

DEVELOPMENT COOPERATION

Flemish development organisations, universities and NGO's have an impressive record of development cooperation activities related to aquaculture. During the last decennia, numerous large and small-scale projects involving aquaculture have been managed in Africa, Asia and Central & Latin America by VLIR, DGOS, VVOB, ABOS, BTC and other Flemish or Belgian organisations. In addition, Flemish universities and cooperation organisations coordinated or participated in various international projects funded by FAO, World Bank, NATO, EU and many others.



KULeuven achieved significant progress with projects based upon their expertise in integrated aquaculture-agriculture-animal husbandry, artificial fish breeding, nutrition, fish selection and genetics, fish pathogens and parasites, water quality assessment, etc.

Ghent University ran projects in over 20 countries on brine shrimp and its applications in integrated salt production units, and on improved larval culture of tropical fish and shrimp species. Over 300 people received practical training in a series of training courses organised locally or here in Flanders.

In 2003, Ghent University was asked to coordinate the **ASEM Aquaculture Platform**, a forum for dialogue between Asian and European stakeholders for the sustainable development of aquaculture. Since 2004, the Flemish government (EWI) has consistently supported Ghent University for its coordination role in the ASEM Aquaculture Platform, herewith recognizing the pivotal role of Flanders on the global aquaculture stage. The Platform has been instrumental in the establishment of VIFINET and China AquaFishNet, the Vietnamese resp. Chinese network for higher education and research institutes (www.asemaquaculture.org).

EDUCATION

Given the limited employment opportunities in the local aquaculture sector, aquaculture education in Flanders is typically targeted to an international audience. It consists mainly of MSc and PhD programmes.

One of the few truly interdisciplinary aquaculture postgraduate programmes in Europe is organised at Ghent University since 1991. This **Master of Science in Aquaculture** is firmly research-based and calls upon the relevant expertise of all Flemish universities and the teaching by European and international experts. This programme is also at the centre of the European Master of Science in Aquaculture, a consortium of 7 leading MSc programmes from Ireland, Norway, Poland, Portugal and The Netherlands.

Ghent University also coordinates **Aqua-TNET**, the European Network for Higher Aquaculture Education. This network spans over 150 institutes throughout Europe and supports the harmonisation of MSc and PhD curricula, language aspects, validation of competences and the use of innovative ICT based teaching (www.aquatnet.com).

Flanders' universities are offering appreciable support to local aquaculture education partner institutes in Vietnam, Ecuador, South-Africa, Cameroon and Rwanda. This support entails capacity building through short term training activities locally or in Flanders, the formation of PhD students and the production of didactic material, increasingly involving innovative ICT tools.



The ASEM Aquaculture Platform facilitates the establishment of the network for Chinese Aquaculture & Fisheries institutes (courtesy Prof. Yingqi Zhou – Shanghai Fisheries University, Qingdao)

Some facts & figures:

- 165 graduates in the MSc Aquaculture from Ghent University (13 Flemish, 132 international from 49 countries)
- 43 PhD's delivered (13 Flemish, 31 international from 19 countries)
- 300+ training course alumni from 74 countries



Over 300 trainees from 74 countries participated in aquaculture courses organised by Flemish experts

FLANDERS' AQUACULTURE IN THE WORLD

"Marine biotechnology stages a wide range of innovative, sustainable and multidisciplinary research with an enormous potential to provide solutions to societal needs. Aquaculture as a particular biotechnology is a very important and fast growing sector in Europe's food supply. It constitutes about 1/3 of the value of the total EU fisheries production. Flanders' expertise in aquaculture hinges on 4 pillars: education, research, industry and development cooperation. In all four domains it acts as a catalyst of a booming business in several regions in the world. The Department of Economy, Science and Innovation recognises this leading role by actively supporting research, education and industry through initiatives such as the ASEM Aquaculture Platform. I'm very happy to present in this leaflet the key figures and achievements of Flanders' aquaculture activities in the world".

Patricia Ceysens

Flemish Minister for Economy, Enterprise, Science, Innovation and Foreign Trade.

DEVELOPMENT COOPERATION



RESEARCH



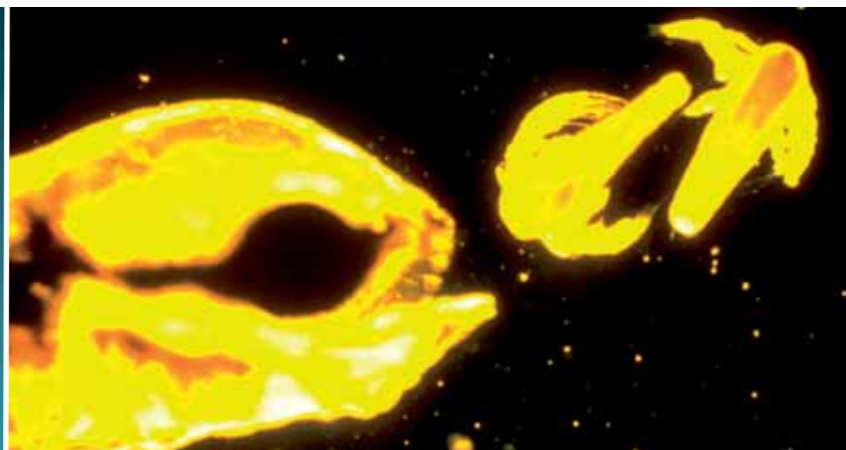
EDUCATION



INDUSTRY



RESEARCH



Flanders plays a leading role in aquaculture research and in the emerging blue biotechnology. Dedicated teams at the Flemish universities of Leuven, Ghent, Brussels and Antwerp have all gained a world reputation in their own aquaculture specialization.

