

The road to sustainable tuna aquaculture

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Domesticating Atlantic Bluefin Tuna may help meet the food industry's demand for this endangered species. However, making such an endeavour sustainable is a challenging task.

Atlantic Bluefin Tuna is a much sought after delicacy. Due to huge fishing pressure, [tuna stocks](#) have decreased dramatically. There are now signs of recovery, according to the International Commission for the Conservation of Atlantic Tunas. But the International Union for Conservation of Nature (IUCN) still lists the Atlantic Bluefin Tuna as endangered. So far, farming of this species in the Mediterranean area involves capturing medium-sized specimens and fattening these in farms. This still depletes the wild stocks. Now, the EU-funded project TRANSDOTT, due to be completed in September 2014, aims to establish a sustainable and commercially viable aquaculture for Atlantic Bluefin Tuna. "This is the only way to reduce the pressure on the natural stocks," says project coordinator Christopher Bridges, professor of Zoology at the Heinrich-Heine-University Düsseldorf, in Germany.

The project builds on several previous projects. "We have achieved a number of milestones," Bridges tells CommNet. Amongst others, project scientists developed a hormone-based method to make the fish reproduce in captivity. "We were able to keep the fingerlings, small young tuna, some of which are still alive in Spain," he says. According to Bridges, project scientists were the first in Europe to do so. But the fish reared in captivity have not yet reached breeding age. The first ones to succeed in closing the aquaculture cycle of a tuna species were scientists at the Kinki University, in Japan. "Now they sell fingerlings around \$50

[€36] per piece to grow-out farms in Japan," Bridges says.

The current project involves scaling up tuna production and making the endeavour economically viable. But project scientists still need to tackle some problems. To make the aquaculture more sustainable, "fish-based feed is replaced step-by-step by vegetable feed," says Florian Borutta, project scientist and chief scientific officer of tuna aquaculture company TunaTech. The Norwegian company Skretting specially designs pellets for feeding the tuna. However, "we get better growth rates with a combination of pellets and dead fish," Bridges adds.

Another issue is larger tuna feeding on smaller ones in the early larval stages. Added to this, alien species can be introduced as by-products of egg collection from open sea cages. What is more, because tuna see poorly and swim fast, "they collide with the walls if kept onshore in tanks," Borutta tells CommNet. Nevertheless, Bridges hopes to have the production of eggs and fingerlings commercially viable within the next few years. "We have got most things in place," he says.

One expert welcomes these efforts. "The management of the Mediterranean Atlantic Bluefin Tuna stock is starting to be achieved. But surely the capture must be limited," says Wayne Hutchinson, aquaculture expert at the South Australian Research and Development Institute in West Beach, Australia. "Full-cycle aquaculture provides the possibility to relieve pressure on the wild stock and contribute to sustainability," Hutchinson tells CommNet. He regards the science-based approach and the degree of collaboration as impressive.

In Hutchinson's view problems such as cannibalism and wall collisions need to be progressed before sustainable aquaculture of propagated tuna can be realised. "The challenges are the same as those that have been experienced with propagating other [tuna species](#)," he says. Hutchinson emphasises the need to develop feeds containing less fishmeal and more

ingredients from sustainable sources, such as terrestrial crops. "This is happening but will take time to optimise," he notes. Also, the fish size expected by the market is large compared to other cultured fish. "This means bigger tanks, bigger cages and greater problems handling and caring for tuna," Hutchinson adds.

But another expert is critical. "The best course of action for the Bluefin is to reduce the quotas to let the wild populations increase to some approximation of their original size," says Bruce Collette, chair of the IUCN tuna and billfish specialist group and senior scientist at the systematics laboratory of NOAA's National Marine Fisheries Service in Washington DC, USA. "I do not believe that Bluefin will be successfully domesticated," he says.

Collette is worried about the high volume of forage fish needed. "This is particularly true if attempts are made to raise Bluefin to sashimi size, which would bring the highest price. This could take several years of expensive feeding," Collette says. He is also concerned about environmental impact. There may be "an increase in parasitism as has occurred in the Australian ranching of the Southern Bluefin," Collette explains. Parasites might jump to migrating wild populations. Moreover, he concludes: "there is the problem of proper disposal of all the [tuna's](#) waste products without adversely impacting the local environment."

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