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## Fish Welfare Status in Czech Republic

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**Abstract:** Welfare issues for livestock at farms have received more and more attention in recent years. Attention focuses mainly on farms raising cattle, pigs, sheep, horses, goats or gallinaceous poultry. From the welfare point of view, the same attention is paid to fish farms whose purpose, i.e. production of fish meat, makes them comparable to livestock factory farms. Fish and fish meat hold an irreplaceable position among foods of animal origin. The aim of this study was to gather information on fish welfare in Rybníkarstvi Pohorelice, as a major producer of freshwater fish in the Czech Republic.

**Key Words:** Fish farming, production of fish meat, welfare, animal protection, legislation

### Introduction

Fish meat belongs to important and nutritionally valuable food of animal origin. Among animal origin food it occupies an important place due to its structure and favorable dietary and protective effects on human health. Cardiovascular disease (CVD) is a major cause of mortality and death in the United States (U.S.) and many other countries. Fish meat is due to its composition, dietary properties and content of long chain omega-3 (LCn-3) fatty acids, such as eicosapentaenoic acid (EPA; 20:5n-3) and docosahexaenoic acid (DHA; 22:6n-3), an important preventive factor

in the prevention of these serious diseases (Raatz *et al.*, 2013). The significance of fish meat and its importance in the diet is still at the forefront of the recommendations of nutritionists. Consumption of fish meat and its effects in the prevention of cardiovascular diseases and other civilization diseases, including the effects against the development of metabolic syndrome has been confirmed by numerous scientific studies, e.g. (Jarvinen *et al.*, 2006, Streppel *et al.*, 2008, Yamagishi *et al.*, 2008, De Goede *et al.*, 2010).

Its consumption in the Czech Republic is in

in comparison with other countries low and is not at the level recommended for prevention of serious diseases. Popularity of fish and fish products is slowly increasing. Good availability of fresh fish from our own production in the CR as well as sea fish imports, high level of hygiene of fish farming, methods of treatment and handling of fish and its processing affect the quality and sensory properties of fish meat.

To the resulting quality of the fish meat from factory farms in the CR contributes the whole process of fish farming, reflecting the care of the fish during the entire breeding period up to the strict criteria for processing technologies. Excellent conditions for breeding and handling of fish during the entire period including the method of harvesting and handling prior to slaughter are later reflected in the sequence of post-mortem changes in the muscle after the fish slaughter and consequently affects especially the sensory properties, quality and shelf life of fish meat (Bušová, 2013).

In the CR is traditional breeding of freshwater fish. The character, purpose and results make raising of fish in fish ponds comparable to intensive farming of other types of livestock animals. As such it must comply with many statutory norms throughout the fish production process, when dealing with fry, stock fish or market-size fish.

The entire production process including the processing of fish provide fish meat for

consumers must comply with a number of regulations. Good production practice as well as scientific research findings from ichthyology is applied to fish farming. Rybníkarstvi Pohorelice a.s., produces freshwater fish in a system from rearing seed to fry and stock, and down to the final product of aquaculture farming. The entire production process is governed by a number of binding rules and regulations. The basic legislation is Act 99/2004 (Act 99, 2004) and related implementing regulations and operating rules. The operation complies with principal provisions of the Protection of Animals against Cruelty Act 246/1992 as amended, specifically with provisions of the amended Act 77/2004 (Act 246, 1992) as the basic legal regulations for the protection of animals in intensive farming.

In the Czech Republic, the competent authority in issues of animal protection and care for their welfare is the Ministry of Agriculture, which also provides organizational supports to the activities of the Central Commission for Animal Welfare (ÚKOZ in Czech). The practice of animal welfare is based on the above-mentioned Protection of Animals Against Cruelty Act 246/1992 (Act 246, 1992) and the Regulation (EC) No. 882/2004 (Regulation, 2004a) of the European Parliament and of the Council. The adherence to, and the application of, legal provisions of the law on the territory of the Czech Republic is supervised by regional veterinary administration.

