Sampling scheme identifier: **Sardine, Anchovy Horse Mackerel Acoustic Survey - SAHMAS**

MS: **PRT**
Region: North-East Atlantic
Sampling scheme identifier: SAHMAS
Sampling scheme type: Research survey at sea
Observation type: SciObsAtSea
Time period of validity: 2025-2027
Short description (max 100 words): The spring acoustic survey SAHMAS includes the PELAGO survey carried by Portugal, the PELACUS survey carried out by Spain and the PELGAS survey carried out by France. The main objective of the PELAGO survey carried out by Portugal is the monitoring of the abundance distribution through echo-integration and the study of several biological parameters of small pelagic species. This survey provides abundance at age estimates for the stock assessment of sardine and anchovy. Main target species: sardine - *Sardina pilchardus* and anchovy - *Engraulis encrasicolus*. Secondary target species: Horse mackerel, Atlantic chub mackerel, mackerel, Mediterranean horse mackerel, blue jack mackerel, boarfish and bogue. Surveying also considers observations of fish eggs and larvae along the acoustic transects with a CUFES, and the physical, chemical and biological characterization of the pelagic ecosystem. Additionally, census of marine birds and mammals are conducted during the survey trajectory. Also, stomachs of selected species are collected and analysed, whereas tissue of one species is collected and stable isotope composition analysed. RWP (Regional Work Plan) of the RCG (Regional Coordination Group) of the NANSEA (North Atltanic, North Sea and Eastern Arctic) - 2025-2027 implementation years
Description of the population
Population targeted: Main target species: ANE and PIL Area: 27.9.a (south of the Portuguese northern border). Subareas 9aCN, 9aCS, 9aS. **Population sampled:** Small pelagic species. **Stratification:** N.
Sampling design and protocols
Sampling design description: See Text Box 2.6 and Table 2.6. See description in: ICES Survey Protocols – Manual for Acoustic Surveys Coordinated under ICES Working Group on Acoustic and Egg Surveys for Small Pelagic Fish (WGACEGG). https://doi.org/10.17895/ices.pub.7462

Is the sampling design compliant with the 4S principle?:
NA – Research survey at sea.

Regional coordination:
Coordinated internationally by ICES WGACEGG.
http://www.ices.dk/community/groups/Pages/WGACEGG.aspx

Link to sampling design documentation:
ICES Survey Protocols – Manual for Acoustic Surveys Coordinated under ICES Working Group on Acoustic and Egg Surveys for Small Pelagic Fish (WGACEGG).
https://doi.org/10.17895/ices.pub.7462

Design follows international recommendations:
Y.
ICES Survey Protocols – Manual for Acoustic Surveys Coordinated under ICES Working Group on Acoustic and Egg Surveys for Small Pelagic Fish (WGACEGG).
https://doi.org/10.17895/ices.pub.7462

Link to sampling protocol documentation:
ICES Survey Protocols – Manual for Acoustic Surveys Coordinated under ICES Working Group on Acoustic and Egg Surveys for Small Pelagic Fish (WGACEGG).
https://doi.org/10.17895/ices.pub.7462

Protocol follows international recommendations:
Y.
ICES Survey Protocols – Manual for Acoustic Surveys Coordinated under ICES Working Group on Acoustic and Egg Surveys for Small Pelagic Fish (WGACEGG).
https://doi.org/10.17895/ices.pub.7462

Sampling implementation

Recording of refusal rate:
NA - Research surveys at sea.

Monitoring of sampling progress within the sampling year:
NA - Research surveys at sea.

Data capture

Means of data capture:
Simrad EK80 – frequencies 18, 38, 70, 120 and 200 KHz. Data storage and post-processing software: Movies+Ecoview. Pelagic trawl. CUFES, continuous underway fish egg sampler, plus coupled temperature, salinity and fluorescence sensors. CTD and Bongo nets.

Data capture documentation:
ICES Survey Protocols – Manual for Acoustic Surveys Coordinated under ICES Working Group on Acoustic and Egg Surveys for Small Pelagic Fish (WGACEGG).
https://doi.org/10.17895/ices.pub.7462

Quality checks documentation:
ICES Survey Protocols – Manual for Acoustic Surveys Coordinated under ICES Working Group on Acoustic and Egg Surveys for Small Pelagic Fish (WGACEGG).
https://doi.org/10.17895/ices.pub.7462

Data storage

National database:

National database.

International database:
NA.

Quality checks and data validation documentation:
Quality check is performed along the process of recording in the database with a second reviewer. Final check is performed with a R-script for outliers checking.

Sample storage

Storage description:
Otoliths and plankton stored at IPMA storage facilities, otoliths stored dry or in resin and kept after processing, CUFES plankton samples stored in formalin and processed in 9 months.

Sample analysis:
See "sample description".

Data processing

Evaluation of data accuracy (bias and precision):
ICES Survey Protocols – Manual for Acoustic Surveys Coordinated under ICES Working Group on Acoustic and Egg Surveys for Small Pelagic Fish (WGACEGG).
https://doi.org/10.17895/ices.pub.7462

Editing and imputation methods:
ICES Survey Protocols – Manual for Acoustic Surveys Coordinated under ICES Working Group on Acoustic and Egg Surveys for Small Pelagic Fish (WGACEGG).
https://doi.org/10.17895/ices.pub.7462

Quality document associated to a dataset:
ICES Survey Protocols – Manual for Acoustic Surveys Coordinated under ICES Working Group on Acoustic and Egg Surveys for Small Pelagic Fish (WGACEGG).
https://doi.org/10.17895/ices.pub.7462

Validation of the final dataset:
Data are cross-checked, theoretical length-weight relationships applied outliers are evaluated.