Sea Around Us

Integrated Multi-Trophic Aquaculture: The way of the future?

by Sarika Cullis-Suzuki

I spent the last week of April on the east coast of Canada, investigating IMTA, Integrated Multi-Trophic Aquaculture, at Cooke Aquaculture, off the shores of New Brunswick. I spoke to various scientists studying IMTA, and was even able to go out on a boat to inspect the underwater setup and get answers to my many questions.

IMTA is a way of farming multiple marine organisms from different trophic levels at the same time. The goal is to create a balanced system, essentially mimicking what already occurs in the ocean. In the case of Cooke Aquaculture, the primary harvest is Atlantic salmon. Yet, in addition to salmon, they cultivate mussels to filter the organic nutrients, and seaweeds to absorb the inorganic nutrients that accumulate from the salmon waste and feed. Even sea urchins and sea cucumbers are included in the system, working to consume macro particles that fall to the bottom of the salmon net pens. In an attempt to reflect what `naturally' occurs in the sea, they incorporate all of these players into their farming—the mollusks, the seaweeds, the invertebrates— creating a healthier farming system… *and* more commercial product. Sounds great so far. So the question then becomes: is this where aquaculture should be headed?

Dr. Thierry Chopin explains the role of seaweeds in IMTA to Cullis-Suzuki.. *Photo by John Badcock.*

Here, on the west coast of Canada, we are already familiar with some of the problems of salmon farming. Such problems extend to the east coast as well, including those associated with fishmeal, waste, lice, disease, and escapees. Cooke Aquaculture tries to mitigate wasteful feed by using remains of other fish in their fishmeal (bones, guts, etc.), and by decreasing the actual amount of fish in their feed altogether; in fact, today, they now claim to use less than 1 pound of wild fish for every pound of farmed salmon.

Waste from salmon nets is taken very seriously. By positioning an underwater video camera below the nets, the amount of fish feed can be controlled, i.e., feeding is stopped as soon as pellets begin accumulating on the bottom. In this way, fish feed waste is minimized. Any other waste from the salmon nets is moderated by nutrient `scrubbers', mussels and seaweeds that are positioned down-flow of the

Continued on page 2 - IMTA

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IMTA- Continued from page 1

nets, as well as invertebrates that live below the nets. By taking up waste matter, the scrubbers accomplish two goals at once: they filter the water, and they grow quicker (enabling more efficient harvesting). Regarding sealice, Mr. Cooke explained that they do not consider it as big a problem as out west—although whether or not that has to do with the extremely low wild Atlantic salmon stock populations was not clear.

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Later that day, while diving in the mussel farm and salmon nets, I searched the water for debris; though I never made it to the ocean floor to inspect the amount of waste buildup, I was struck with the size of the net in relation to the number of salmon—put simply: I didn't see many fish in the nets!

The nets themselves, set up in a series of large rings in the ocean, are not fixed, meaning they are rotated, as in land-based farming, allowing certain areas to be left fallow. Also, the nets contain a comparatively low count of salmon per net (hence my disappointingly uneventful dive), thereby reducing both the inception and spread of disease amongst organisms. In order to execute an operation like this, a lot of space is needed.

But the spread of disease from farmed fish to wild Atlantics (well, what's left of them), is still a reality, and a significant case against allowing the replication of such a system on the west coast of Canada. And escapement, although said to be low, cannot be completely prevented without closed containment. However, by farming Atlantic salmon on the east coast, this avoids culturing an alien species, and they use genetic stock from wild salmon in the area.

Glenn Cooke, founder of Cooke Aquaculture, was very candid about the operation, agreeing that there remain problems to work through; his company is still in the initial stages of the system, though moving fast. Back in 1985, when the company was just starting off, Mr. Cooke remembers that taking the larger ecosystem into consideration was simply not done, let alone incorporating other creatures into the harvesting plan. "Things are very different now," he reflects. Today, his company has been lauded as a model in progressive aquaculture, and has received numerous awards. Employing 1,500 people, Cooke Aquaculture is no longer a small operation; indeed it has become a thriving, big business.

But Mr. Cooke still feels that by being a locally-owned family company, this operation is more sustainable than most large-scale fish farm companies. Certainly, as a New Brunswick native, and as a parent raising his children in this community, he feels much more accountable for his business, and his actions: "For example: if I were a large company from Spain, with no interaction or connection to the place where I was farming, I wouldn't feel the same responsibility to that community." Mr. Cooke acknowledges that, if he wants to live comfortably in his own neighbourhood, community involvement and acceptance aren't just desirable, they're essential.

Back at the restaurant, I sampled freshly-harvested seaweeds and mussels; but for some reason couldn't bring myself to try the farmed salmon. At least, not yet. Perhaps it's simply the west coast stigma that goes along with farmed salmon; but, there are still a few issues that need to be worked out under the water. Future or not, IMTA certainly offers fish for thought.

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