemigrapsus*, while mussels in northern Maine, having never experienced predation by *Hemigrapsus*, do not respond to cues from the crab. These results suggest that the southern mussel population, through contact with the predator, has evolved the ability to recognize and respond to this predator, while northern populations of mussels do not yet have this ability.

A second aspect of my work has looked at the impacts of multiple predators on the inducible defenses of blue mussels. In general, there have been hundreds of investigations of induced morphological defenses in numerous organisms, yet we know very little about how prey respond to simultaneous threats from different predators. Some of my recent results indicate that blue mussels do a poor job of expressing any induced defenses in response to combined cues from sea stars and crabs (*Carcinus maenas*). These results suggest that in the presence of the invasive crab, mussels may be more vulnerable to native predatory sea stars. This may be of conservation interest because as more species are introduced, they may have synergistic impacts altering native species interactions in unforeseen ways. The true test will be to determine if these have impacts in the field.

Doing this work has been fascinating, but as always, answering one question leads to at least two more. While at UNH I have found that the faculty and staff in COLSA, the Zoology Department, the Coastal Lab, CMB, and JEL, and everyone at the Shoals Marine Lab have been very supportive. I look forward to continuing various aspects of this work through a long career in marine research.

Marine Program Pot-Pourri

Wishes for a speedy recovery go out to **Larry Harris** and **Ray Grizzle** who are both recuperating at home after surgery. We hope to see you both back soon!

Seacoast Science Center Grand Reopening - The Seacoast Science Center (SSC), a long-time partner with the UNH Marine Program, has recently undergone

extensive renovation. The renovations, which began last October, were made possible with a \$1,000,000 NOAA grant secured with the help of Senator Judd Gregg and additional grants for exhibits and lobby renovation awarded from Fischer Scientific, Inc., and several other foundations. The SSC will unveil their new and improved facilities, which include improved handicapped access, to the public at a Grand Reopening on Saturday, May 15. The festivities, which are open to the public, will begin with the cutting of a ribbon-of-kelp to officially re-open the Center at 10 am and run until 5 pm. For more information or driving directions, visit their web site at: <http://www.seacentr.org/main.html>.

New Poster Display for the Marine Program - The Marine Program recently designed and constructed a three panel presentation board that was displayed at the Undergraduate Research Conference at Morse Hall along with handouts about different aspects of the Marine Program. The poster and handouts are available for use at other campus and professional meetings where the activities of the Marine Program can be highlighted. We hope you had a chance to stop by and see it while checking out all the great student presentations and posters.



Diving Program - Another successful year of SCUBA classes is coming to an end for this year. With only a few open ocean dives to complete, these divers have done everything from ice diving to diving on a shipwreck to “combat” diving.



Approximately 32 students participated in the 3 basic classes under the guidance and care of **Liz Kintzing**, **Becca Toppin** and **Noel Carlson**. Liz taught the Advanced Class to another 10 students – including the four self-proclaimed combat wannabees.

To find out more about our Diving Program, contact Liz at ek@cisunix.unh.edu or visit the Diving Program website at: <http://marine.unh.edu/facilitiesdivingprogram.html>.

