



A non-profit conservation group gives high marks to one of our industry partners, Grieg Seafood BC Ltd., for responsible aquaculture practices. Seafood for the Future, a non-profit seafood advisory and promotion program of the Aquarium of the Pacific, concluded that Grieg Seafood BC Ltd. is

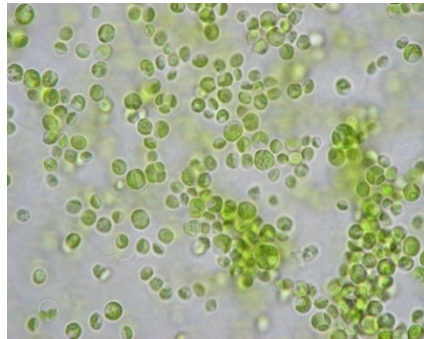


Tracking fish health – Fish health data are regularly collected and monitored by technical staff of Grieg Seafood BC Ltd.

“operating responsibly and continues to make measurable progress toward reducing its impacts,” according to a recent peer-reviewed study. “We are very proud of our farming practices and have always been absolutely committed to demonstrating that farming fish in their natural ocean environment is part of the solution to some of the world’s environmental challenges,” said **Stewart Hawthorn**, Grieg Seafood BC Ltd. Managing Director. “We are delighted with this positive endorsement of our responsible farming practices from an unbiased and credible seafood advisory program that promotes healthy and responsible seafood choices.” Seafood for the Future

studied Grieg’s fish health management, marine mammal interactions, environmental mitigation measures, feed sourcing and practices, and community relations and environmental stewardship. The review also cited Grieg’s best aquaculture practices certification from the **Global Aquaculture Alliance** as a sign of the company’s commitment to sustainable aquaculture.

Algae for bioremediation and diversification. Algae has been a key buzzword during the last few weeks following the announcement by Prime Minister Stephen Harper and French Prime Minister Jean-Marc Ayrault that the National Research Council of Canada and the Commissariat à l’énergie atomique et aux énergies alternatives of France will collaborate on a project using algae to reduce greenhouse gas emissions in Alberta. Some confusion ensued as the project, which will use microalgae to remove some of the greenhouse gases from Alberta oilsand emissions, has been portrayed as a project to make biofuels from seaweeds. **Thierry Chopin** explained that the mix-up may have come from the confusion that often exists with respect to the use of the terms algae and seaweeds.



Phytoplankton (as seen under the microscope, on the left) or seaweeds (the kelps, on the right, grown on ropes in proximity to salmon cages at IMTA sites in the Bay of Fundy) are all algae, which provide key services to the ecosystem (absorbing nutrients, releasing oxygen, sequestering carbon dioxide, etc.) and can also be used in many applications in our everyday life.

Read the articles:

<http://blogs.unb.ca/newsroom/2013/03/21/algae-for-bioremediation-and-diversification/>
<http://www.cbc.ca/news/canada/new-brunswick/story/2013/03/18/nb-algae-research-930.html>

Listen to the radio interview by Tyler McLean on *McLean in the Morning* - News 88.9:

http://www.unbsj.ca/sase/biology/chopinlab/av/content/mmint_130320.mp3



Thierry Chopin co-authored a paper in **BioScience** [Vol. 63, No. 4: 255-262 (April 2013)] entitled “**Responsible aquaculture in 2050: valuing local conditions and human innovations will be key to success**”. The authors – who include James S. Diana, Hillary S. Eгна, Mark S. Peterson, Ling Cao, Robert Pomeroy, Marc Verdegem, William T. Slack, Melba G. Bondad-Reantaso and Felipe Cabello – indicate that as aquaculture production expands, we must avoid mistakes made during increased intensification of agriculture. Understanding environmental impacts and measures to mitigate them is important for designing responsible aquaculture production systems. There are four realistic goals that can make future aquaculture operations more sustainable and productive:

