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With deep expertise in aquatic veterinary science, Roxanna Smolowitz continues to lead research investigating the health or disease of marine animals

Roxanna Smolowitz, a visiting assistant professor of biology who specializes in aquatic veterinary science, leads a number of EPSCoR research projects. Image Credit: Amy Dunkle, Rhode Island NSF EPSCoR

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Bristol, R.I. -- If there is an EPSCoR (Experimental Program to Stimulate Competitive Research) research project in Rhode Island investigating the health or disease of marine animals, there is a good chance Roxanna Smolowitz is involved.

With deep expertise in aquatic veterinary science, Smolowitz regularly teams up with her colleagues at EPSCoR partner institutions, from developing tools to combat aquaculture disease to seeking answers to a mysterious and prolonged sea star die off.

In her first RI Science and Technology Council (STAC) grant, in 2012, Smolowitz collaborated with URI professors David Rowley, David Nelson, and Marta Gomez-Chiarri on using marine bacteria as a protective agent against disease.

“The idea was, are there different kinds of bacteria we could add to larval cultures of bivalves specific to oysters to increase healthiness and get more animals through the metamorphosis stage,” explains Smolowitz, noting that one Vibrio bacterial disease, in particular, is responsible for high rates of larval death.

The scientists identified two bacteria that might provide a protective defense as probiotics, developed varying concentrations and methods of application, treated larvae in different tanks, and observed morbidity, mortality, survival, and growth rates. With the STAC award serving as seed funding for the project, the team secured follow-on grants to test the potential of the results and now will see if the findings hold true for different bivalves and application methods, and move from experimental, controlled research to out in the field.

Assessing the process and outcomes to date, Smolowitz reflects: “I don’t think this work would have been accomplished if we had not worked together. A lot of collaboration was needed to pull it off.

“And, the result is that we have two potential bacteria that might be usable in commercial hatcheries; it’s producing a product, hopefully, and lots more questions. When you see a result, you need to know why it’s happening.”

A 2013 STAC grant pulled together a multi-disciplinary team to pursue answers to a prolonged and unexplained die off of sea stars from New Jersey to the Gulf of Maine. The history of such disease in marine animals is episodic, periodically waxing and waning, notes Smolowitz, but the most recent outbreak was surprisingly long and lethal.

A massive die off took place along the Pacific shoreline at the same time, but Smolowitz, who worked on the histology, or tissue, angle of the disease, says no one was addressing the issue here. Ultimately, in 2014, scientists reported that a sea star associated densovirus (SSaDV) was at the root of the West Coast deaths. But, questions remain whether there was any relation between the incidences on both coasts.

“We’re still investigating it and thinking about where we might go next,” Smolowitz says. “More work needs to be done. Climate change could be one of the reasons why the episode lasted so long. Lots of things are happening out there that we don’t really understand.”

Even though the New England outbreak lacks a definitive cause at the moment, the STAC project produced valuable data, according to Smolowitz: “This disease has happened in groups of echinoderms around the world. Many more scientists and lay people are aware of it now. The problem is documented in the literature, so we’ve got a base of findings and tissues to refer to. That didn’t happen last time this occurred. This current material and information will provide material to build on in future outbreaks.”

Smolowitz also is contributing her expertise to a 2015 STAC grant integrating historical datasets with numerical models to better understand how physical and chemical changes in the ocean impact the health of coastal fish and shellfish.

For her part, Smolowitz is collecting data on bivalve disease to add into the models and see if any patterns emerge. She says she finds the project fascinating in the perspective it takes, looking at the way the water moves and how that information can fit and overlay with the biological data.

Throughout all of the projects, Smolowitz says, RI EPSCoR core facilities and equipment provide support, without which the work would not be possible. For example, the RI Genomics and Sequencing Center at URI, makes procedures — identifying a parasite in blue mussels — accessible and affordable.

She also says the breadth and depth of the EPSCoR community of scientists offers a knowledge base that builds on what is available on individual campuses: "Without collaboration, it wouldn't be anywhere near possible to do what we do. That accessibility and interactions with other professors is critical.

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- http://web.uri.edu/rinsfepscor/2016/03/24/rwu-researcher-contributes-veterinary-expertise/