DTU

Notat

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Vedr.   Velfærdsmæssige forhold for opdræt af fisk

Fra   DTU Aqua

Redegørelse om velfærdsmæssige forhold ved opdræt af fisk og viden syntese om dyrevelfærdsmæssige forhold for opdræt af fisk under danske forhold

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Description of animal welfare conditions in fish farming and knowledge synthesis on animal welfare conditions in fish farming under Danish conditions

This report has been produced following the request made by the Danish Veterinary and Food Administration (Office for Animal Welfare and Veterinary Medicine) on 15th January 2024.

The knowledge gathered during the preparation of the report, about the legal background and fish welfare aspects of Danish fish farming, was compiled in an extended version of the report, added here as an appendix (Bilag 1).

The Danish aquaculture sector is mostly focused on the production of fish, which is in turn dominated by rainbow trout (*Oncorhynchus mykiss*), constituting 70% of the total aquaculture production and 88% of the total fish production in 2021. Other fish species farmed in Denmark include Atlantic salmon, European eel, kingfish/yellowtail amberjack, char, pikeperch, brown trout, striped bass, European perch and sturgeons.

The current regulatory framework in relation to the surveillance, protection and promotion of animal welfare for fish in the aquaculture sector seems underdeveloped and for example, there is no explicit consideration in Danish law about the *Recommendations concerning farmed fish from the Standing Committee of the European Convention for the Protection of Animals kept for Farming Purposes, adopted by the Committee on 5 December 2005 (REF)*. This regulatory issue is in line with the current situation at EU level (REF), which has been recognized as a problem in recent years. Now, two new initiatives at EU level, that started activities in 2024, are expected to elevate the welfare of farmed fish, traditionally neglected, and give it the same consideration as to other farmed animals. The first one is the creation of

the EU Reference Centre for Animal Welfare of Aquatic Animals (REF). The second one is the EU Partnership on Animal Health and Welfare (EUPAHW) (REF), which will invest around €360 million over the next seven years to boost research and facilitate cooperation on Animal Welfare research, including fish, that are considered at the same level as terrestrial farmed animals.

In Denmark, the current applicable regulations on fish farming have a strong focus on environmental variables but lack specific focus on the welfare of fish. In this regard, rules in place for the farming conditions provided to the fish are not subject to specific regulations or guidelines but are rather bound to the general protection provided to all animals in the Danish Animal Welfare Act.

In lack of specific regulations for the conditions provided to the fish in Danish aquaculture, it is still in the best interest of the farmers to optimize the welfare of the fish, as good welfare conditions are known to positively correlate with growth performance, increasing profitability. However, there seems to be very limited opportunities at the national level for education or training in knowledge and methods to assess, protect and promote the welfare of farmed fish.

Current accessible information about the conditions provided to the fish in Danish fish farms, and about the welfare status of the fish is very limited, as there are no defined protocols for assessment and no surveillance programs for welfare data collection and reporting. Contrary to other farmed animals, there are no publicly available reports about the welfare status of farmed fish.

The current general scientific consensus about how to assess fish welfare establishes the need to consider both input-based indicators (i.e. the conditions provided to the fish, including water quality, stocking density, lighting conditions, etc.) and outcome-based indicators (animal-based variables that tell about the actual welfare status of the fish, including behavior, feed intake, growth, external appearance, injuries, stress indicators, etc.). For several of the farmed fish species in Denmark, current fundamental knowledge on their welfare needs is limited. However, there is good availability of information about fish welfare needs and welfare assessment tools for the two main species in Danish fish farming: rainbow trout and Atlantic salmon (*Salmo salar*), and, to a minor extent, for the third main species, the European eel (*Anguilla Anguilla*). However, while different variables have been suggested as potential welfare indicators (on-farm, during transport or at slaughter) for certain fish species, those are generally still awaiting further research about their applicability and their validation on real fish farming scenarios. Data on these variables is lacking in real farming scenarios, such as the Danish fish farming industry, which prevents a good overview of the welfare status of farmed fish in Denmark. This is a critical gap of knowledge, as data on real farming conditions might be necessary to optimize the use of the indicators and to develop guidelines and set acceptable thresholds for different welfare-related variables.

One of the limitations about the current knowledge about welfare needs in connection with particular variables (density, temperature, light conditions, photoperiod, others), is that it mostly comes from well controlled laboratory-based studies where

those variables are tested while keeping others fixed. However, the combined effect of the array of variables potentially affecting fish welfare cannot be fully understood from isolated studies in the laboratory. Each single farm provides different conditions to the fish it hosts, and, in that sense, there is not such a thing as "Danish conditions" that could be defined *a priori* as representative of the Danish fish farming sector. Collecting welfare data from different farms/production systems and building fish welfare datasets would help in detecting strengths, weakness, temporal trends, etc., in order to better understand the welfare of farmed fish and further develop legislation about what should and what should not be allowed in connection to fish welfare status (including recommendations for acceptable levels of welfare indicators on different farming systems) in fish farms.

Conclusions

- Data about the welfare status of fish in the Danish fish farming industry is lacking in connection with both the conditions provided to the fish (input-based indicators) and the actual welfare status of the fish (outcome-based indicators).

- Educational/training possibilities in connection to fish welfare needs and fish welfare assessment are very limited in Denmark.

- For rainbow trout, Atlantic salmon, and to a minor extent European eel, there are potential indicators and protocols available to assess their welfare, but those are still not being used/implemented in Denmark. There is a need for research on the feasibility/practicality of those tools in the Danish fish farming sector, so optimized methods can start to be used to fill the knowledge gap about the welfare status of the fish under farming.

- The complexity and diversity of conditions provided to the fish in different farms and production systems is difficult to simulate in controlled research scenarios. For this reason:
  - It is at present difficult to develop new regulations setting specific limits for welfare-related variables or indicators, particularly for input-based indicators. This because current scientific knowledge on welfare needs and welfare indicators is not large enough to predict the effects of the complex interactions of different conditions that can be present in particular farms.
  - The collection of welfare data in real farm scenarios, and the generation of large datasets combining both input- and outcome-based welfare indicators would be critical to fully understand the fish welfare needs in each case and consequently, the needs for potential regulatory control on specific variables/indicators.