

# Fish farms getting their own ecosystems

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NEW BRUNSWICK BUSINESS JOURNAL

Researchers at Cooke Aquaculture are exploring how introducing new sea life to fish farms could help raise healthier salmon.

Cooke Aquaculture is the largest producer of fresh Atlantic salmon in North America, providing naturally raised, farmed Atlantic salmon. With investments in several research projects the company is committed to continuous improvement through a number of strategies.

Dr. Thierry Chopin, a marine biologist at UNB in Saint John is known as the seaweed guy. Since 2005 he's been working with seaweed at one of the company's farms on the Bay of Fundy. Both seaweed and mussels have the ability to absorb fish waste and both are being utilized by Cooke Aquaculture.

Rather than seeing the waste as water pollution, Chopin sees it as nutrients for other life. Known as Integrated Multi-Trophic Aquaculture, the research is aimed at creating an ecosystem in the farm with sea life feeding off one another. It's not a new concept but Chopin is trying to figure out how to make it work on an industrial scale.

"We're not doing anything different than what nature is doing," Chopin said. "In nature you have organisms that eat the nutrients or absorb the nutrients. Seaweed absorbs the dissolved nutrients. Mussels go after small organic particles."

It's a green solution too and can work two-fold for Cooke Aquaculture. Not only will a system like this get rid of the waste, but they have a new product to market. The company is able to sell the sea-

weed as a specialty food and also sell it to a cosmetic company that uses it for its natural extracts. The seaweed production is not a full-scale commercial operation yet and is not suitable for every area but Cooke Aquaculture is pleased with the outcomes thus far.

"The whole idea is to take an ecosystem based approach to farming where you take these nutrients and look at how you can use them to grow something else," said VP of Communications Nell Halse. "It's one of the many methods to minimize the environmental impact on the farm. This is not the silver bullet, that all farms suddenly have to be IMTA, but it is an important area of research that we've been exploring for quite a few years and intend to continue with the program. And Thierry is actively looking for new markets for the seaweed."

Down the road Chopin is confident they could use seaweed to produce bio gas on a small scale with the potential of powering a fish plant. And they are looking at using some species of seaweed for fish feed within the company as well.

"It's a good source of protein for the salmon. It could be a partial substitution in the fishmeal."

Over in Cooke Aquaculture's Huntsman Marine Science Centre in St. Andrews researchers are looking at ridding sea lice from farmed salmon by introducing another kind of fish to the farm that feeds on lice.

The cunner, a native species to the Maritimes, has been dubbed a "cleaner fish". Dr. Keng Pee Ang, vice-president, research and development, feed and nutrition with Cooke Aquaculture is exploring the possibility of using them on an

industrial scale.

"Sea lice have been around for millions of years and it is something salmon farmers have had to deal with and may continue to deal with," he said. "The most effective way for any farmer to manage a pest like this is to have a variety of tools and strategies. The use of cleaner fish is one tool that could be effective at keeping sea lice under control and they are a natural, green option. There are other management tools too. Crop rotation and fallowing, lower stocking densities, lice traps, filter feeders like mussels that eat planktonic sea lice, and we have been able to keep the fish clean by treating with hydrogen peroxide, a benign substance, in enclosed well boats."

There are challenges to the project and it will be a while yet before the company knows if it is viable on a large scale. While the cunners do an effective job of cleaning, Keng said the "breeding program is still in its early days with only partial success".

His team has successfully spawned cunner fish in the hatchery but long-term survival has been an issue.



SUBMITTED PHOTO

Harvesting of the cultivated kelp, *Saccharina latissima*, at an Integrated Multi-Trophic Aquaculture (IMTA) site of Cooke Aquaculture Inc. in the Bay of Fundy, kelps recapture some of the dissolved nutrients in the ecosystem while providing additional commercial products.

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