

Report of the 2nd Cross-border training labs in Croatia

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Report	2 nd cross-border training labs in Croatia
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1. INTRODUCTION

The ARGOS project WP5 “Sectorial know-how development and pilot project implementation” aims at improving the sectorial capacities and know-how to change the behaviours of the Italian and Croatian fisheries and aquaculture operators towards shared environmental sustainability and responsible actions. Under this WP, the Act.5.1 “Network for the training and education of operators towards environmental sustainability” is oriented to establish a cross-border network as a framework to test training and education activities oriented to operators towards the adoption of responsible behaviours and to share the common Adriatic good practices. Within this framework, the Act.5.1 foresees:

- (D.5.1.4) [N.2 cross-border training labs](#) aimed at improving the sectorial capacities and know-how to change the behaviours of Adriatic partnership area fishery and aquaculture operators towards shared environmental sustainability along the whole chain of fish products;
- (D.5.1.5) [N.2 cross-border exchanges of experiences](#) between Croatian and Italian operators, aimed at disseminating results obtained with pilot actions (act. 5.2 and 5.3) and hence improving the sectorial capacities of Italian and Croatian stakeholders

The second cross-border training labs for Italian and Croatian fishermen and aquaculture operators have been organized in Zadar, Šibenik and Split from 14th to 16th March 2023. The activity was coordinated by PP8 Zadar County, PP9 Public Institution development Agency of Šibenik Knin County, PP10 Public Institution RERA S.D. for Coordination and Development of Split Dalmatia County and PP13 Institute of Oceanography and Fisheries and with the contribution and involvement of all project partners.

This report presents D.5.1.4 related to the cross-border training labs organized in Croatia Zadar, Šibenik and Split, by the partners of ARGOS, from 14th to 16th March 2023.

2. THE CROSS-BORDER TRAINING LAB IN ZADAR

Second cross-border training lab started in Zadar on March 14th, 2023. The Cross-border training lab for the fisheries operators and aquaculture operators was organized by PP8 Zadar County in close cooperation with Cromaris d.d. and their marine fish hatchery in Nin and “Omega 3” Fishing Association in Šopot.

The tour started in Nin where the operators and project partners visited a modern marine fish hatchery Cromaris d.d., in the northern part of Zadar County.



Cromaris' hatchery in Nin was opened back in 1981 as one of the first fish hatcheries in the Mediterranean by Cenmar, the predecessor of Cromaris. In 2015 was completely reconstructed and opened, and today it represents one of the most modern facilities for spawning sea bass and sea bream in the world and produces over 30 million marine fish juveniles per year.

Marine fish farmers are under constant pressure from the challenges of increasing productivity, improving food safety and animal welfare, facing new challenges such as climate change and lack of raw materials.

The company Cromaris d.d. operates in Zadar County and successfully copes with these challenges. One of the key production stages in marine fish farming is the controlled production of juveniles. The main part of the produced fry refers to gilthead sea bream and sea bass.



The company bases its development on efficiency and innovation, and in addition to the traditional species, whose production is continuously improved, company has introduced meagre and common dentex and is developing spawning technology for greater amberjack, which, in addition to other species, is already successfully bred in floating cages. When the juvenile reaches a weight of 3-5 grams, it is transported in the transport basins to the farm where its breeding cycle continues. In addition to the focus on the regular production of sea bass and sea bream fry, a lot of effort is invested in research into the production of fry of new species.

During the tour of the hatchery, visitors were shown production units (live food production unit, larvae production unit from hatching to metamorphosis, fish fry production unit). Visitors had an insight into the technological organization and design, and through direct communication with the company's experts, they were able to get the information they were interested in.



After Cromaris d.d., we went to the Development and Education Center Poličnik, where Zadar County_PP8 placed its equipment purchased through the ARGOS project.

Equipment for recirculating shellfish aquaculture, worth EUR 150,000.00, consists of a bioreactor for the cultivation of single-cell algae and equipment for an experimental hatchery and experimental cultivation of shellfish in recirculation with a device for filtration, biofiltration and water sterilization.



We ended the first day of cross-border training lab with a visit to the Fishing Association "Omega 3" in Šopot, whose primary occupation is fishing of small pelagic fishes (sardines and anchovies).

The catches of the fishermen members of the "Omega 3" Fishing Association has a significant share in total Croatian catches, and especially with purse seine nets, where they participate with over 20% of the total national catch of small pelagic fishes. It gathers 16 associates and owns a fleet of 21 vessels (21 purse seine vessels).

