# TESTING PROJECT COULD EXPAND YIELDS OF SEAWEED GROWN IN LONG ISLAND SOUND

By JUDY BENSON

If seaweed farming has a future in Long Island Sound, the groundwork being laid by Anoushka Concepcion and her team at Connecticut Sea Grant will be among the ones to thank.

"We're trying to figure out what the standards should be, in the interests of public health," she said, as she began a summer weekday of multiple stops between seaweed testing sites. "For a new industry, the last thing we need is for someone to get sick."

Four years ago, Concepcion, assistant aquaculture extension educator at Sea Grant, began this task, with funding from NOAA National Sea Grant. Though complicated and seemingly obscure, it's work that's essential to helping a commercial industry for at least two types of native seaweed to grow in the state. It could help unleash its promising potential if the hurdles she and others are working on can be overcome. Now, most of the seaweed consumed in this country comes from overseas. Proponents of this nutritious sea vegetable see an untapped opportunity for a locally grown crop to supplant the imported seaweed most prevalent in Asian cuisine and processed into a thickener for foods and cosmetics. But seaweed researchers and would-be growers can't yet fully take on the challenge of finding and expanding markets and consumer demand for local seaweed.

What's holding them back is the absence of federal guidelines on potential hazards, water quality, storage, optimal processing temperatures and other standards critical to maintaining product safety. That's where Concepcion comes in, doing the field work and data collection needed for state regulators to figure out what the standards should be.

"We need this information so the state can make a recommendation about whether they will allow commercial cultivation, and if so, where," Concepcion said.

Concepcion's job – a little like helping figure out rules so an informal sport can start organized competitions – is to harvest and supply testing samples of seaweed grown in multiple seasons at different areas of the Sound to be both sold fresh or preserved through drying or freezing. Samples collected from seaweed lines set by commercial fishermen are sent cold and raw to two state labs for testing of heavy metals, pesticide residues, harmful bacteria and other pathogens. Samples dried and packaged at a West Haven commercial kitchen that employs developmentally disabled adults also go to the labs.

"We're also working with a food testing lab that will be testing for molds and yeasts and shelf life," she said.

In 2017, a dozen acres of seaweed was being cultivated in the Connecticut waters of the Sound by four producers, all growing one type of seaweed – kelp. These enterprises currently follow state guidelines for public health standards for sales of fresh kelp – wide brown ribbons that turn translucent green when cooked – as well as crop that's processed, cut into kelp noodles and packaged. The guidelines will ultimately be replaced by regulations for permitting and public health standards.

"We've got kelp pretty much figured out, but we've been at it for seven years," she said, referring to Sea Grant's seaweed technology transfer efforts that predate her current project. Her work is the latest chapter in more than three decades of Sea Grant-funded research and outreach that laid the foundation for commercial seaweed farms in the state and elsewhere in the Northeast, spearheaded by University of Connecticut Ecology and Evolutionary Biology Prof. Charles Yarish, based at UConn's Stamford campus. Now, Concepcion's focus is on *Gracilaria tikvahiae*, a lacey reddish-purple species that provides shelter in the wild for snails, sea urchins and other marine organisms, and is salad for sea turtles and fish. While kelp is grown by seeding it onto lines, then anchoring sets of lines in a grid along the sea floor, Gracilaria doesn't need structure. It can be grown by threading cuttings onto a thick rope which is tied to a mooring and allowed to sway in the surf. For all types of seaweed farming, the start-up investment is relatively modest: a state lease or license for the undersea grounds, a boat with an anchor and a winch, buoys and line. Fast growing and easy to propagate from cuttings, Gracilaria takes about a month for a 2-ounce bundle to double in size, depending on nutrient levels in the waters where it's growing.

"It's native to Long Island Sound," Concepcion said. "It's usually found in high nutrient, shallow waters. You'll find it attached to lobster pots. We just thread seed bundles into the long line."

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Left, Gracilaria is removed from a tank at the Bridgeport aquaculture school. Above, Gracilaria grown on lines is pulled out of Branford harbor. Photos: Judy Benson

Concepcion's day of field work began at the Bridgeport Regional Aquaculture & Technology Education Center, where Gracilaria stock for the project is grown in large bubbling tanks of sea water. What distinguishes these particular plants from what can be found washed up on beaches across the Sound is that these are verified as all being the native species of Gracilaria, not the invasive *Gracilaria vermiculophylla* that is emerging as the dominant type in the estuary.

She and Annalee Mears, a University of Connecticut marine sciences undergraduate interning with Sea Grant, scooped nets full of dripping clumps from the tank, then removed excess water using kitchen salad spinners. They then weighed and tied clusters to the line.

Next stop that day was the Marrakech Inc. commercial kitchen, where bags of Gracilaria were delivered for drying and packaging.

"They'll dehydrate it at about 100 degrees Fahrenheit for about 40 hours," Concepcion said, as she set bagfuls of seaweed inside a large refrigerator at the facility. "They've been playing with getting the best temperature."

After that came the docks of King Lobsters in Branford, where owner D.J. King has been diversifying into oyster farming, scup fishing and now seaweed farming since the Sound's lobster population crashed in the late 1990s. About 5 percent of his income now comes from commercial kelp farming, he said, and Gracilaria could be added in the future.

"I started doing this when we started to not catch anything," said King, as he motored his boat, Concepcion and Mears on board, to the site where two Gracilaria lines had been set a few weeks earlier.

The three first hauled in the lines, untied the seaweed bundles and collected them in buckets. One line had been hauled out a week after being set, dipped in fresh water to discourage other marine life from smothering the seaweed, then reset. The other line had been set without the treatment. Comparisons of the two methods will be used to inform future Gracilaria farmers.

"We submerge the dip line in fresh water for 20 minutes to kill off fouling organisms," Concepcion said.

After the old lines are hauled and emptied, the newly seeded lines are hooked onto buoys and released into the water for the start of another growing cycle.

Back on shore, the harvested seaweed was packaged and iced for transport to the testing labs.

"We have to do this for two seasons," Concepcion said. "Within two years, we'll know whether open water Gracilaria cultivation will be allowed anywhere, or only at specific sites."

Anoushka Concepcion and Annalee Mears remove Gracilaria grown on lines off Branford and package it for testing at a state laboratory. Photo: Judy Benson

Annalee Mears, a UConn marine sciences student, weighs Gracilaria taken from a tank at the Bridgeport Regional Aquaculture & Technology Education Center before packaging it for drying as part of a testing project. Photo: Judy Benson