

New tool to improve 'cleaner fish' welfare in salmon farming

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Researchers at the University of Stirling have developed a new tool that fish farmers can use to improve the welfare of lumpfish—a species crucial to tackling the problem of sea lice in salmon.

Lumpfish are increasingly being used by the [salmon](#) industry as a 'cleaner fish' to remove parasitic sea lice, which cost the Scottish salmon industry alone an estimated £40m per year.

Because they are a relatively new fish to aquaculture, researchers are still establishing the optimum conditions for lumpfish [welfare](#).

In a new study, a team led by Dr. Sonia Rey Planellas at the University of Stirling's Institute of Aquaculture has established the correlation between lumpfish growth weights and welfare, and turned it into a tool farmers can use to assess the health of the fish and take remedial action if required.

Dr. Rey Planellas says that "at the moment, in the UK we use Operational Welfare Indicators (OWIs) for fish welfare, but lumpfish are a different shape to many other fish, so it's about identifying the best indicators for each species."

"Fin damage is typically the indicator that is used, but in this study we found a more useful indicator was the correlation between growth weight relative to size and welfare."

The researchers developed four indices based on weight and length comparisons, correlated with the OWIs for lumpfish, to develop a formula that calculates an overall score of above or below 2.8 (for other fish the figure is 3). Above 2.8 means the fish is fine, below means the condition is sub-optimal and farmers must take remedial action. Farmers input their measurements into a free online tool.

"It can help farmers calculate optimal times to introduce the lumpfish to the salmon, for example," said Dr. Rey Planellas. "Lumpfish can sometimes grow very fast, which leads farmers to introduce them too early, when the waters are still too cold. This is not good for welfare

outcomes."

Jim Treasurer is a scientist with Fai Farms near Fort William. He worked on the study and works closely with fish farmers. He says that "this tool will help farmers identify fish that are below average condition for the population in the cage, and will indicate a need for prompt, remedial action, such as modifying feed."

Ralph Bickerdike, Head of Fish Health and Welfare at Scottish Sea Farms who participated in the study, says that "the welfare indicators identified from the project have since been adopted at those of our farms using lumpfish to help control sea lice levels and have proven hugely helpful in ensuring high welfare standards among our cleaner fish."

The researchers collected data from 456 [fish](#) from two different environments: a hatchery at Ardtoe in Scotland and in salmon sea cages in the Faroe Islands and Scotland, in conditions approved by the University of Stirling's Animal Welfare and Ethical Review Body.

The project was a collaboration between the University of Stirling, including modeling by lecturer Bruce McAdam; the Scottish Aquaculture Innovation Centre (SAIC); the Fisheries Society of the British Isles (FSBI) and several salmon companies. Its focus was to improve non-medicinal measures to manage sea lice.

Dr. Rey Planellas added that "the main idea is to minimize the use of medicines in salmon farming, and [cleaner fish](#) offer a good alternative. However, we need to develop our knowledge of the welfare of these animals."

The paper, Using model selection to choose a size-based condition index that is consistent with operational welfare indicators, is published in the

Journal of Fish Biology.

More information: Sonia Rey et al, Using model selection to choose a size-based condition index that is consistent with operational welfare indicators, *Journal of Fish Biology* (2021). [DOI: 10.1111/jfb.14761](https://doi.org/10.1111/jfb.14761)

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