

# Development of the ICES Fecundity and Atresia reporting format and inventory

**Maria Makri**, International Council for Exploration of the Sea – ICES (Denmark), maria.makri@ices.dk

**Anna Osypchuk** – ICES (Denmark), anna.osypchuk@ices.dk

**Cindy van Damme** – Wageningen Marine Research (Netherlands), cindy.vandamme@wur.nl

**Evanthia Bournaka**- DHI (Denmark), evbo@dhigroup.com

**Carlos Pinto**-ICES (Denmark), carlos@ices.dk

## Introduction

Estimates of spawning stock biomass (SSB), particularly through the estimation of reference points from the stock-recruitment curves, are one of the basic tools used in the assessment of the status of main commercially important fish stocks. The combination of egg production estimates from ichthyoplankton surveys with fecundity and batch fecundity data from fish sampled at appropriate time periods, can yield accurate SSB and potential SSB estimates to be used in the design and implementation of stock management plans. The estimation of fish fecundity is also crucial in providing predictions on the timing and scale of spawning, thus enabling assessment of stock condition and the provision of fishing advice. ICES has for around a decade, hosted a fish eggs and larvae database, with data collected from ichthyoplankton surveys carried out in the North Atlantic and the Mediterranean Sea. To provide full access to the data for SSB estimation from egg production methods, ICES has built a new database and a respective data inventory, to host estimations of fecundity, batch fecundity and atresia of major commercially important fish species.

## Reporting Format

The reporting format and the inventory were developed by the ICES data center in cooperation with the expert group on Mackerel and Horse Mackerel Egg surveys (WGMEGS). The format was designed in accordance with the manual followed by WGMEGS for the estimation of daily and annual egg production of Mackerel and Horse Mackerel<sup>1</sup>.

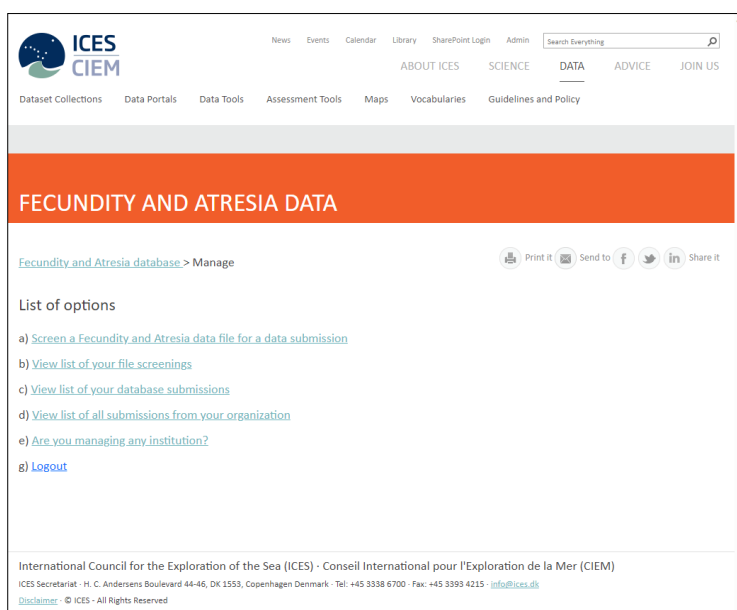


Figure 1: Inventory for screening and submitting data.

According to the sampling protocol, after removing ovaries from the fish, both whole mount and sectioned ovary samples are screened for spawning markers and/or early atresia. Information on the development stages of oocytes, the presence of the hydration stage in oocytes, the presence of Post Ovulatory Follicles (POFs) and estimated Spawning and Atresia markers is collected. According to the most advanced oocyte stage, it is decided whether the ovary sample will be used for fecundity, batch fecundity and/or atresia estimation, and the samples

are flagged accordingly. Thus, data submitted to the Fecundity and Atresia database through the website (Fig. 1) in xml or csv files, are organised in the following records: a) Cruise Information, b) Haul Information, c) Fish Measurement, c) Whole mount screening data, d) Histology screening data and, if applicable, e) Fecundity data, f) Batch Fecundity data and g) Atresia data<sup>2</sup>. During submission, the data undergoes quality checks to ensure file integrity, format compliance, and overall quality control. These quality control checks are constantly improving, and the data manager can insert new quality control measures as needed. The database underwent testing in October 2023 and is scheduled to open for submission on the 1st of January 2024.

## Data policy and data Extraction – Visualization

Users will be able to download data using the inventory and will have the option to filter the data by Ecoregion, Country, Year, Species or Survey (Fig. 2). Data will be delivered in csv format, with a separate csv file for each one of the records. Once the database is launched and data is uploaded, users will be able to spatially visualize different parameters of the data, such as maturity stage of fish. The data will be available under a CC BY 4.0 license, and in accordance with the ICES data policy.<sup>3</sup>

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### FECUNDITY AND ATRESIA DATA

Fecundity and Atresia database > Download Data

Inventory of the fecundity and atresia database - here you can filter data to download

Ecoregion: Select Ecoregion Country: Select Country Year: Select Year

Species: Select Species Survey: Select Survey

Apply criteria Reset criteria Download data

There are 3 survey(s) that match your criteria

Year	Survey Name	Country	Responsible Organization	No Hauls	No Fish Measurements	No Atresia Records	No Fecundity Data Records	No Whole Mount Screening Records	No Histology Screening Records
2022	14189	NETHERLANDS	Wageningen Marine Research, IJmuiden (WMRI)	88	74	23	53	0	88
2020	14189	NETHERLANDS	Wageningen Marine Research, IJmuiden (WMRI)	88	74	23	53	0	88
2020	14189	Denmark	DTU Aqua, National Institute of Aquatic Resources, Technical University of Denmark	88	74	23	53	0	88

International Council for the Exploration of the Sea (ICES) · Conseil International pour l'Exploration de la Mer (CIEM)  
 ICES Secretariat · H. C. Andersens Boulevard 44-46, DK 1553, Copenhagen Denmark · Tel: +45 3338 6700 · Fax: +45 3393 4215 · [info@ices.dk](mailto:info@ices.dk)  
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Figure 2: Inventory for downloading data from the fecundity and Atresia database ([ICES - Fecundity And Atresia Data](#))

## Conclusion

The goal of the Fecundity and Atresia database is to provide a common platform for experts of the wider scientific community to share and access data according to the FAIR data principles.<sup>4</sup> It is expected to constitute a useful tool in assessing temporal and spatial shifts in fecundity and spawning of major fish stocks, thus contributing to their understanding and sustainable management. Data from fish surveys, such as the mackerel, horse mackerel, sardine and anchovy egg surveys, are expected to populate the database, enabling the expert group to later calibrate, and analyze the data. In summary, this paper outlines a comprehensive approach to collecting, storing, and managing fecundity data.

## Links

<sup>1</sup>SISP 5 - Manual for the AEPM and DEPM estimation of fecundity in mackerel and horse mackerel (figshare.com)

<sup>2</sup> <https://datsu.ices.dk/web/selRep.aspx?Dataset=157>

<sup>3</sup> <https://www.ices.dk/data/guidelines-and-policy/Pages/ICES-data-policy.aspx>

<sup>4</sup>FAIR Principles - GO FAIR (go-fair.org)