

**Project ARIEL: Promoting small scale fisheries and aquaculture transnational networking in Adriatic –Ionian macroregion**

**Training cycle**

Act. 3.2. Training and Capacity Building

**Regional training/ competences needs for empowering socio-economic operators with new skills (technological and soft skills)**

**Topic – Diseases management and control**

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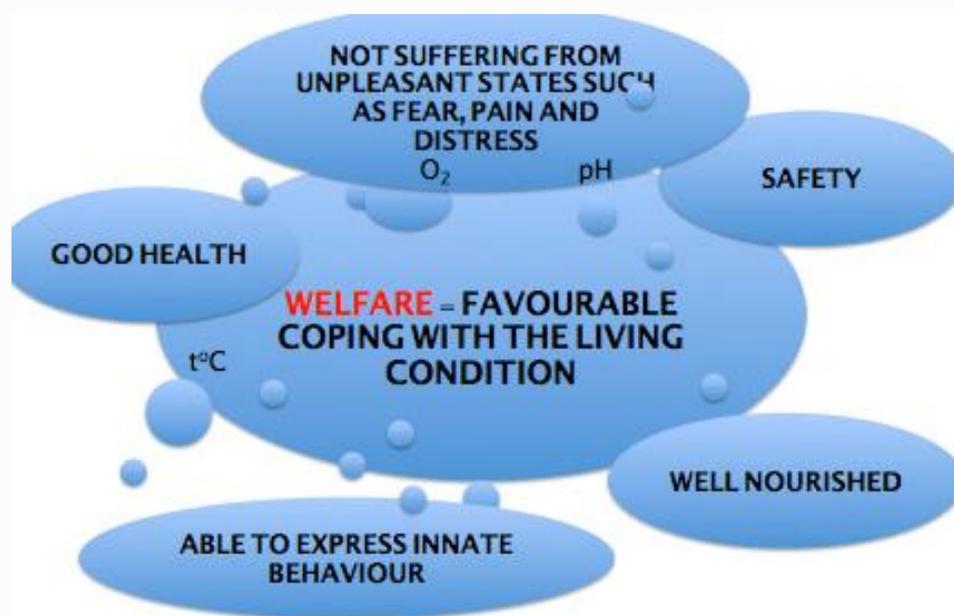
Laboratory for fish, molluscs and crustacean diseases

**Background**

Croatian marine aquaculture has grown over the last decades and currently, Croatia is the fourth producer of European sea bass (*Dicentrarchus labrax*) and Gilthead sea bream (*Sparus aurata*) in the Mediterranean basin. Thus, the Croatian marine aquaculture became the industry similar to those in other Mediterranean countries and the problems are more or less the same as around the Mediterranean basin. Lessons learned from the other aquaculture productions all over the world are raising the awareness of the risk that unsustainable intensification is leading to unprecedented outbreaks of devastating diseases. Unfortunately, diseases will continue to be the major constraint of profitable and sustainable aquaculture. Although there were several educational events with the task to educate the marine aquaculture stakeholders on the most relevant issues in diseases management and control, still there is a strong need to acquire new knowledge and receive most up to date information on diseases and on the means of their control.

There is a lack of coordinated actions carried out by fish farmers, researchers in the field of Mediterranean fish species health and competent authorities, veterinary services. Moreover, there is the knowledge gap on the duty of each actor and how to reach advantage in the sector by close cooperation.

Therefore the education should gather all mentioned actors from the national structures aiming to deepen their knowledge and strengthen the cooperation and understanding in reaching the more profitable but sustainable marine aquaculture.



Principle of the welfare indicators

**Diseases management and control**

Management of diseases encompasses the numerous measures aiming to minimize the likelihood of diseases occurrence and to mitigate the losses, but at the same time prevents the spreading of the devastating pathogens to other farms and feral fish. The aim the workshop and the booklet are to give a guideline to personnel of marine fish farm providing them with a good aquaculture practice for fish health and welfare as key objectives. The content of the learning material should help them to learn how to reduce the occurrence of the diseases in the farm, how to prevent the spreading of the diseases within and outside the farm, how to maintain the environment that promotes the health and welfare of the fish, how to maintain the environment that reduce the susceptibility to diseases, how to prevent the introduction of exotic and devastating diseases in the area, how to protect the environment and public health by responsible and prudent use of veterinary medical products (VMP) what is the meaning and how to implement the biosecurity measures.

Moreover, the workshop participants will get the basic information on the most important viral, bacterial and parasitic diseases endangering the farming of sea bass and sea bream. Namely, economically most important diseases of two species are Viral nervous necrosis/Viral encephalopathy and retinopathy, vibriosis caused with most often bacteria *Vibrio anguillarum* but also an emerging pathogen with increasing incidence and pathogenicity *Vibrio harveyi*, then pasteurellosis, synonym pseudotuberculosis or infection with *Photobacterium damsela* subsp. *piscicida*, chronic bacterial infection and very important disease caused by different species of bacteria from the *Tenacibaculum* group. The most devastating parasitic diseases are caused by gill flukes such as *Sparicotyle chrisophrii* parasiting on the gills of sea bream and being considered as the most devastating pathogen in sea bream rearing and *Diplectanum aequans*, a parasite of the sea bass. Other groups are crustacean/isopods represented by *Lernarthropus kroyerii* and *Ceratothoa oestroides*, hermaphroditic parasite with the endemic pattern. The participants will learn about the characteristics of the pathogens, basic about their life cycles and multiplication, the pathogenesis and epidemiology of the particular disease. The means of control and prevention will be described as well as the most recent scientific advantage in attempts to mitigate the losses caused by pathogens.

The last part of the workshop and the educational printed material on the topic of the Diseases management and control will discuss the general information on the veterinary medicinal product usage and different modes of the administration in the fish farms. The pros and cons of each method are evaluated. The guideline how to use antimicrobials prudently and responsible are highlighted.

Finally, some basic principles of innate and specific immunity in fish are presented with the examples of beneficial usage in marine aquaculture by immunostimulants administration and vaccination practices.



VER/VNN in sea bass



Acute vibriosis caused with *Vibrio anguillarum*



White nodules on the spleen of sea bream due to pasteurellosis



*Diplectanum aequans*



*Ceratothoe oestroides*



Immersion of sea bass fry in the vibrio vaccine