Journal of Fisheries Sciences©
4 (13) 2023 : 001-002 • Case Report

Analysis of salmon activity in response to fisheries diseases

Lakshmi Shankar*
Department of Fisheries, University of Aquaculture and Fisheries, Canada

AUTHORS' CONTRIBUTION: (A) Study Design · **(B)** Data Collection . **(C)** Statistical Analysis · **(D)** Data Interpretation · **(E)** Manuscript Preparation · **(F)** Literature Search · **(G)** No Fund Collection

ABSTRACT

Analysis of salmon behaviour is a successful method for detecting environmental toxins that have a negative impact on salmon survival, production, and quality. Large volumes of non-linear data are produced when tracking individual and group behaviour, necessitating the use of specialised computing techniques to interpret and manage the data. Measures of operational complexity (FD) and predictability (entropy) are provided by two categories of nonlinear analysis approaches called fractal dimension (FD) and entropy. Changes in FD and entropy values can obviously be incorporated into biological early warning systems (BEWS), which are particularly accurate, because behavioural complexity and predictability can be modified by pollutants. There are various salmon farming environments and situations where it can be useful. for keeping an eye on wild populations. The study looked into a wide range of environmental pollutants, including pesticides, persistent pollutants, heavy metals (lead, copper, and mercury), heavy metals (lead, copper, and mercury), stimulants (caffeine), anaesthetics, and antibiotics. gives a summary of the effects of drugs. Studies on the population and individual behavioural reactions of different salmon species' HFD and entropy levels. With early changes in the tendency to develop their values before they significantly diverge from control values, all revised investigations show the value of both FD and entropy to identify the presence of pollutants. the importance of taking H into account. While pollutants are prevalent, it is still possible to spot them and keep salmon healthy and intact.

Keywords: Aquaculture; Aquatic pollutants; Entropy; Salmon behaviour

Address for correspondence:

Lakshmi Shankar,
Department of Fisheries, University of Aquaculture and Fisheries, Canada
E-mail: shankar765@gmail.com

Word count: 1087 **Tables:** 00 **Figures:** 00 **References:** 10

Received: 01.07.2023, Manuscript No. ipfs-23-13830; **Editor assigned:** 06.07.2023, PreQC No. P-13830; **Reviewed:** 20.07.2023, QC No. Q-13830; **Revised:** 24.07.2023, Manuscript No. R-13830; **Published:** 31.07.2023

INTRODUCTION

Around 3 billion people cannot afford a decent food, and an estimated 811 million people experience hunger. The need for continued gains in food production is critical given that the world's population is expected to rise from the current 7.7 billion to 9.7 billion by 2050 (United Nations World Population Prospects, accessed May 11, 2023) [1]. Fish and shellfish (freshwater and marine animals, plants, and algae) are thought to be crucial for maintaining a steady supply of wholesome, nutritious food in the present and the future [2]. Currently, seafood makes up around 17% of animal protein consumed worldwide, but in some Asian and African nations, this percentage is even higher. Furthermore, the majority of seafood supply is anticipated to come from aquaculture due to the precarious state of many wild salmon stocks and salmon farms used for commercial harvest [3]. However, the aquaculture sector faces significant obstacles like unpredictable harvests and the requirement to protect salmon's health and wellbeing. Climate change is the root cause of many of these problems. emerging diseases; overuse of antibiotics leading to an increase in antibiotic-resistant pathogens; human pharmaceuticals; an increase in the types and amounts of chemical and biological water contaminants (with related pollution and challenges sourcing raw materials); and for feed production, the presence of micro- and nanoplastics worldwide linked to pollution and challenges in raw material sourcing. Additionally, pandemics and conflicts have an impact on the continuity of the overall production system [4, 5].

Fractal dimension of salmon behavioural parameters

We suggest reading the test report for a useful summary of technical difficulties [6]. The nature of computational analysis (Fourier and wavelet transforms, fractal analysis, and permutation entropy), as well as machine learning techniques (multilayer perceptrons, self-organizing Hidden Markov), have obvious potential to support toxicological monitoring of water quality with BEWS, according to these authors, who also discuss the difficulties encountered when performing motion tracking for 2D and 3D videos [7].