In June 2012 in the industrial zone Šopot, the "Omega 3" Fishing Association built its logistics base which includes a production facility which allows processing of fresh fish into a frozen product with the modern technology of individual freezing (IQF) and the freezer warehouse. With its own trucks, it transports the fresh fish from the vessels to the production facility in the industrial zone Šopot where the fish goes for freezing. The freezing capacity is 5 tons per hour. In this way, the product is frozen individually, where it reaches a temperature of -18 degrees next to the bone. After freezing, the product takes on a thin layer of glaze. The specified glaze serves to protect the product from drying out.

Unlike classic tunnels, this freezing system does not dry the fish by freezing it in a stream of cold air, but retains all its natural properties. The entire freezing process, from the raw material entering the line to packaging, takes a maximum of 15 minutes. A short freezing time is extremely important in order to avoid the formation of larger ice crystals inside the product, which significantly affect the quality.





3. THE CROSS-BORDER TRAINING LAB IN ŠIBENIK

The second day, March 15th, Cross-border training lab for the fisheries operators and aquaculture operators was organized in Šibenik by PP9_Public Institution Development agency of Šibenik-Knin county in close cooperation with Development Innovation Center AluTech. AluTech enhance the innovative and research capacities for development of industrial products with emphasis on the light metal industry, maritime and other related industries and products in Šibenik-Knin County.

Development Innovation Center, an institution for the promotion of entrepreneurship, research and development is established by the Sibenik-Knin County in 2015.

Facilities intended for activities connected to regional development and encouragement of entrepreneurship in development of new technologies and final products are being equipped in an ex-military complex that was given to the city of Šibenik by the state.



We visited the Shellfish Purification Center within the Center for the development of Mariculture of Šibenik-Knin county. Alutech is implementing the project of building and equipping the Center for development of mariculture in Šibenik-Knin County from 2021 and is nearing the end of the first phase of its implementation – equipping the Shellfish Purification Center.

The Center will be the first of its kind in the whole Dalmatia, and its role in the development of mariculture in the area of Šibenik-Knin County and neighboring coastal counties is extremely important.

The specific experimental equipment and field (on sea) devices for environmental monitoring and quality control acquired as part of the ARGOS project (microscope, aquatic laboratory kit, laboratory dishes, dissolved oxygen ph and CO2 meters, salinity refractometer, mobile balance, mobile hanging scale, sechi disc ect.) will be placed in the same building inside of the laboratory for research and will be used for experimental purposes.

The most important part of the equipment for researching: ROV - research underwater robot, Algal Bioreactor for the experimental cultivation of single-celled algae in recirculation with RAS - system for filtration and recirculation will be put into operation by performing experimental tests in the next few weeks.

This other part of equipment wasn't available to see because it arrived few days after this visit.



Another activity that was planned but unfortunately could not take place due to bad weather conditions was a boat trip and a tour of the Šibenik water area and shellfish and fish farms in the Šibenik canal. Sudden bad weather conditions made it impossible to set sail, and as an alternative, a short tour of the city accompanied by a tourist guide was held.

4. THE CROSS-BORDER TRAINING LAB IN SPLIT

Last day of the second Cross-border training lab was organized in Split, by the **Institute of oceanography and fisheries** and **Public Institution RERA S.D. for Coordination and Development of Split Dalmatia County**.

The event was divided in two parts. One part was organized for aquaculture members and the other part was for fisheries members.

At the very beginning, all present were greeted by Ph.D. Živana Ninčević Gladan, the director of the Institute. The participants from fisheries sector took part in the lecture by Ph.D. Nedo Vrgoč.

In the first part of the lecture, Ph.D. Nedo Vrgoč referred to the state of resources in the Adriatic Sea. He described how the cooperation between Croats and Italians in the field of marine research is going. He also touched on the catch ratio between the Italian and Croatian fleets and the fishing effort in certain parts of the Adriatic Sea.

In the second part of the lecture, he talked about the Jabuka pit, and explained the procedure for its declaration, the current fishing regime in the area of the Jabuka Pit, as well as how monitoring is carried out. He also showed the positive effects of this area.