## **Welfare situation at Rybníkarstvi Pohorelice a.s.**

The term "welfare" in connection with animal rearing was not used before the end of the last century. Even recently, animals were looked upon as objects from the legislative point of view. According to the principles formulated in the WAZA Code of Ethics (WAZA, 2003), welfare and dignified existence must be provided to animals reared in captivity. One of the most important principles refers to the obligation to provide the animals reared in captivity with sufficient feed, water and space, to prevent the cruel treatment and allow for natural behaviours of animals according to their physiological needs.

In recent years, welfare has increasingly asserted itself in intensive livestock operations. The main attention focuses mainly on factory farms where poultry, cattle, pigs, horses, sheep or goats are reared (Malena *et al.*, 2006).

A Mission of DG/SANCO/8040/2006 was carried out in March 2006 in the Czech Republic with the objective to evaluate the supervision of animal welfare at the time of slaughter and killing of animals, with a special emphasis on waterfowl, rabbit and fish farms. Evaluation results were positive and were published in Information Bulletin of the State Veterinary Administration of the Czech Republic No. 4/2007 (Dousek *et al.*, 2007). It was noted that breeding, handling and killing of fish is carried

out under veterinary legislation with regard to decent living conditions for the fish.

In this country, fish received due attention even in the historical past when fish farms were first established in the 16th century by the founders of pisciculture in Bohemia (Míka, 1955). On the basis of scientific findings and observations also from later days, new findings, methods and improvements were introduced that enhanced welfare and established proper living conditions on fish. This includes monitoring of water quality and its parameters, the amount of fish stock density, protection against pollution, monitoring the oxygen content and temperature of the water and use friendly handling equipment to prevent and limit damage to the body of a fish, eg special network etc.

It has been demonstrated that fish are sensitive to external factors just as other animals. The factors influencing fish welfare are well-known. They may be factors operating during fish rearing itself. An important role is played by the environment in breeding ponds, physical and chemical parameters of the environment, microclimate, as well as stocking density and species mix (Svoboda, 2001; Randall and Tsui, 2002; Mazeaud *et al.*, 1977).

For that reason, it is important that all pond features and fixtures (pond bed, inflow and discharge equipment) be maintained in good state of repair. The aquatic environment is monitored regularly, and, if required, water

quality (e.g. water pH adjustment, disinfection, oxygen volume) is adjusted using permitted agents in order that fish raised there can enjoy optimum conditions and ones as close to their natural environments as possible (Osička, 2005).

From this point of view, the area where the breeding ponds are located (industrial area compared with the open countryside with no transport and sources of contamination) may play an important role. Another important factor in fish farming, transport and processing technology is stressful. Fish may be stressed during harvest itself as well as during transport with all its negative effects, such as temporary confinement, higher density in transport tanks, and drop in oxygen levels, vibrations transmitted from the transport vehicle. Transfer of fish to storage ponds may have similar stressful effects.

To countermand these effects, water is enriched with compressed oxygen from cylinders and, when transporting fish over long distances, liquid oxygen is used that also decreases water temperature.

To monitor parameters of not only health status from the fish meat quality point of view and implementation of welfare principles in an intensive fish farming operation, the Mušov Fish Processing Plant of the Rybníkarstvi Pohorelice a.s., which meets the most stringent hygienic criteria of the European Union, was selected.

Rybníkarstvi Pohorelice a.s. farms fish in

138 ponds with a total area of 1,613 ha. It produces carp, silver carp, grass carp, bream, tench, pike, silver salmon and other species of marketable fish. Carp represents 85% of the company's total production. Thanks to the carp's unique characteristics, firm consistency of muscle tissue, pink to red in colour, fresh smell, and especially fine typical fish taste that it has acquired through breeding, proper technological procedures and thanks to the unique environment in the region, EU Commission awarded Rybníkarstvi Pohorelice a.s. Company the right to use the Protected Designation of Origin for its "Pohorelice Carp".

