



Correction: Caught in the middle: bottom up and top down processes impacting recruitment in a small pelagic fish

Marta Moyano · Björn Illing · Anna Akimova · Katharina Alter · Valerio Bartolino · Gregor Börner · Catriona Clemmesen · Annegret Finke · Tomas Gröhsler · Paul Kotterba · Lina Livdane · Felix Mittermayer · Dorothee Moll · Lena von Nordheim · Myron A. Peck · Matthias Schaber · Patrick Polte

Published online: 18 January 2023
© Springer Nature Switzerland AG 2023

Correction to: Rev Fish Biol Fisheries

<https://doi.org/10.1007/s11160-022-09739-2>

Following publication of the original article [1], the authors identified an error in Table 1. The correct Table 1 is given below.

The original article has been revised.

The original article can be found online at <https://doi.org/10.1007/s11160-022-09739-2>.

M. Moyano (✉)
Centre for Coastal Research, University of Agder,
Universitetsveien 25, 4630 Kristiansand, Norway
e-mail: marta.moyano@uia.no

M. Moyano
Norwegian Institute for Water Research (NIVA),
Økernveien 94, 0579 Oslo, Norway

B. Illing
Thünen Institute of Fisheries Ecology, Herwigstraße 31,
27572 Bremerhaven, Germany

A. Akimova · M. Schaber
Thünen Institute of Sea Fisheries, Herwigstraße 31,
27572 Bremerhaven, Germany

K. Alter · M. A. Peck
Department of Coastal Systems (COS), Royal Netherlands
Institute for Sea Research (NIOZ), PO Box 59,
1790 AB Den Burg (Texel), The Netherlands

V. Bartolino
Department of Aquatic Resources, Swedish University
of Agricultural Sciences, Turistgatan 5, 45330 Lysekil,
Sweden

G. Börner
Institute of Marine Ecosystem and Fisheries
Science (IMF), Center for Earth System Research
and Sustainability (CEN), University of Hamburg, Grosse
Elbstrasse 133, 22767 Hamburg, Germany

C. Clemmesen · F. Mittermayer
GEOMAR Helmholtz Centre for Ocean Research Kiel,
Düsternbrooker Weg 20, 24105 Kiel, Germany

A. Finke · T. Gröhsler · P. Kotterba · L. Livdane · D. Moll ·
L. von Nordheim · P. Polte
Thünen Institute of Baltic Sea Fisheries, Alter Hafen Süd
2, 18069 Rostock, Germany

Table 1 Summary of identified knowledge gaps in Western Baltic Spring-Spawning (WBSS) herring research related to population productivity and recruitment

Knowledge gap	Objectives	Potential approaches	Outcomes relevant for management	Priority for management
Migrations and habitat use	<p>Revisit migration pathways, inc. spawning, feeding and overwintering grounds</p> <p>Identify environmental migration cues</p> <p>Improve survey-based indices of abundance by accounting for changes in the availability of different age groups to the survey</p> <p>Characterize habitat use (fragmentation)</p>	<p>Using telemetry and echosounders, revisit the role of the Øresund as an overwintering ground and the environmental cues driving the spawning migration</p> <p>Using otolith microchemistry, identify contribution from different spawning grounds and their variability over time</p>	<p>Knowledge to revisit survey extension and timing and develop indicators based on the migration cues that allow for dynamic, flexible survey design and an improved strategy for the commercial sampling</p> <p>Building a knowledge baseline for bridging coastal planning and fisheries management (e.g. MPAs)</p>	High
Metapopulation structure and demographics	<p>Revisit metapopulation structure in the Western Baltic (spring vs autumn spawners) and exchange with other neighboring stocks</p> <p>Investigate changes in demographic structure across time and how it is impacted by fishing</p>	<p>Validate potential indices based on simple metrics (e.g. vertebrae, otolith shape, growth parameters) with established stock-discriminator tools (e.g. genetics, otolith microchemistry)</p> <p>Compile and compare historical datasets of fisheries-dependent and independent sources</p>	<p>Knowledge to develop more effective management concepts for WBSS and its neighboring/overlapping stocks in the North and Baltic Seas</p> <p>Reduce uncertainty in biological reference points</p> <p>Reduce uncertainty in biological reference points</p> <p>Develop tools to track changes in productivity and distribution at time-scales relevant to management</p>	High
Life-stage specific impact of multi-stressors	<p>Obtain life-specific physiological thresholds for multiple stressors (inc. its interactions)</p> <p>Investigate the combined direct and indirect role of multi-stressors via mesocosm experiments and modeling</p>	<p>Obtain estimates of thermal windows via cardiac performance at different life stages (e.g., egg, larvae, juvenile, adults)</p> <p>Quantify interacting and carry-over effects of prey availability, temperature and hypoxia from egg to juveniles</p>	<p>Help parameterize species distribution models to account for shifting distributions and productivity under changing environmental conditions (e.g. heatwaves)</p> <p>Improve of the predictive skills of the stock-recruitment relationships</p> <p>Identify amplifications between factors affecting fish recruitment</p>	Average

Table 1 (continued)

Knowledge gap	Objectives	Potential approaches	Outcomes relevant for management	Priority for management
Predator–prey interactions	<p>Characterize spatio-temporal changes in prey fields in terms of abundance, type and quality</p> <p>Reevaluate the hypothesis of food limitation in the nursery grounds across different years and cohorts</p> <p>Reevaluate the impact of top-down effects on egg and larval mortality across different years and cohorts</p>	<p>Analyze historical zooplankton samples available for Greifswald Bay and Kiel Canal</p> <p>Apply a physiological-based model to explore whether in situ prey fields can support observed larval growth rates</p> <p>Estimate top-down control on eggs and larvae combining spatio-temporal overlap analyses, feeding experiments and predator fields</p>	<p>Develop indicators based on zooplankton abundance and/or diversity and test their relevance for the assessment models</p> <p>Develop predation mortality indicators and test their relevance for the assessment models</p>	<p>Average</p> <p>Average</p>

Open Access This article is licensed under a Creative Commons Attribution 4.0 International License, which permits use, sharing, adaptation, distribution and reproduction in any medium or format, as long as you give appropriate credit to the original author(s) and the source, provide a link to the Creative Commons licence, and indicate if changes were made. The images or other third party material in this article are included in the article’s Creative Commons licence, unless indicated otherwise in a credit line to the material. If material is not included in the article’s Creative Commons licence and your intended use is not permitted by statutory regulation or exceeds the permitted use, you will need to obtain permission directly from the copyright holder. To view a copy of this licence, visit <http://creativecommons.org/licenses/by/4.0/>.

Publisher’s Note Springer Nature remains neutral with regard to jurisdictional claims in published maps and institutional affiliations.