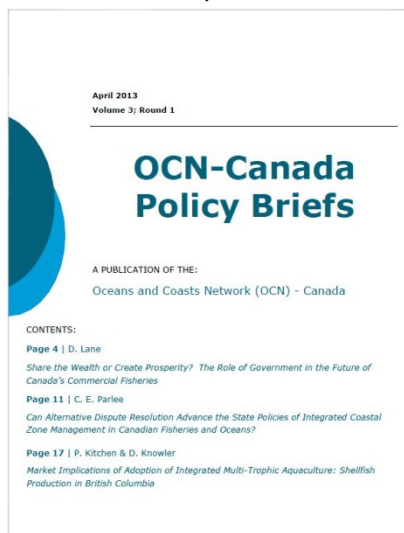
- (1) Improvement of management practices to create more efficient and diverse systems at every production level;
 - (2) Emphasis on local decision making, human capacity development, and collective action to generate productive aquaculture systems that fit into societal constraints and demands;
 - (3) Development of risk management efforts for all systems that reduce disease problems, eliminate antibiotic and drug abuse, and prevent exotic organism introduction into local waters; and
 - (4) Creation of systems to better identify more sustainably grown aquaculture products in the market and promote them to individual consumers.
- By 2050, seafood will be predominantly sourced through aquaculture, including not only finfish and invertebrates but also seaweeds.

Read the paper: for copyright reasons, the paper cannot be posted here, but you can contact Thierry Chopin (tchopin@unbsj.ca) and he will send you a copy for individual use.



Patrick Kitchen (CIMTAN student who graduated with a Master of Resource Management at Simon Fraser University) and Duncan Knowler (CIMTAN investigator and supervisor at Simon Fraser University) recently published a paper entitled “**Market implications of adoption of integrated multi-trophic aquaculture: shellfish production in British Columbia**” in the **Oceans and Coasts Network (OCN) - Canada Policy Briefs** [Vol. 3, No. 1: 17-20 (April 2013)]. This policy brief assesses the potential for IMTA in terms of the possible economic and market implications of the additional production of extractive aquaculture shellfish products associated with the adoption of IMTA by finfish farmers, using the hypothetical case study of additional oyster production associated with IMTA adoption by BC salmon farmers. The policy brief makes three recommendations:

- (1) Market implications for all products in an IMTA system should be considered as part of any realistic assessment of the feasibility and impact of IMTA adoption;

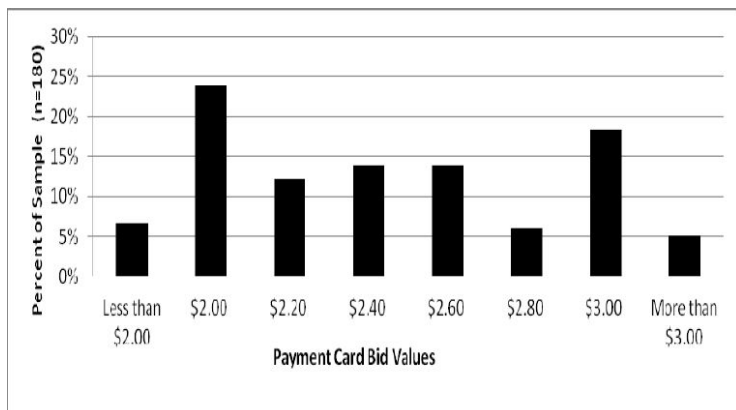




(2) Additional production should be considered for developing new markets. The most important role IMTA may play in addressing British Columbia shellfish industry challenges is by providing

sufficient oyster supply to access new markets. Additional oyster production associated with IMTA adoption could help open up foreign markets, which can be difficult to access for British Columbia producers; and

(3) As aquaculture is currently being increasingly scrutinized as the public grows more sensitive to food production methods and environmental sustainability issues, IMTA should be promoted to improve public perception, thereby helping aquaculture gain additional public acceptance in the province.



Frequency distribution of Willingness To Pay (WTP) responses. The bid value range presented to respondents on the payment card is along the x-axis. \$2.00 represents the reference price for a non-IMTA oyster.

Read the paper: this paper is presently not yet available online. However, interested readers should check the following link for updates (http://www.omrn-rrgo.ca/smc/home.php#l._OCN-Canada_Policy_Briefs_Publications). You can also contact Duncan Knowler (djk@sfu.ca) and he will send you a copy for individual use.

Dyneema®, a supplier of net materials for Cooke Aquaculture Inc., refers to IMTA as an innovation in aquaculture gaining popularity in its Dyneema® 360 Newsletter.



