A Conversation with Patrick Sorgeloos

Rodrigue Yossa

To continue the discussion that started with the publication of an article on the professionalization of aquaculture in the World Aquaculture magazine in 2015 (***World Aquaculture*** 46(2):22-23), I invited Patrick Patrick Sorgeloos to share his thoughts on the subject.

Patrick Sorgeloos has been involved in fish and shellfish larviculture R&D in Europe, Asia, Latin America and Africa ever since the mid-1970s. In 1978 he established the Artemia Reference Center and in 1986 he became the first professor of aquaculture at Ghent University until his retirement as emeritus professor in October 2013. Under his guidance, more than 250 Masters of Science from more than 50 countries and 70 PhD students from more than 20 countries graduated from Ghent University in aquaculture. Patrick is a strong promoter of international networking in aquaculture and was/is involved with the World Aquaculture Society (serving as President from 1999-2000), the European Commission (chairman Thematic Network Aquaculture — AquaTnet; member Advisory Group DG Research FP7 theme 2 "food, agriculture and biotechnology"; chairman ASEM Aquaculture Platform) and the European Aquaculture Technology & Innovation Platform (founding member).

He was co-founder of the Ghent University spin-off company Artemia Systems (1983), now operating as INVE Aquaculture and belonging to the Benchmark Holdings plc. He has received honorary awards in Belgium, China, Egypt, Greece, Malaysia, Thailand, USA, Vietnam and Ecuador. Below is the quintessence of the conversation, which was held on 22 November 2016.

Rodrigue Yossa: Why have you chosen to work in aquaculture?

Patrick Sorgeloos: It was a succession of pure coincidences. Early in my career, I did not know the word aquaculture. I started working on brine shrimp, *Artemia*, not from an aquaculture prospective, but because at the time the late Professor Fautrez at Ghent University was using *Artemia* as a model organism in cancer research. My thesis aimed at helping this professor develop a standard culture technique that will prevent *Artemia* from dying after just two weeks of culture.

Upon graduation, I received a scholarship to pursue postgraduate studies at the marine station of Duke University in North Carolina, USA. Another coincidence, Professor Bookhout, former Director of the Marine Institute at Duke University and a very famous scientist on the biology of crabs, was using *Artemia* to feed crab larvae throughout all the molting stages. Professor Bookhout told me that the Japanese were using *Artemia* in aquaculture. That is how I got familiar with aquaculture.

Following my return from the US in 1972, I discovered that the Japanese were very active and advanced in aquaculture hatchery research and production with shrimp and seabream. Following the Japanese experience, we started hatchery aquaculture activities in Europe, and then followed the USA and the rest of the world. So, when I started working on *Artemia* for aquaculture, the global annual consumption of *Artemia* cysts was a few hundred kilograms, and today it is close to 4 million kilograms. So, I am fortunate to have had the unique chance to see the development of hatchery aquaculture basically from scratch at the very beginning in Japan to a global business of several billion dollars.

Rodrigue Yossa: How would you describe the ideal aquaculture scientist?

Patrick Sorgeloos: Aquaculture is very dynamic, and there is currently no ideal aquaculture system; therefore, it would be difficult to describe an ideal aquaculture scientist. However, a good aquaculture scientist should be very open-minded. Aquaculture is a very complicated science where we are dealing with hundreds of species, physico-chemical parameters of water, engineering, microbiology, diseases, nutrition, etc., so a good aquaculture scientist should be ready to knock on doors and seek collaborations with scientists from other scientific disciplines. In addition, a good aquaculture scientist should be willing to share their knowledge with other scientists, to set up a win-win relationship with them. Willingness to share scientific knowledge and ideas goes with being open to taking some risks, trusting other people, and willing to motivate other colleagues and train students.

Rodrigue Yossa: How would you describe the ideal aquaculture producer?

Patrick Sorgeloos: An ideal aquaculture producer should be open-minded for new ideas and be willing to share experiences with other producers and scientists. An ideal aquaculture producer should be receptive to students seeking internships on the farm because students come with access to recent knowledge in the field. Farmers who are secretive somewhat also hide their problems without knowing.

