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UNH Researchers Working to Revitalize Gulf of Maine Urchin Industry

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UNH Sea Grant

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DURHAM, N.H. -- During the past 10 years, the Gulf of Maine green sea urchin industry has gone from boom to bust. University of New Hampshire researchers are working to bring it back.

After being ignored by New England commercial fisherman for hundreds of years, the prickly urchins became popular in the early 1980s. They migrated en masse through Northeastern waters, gorging themselves on kelp beds and leaving the bottom of the ocean barren. The effects were disastrous for lobsters.

Larry Harris, UNH professor of zoology, has been studying marine communities for 30 years. He explains that after the urchins took over, commercial fishermen began to tap into the large Japanese market for sea urchin gonads. Known as uni, the gonads are considered a delicacy. During the late '80s this new fishery was a gold rush.

By 1993 the resource had peaked and urchin populations began to decline. Harris, who had started monitoring young urchins in 1983, found last year's population reached an all-time low.

Sea Grant and the UNH Agricultural Experiment Station are now funding Harris to find the most efficient way to grow large numbers of sea urchins in hatcheries. This type of production may be the only way the Gulf of Maine will have any long-term role in the sea urchin market.

Harris is experimenting with different types of growing containers, including rafts and panels. Urchins are cultured until they reach a suitable size, then outplanted or released into the ocean because storing them is expensive and labor intensive. Cultured urchins can be used to replenish wild stocks or aquaculture efforts on leased sections of the ocean bottom.

During the past academic year, Harris served as adviser for a Tech 797 project in which students developed an urchin growth system. Tech 797 is a year-long course that allows interdisciplinary teams of undergraduates to collaboratively address marine issues. The students Laura Marshall, Seung Suk and Brian Sullivan, members of the class of 2000, won the David Drew Memorial Award for their efforts. The award is given annually to the year's best project.

Harris says the growth system shows great promise. Another project team is developing it further this semester. He hopes UNH will have an active sea urchin aquaculture hatchery in operation by early 2002. Currently there is only one hatchery in operation in the region. Located in Lubec, Maine, and operated by Peacock Canning Co., it is a side effort in a salmon hatchery.

Natural settlement of urchins occurs in June and July in the Gulf of Maine, and this is also when outplanting might be expected to take place. The problem, Harris says, is that this is also the time when the urchins' predators -- crabs and certain fish -- are most active. The alternate plan is to outplant urchins in the winter when urchin predators are inactive. Initial results suggest that winter outplanting is effective and further trials are planned.

By outplanting early, however, the sea urchins' reproductive cycles are out of sync. This is a problem that researchers Charles Walker, UNH professor of zoology, and Michael Lesser, UNH associate professor of zoology, are addressing with funding from Sea Grant, the UNH Agricultural Experiment Station and the U.S. Department of Commerce.

Light plays an important role in the sea urchin reproductive cycle, and by manipulating photoperiod (daily exposure to light), Walker and Lesser have been able to induce reproduction at different times during the year. Thus, the urchins can be outplanted earlier while the water is still very cold, sharply reducing the activity of predators and allowing the urchins time to become established.

Walker has been using his knowledge of the urchin reproductive system to develop land-based techniques to be used in the industry for producing optimal uni. While Japan is the largest market for uni, there are smaller markets in France, Belgium, Greece, Italy and Turkey. The ideal gonad is classified by its large size, firmness, color, texture and taste. Gonads are only marketable during a specific phase of the reproductive cycle, so by manipulating photoperiod it is possible to have ideal gonads available continuously.

Michael Devon is an aquaculturist in Darling, Maine, who sells sea urchins to the Japanese market and has implemented some of Walker's findings. Walker hopes to help others like Devon, and is currently building a web site to make his results more accessible to the public. The site is still under construction, but can be visited at <http://zoology.unh.edu/faculty/walker/urchin/gametogenesis.html>.

New Hampshire Sea Grant is a component of the National Sea Grant College Program, a network of university-based research, education and extension efforts that promotes the wise use, conservation and development of our marine resources.

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