Read the article: <http://www.dyneema360.com/133/innovation-in-aquaculture-imta/>



You know there is something special in your passport and on your Visa card when:

- (1) An employee from LOT Polish Airlines wants to give you a free upgrade to business class while the employee from Air Canada is still asking how to spell your name;
- (2) The name of the airport in Warsaw sounds familiar;
- (3) The customs officer at the Warsaw airport shows your passport to her colleague and they both smile;
- (4) The name of the airline lounge also sounds familiar;
- (5) The gates of the Rose Garden at the Lazienki Park in Warsaw, while closed for renovation, are still opened for you;
- (6) The cashier at the gift shop of a particular museum laughs and hesitates before swiping your credit card; and
- (7) While booking a taxi for the next morning, the person asks you if this is a joke...

Of course, what is special is your name when it is "Chopin" and you travel to Poland...! Frédéric Chopin, born to a Polish mother and a French father, is the quintessential romantic and poetic composer who has embodied the nationalism, emotion and suffering of Poland in art forms of universal appeal with unique sonorities, melodies and deeply moving rhythmic sense (*rubato*), which have endured for two centuries. As Frédéric Chopin did not have any children and only one of his three sisters had four children, the Chopin name has disappeared in Poland (hence the incredulity), while approximately 5,000 people bear this name in France.

Needless to say, **Thierry Chopin** was quite amazed by the very warm reception he received everywhere in Poland, which he visited between April 15 and April 18 to attend the **Workshop of the PartiSEApate Framework for the Baltic Sea Region on "Spatial planning implications of aquaculture as a new user in the Baltic Sea"**. Thierry Chopin was an invited speaker to this workshop, organized by **The Maritime Institute of Gdańsk**, and he presented a paper entitled **"Integrated Multi-Trophic Aquaculture (IMTA): an overview of the concept, the Canadian experience and its potential for the Baltic Sea Region"**.

The goals/main discussion points of the workshop, attended by 42 participants, were:

- (1) Expectations of the aquaculture sector towards Maritime Spatial Planning (MSP). The sector has great hopes for MSP to regain a "voice" ("the forgotten sector") and get a stronger say towards an overall fair consideration of spatial allocation. It will be important to take into account transnational aspects and to engage in broad consultations.
- (2) Overall development prospects and related spatial targets for aquaculture in the Baltic Sea Region (BSR).

Aquaculture differs substantially between the countries of the BSR in term of cultivated species, level of development and locations. Thus, the question of how much maritime space would be needed is somewhat premature. It will be more relevant to consider the specific conditions of the BSR and to ask what type of aquaculture will be developed and for what purposes.

- (3) Specific areas of conflicts/synergies with other sectors/interested parties in the BSR. Communications between all sea space users – traditional fisheries, tourism, transportation, wind farms, etc. – should take place.

- (4) Suggestions for ways of involving the aquaculture sector in MSP development in the future. With the European Union Blue Growth and Bio-based Economy initiatives, one should expect the aquaculture sector to develop more rapidly in Europe. Specifics of the natural conditions of the BSR will be a driving force for the sector development, with an interest in the economic development of the coastal regions also having to be considered. Environmental remediation, with techniques such as IMTA, may represent more spatial demand but should be understood within a broader integrated coastal zone management approach.