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Rodrigue Yossa: What do you think will be the main challenges of aquaculture in the future?

Patrick Sorgeloos: I have had the chance to follow aquaculture practices and developments in different continents and to witness over the last four decades how successful "business" aquaculture has taken off. We can be proud of the expansion of "business" aquaculture, which is mostly based on the monoculture of shrimp, salmon, tilapia, seabass, seabream, etc., which can be considered as success stories. However, when we look at it from an ecological point of view, the current situation of business aquaculture can be considered close to its limits, because big-scale monoculture of shrimp or fish is at a turning point of sustainability, and the expansion of this type of aquaculture cannot be accepted in the decades to come.

So, we need to develop integrated aquaculture approaches in order to recreate and maintain stable environments and highly productive aquaculture ecosystems. Depending on the region and places, such integrated systems should include multi-trophic aquaculture offshore, greenwater (or mature water) technology in shrimp farming, recirculating aquaculture systems with several species including plants (aquaponics), and so on. For instance, shrimp farmers who recently have switched to green- or mature-water technology in Southeast Asia following the devastating EMS outbreaks of the last three years are having the same profit like when they were doing monoculture in the good years. In fact, although the production is a little bit lower, the stable rearing environment created through integration of intensive shrimp farming with tilapia and seaweed polyculture reduces the use of inputs such as therapeutics, because the pathogens, although still present, are less harmful.

Therefore, although aquaculture has gone through three to four decades of increasing production and good business, we have reached the limits with monoculture. The development in monoculture should not be considered a mistake because, if the pioneers in the 1970s wanted to set up integrated aquaculture systems, they would probably have not succeeded because the knowledge of science and technology associated with integrated systems was not available yet. We have succeeded in focusing on monoculture of different species (fish, shrimps, mollusks, algae). Now we need to balance the sets of knowledge gained through monocultures by integrating them into an ecosystem-based approach, which will allow us to sustainably produce more aquaculture products in the future. Nevertheless, the development of successful integrated systems in different regions throughout the world will also be the next big challenge of aquaculture and will require a few more decades of multidisciplinary research and development.

Rodrigue Yossa: What does the future of aquaculture look like in your region?

Patrick Sorgeloos: A few decades ago, the European Union (EU) wanted to set up several technology platforms involving EU countries and they initially asked a few of us to set up the European Aquaculture Technology and Innovation Platform (EATiP). The EATiP is now composed of groups of all the stakeholders involved in aquaculture business in Europe, including farmers, feed companies, pharmaceutical companies, knowledge centers (including academics, trainers and extension specialists), consumers (including retailers), and legislators. The EATiP board is composed of eleven CEOs and this board makes recommendations for aquaculture research, supported by the stakeholders, to the EU.

I am currently the chairman of the Working Group "International Cooperation" at EATiP because the next step (or challenge) is to reconcile the EATiP with the rest of the world. In fact, some European farmers have been complaining to the European Commission (EC) that our markets are flooded with Asian seafood supposedly produced in an unsustainable manner. In return, I always tell the EC that ten years from now Europe will have a seafood security problem (and not just Africa as some people like to believe) because today about 70 percent of the seafood consumed in Europe is imported, and this percentage tends to increase year after year.

There is high probability that in the coming years the fish that is currently imported for instance from Vietnam will be directed to China, which is now becoming a net importer of seafood. If the seafood from Southeast Asia currently sold to Europe is diverted towards China, there will be a problem. In addition, we are informing European trout, seabass, seabream farmers that it is good that young European families eat affordable imported pangasius because, if their children get used to eating fish from a young age, then they will become interested to explore other fish species, including locally-produced fish. Such a misunderstanding of the international cooperation with Asia, which is in fact a win-win situation rather

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than a threat, is a challenge for the aquaculture sector in Europe.

