



Cleaning up Aquaculture

By Monica Kidd

You don't often meet someone who's fired up about seaweed, but Thierry Chopin is a rare person.

"We start our day with seaweed in our orange juice, and we end the day with seaweed in our toothpaste." Without the seaweed extracts such as carrageenans and alginates, Chopin explains, orange pulp would settle to the bottom of your glass, toothpaste would come out as liquid goo, and many frozen deserts would be a little less creamy. "Seaweeds are very important to us, even if we don't realize it."

Chopin is chair of the biology department at the University of New Brunswick, Saint John, where he's studied basic biology of seaweeds - their geographic distribution, their physiology and biochemical pathways, and the relationship among species - for years. This morning, driving us west toward his field site, he has the air of a man with vision. "I always knew I could do something with them," he grins.

What's his vision? To revolutionize the way aquaculture is prac-

ticed in the Western World.

Currently, most aquaculture around the world is carried out one species at a time, and not everyone is content with this. Two salmon growers in New England have recently settled out of court after an environmental group charged them with discharging effluent into federal waters. On the other hand, French oyster growers have to move their crops around in order to avoid hoovering up all essential nutrients and phytoplankton in delicate coastal ecosystems. Two different life history strategies present two different environmental problems.

Thierry Chopin's idea was to grow finfish (salmon), shellfish (mussels) and seaweed (kelp) together and get them to balance each other out.

"What you need is three things. You need the fish, which [are fed pellets] and excrete (especially) nitrogen, so there is extra food. The shellfish extract from the water the organics, the particles. The seaweed extracts from the water the inorganics: mostly dissolved nitrogen and

phosphorous."

But there was a hitch. Kelp have a complicated life cycle. In the fall, the long blades develop spores, which are released to the environment. These spores grow into a microscopic, intermediate life stage called a gametophyte. The gametophytes create cells much like eggs and sperm, which undergo fertilization to grow into the large blades. The whole cycle is called "alternation of generations." Farming kelp requires being able to manipulate the microscopic gametophytes.

With the help of a small army of graduate students and co-researchers, Thierry Chopin managed to do just this. He performed the fertilization on very thin rope, wrapped tightly around plastic tubes in lab aquaria. Then when the time came, he wrapped this thin rope around heavier rope and moored it a few metres on either side of salmon pens and mussel rafts at his field site.

His first field trial last year was promising: the kelp grew, but they

took their time. This year, with some tweaking, they managed to cut their lab time by three-quarters, and put the ropes out in the fall when the blades were just half a millimetre long.

We pull off the highway at Bocabec Bay, just east of St. Andrews, and launch a university speedboat. The morning is the warmest one yet this year, full of spring. Field workers with Atlantic Silver Inc. are clearing fish from a dozen salmon pens moored a few hundred feet offshore. We cruise toward the cages, slow toward a huge yellow buoy, and cut the motor. Two colleagues reach into the water, and with considerable effort, haul a rope over the side.

The rope is smothered in long, glistening blades of kelp. They resemble lasagna noodles, tapered at one end, with a stem at the other, and they're the brownish-amber colour of swamp water. They range in size from just a few centimetres to longer than a metre, and on the floor of the boat, they lie tangled together in a giant slippery knot. Someone on board estimates Chopin has between 10 and 20 kilograms of kelp per linear metre of rope.

"So, are we doing a good job?"
No answer required.

Chopin and co-investigators Shawn Robinson and Bruce MacDonald have discovered the mussels they place near the salmon pens grow 20 per cent faster than those at the control site across the bay, and these kelp are ahead for the season. In two years of testing, the Canadian Food Inspection Agency hasn't found any traces of chemicals additives from salmon therapeutants in either the mussels or the kelp. He says now that his team has demonstrated integrated aquaculture can work biologically, their next task is to show it can work economically, too.

"The mussels and seaweed that are produced not only scrub the nutrients around the salmon cages,

but you can sell them, too, so you can work on three crops, and diversify."

This next phase of Chopin's research will find him collaborating with industrial partners, sociologists and economists. Together they'll examine whether integrated aquaculture increases the social acceptability of aquaculture, and look for markets for farmed kelp, whether as kombu (fresh or dried seaweed sold

as sea vegetables), as feed for sea urchin aquaculture, or in extracts for nutraceuticals, bioactive molecules and pigments.

Chopin believes the markets are there. Unable to resist, he wheels out his old classic: "Don't put all your salmon eggs in the same basket," he says, and chuckles. ⚓



IT'S TIME TO UPGRADE YOUR ARSENAL

GET THE ULTIMATE WEAPON ON BOARD

Come see us at **Marine 2003** MAXSEA UPGRADE SPECIALS

Upgrade your MaxSea System Version Update 2D 3D PBG Update

See what you've been missing!

And if that old computer needs
upgrading...we do that too!

**10 Locations across Canada including:
1164 Topsail Road., Mount Pearl.
709-368-8853**

www.ael.ca

Dartmouth, NS

Toll Free: 1-888-235-3628

Fax: (902) 468-6646

Bloomfield, P.E.I.
Phone: (902) 853-4000
Digby, N.S.
Phone: (902) 245-5500
North Sydney, N.S.
Phone: (902) 794-7611

Mount Pearl, Nfld.
Phone: (709) 368-8853 or 6224
Yarmouth, N.S.
Phone: (902) 742-9700 or 2200
Lunenburg, N.S.
Phone: (902) 634-4004

Iles de la Madeleine, QC
Phone: (418) 986-8010
Richmond, BC
Phone: (604) 270-1244
Victoria, BC
Phone: (250) 383-9731