

# Genetically tracking farmed fish escaping into the wild

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European sea product consumption is on the rise. With overfishing being a threat to the natural balance of the ocean, the alternative is to turn to aquaculture, the industrial production of fish and seafood. But this raises issues of sustainability and ecological impact. For example, it requires dealing with cultivated fish escaping into the wild and finding methods for tracing them. Not to mention, preventing them mixing with natural and fragile species. Now, an EU-funded project, called Aquatrace, due

to be completed in 2017, aims to set up genetic-based tools to quickly and accurately identify farmed fish.

Project coordinator Einar Eg Nielsen, Professor of Ecology and Genetics at the National Institute of Aquatic Resources at the Danish Technical University in Silkeborg, Denmark, talks to CommNet about how the project will help producers improve farming efficiency, and watchdogs monitor the industry.

## **Why is it important to track genetic differences between wild and cultivated fish?**

In Europe we need more [aquaculture](#). And this has to be sustainable and environmentally friendly. We therefore need to have as little impact on natural resources as possible. We do not want that escaped cultivated [fish](#) have genetic negative impact on wild fish. As a farmed animal, the domesticated fish is adapted to a life in captivity, while the wild fish is not. This means they have different abilities to survive. Domesticated fish, when they flee into the wild, do not survive long, nor do they reproduce well. If they mix with wild fish, the genes of the [farmed fish](#) will be transferred into the wild population, which will become weaker to survive in nature.

## **Are there actually cases of aquaculture fish that have escaped and mixed with wild fish?**

The classical example comes from salmon – the Atlantic salmon. In Norway, which is the world's large producer of salmons, a huge number of fish escape yearly. And we have found in some rivers that up to 50% of the genetic contribution of local populations may come from aquaculture fish. This may have a substantial impact on how the natural populations will do in the wild.

## **Is the risk of escape of farmed fish into the wild real?**

Yes, it is. Consider the cases of net pens in the open ocean. It is inevitable that some fish will escape, because of storms and malfunctions of such pens.

In case where the fish are affected by some diseases, farmers may illegally release it into the sea. Most of aquaculture farmers follow the rules. But in order to make sure that the few who do not are found, we need tools that may track back the fish to the farms they originated from.

## **And what is the novelty of your research?**

We have two lines of research. We are working on tools to track back fish to their origin and detect interbreeding in the wild. We do this by using the most advanced genomic tools to identify fast and accurately farmed fish in the wild. Until now, such tools have not existed.

The other line of research is identifying the genetic background between the farmed and the [wild fish](#). We focus on the different survival and reproductive performances of both types of fish. We want to identify the genetic background of such differences. To do this, we perform genome sequencing and experiments.

At the moment, the methods that we are developing can only be implemented in the laboratory. But these tools will be validated with forensic standards, and have value in the court, if needed. We are not only developing controlling tools. Our method aims to support farmers in improving breeding and cultivation efficiency.

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