Arrival at the Chopin
Airport in Warsaw



Workshop in Gdańsk



Workshop in Gdańsk



Entrance of the Solidarnosc Museum



Inside the Solidarnosc Museum



The Solidarnosc building in Gdańsk



The statue of Chopin in the Lazienki Park
in Warsaw



The Chopin Museum in Warsaw



The domino effect
in central Europe



Chopin concert at the Chopin Museum



Mural paintings about Chopin



The birthplace of Chopin in
Zelazowa Wola



The room in which Chopin was born



Interesting algae growing on
the bust of Chopin



The Chopin store





Thierry Chopin, as the **Secretary of the International Seaweed Association**, was one of the organizers of the **21st International Seaweed Symposium**, which was held in Bali, Indonesia, April 21-26, 2013. He also presented a paper in the mini-symposium on Integrated Multi-Trophic Aquaculture – co-authored with Neil Ridler, Bryn Robinson, Kelly Barrington, Heather Shuve, Erin Caines, Duncan Knowler, Patrick Kitchen, Winnie Yip, Roberto Martínez-Espiñeira, Grant Murray, Linda D'Anna, Mark Flaherty, Kathryn Tebbutt, Erin Latham, Anna Belanger, Shawn Robinson and Michael Szemerda – and entitled **“Upscaling IMTA systems will also require consideration of economic and societal implications”**. Thierry Chopin was also a co-author – with Feng Liu, Shaojun Pang and Su Qin Gao – of the paper entitled **“Updated understanding of the green tide events in the Yellow Sea in China”**. International Seaweed Symposia (ISS) are held every three years under the auspices of the International Seaweed Association (ISA). For more than six decades, the ISS have been the foremost international symposia for individuals and organizations involved with seaweed research and applications. Over the years, ISS have provided a renewed forum for scientists, technologists, business people and resource managers to present their latest research results, exchange ideas and network to develop synergies for strengthening this important bioresource sector. This year was no exception, as 580 participants from 50 countries presented and discussed many aspects focusing on the theme of this year's edition **“Seaweed Science for Sustainable Prosperity”**. This theme recognized the fact that scientific research plays a fundamental role in the development of seaweed cultivation, harvesting, processing and commercialization.

The 21st ISS was held in Bali, in the heart of the Coral Triangle where seaweed farming employs tens of thousands of coastal people. There is a clear and present need for expanding research and development to enable environmentally, economically and societally sustainable seaweed industry commercialization, not only in the Coral Triangle but also in other regions throughout the world, either alone or integrated with other aquaculture activities. One of the goals of the 21st ISS was to catalyze support for such endeavours.

The program was a rich learning experience and provided opportunities for stimulating discussions. There were four plenary presentations:

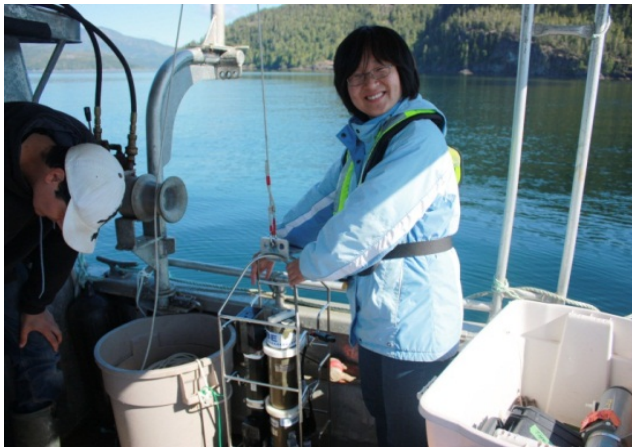
- (1) Dr. Shaojun Pang (China) covered **“How much we have achieved towards improving the farming of seaweeds and what remains to be accomplished towards sustainable prosperity in China”**,
- (2) Dr. Helmi Faisal Zaini (Indonesian Minister for Development of Disadvantaged Regions) talked about **“The seaweed industry of Indonesia”**,
- (3) Dr. Iain Neish (Indonesia) talked about **“Seaweed science for sustainable prosperity – from research to reality”**, and
- (4) Dr. Ik Kyo Chung (South Korea) offered his perspectives on **“Seaweeds in the era of climate change”**.

Twelve mini-symposia covered the whole realm of where seaweeds play crucial roles: bioactive extracts; integrated multi-trophic aquaculture; environmental and social impacts of seaweed farming; physiology and systematics; biofuels; seaweeds as food and feed; population ecology; human and natural impacts on seaweed beds; agricultural applications of seaweed extracts; cultivation of tropical red seaweeds; phycopathology and diseases; and cultivars and molecular biology of commercial species.

Twenty eight contributed paper and two poster sessions covered a suite of topical and varied subjects such as: seaweed biogeography and productivity; cultivation techniques; diseases and grazers; bioactive substances; alien, invasive and bloom species; aquaculture impacts, bioremediation and integrated multi-trophic aquaculture; seaweed resources and harvesting impacts; seaweed diversity and biogeography; ecophysiology; postharvest and processing; hydrocolloid extracts; non-hydrocolloid extracts; climate change and natural seaweed biomass; socio-economic impacts of seaweed farming; molecular biology and systematics; biofuels; reproductive biology, ecology (population and community); and seaweeds as food and feed.