In our perspective, the Bae and Park review emphasises the use of aquatic organisms as BEWS for the ongoing detection of contaminants in freshwater systems [8]. These organisms can range from bacteria, algae, mussels, salmon, and multi-species systems. Regarded to be the most thorough research on This study looked at how well BEWS may be used to track wastewater, water distribution networks, and contaminated or clean field drinking water all around the world [9]. Monitoring environmental conditions in aquaculture habitats, though, can be done using the same guidelines [10].

DISCUSSION

The differences in the species, size/age, sexual maturity, and sex of the animals utilised, as well as the experimental setups, make it difficult to directly compare the findings from the examined papers. As a recap, some studies measured the behaviours of salmon placed individually in tanks, others the behaviours of salmon placed in groups (typically consisting of only two or three individuals), and others measured the behaviours of salmon placed in groups with a variable number of individuals (ranging from three to eighty-seven). Additionally, the personalities of the individuals themselves must undoubtedly have an impact on how the salmon react to stressors and toxins. The Katz FD of MeHg+-treated seabass was the sole instance in which a contaminant did not alter the value of a parameter, although this was because of a problem in the Katz method. When the Castiglioni's adjustment was used, a problem with that algorithm that had previously been noted was resolved.

CONCLUSION

After taking into account all of the aforementioned factors, we come to the conclusion that BEWS will likely work best when implemented using both FD and entropy parameters applied to the collective animal behaviour in order to detect abnormalities, such as the presence of contaminants, particularly in salmon farms that use an intelligent aquaculture/PFF approach for online monitoring and control of the production. On the other hand, a few algorithms are available to calculate the FD and entropy of systems. It is necessary to test and choose the specific FD or entropy method that is best for a certain practical application. Furthermore, given the unpredictable nature of the contaminants and the possibility that a given system's response could change depending on the contaminant, in our opinion, many techniques ought to be used. The achievement of a good, dependable signal (from either video images or echo sounds of RIFs) to be further processed is the most challenging aspect of implementing this type of BEWS (especially from a technical standpoint). Once the signal is strong and trustworthy, applying one or more algorithms to the same signal should be simpler to do. As a result, with just a small increase in computer cost, it should be possible to extract a wealth of useful information from the same raw data.

REFERENCES

1. **Greaves K, Tuene S**. the form and context of aggressive behaviour in farmed Atlantic halibut (Hippoglossus hippoglossus L). *Aquaculture*. 2001; 193: 139-147.
2. **Ellis T, North B, Scott AP, et al.** The relationships between stocking density and welfare in farmed rainbow trout. *J Fish Bio.* 2002; 61: 493-531.
3. **Johansen LH, Jensen I, Mikkelsen H, et al.** Disease interaction and pathogens exchange between wild and farmed fish populations with special reference to Norway (PDF). *Aquaculture.* 2011; 315: 167-186.
4. **Jones NAR, Webster M, Salvanes AGV.** Physical enrichment research for captive fish: Time to focus on the DETAILS. *J Fish Bio.* 2021; 99: 704-725.
5. **Azevedo-Santos Valter M, Pelicice Fernando Mayer, Lima-Junior Dilermando Pereira, et al.** How to avoid fish introductions in Brazil: education and information as alternatives. *Natureza & Conservação*. 2015; 13: 123-132.
6. **Hardy JT.** The sea surface microlayer: Biology, chemistry and anthropogenic enrichment. *Progress Oceano.* 1982; 11: 307-328.
7. **Reche Isabel, D'Orta Gaetano, Mladenov Natalie, et al.** Deposition rates of viruses and bacteria above the atmospheric boundary layer. *ISME J.* 2018; 12 (4): 1154–1162.
8. **Wurl Oliver, Holmes Michael.** the gelatinous nature of the sea-surface microlayer. *Marine Chem.* 2008; 110: 89-97.
9. **Österblom H, Crona BI, Folke C, et al.** Marine ecosystem science on an intertwined planet. *Ecosys.* 2017; 20: 54-61.
10. **Halpern BS, Frazier M, Afflerbach J.** Recent pace of change in human impact on the world's ocean. *Sci Rep.* 2019; 9: 11609.