WINFISH - Welfare, Health and Individuality in Farmed FISH

Abstract

In modern aquaculture, production costs are the major driver. This has resulted in culture practices and rearing environments aimed at maximizing production capacity. Consequently, fish are exposed to unavoidable stressors, which can be detrimental to animal health and welfare. Moreover, it is increasingly clear that individuality in stress reactions have to be included in the concept of animal welfare. Such differences often take the form of suites of traits, or stress coping styles (SCS), where traits like sympathetic reactivity, aggression and the tendency follow and develop routines show positive relationships. In addition, these traits show a negative relationship with plasma cortisol levels and are also associated with differences in immune function. The consortium, consisting of 6 partners in 5 countries, will validate behavioral and physiological welfare indicators for sea bass (IFREMER), sea bream (COISPA, IzsVe, IRTA) and rainbow trout (DTU aqua, UPM) at the individual and rearing unit level. This will generate new information about responses to environmental factors, knowledge that can be applied to improve husbandry and management practices. Recirculating aquaculture system (RAS) has been developed as a sustainable alternative with low ecological consequences compared to traditional flow through systems. However, in RAS factors such as higher rearing densities and water quality parameters may challenge the welfare of fish. In WIN-FISH, health, welfare and production related effects of RAS rearing of sea bass (IFREMER) and sea bream (IRTA) kept at different densities will be monitored. In order to account for individual variation, these studies will be performed on fish screened for SCS. Similarly, in flow through systems (COISPA, IzsVe), health, welfare and production related effects of rearing densities will be further investigated in sea bream differing in SCS. Generally, environmental enrichment has positive effects on animal welfare. WIN-FISH will investigate effects of environmental enrichment on rainbow trout with contrasting SCS (UPM). In an attempt to generate genetic markers for selective breeding to optimize performance and welfare of farmed Atlantic salmon, a genome-wide association analysis will be performed on salmon with divergent SCS, focusing on proactive fish differing in aggressive behavior. In addition, zebrafish will be used as a model to gain additional knowledge on mechanisms underlying SCS and aggressive behavior (UU).