



SUMMARY

This output concerns the effects of transfer from cages to tanks on the European sea bass (*Dicentrarchus labrax*). The output provides insight into the general acclimation requirements of the species after transfer. Therefore, it will help to improve the robustness of experimental methodology and the quality of experimental results.

KNOWLEDGE NEED

Handling of fish is necessary, both in commercial farming operations and in research facilities, but causes stress and discomfort for the fish. The acclimation time – the time for the fish to resume normal physiology and behaviour – will depend on the severity of the stress experienced by the fish. An important consideration when conducting fish experiments *in vivo* is the use of animals that are in a stable physiological, biochemical and behavioural state so that the effects of potential treatments can be clearly distinguished. Without this consideration, the quality of research and findings are undermined. Therefore, it is important for both aquaculture farmers and researchers to understand the effects of transfer on the stress and acclimation time of the fish.



POTENTIAL IMPACT

- Improved handling protocols for aquaculture farmers, leading to improved welfare of farmed European sea bass.
- Improved aquaculture experimental design, leading to higher quality results that can be implemented by the aquaculture industry.

EATiP - Strategic Research and Innovation Agenda (SRIA) Thematic Area 2 – Technology and Systems; Goal 4; Thematic Area 7 – Aquatic Animal Health and Welfare; Goal 4. To see the full list and descriptions of the thematic areas and goals, please visit: bit.ly/3hBDpGH

UNDERLYING SCIENCE

Two trials were conducted in which European sea bass were monitored over a period of several weeks after their transfer from cages to tanks. The effects were evaluated by close monitoring of biochemical, haematological, hormonal, behavioural and husbandry variables. The trials were performed on fish of two sizes: 150 g (small) and 300 g (large), to examine whether acclimation capacity is related to size. After transfer to the facilities, the small fish were randomly distributed in eight 500 L tanks, thus forming eight experimental groups. Subsequently, a group was chosen at random every week for growth and physiological parameter monitoring. Each group was only sampled once during the eight-week trial. The same procedure was used for the large fish.

RESULTS

- The results suggest that fish quickly attain physiological and behavioural normality, but require substantially longer acclimation time to fully adapt to the new conditions.
- All fish exhibited elevated post-transfer values of their hormonal, biochemical, and haematological variables. However, all variables reverted to their normal range by the end of the first week, irrespective of their size.
- The results suggest that smaller fish have higher capacity for adapting to the new conditions compared to their larger counterparts. Specifically, smaller fish reverted to normality 1 to 2 weeks earlier than larger fish with respect to husbandry parameters, and they also exhibited negligible mortalities.
- Regarding husbandry parameters, acclimation lasted 3 to 4 weeks for the small fish and 4 to 5 weeks for the large fish, with feed consumption generally low and conversion to biomass (Feed Conversion Ratio, FCR) exhibiting sub-optimal values during that time.
- Post-transfer fish showed signs of low swimming activity and preference for the lower parts of the tanks. However, for the majority of fish, this effect disappeared after a few days and, within the first two weeks, all fish resumed normal swimming behaviour irrespective of their size.
- The overall results of the trials suggest a minimum acclimation time of three weeks despite behavioural and physiological normality appearing to be achieved much faster (1 to 2 weeks post-transfer).

END-USERS & POTENTIAL APPLICATIONS

↻ END-USER 1: Aquaculture researchers

APPLICATION: Use of longer acclimation periods to improve experimental methodology and therefore validity of results, leading to greater trust from industry.

↻ END-USER 2: European sea bass producers

APPLICATION: Improved understanding of fish stress and response when subjected to transfer in addition to the effects of age on acclimatisation time, both of which could lead to improved welfare.

STATUS

Technology Readiness Level (TRL) 3 - experimental proof of concept

- Further research is needed to examine other parameters in the experiments, such as effect of temperature on acclimation time.

AT A GLANCE

TITLE: Effects of transfer from cages to tanks on European sea bass

KNOWLEDGE TYPE: Report

WHERE TO FIND IT: Contact details below

STATUS: Complete

TNA FACILITY USED: Hellenic Centre for Marine Research (HCMR), Greece

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