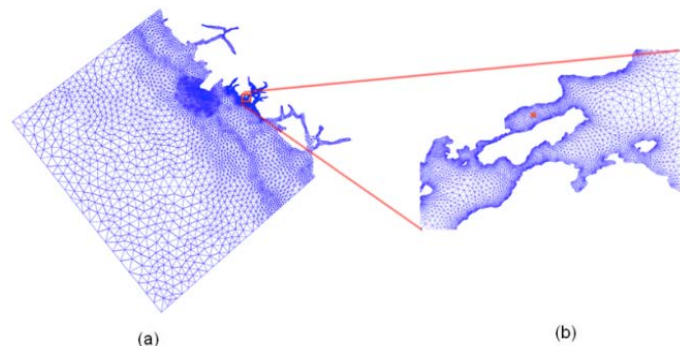
The mid-symposium excursions were an opportunity to see seaweed farming in action, as Bali was the birthplace of extensive commercial seaweed farming in Indonesia about thirty years ago. There was also time to discover the rich Balinese culture, during the mid-symposium excursions and several very enjoyable cultural evening events, under a no less enjoyable tropical climate and with the much appreciated Balinese hospitality.



Di Wan with a conductivity, temperature and depth (CTD) instrument
(photo credit: Di Wan).

Di Wan is an MSc candidate in Ocean Physics at the University of Victoria, co-supervised by Dr. Mike Foreman from the Institute of Ocean Sciences (DFO) in Sidney, British Columbia, and Dr. Jody Klymak at the University of Victoria. Di joined CIMTAN in January 2012, working on the physical oceanographic characteristics of the region of the Kyuquot SEAfoods Ltd. IMTA site with Dr. Stephen Cross. Her project is to study the major circulation patterns within Kyuquot Sound using numerical models and field observations. The hydrodynamic modelling work is essential to establish the background information before addressing the near-field patterns around the IMTA site. CIMTAN provided Di an opportunity to collect field data,

such as salinities, temperatures, conductivities and wind information, to validate the numerical model results. In June 2012, data were collected at 30 sites and two more wind stations (total four) were installed within Kyuquot Sound. Di is currently working on analyzing the total energy budget within Kyuquot Sound and finalizing the model validation for her thesis.



The computational grid used in FVCOM modelling for the west coast of Vancouver Island (a) and for Kyuquot Sound in particular (b; the red dot is the location of the Kyuquot SEAfoods Ltd. IMTA site).

First CIMTAN member quote of the month: "CIMTAN is giving me a great opportunity to work with researchers from many different fields and allows me to apply Physics and Math in the REAL world."
(*Di Wan, CIMTAN MSc candidate*).



Marissa Gale is currently completing her 3rd year of undergraduate studies at the University of New Brunswick in Saint John, in the Bachelor of Science program, with a major in Biology. She has been a summer student with CIMTAN since 2011, in the laboratory of Dr. Thierry Chopin, and is returning this year. The data from her work this summer, on the growth of kelps, will be the material for her Honours thesis under the supervision of Dr. Chopin in her final year of study. According to Marissa, "working with CIMTAN has provided many opportunities, which have helped me in multiple aspects of my life, both personally and academically. My summer work experience has allowed me to apply the information learned so far in my degree to real life research scenarios and has given me a better understanding of the



Marissa Gale measuring kelps sampled from cultivation ropes at the IMTA sites in the Bay of Fundy, New Brunswick (photo credit: Thierry Chopin).

processes involved in science. Also, performing extensive literature searches in my summer work has enabled me to become a more proficient and involved student. From working in both a laboratory and field setting, I have gained better insight into how aquaculture works and also a stronger appreciation for the skilled people required to run such an amazing system. The guidance and kindness I have experienced from the people I have worked with in this Network (especially Ellen Belyea, Constanza Chianale, Manav Sawhney, Adrian Hamer and Thierry Chopin) never cease to amaze me and are the reason why I look forward to coming back every summer."



Marissa Gale collecting the kelp, *Saccharina latissima*, at Maces Bay, New Brunswick (photo credit: Constanza Chianale).

Second CIMTAN member quote of the month: "The moment I began calling seaweeds beautiful, I realized that I had become a true member of an incredible lab, team and Network." (*Marissa Gale, CIMTAN summer student*).