Furthermore, aquaculture regulation is a big challenge for aquaculture development in the European Union. For instance it takes 2-3 years to obtain a permit to operate an aquaculture farm in most of the EU member countries, while this process takes only about 6 months in Norway. Because of this, there has been a very small increase in aquaculture production in the EU over the last 5 years, while aquaculture has grown significantly over the same period in Norway. The initial setting of aquaculture regulations in the EU was good in assuring that aquaculture practice takes into account food safety, environmental impacts, ecosystem services, etc. However, if the current heavy bureaucratic and complicated process is not properly simplified, aquaculture production in the EU will stagnate and may be in a crisis and consequently rely more on imports.

Rodrigue Yossa: What does the future of aquaculture look like in the world?

Patrick Sorgeloos: At the world level, I see very promising opportunities for aquaculture development, especially if the new aquaculture systems are integrated and managed sustainably. However, other countries should not make the mistakes that were made in the US and EU, with over-bureaucratic, complex and unpredictable legislation.

Rodrigue Yossa: What do you think about professional certification of aquaculturists?

Patrick Sorgeloos: In 1999-2000, when I was the President of the World Aquaculture Society, someone suggested that the organization should set up professional certification for its members. The idea was not pursued because the main discussion was about who has the authority to offer such a certification. However, after all the evolution that has happened in the aquaculture sector over the last 15 years, today is probably an opportune moment to reconsider this idea.

Rodrigue Yossa: What would be the steps towards the professionalization of aquaculturists?

Patrick Sorgeloos: The certification of fisheries professionals by the American Fisheries Society (AFS) was used as a reference in 1999-2000 when the idea of professional certification of aquaculturists was suggested to WAS. Maybe AFS' experience could still be considered today. Moreover, it could be a good idea to discuss this further with international organizations such as the WAS and EAS, the Global Aquaculture Alliance, EATiP, etc.

Rodrigue Yossa: What would you have done differently if you had to restart your career in aquaculture?

Patrick Sorgeloos: I have no idea, because my career was a series of pure coincidences.

Rodrigue Yossa: What advice would you give to young aquaculturists?

Patrick Sorgeloos: Be open-minded, share knowledge and experiences, don't hesitate to give and take, and keep in mind that we are in a very dynamic sector of food production where ideas and approaches evolve fast. Also, be open to life-long learning based on literature and experiences.

Plans Well Underway for Asian-Pacific Aquaculture 2017

Hervé Lucien-Brun to be Plenary Speaker

One of the key highlights of the conference program at APA 17 is the plenary session, with presentations by leading aquaculture experts. The session will start with an address by Hervé Lucien-Brun, Aquaculture & Qualite, France. He will make a presentation on "Marketing farmed seafood from Asia to global markets," which is linked to the conference theme of "Transforming for market needs." Hervé Lucien-Brun is an independent consultant with more than 30 years of experience in tropical marine shrimp and finfish aquaculture.

Travel Award for Women's Participation

The WAS-APC is providing the opportunity for two women working in aquaculture to attend APA 17. Funding for this opportunity is provided by WAS-APC and Aquaculture without Frontiers is facilitating the selection process. There are two grants available of US$600 each, which can be used to assist with accommodation and travel to the conference. Conference registration fees of the successful applicants will be waived. Applicants need to complete the application form and will be assessed according to the following selection criteria:

1. Knowledge and understanding of the role of women in aquaculture (20 points)
2. Capacity to contribute to the future development of aquaculture (30 points)
3. Potential benefits to the individual and the sector that they work in (30 points)
4. Demonstrated skills that will enable the applicant to be an effective member of the WAS-APC information booth. (20 points)

Applicants must be willing to serve and assist at the WAS-APC Booth in the trade show.

After the conference, the successful applicants must prepare a report within 30 days, including photographs, outlining issues that need to be considered by women prior to, during and after the conference to maximize the benefits of participation.

Enquiries should be referred to Dr. Guillaume Drillet, President-Elect of the WAS-APC and Chair of the Award Committee (gdr@dhigroup.com) and Dr. Bibha Kumari, Student Director of the WAS-APC (bibhak136@gmail.com).

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