The Laboratory of Aquaculture & Artemia Reference Center of Ghent University (UGent) has established a worldwide reputation in the application of brine shrimp (*Artemia*) in integrated salt production farms, and as a vital food source for the culture of fish and shellfish larvae. Research activities now extend into the production and nutritional manipulation of the other live food organisms, micro algae and rotifers, and into the many zootechnical, microbiological and immunological aspects of larviculture. To effectively tackle this broad range of topics, Ghent University established in 2007 the

UGent Aquaculture R&D Consortium. By building upon the expertise of 13 departments in 3 faculties, this partnership can cover a wide range of disciplines with a unique multidisciplinary approach (www.aquaculture.ugent.be).

At the Leuven University (KULeuven), the Laboratory of Aquatic Ecology and Evolutionary Biology participated in various EU, Flemish and international research projects on seabass, eel, Dover sole and turbot, providing their expertise in population genetics, the use of pre- and probiotics in aquaculture and the culture of new fish species (www.bio.kuleuven.be/de/dea/).

The Institute for Agricultural and Fisheries Research (ILVO) has an aquaculture division based in Ostend that explores the local aquaculture perspectives. Main research topics are offshore shellfish cultures, the conversion of traditional farms into fish farms and the integration of aquaculture and restocking into offshore windfarms (www.ilvo.be). Furthermore, the Flanders' Marine Institute (VLIZ) provides essential complementary services (logistics, data management, communication) to all Flemish universities and institutions (www.vliz.be).

First research experiences in aquaculture of the Flemish Institute for Biotechnology (VIB) together with the Ghent University and Moana Belgium, have yielded cutting-edge developments in shrimp breeding and *Artemia* gene expression (www.psb.ugent.be).

INDUSTRY



Aside from small-scale production of mussels, oysters, sturgeon and carp, Flanders has little aquaculture production of importance. However, it does have several aquaculture feed companies with a very strong market position in the world thanks to a highly specialized production technology and research-based expertise, such as INVE Aquaculture and Moana. Furthermore, the former Pieters Group in Bruges (now part of the Marine Harvest Group) has made a marked contribution to the current on import, R&D, processing, sales & distribution of seafood in Europe. And also in Europe, Patrick Sorgeloos of Ghent University is co-founder and member of the board of the European Aquaculture Technology Platform (EATP), that brings together producers, consumers and researchers to advocate the sector's interests towards the European Commission.



INVE Aquaculture (who took over Artemia Systems, a former spin-off company of Ghent University established with the support of the GIMV in 1983) is market leader in specialized aquaculture feeds and health products. With production units in Europe, Asia and the Americas, INVE Aquaculture serves customers in more than 70 countries and yields an annual turnover of close to 150 million EUR.

Upon initiative of the INVE group, a new company was set up in 2001 for the domestication and selective breeding of the Asian tiger shrimp. In 2007, Moana Technologies presented the first harvest of their Moana shrimp, a new breed for the shrimp farming industry.

Thanks to a very ambitious project with INVE Technologies and Moana Belgium, the Flemish Institute for Biotechnology (VIB) achieved a unique break-through with a high potential for application with other species of aquaculture interest. By using molecular techniques for early sexing of shrimp larvae, it enabled the development of mono-sex populations, having a large impact on IP investments in this branch.

Marine Harvest is the world's leading seafood company and largest producer of farmed salmon, and holds an important position in the development, production and marketing of value added seafood products. The group guarantees sustainable top quality raw material thanks to upstream vertical integration and a worldwide sourcing network.



INVE AQUACULTURE

Feeding & protecting fish and shellfish

a world player in the aquaculture specialty feed business, with a unique range of products related to the feeding and health status of marine fish, molluscs and shrimp

some achievements:

- pioneering nutritional products including *Artemia* cysts, enrichment diets and compound larval and nursery diets
- specialties for grow-out of marine fish and shellfish aiming to solve particular problems such as digestibility, attractiveness and pigmentation
- a complete health range targeting disease prevention in aquaculture
- a worldwide reputation for strong aquaculture R&D competences
- ability to steer nature by transferring specific nutritional components (INVYTOL®) into fish and shrimp, producing seafood tailored to the health targets of choice.

www.inve.com

MOANA

A new generation of Black Tiger Shrimp

a science based aquaculture enterprise with head office in Belgium, working on the economically important Black Tiger Shrimp, with a focus on:

- the selective breeding for the genetic improvement of the species and the production of shrimp post larvae
- building a foundation for aquaculture technology for growing and maturing broodstock from disease free founder populations under captive conditions (instead of catching parents in the wild)
- high-level molecular genetic research (in partnership with the Flemish Institute for Biotechnology, VIB)

some ground breaking research projects in partnership with VIB:

- the investigation and the discovery of molecular genetic markers for sex determination of the Black Tiger shrimp
- the research into the use of genetic markers for assisting the selective breeding process and molecular genetic tools for the production of mono-sex shrimp population.

www.moanatech.com

MARINE HARVEST

Excellence in seafood

Leading seafood company and the world's largest producer of farmed salmon (400.000 tons/year)

- Atlantic salmon cultured in own farms based in the clear waters of Norway, Scotland and Chili
- Vertical integration of the whole farming process (from egg to adult salmon)
- present throughout the value chain, with activities in Norway, Scotland, Ireland, Chili, Canada, US, France, Belgium, Poland and The Netherlands
- Headquartered in Oslo and listed on the Oslo Stock Exchange
- Realized for farmed salmon Eurepgap Integrated Aquaculture Assurance Standard, a member of criteria Rat realizes sustainable farming and a safe product.

www.marineharvest.com

