

# Health status of aquatic animals in Bosnia and Herzegovina

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## ABSTRACT

According to the State Veterinary Office (SVO) of Bosnia and Herzegovina, there are 34 salmonid, five cyprinid and two marine fish farms registered. Additionally, a number of fish farms are in the process of registration. Regular monitoring of viral fish diseases began in 2003. The National Reference Laboratory (NRL) for viral fish diseases, in cooperation with veterinary inspectors, has implemented all decrees assigned by the SVO and has performed analyses at registered fish farms. The situation in Bosnia and Herzegovina with regard to the presence, distribution and spread of viral diseases of salmonid species is favourable because the country is a major fish producer in the region and is oriented to its own production of fry through the existence of quality hatcheries and thus imports only a small percentage of fry. Because there are no cyprinid hatcheries in Bosnia and Herzegovina, the country is forced to import fry from other countries in the region. Fortunately, cyprinid viral diseases have not been reported from these sources. Because of the implementation of preventive measures at fish farms and the internal control of health status, especially at full-system fish farms, the presence of bacterial and parasitic pathogens is minimal.

## INTRODUCTION

Bosnia and Herzegovina has very advantageous climatic, geographical, hydrological and ecological conditions for the intensive production of freshwater and marine fish and molluscs in controlled production systems. Its water resources, which belong to the basins of the Black and Adriatic seas, include 20 000 km of rivers and streams, 400 ha of lakes and 1 400 ha of coastal waters. These clean and abundant water resources have enabled the presence of some 119 species of salmonid and cyprinid fishes.

The beginning of artificial breeding in Bosnia and Herzegovina dates back to 1894 when the first salmonid fish farm “Vrelo Bosne” was established on the headwaters of the Bosna River with a capacity of 600 000 fry. The first cyprinid fish farm was founded in 1902 in Prijedor with an area of 300 acres.

Among the countries of the former Yugoslavia, Bosnia and Herzegovina leads in the production of salmonids and plays a significant role in the production of cyprinids. During the 1992–1996 war, most fish farms were ruined and production stopped. After 1996, privatization of state fish farms occurred, the reconstruction and modernization of production began, and new fish farms were established. It is important to note that by 1999 the nation's aquaculture production had returned to the pre-war level of production in 1991. Apart from significant increases in the production of rainbow trout and brook trout, new technologies for the breeding of grayling, Adriatic trout and arctic char are being adopted. In marine culture, the production of seabass and gilthead seabream has increased several times, and the production of toothfish, mussels and oysters is starting.

The advantages that Bosnia and Herzegovina possesses for potential aquaculture development are the quality of its waters, the absence of major fish diseases in open waters, the high-quality of its hatcheries and other fish-breeding facilities, its trained and available work force and the existence of facilities for fish processing. Bosnia and Herzegovina thus has the capacity to increase its fish production and the exportation of live fish. There is also the possibility of producing native fish species for ranching in local waters and their exportation to the European Union (EU).

### **HEALTH STATUS OF AQUATIC ANIMALS**

Today, according to the State Veterinary Office (SVO) in Bosnia and Herzegovina, there are 34 salmonid, five cyprinid and two marine fish farms registered. A certain number of fish farms are also in the process of registration.

The development of the aquaculture sector and the growth in intensive aquaculture production in Bosnia and Herzegovina has been accompanied by the development of associated scientific expertise. In particular, the growth of the sector that has occurred since 2003 has been accompanied by the active involvement of the veterinary profession. The SVO, with the collaboration of the Department of Aquaculture, Veterinary Faculty of the University of Sarajevo and the veterinary inspectors in the Federation of Bosnia and Herzegovina (FBiH) and the Republic of Srpska (RS), has created an operational model and established a system for the monitoring and of control fish diseases at the State level with the aim of preventing, controlling and eradicating infectious diseases of fish and shellfish according to the standards of the World Organisation for Animal Health (OIE). At the same time, appropriate legislation has been established that will regulate problems in Bosnia and Herzegovina's aquaculture and is in accordance to EU directives.