Ph.D. Ivana Ujević aslo had lacture in which she presented the laboratory for plankton and shellfish toxicity. In the frame of the Interreg project ARGOS, the Laboratory of Plankton and Shellfish Toxicity created a laboratory for the analysis of marine biotoxins, as it participates in the official control of the analysis of shellfish from farms and fishing areas and is a National Reference Laboratory in the field of marine biotoxins. Measurements are performed using chromatographic techniques and mass spectrometry.

Here is Ultra-High-Performance Liquid Chromatography and Institute is currently in the process of purchasing an LC-MS/MS instrument. The instruments require a separate and

adapted room to ensure stable working conditions. In this way, they increase the quality of the analysis of sea food and improve the public health safety.

Since the Laboratory of Plankton and Shellfish Toxicity is the national reference laboratory for marine biotoxins, it is likely that the new laboratory will provide training for staff of official laboratories. The laboratory will also be involved in the training of students through the "teaching base" of the University of Split.

Liquid chromatography and mass spectrometry are techniques with a wide range of applications for the identification and quantification of various substances, focusing on anthropogenic or natural hazardous substances in the marine environment. Shellfish feed by filtering seawater, so they can accumulate toxic phytoplankton and can cause poisoning in humans after consuming shellfish because biotoxins are thermostable. Generally, toxic compounds are thought to originate only from man-made sources, but toxic compounds can also be of natural origin, which is why they are called natural toxins. Their main characteristic is thermostability: when seafood is prepared at any temperature, they do not decompose and their toxicity remains unchanged. Poisoning occurs in humans and other mammals and birds after consumption of contaminated organisms, with consequences ranging from barely noticeable symptoms to death, depending on the type and amount of toxin ingested. Poisonings can be ASP (Amnesic Shellfish Poisoning) - shellfish poisoning that causes memory loss, DSP (Diarrhetic Shellfish Poisoning) - shellfish poisoning that causes indigestion, PSP (Paralytic Shellfish Poisoning) - shellfish poisoning that causes paralysis, and AZP (Azaspiracid Poisoning) - azaspiracid poisoning. ASP and PSP poisonings are caused by hydrophilic toxins, while DSP and AZP poisonings are caused by lipophilic toxins. Institute analyse more than 1000 samples per year, mainly farmed mussels.



Participants belonging to the aquaculture sector were joined by Ph.D. Leon Grubišić. His lecture covered subjects of Aquaculture in Croatia; one of the challenges; prominent representatives of the breeder sector and various Italian and Croatian regions.

The first part of the lecture was devoted to breeding technologies, information on cultivated species and the volume of production. The second part of the presentation covered the

problem of seabird predation on mussel farms, and the assessment of damage along the eastern coast of the Adriatic. The presentation of the results of the damage assessment on mussel farms aroused great interest and intense discussion among those present.

The lecturer answered numerous questions from shellfish farmers and researchers from Italy, especially about the abundance and origin of the mollusk from the eastern Adriatic.



After visiting the Institute, all the participants went to **the fishermen's port in Kaštela and Fisherman's Cooperative FRIŠKA RIBA**. Participants were welcomed and greeted by the FRIŠKA RIBA director, Mrs. Linda Zanki as well as Mr. Antonio Šunjić, president of the Fishermen's Guild of Split-Dalmatia County. Fishermen's Cooperative FRIŠKA RIBA was founded in February 2007 on the initiative of professional fishermen from Split and its surroundings (Vinišće, Trogir, Kaštela, Vranjic, Mali Rat, Dugi Rat, Sumpetar and Omiš), and then fishermen from the island of Hvar joined the Cooperative and Brač, from Dubrovnik, Gradac... Today, the cooperative gathers 20 professional fishermen who use their boats and fishing tools to provide the entire range of products - from small blue fish, shellfish to all types of white fish.

As part of its activities, the cooperative performs the following: purchase and sale of fish; trade mediation on the domestic and foreign markets; procurement of equipment and tools; accounting and bookkeeping; informing about legal and other changes related to the fishing sector; consulting and professional assistance when applying for tenders; protects and promotes the interests of its members. Since 2012, the cooperative has significantly expanded its range of activities with the new Rules of the cooperative.

The participants had the opportunity to see the plant of this cooperative as well as the loading and unloading places. Mrs. Zanki and Mr. Šunjić answered questions from the crowd.



5. ANNEXES

Annex I – ARGOS project: 2nd cross-border exchange programme Croatia

Annex II – ARGOS project: List of Participants to the 2nd cross-border exchange – Zadar, Šibenik and Split