

“FASTFISH”

Identifying quantifiable indicators of stress in farmed fish

The performance of farmed fish during rearing, and hence the profitability of the industry, can be highly dependent on the general well-being of fish. In sub-optimal conditions, fish can be subject to stress that affects their physiology, behaviour and feeding with adverse consequences for growth and health.

This raises the need for guidelines for avoiding stress in fish based on a standardized system that identifies and quantifies significant causes of stress.

The **FASTFISH** project is continuing and further developing the WEALTH approach (AA-FI-WELF-03). Also in this project, Atlantic salmon and European sea bass are the chosen model species, but now the larval stages are also included in sea bass. The main goal of this project is to **develop the first database and expert system for on farm welfare and stress level assessment in farmed fish** at all ontogenetic stages. A central part in this assessment will be validated **behavioural stress level indicators**.

The main focus areas for the search for potential indicators are feeding motivation and behavioural control mechanisms. Feeding motivation depends on the metabolic state of the fish and is well known to be sensitive to stress, and can be assessed by e.g. quantifying anticipatory behaviour before feeding and feed intake.

Secondly, swimming behaviour is an indicator of behaviour control level and state, and should be sensitive to stress level and physiological state. The identified indicators will be cross-validated as “proxy” measures for stress, using immunological and physiological (plasma cortisol and cortisol released in water) methods.

To interpret these indicators correctly and identify the stressors, essential information on present and previous rearing conditions must be available. This will be achieved by the database and expert system, the “**FAST-TOOL**”, which can be used for day-to-day monitoring of environmental conditions, and the stress level indicators identified, as well as periodical monitoring of growth performance and health data.

Based on these data the program shall be able to assess the stress level and give early warnings and management advices when rearing conditions and stress indicators are indicating risk of harmful conditions.



THE NEW EXPERIMENTAL FACILITIES AT IMR, MATRE, WHERE EXPERIMENTS ARE BEING DONE WITH ACUTE AND CHRONIC STRESSORS IN SALMON. SOURCE: F. OPPEDAL.



Project acronym:

FASTFISH

Full title of Project:

On farm assessment of stress level in fish

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fastfish.imr.no

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The system will be Internet-based, and the first version will be tested and evaluated in 2007/08. The expert system will also include forecasts based on artificial neural networks.

FASTFISH will tailor the FAST-TOOL to commercial production by testing on selected hatcheries and farms in periods with potentially high and low stress levels. Finally, FASTFISH will evaluate which market-factors and governance mechanisms will enhance the implementation of FAST-TOOL in the industry, and estimate costs and benefits of implementing FAST-TOOL in the industry.

On fish farms, observations of fish behaviour are the most common indicators used to assess stress or well-being. However, these indicators are mainly built on the fish farmers' experiences and not on scientific experiments or studies.

The FASTFISH project will provide a scientific basis for developing farmed-fish welfare policies that underpin a profitable industry. Moreover, it will inform policy makers over a wide range of fish farm management issues, from site selection and stocking densities to feed quality and diet, and underpin environmental policies that aim to limit the use of pharmaceutical products on fish farms.

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SEA BASS CAGES IN CRETE WHERE STRESS RELATED BEHAVIOUR OF SEA BASS IS BEING OBSERVED WITH CAMERAS AND ECHO-SOUNDERS. SOURCE: J.E. FOSSEIDENGEN.