

## **Report – Extramural studies in aquaculture medicine**

The project in which I participated, addressed to last year's veterinary students, especially in the aquaculture field, is about extramural studies, promoted by EVERI and financed by pharmaceutical companies MSC and Pharmaqua.

The aim of the project is to give students the chance to acquire expertise and knowledge in the aquaculture area, thanks to practical activities held with experts.

The project was conducted in Frøya, Norway, lasting two weeks, during which we had the opportunity to face various topics and activities. During the first week, Mr. Asgeir Østvik, veterinarian at Havbrukstjenesten AS, followed and guided us during the activities, providing information and support to be able to enjoy.

During the second week, all activities were carried out in Norwegian, under the supervision of prof. Trygve Poppe and the help of students of the Norwegian University of Life Sciences, especially with regard to the understanding of the lessons in their native language.

The experience started with a meeting with the staff of a company called Havbrukstjenesten AS, organized by our manager Asgeir Østvik, who works for the said company. During the first week we visited several companies with different types of farming. During these visits we have been presented with several production phases for the different stages of growth of the salmon: from the tanks of the hatchery to those of post-smolt to the following smoltification in sea cages.

On farms on land we were also shown the filtration systems and water treatment, delicate and important phase for each aquaculture breeding. Particular attention has been given to semi-mechanized procedures regarding vaccinations and control methods to ensure a regular execution. We spent a full day in company of the staff of an off-shore breeding in which we have been followed by a marine biologist that explained us the routine management of fourteen off-shore cages. Particular attention has been paid to the control of fish behavior to assess health, nutritional status and well-being; more was discussed about the issues regarding the sea lice parasite, a well-known issue in the salmon breeding industry. Plus, the marine biologist showed us different stages of various parasites in many stages of growth.

During the visits, some necropsies were carried out by veterinarians and marine biologists, who have shown us and explained the autopsy techniques conducted on fish and harvesting techniques for sampling of tissues and organs to be sent for laboratory tests such as PCR. During the visits there was also provided information on the major malformations found in fish breeding, information on major infectious and parasitic diseases affecting salmon farming but also the fish of the aquatic wild.

Throughout the entire experience, our manager Asgeir showed what the duties of the veterinarian in the farm are, from the evaluation of fish conditions to fish health assessments inspection. The inspection evaluation was carried aboard a ship used for pest control treatment with hydrogen peroxide, the biggest boat in the world of its kind. The inspection controls were performed in the tanks used for the antiparasitic treatment with the use of swabs for the detection of adenosine triphosphate.

Subsequent checks have been made also in other part of the boat to monitor the state of health and hygiene of the ship, with satisfactory results.

The last day of the first week we spent at the company Havbrukstjenesten AS, participating in a meeting in which a representative of MSC has presented new vaccinations proposals by MSC and new epidemiological trends in aquatic medicine and methods to address future.

The representative of MSC has interviewed my colleague Ross and me, asking questions about the experience and why we decided to approach the aquaculture sector.

The second week, activities were carried out in the company of students from the Norwegian School Veterinary Oslo with various presentations in the field of infectious and parasitic diseases of wild and farmed fish.

We carried out necropsies on Salmon with practical tests for autoptic assessments but also for sampling and for research of parasites through the removal of fins and gills skin mucus, followed by Professor Poppe and veterinaries of the company. Besides continuing visits to land farms we have also been able to appreciate the breeding of wild salmon.

The visit to the plant on the ground of Sal Mar allowed us to follow all the final stages of breeding fish to packaging.

The Faculty of Veterinary Medicine offers a wide variety of job opportunities, although for many of them the course of veterinary medicine does not offer adequate preparation, this does not allow young graduates to enter in all these areas in a competitive way, requiring additional postgraduate titles. The lack of information does not allow the student to gain a complete picture on the real employment opportunities offered by the course of veterinary medicine, which is why recent graduates are seeking to enter in the usual fields of work, now saturated, leaving aside growing sectors, such as aquaculture.

EVERI tries to promote practical training for students of veterinary medicine in those areas of the veterinary that often do not attract immediate interest of the young veterinarians, because of a problem of misinformation within the Faculties of Veterinary Medicine. For this reason I believe it is very important to offer practical experience and training to students of veterinary medicine in aquaculture. The rapid growth of this sector occurred in a few years underlines the ability of this sector to provide jobs in a time when graduates hardly fit into the world of work.

Through this experience I have had the opportunity to experience the reality of salmon farming in Norway, world's largest producer of salmon, see closely the daily life of those working within this sector, to receive the basics of fish pathology and information on key infectious and parasitic diseases that afflict the breeding of salmon with attached control methods, prevention and fight. Through this experience I was able to see the complex management that intensive farming requires and what is necessary to find solutions to reduce the environmental impact caused by these types of productions. The experience has strengthened my interest in this area, in particular the searching for techniques to permit sustainable and environmentally friendly growth of aquaculture. I hope to work in the field of research for the discovery of new sources of protein and lipid environmentally friendly to be included in the diet of fish.

The need to increase factory farming links to the increase in the global population, this makes it essential to invest in a sector that can meet the emerging and pressing demands for food.

Fish is an excellent source of protein and it is an animal that is well suited to be grown for many reasons, including: It is eaten all around the world, finding no cultural or religious barriers; excellent ability to convert food into muscle mass without energy loss, being cold-blooded animal.

For these reasons and others, fishery products are one of the most important protein sources of food in the world.

I am grateful I had the opportunity to do this wonderful experience, perfectly organized within two weeks; even if the activities of the second week were carried out in all Norwegian language, the difficulties have been resolved by the knowledge gained in the previous week, plus proved valuable help offered by the students of the faculty of the Norwegian School of Veterinary Science of Oslo, always ready to offer their help for translation.

Special thanks to Asgeir Østvik that presented the activities during the first week and provided support and attention for the duration of the entire experience; the EVERI, the MSC and the Pharmaqua companies that gave us the chance to enjoy this wonderful experience; the students of the Norwegian School of Veterinary Science in Oslo and the Professor. Trygve Poppe, who always managed to make us feel integrated and comfortable, with last special thanks to the student Anne Christine Føllesdal and to the International Veterinary Students Association.

Best regards,

Consuelo de Amico

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