

WORKING GROUP ON SOUTHERN HORSE MACKEREL, ANCHOVY AND SARDINE (WGHANSA)

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WORKING GROUP ON SOUTHERN HORSE MACKEREL, ANCHOVY AND SARDINE (WGHANSA)

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i Executive summary

The ICES Working Group on Southern horse mackerel, anchovy and sardine (WGHANSA) assessed the status of anchovy in Atlantic Iberian waters (ane.27.9a; western and southern components) and horse mackerel in Atlantic Iberian waters (hom.27.9a) in the May meeting. The status of anchovy in Bay of Biscay (ane.27.8), sardine in southern Celtic Seas and the English Channel (pil.27.7), sardine in Bay of Biscay (pil.27.8abd), sardine in Cantabrian Sea and Atlantic Iberian waters (pil.27.8c9a) and jack mackerel in Subdivision 10.a.2 (Azores grounds) (jaa.27.10a2) was assessed in the November meeting.

The stock of **anchovy in Bay of Biscay** (ane.27.8) has been above B_{lim} since the reopening of the fishery in 2010. SSB in 2022 has been estimated as the third highest of the historical series. Recruitment (age 1 biomass at the beginning of the year) in 2023 is estimated above the average of the time-series. Harvest rates (catch/SSB) have been stable in the last years.

The stock of **anchovy in Atlantic Iberian waters** (ane.27.9a) is composed by the western component (distributed in areas 9.a North, Central–North, and Central–South) and the southern component (distributed in area 9.a South). The advice is provided for the two components separately for the management calendar from July to June next year. For the western component, the index ratio (1-over-2 rule) based on the PELACUS and PELAGO surveys shows an 83% increase of the stock in 2022 compared with the mean of the two previous years, and the 80% uncertainty cap is applied. For the southern component, the relative SSB from an analytical assessment conducted with GADGET is used as the index of stock size development. The index ratio (1-over-2 rule) indicates that the relative SSB in 2022 is 71% lower than in the two previous years. Given that in 2022 the stock component size is below B_{lim} , a biomass safeguard has been considered.

In the last years **sardine in the Bay of Biscay** (pil.27.8abd) shows a decreasing trend in SSB. In 2022 spawning-stock biomass is estimated below $MSY B_{trigger}$, B_{pa} and above B_{lim} . Since 2013 the fishing mortality has been oscillating above F_{MSY} and F_{pa} , and below F_{lim} .

The advice for **sardine in southern Celtic Seas and the English Channel** (pil.27.7) is based on the PELTIC survey biomass index in the total area. Due to technical reasons, this year the coverage of the survey was incomplete and an estimate of the biomass in the total area was obtained by raising the estimate from the area covered in 2022 to the total area based on historical proportions. The index ratio indicates an increase of 20% in 2022 compared with the two previous years.

The biomass (age 1+) of **sardine in Atlantic Iberian waters** (pil.27.8c9a) in 2022 is estimated to be above $MSY B_{trigger}$, B_{pa} and B_{lim} for the third consecutive year. Fishing mortality in 2021 is slightly above F_{MSY} but is among the lowest of the time-series. ICES advice is based on the ICES MSY advice rule. However, the catch options explored for 2023 include several harvest control rules that were assessed by ICES as precautionary.

The SSB of **horse mackerel in Atlantic Iberian waters** (hom.27.9a) fluctuated from 1992 (the beginning of the assessment) to 2013 and afterwards has increased continuously to historical maximum values in 2022. In 2022 SSB is estimated at 1 155 488 tonnes, well above $MSY B_{trigger}$, B_{pa} , and B_{lim} . Fishing mortality has been below F_{MSY} over the whole time-series, with a decreasing trend in the last years. Since 2018, recruitment is considered very uncertain due to the lack of the survey index in 2019 and 2020.

The **jack mackerel in Subdivision 10.a.2 (Azores grounds)** (jaa.10.a2) is classified in category 5 and advice is provided biannually. The stock and exploitation status relative to MSY and precautionary approach (PA) reference points cannot be assessed. Given that there is no ancillary

information clearly indicating that the current level of exploitation is appropriate for the stock, the 20% precautionary buffer was applied to provide advice for 2023 and 2024.

ii Expert group information

Expert group name	Working Group on Southern Horse Mackerel Anchovy and Sardine (WGHANSA)
Expert group cycle	Annual
Year cycle started	2022
Reporting year in cycle	1/1
Chair	Leire Ibaibarriaga, Spain
Meeting venues and dates	23–27 May 2022, Online meeting (14 participants)
	21–25 November 2022, Lisbon (19 participants)



1 Introduction

1.1 Terms of reference

2021/2/FRSG14 The Working Group on Southern Horse Mackerel Anchovy and Sardine (WGHANSA), chaired by Leire Ibaibarriaga, Spain, will meet by correspondence **23–27 May 2022** (WGHANSA1) and in Lisbon (if COVID-19 allows, otherwise online), on 21–25 November 2022 (WGHANSA2) to:

- a) