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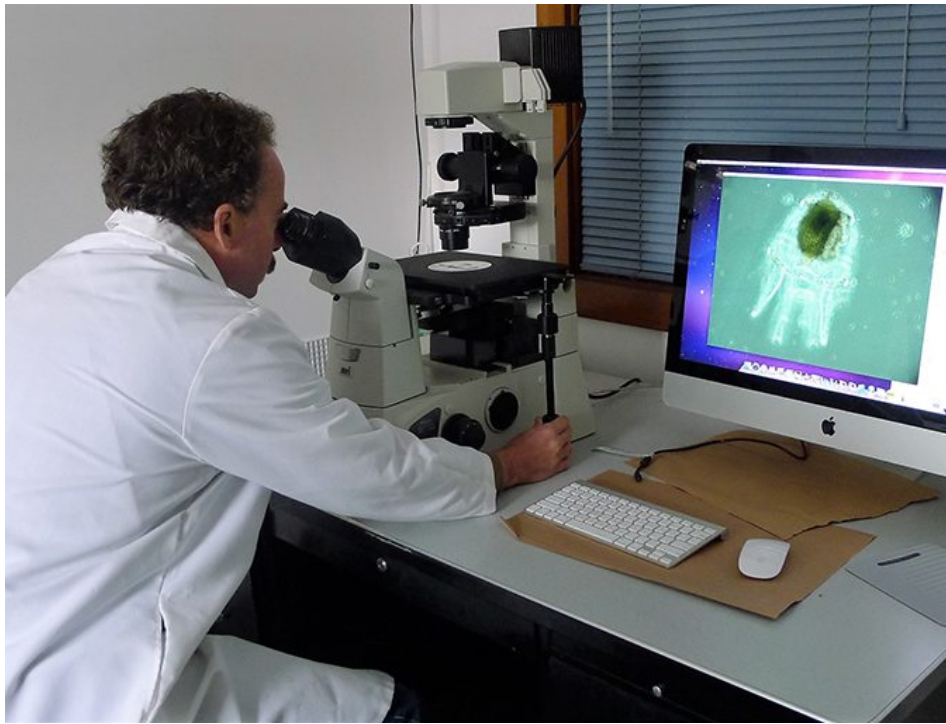
Innovation &
Investment

Better together: Partnerships drive innovation at leading labs

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By Jodi Helmer

Top research outfits strive to make aquaculture more innovative, efficient and responsible



Steve Eddy, Ph.D., director of operations at the Center for Cooperative Aquaculture Research at the University of Maine, uses Nikon microscopy to view sea urchin larvae.

In 2009, the Institute of Aquaculture at Scotland's University of Stirling started exploring new environmentally responsible methods to control sea lice in Atlantic salmon pens.

To conduct the £4 million (\$5 million U.S.) research project, the institute partnered with Scottish Sea Farms, Marine Harvest Scotland and BioMar, all major industry players. The collaborators hoped farmed Ballan wrasse (*Labrus bergylta*) could be used as cleaner fish, replacing widely used pharmaceutical controls.

The initial findings were promising and the research went from lab experimentation to commercial-scale deployment within five years. Herve Migaud, Ph.D., deputy director of the institute, credits the partnership for driving innovation.

"We had the ability to work with a state-of-the-art facility on a commercial scale," he explained. "Without a partnership, that would be impossible. As a university, we don't have the resources to develop and maintain facilities at this scale."

Leading labs around the world are engaged in public-private (or private-private) partnerships to make aquaculture more innovative, efficient and responsible. These collaborations offer multiple benefits from access to expertise, facilities and funding, all with the goal of furthering the industry and improving global food security.

Getting research off the bench and into the world helps create a more sustainable aquaculture venture and a more sustainable institution overall.

Giovanni Turchini, Ph.D., associate head of research at the School of Life and Environmental Sciences at Deakin University in Australia, calls partnerships “fundamental” for advancements in aquaculture practices and knowledge.

“Research is expensive,” Turchini said. “Aquaculture companies must engage in R&D but smaller ones cannot afford to do it on their own and start to engage with academia and labs. This research is more focused and specific because companies want to solve problems.”

In Australia, a collaboration between Deakin University and commercial animal nutrition provider Ridley Corp. aims to develop diets for farmed fish made without any marine ingredients. Dubbed the Deakin-Ridley Aquaculture Research Initiative, the six-year collaboration represents a \$2.4 million investment.

Fishing for funding

Michael Lomas, Ph.D., director of the National Center for Marine Algae and Microbiota at Bigelow Labs, noted that, “Partnerships have become an increasingly important part of our funding portfolio. We wouldn’t survive without them.”

At NCMA in East Boothbay, Maine, corporate partnerships have led to funding for projects like testing native shellfish for parasite resistance and using microalgae to consume carbon dioxide and ameliorate ocean acidification. Such initiatives help translate basic knowledge to the public sector, which Lomas believes will help provide more support for aquaculture and, in turn, lead to additional research funding.

“Getting research off the bench and into the world helps create a more sustainable aquaculture venture and a more sustainable institution overall,” Lomas said. “Partnerships help our research go from a peer-reviewed journal that no one looks at out into the world where it has an impact.”

There are drawbacks, however, to depending on industry partners for funding.

The Center for Cooperative Aquaculture Research at the University of Maine was collaborating with Great Bay Aquaculture of Maine to explore the viability of growing Atlantic cod in net pens when the company went out of business; funding for a \$240,000 project to double gonad yield in urchins expired after two years.



At the University of Maine, Susan Brawley and graduate student Nicolas Blouin seed scallop shells with nori spores (*conchocelis*).

“Most funding is for a limited time and not sustainable for a long-term project,” said Steve Eddy, Ph.D., director of operations at CCAR.



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Picking the right partnerships

About 80 percent of the research conducted at Stirling's Institute of Aquaculture is done in collaboration with other agencies or companies – but the lab still does a lot of work on its own.

Researchers often start with riskier projects with a goal of understanding basic mechanisms; once proof of concept is established, collaboration is the next step. But those collaborations come with risks.

“Companies are putting their money on the table in exchange for information that benefits them,” noted Lomas. “We can learn a lot [during the research phase] but the answers the company pays us to get may be counter to their mission.”

Whether that research, which has the potential to impact the entire industry, is released depends on the terms of the collaboration agreements. Most companies ultimately want research findings disseminated.

“Aquaculture is still a new kid in town compared to other industries and companies want to show investors and clients that they are partnered with universities, engaged in research and publishing findings in peer-reviewed journals,” Turchini said.

Labs also benefit from the expertise that producers, retailers and regulators bring to a partnership.

“The times when scientists were working in labs in isolation are gone,” said Migaud. “We are collaborating worldwide with impact worldwide.”

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