The company has produced a Hazard Analysis and Critical Control Point (HACCP) document that includes not only an analysis of potential risks during fish processing but also BRC/IFS standards. Production technology must meet the legislative Regulation (EC) No 852/2004 of the European Parliament and Council on the hygiene of foodstuffs (Regulation, 2004b), Regulation (EC) No 853/2004 of the European Parliament and of the Council laying down specific hygiene rules for food of animal origin (Regulation, 2004c) and Regulation (EC) No 854/2004 of the European Parliament and of the Council laying down specific rules for the organisation of official controls on products of animal origin intended for human consumption (Regulation, 2004d).

The entire technology of marketable fish

production complies with effective legal provisions and implementing regulations of the legislation in force, and draws on the latest scientific findings. In research, Rybníkarstvi Pohorelice, a.s. closely cooperates with scientific institutions and organisations in the Czech Republic, the foremost among them being the Research Institute of Fish Culture and Hydrobiology in Vodňany, the Institute of Vertebrates Biology of the Academy of Sciences of the Czech Republic, v.v.i., University of South Bohemia in České Budějovice, University of Veterinary and Pharmaceutical Sciences in Brno and Mendel University in Brno.

Farmed fish are regularly checked by a veterinary specialist who conducts checks of the health status of the fish. Fish in ponds are monitored continuously throughout the year by a competent veterinary specialist who looks after the health status, and also by the company's animal husbandry specialist who monitors and records weight gains throughout the year. The diet of farmed fish consists of 50% of natural feeds and the other 50% are high-quality cereals that meet appropriate hygienic standards. At regularly intervals, the fish farm is checked by State Veterinary Administration, also during harvest, uploading and other fish handling operations. Annual audits for the above activities are conducted. In addition to that, inspection visits checking operational procedures of ponds, hatchery reservoirs and storage ponds are made.

Company management is particularly mindful of the need to constantly upgrade operating equipment in order to prevent fish stress, or injury to fish. To handle fish, the so-called "wet process" is used. Plastic handling equipment, i.e. plastic tubs, tanks, grading desks and transport crates, are used. To prevent fish injuries, knotless nets are used, which cause significantly less damage to fish skin. For transport in fish transport tanks, good-quality and wholesome water from storage ponds is used that must meet strict criteria (Osička, 2005). Water used for transport of fry to, and stocking of, ponds must meet the same quality standards.

During harvest, all tanks must be supplied with water and fish handling must be minimized and should not be prolonged unnecessarily. Numbers of fish for transport are determined according to the technical equipment of vehicles, transport distances, and the species and weight of fish to be transported. All fish handling must be conducted carefully with a special attention to fish welfare in order to avoid causing unnecessary stress to the fish (Act 149, 2004; Council Regulation, 1998; Council Directives, 1991; ČSN, 1994).

Technological processes follow the Basic Principles of Good Manufacturing Practice in Fish Farming in the Conditions of Rybníkarstvi Pohorelice a.s. (Osička, 2005). Once a year, the company regularly organizes training for all of its employees on laws in force, i.e. Act 77/2004

(Act 77, 2004), Decree 382/2004 (Decree, 2004) and Act 149/2004 (Act, 2004).

In 2006, Rybníkarstvi Pohorelice a.s. was visited by EU DG/SANCO/8040/2006 mission (Mission, 2006), which carried out a very rigorous audit of the company's entire work processes, including the methods used for stunning and killing of fish, and the results were positive (Decree, 2004).

Rybníkarstvi Pohorelice a.s. Company is exemplary in its approach to research into health status and welfare of animals.

## Conclusions

The outcome of all the process steps in Rybníkarstvi Pohorelice a.s. is the production of good-quality and healthy fish, and a highly nutritious food in all respects, i.e. fish meat, an irreplaceable product in the consumption basket. In the entire process of fish meat production, fish should be treated with the right of animals to life without suffering in mind. Consumers should have the right to choose products that were produced under conditions that took animals' quality of life into account. Rybníkarstvi Pohorelice a.s. and its Mušov Fish Processing Plant are an example of an intensive fish farm and freshwater production operation run in accordance with the most rigorous hygienic and fish welfare criteria. These principles, which are presented in this article, are used and implemented and controlled on

other fish farms in the Czech Republic.

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