The monitoring of viral fish diseases was begun for viral haemorrhagic septicaemia (VHS), infectious haematopoietic necrosis (IHN) and infectious pancreatic necrosis (IPN) of salmonid fish and for spring viraemia of carp (SVC) at the State level, which includes almost all of full-system (hatchery and grow-out) and the majority of half-system (grow-out only) fish farms. Reference laboratories have been established, with a National Reference Laboratory for viral fish diseases (NRL) being established at the Department of Aquaculture, Veterinary Faculty of the University of Sarajevo. At the same time, the training of veterinary inspectors and fishfarm owners in the control and monitoring of fish diseases has taken place.

As mentioned above, since 2003 regular monitoring of viral fish diseases has occurred. The NRL for viral fish diseases, in cooperation with veterinary inspectors, has implemented all decrees assigned by the SVO and has performed analyses at registered fish farms. Initially the NRL was unable to apply certain diagnostic procedures because it lacked necessary equipment. Thus samples were processed in Bosnia and Herzegovina by using enzyme-linked immunosorbent assay (ELISA) tests, and the same samples were sent to the European Reference Laboratory for Fish Diseases in Aarhus, Denmark. The results of analyses confirmed the existence of IPN,

while the presence of VHS, IPN, SVC and infectious salmon anaemia (ISA) were not confirmed. By long-term monitoring and the application of measures assigned by the NRL and SVO, the existence of IPN was reduced to few cases.

The national situation related to the presence, distribution and spread of viral diseases of salmonids is favourable because Bosnia and Herzegovina is a major fish producer in the region and is oriented to its own production of fry through the existence of quality hatcheries, with only a small percentage of fry being imported. As there are no cyprinid hatcheries, fish farmers are forced to import fry from neighbouring countries; however, a favourable circumstance is that these countries have not reported the presence of cyprinid viral diseases.

Although there are no national monitoring programmes for bacterial or parasitic diseases, data obtained from fish farms, veterinary inspectors and through the collaboration of the NRL with fish farms indicate that important bacterial diseases such as bacterial kidney disease and yersiniosis have not caused massive morbidity or mortality, although there have been sporadic cases of furunculosis in salmonids and erythrodermatitis in carp. Parasites such as *Ichthyobodo necator*, *Ichthyophthirius multifiliis*, *Gyrodactylus* spp., *Dactylogyrus* spp. and *Diplostomum spathaceum* are seen in six-month-old salmonid and cyprinid fry in intensive production systems but have not been reported to cause mortality. Through the use of preventive measures on fish farms and internal controls on health status, especially at full-system fish farms, the presence of bacterial and parasitic pathogens is reduced to a minimum.

Thanks to the FAO Project TCP/BIH/3101 "Strengthening capacity for the management health in aquaculture in Bosnia and Herzegovina", training of staff of the NRL was conducted at the European Reference Laboratory for Fish Diseases in Denmark, and necessary equipment for analysis through cell culture was purchased. With these improvements, Bosnia and Herzegovina will be able to be actively involved in the control of infectious fish diseases by using appropriate diagnostic methods.

Apart from monitoring and controlling the national fish health status, it is necessary to improve those factors that can significantly influence national aquatic animal health status and the sustainable development the country's aquaculture sector, such as:

- adopting new legislation and modifying existing Bosnia and Herzegovina legislation regulating aquaculture to ensure conformity with EU legislation;
- financing and equipping the NRL and other authorized laboratories so that they can perform relevant specialized diagnostic procedures;
- registering unregistered fish farms;
- implementing disease zoning programmes;
- controlling the transportation of fish and fish products through Bosnia and Herzegovina; and
- controlling fish markets within Bosnia and Herzegovina.

## CONCLUSIONS

Bosnia and Herzegovina has very advantageous climatic, geographical, hydrological and ecological conditions for the farming of freshwater and marine fish and molluscs. The national situation with regard to the presence, occurrence and transmission of viral diseases of salmonid species is favourable because Bosnia and Herzegovina is a major fish producer in the region and is oriented to its own production of fry through quality hatcheries. The results of analyses conducted by the NRL and at the European Reference Laboratory for Fish Diseases in Denmark confirmed only the existence of IPN.

Through the implementation of preventive measures on fish farms and the internal control of health status, the presence of bacterial and parasitic pathogens is reduced to a minimum. Apart from monitoring and controlling the national fish health status, it is necessary to improve another factors that can significantly influence national

aquatic animal health or impact upon the sustainable development of the Bosnian and Herzegovinian aquaculture sector.

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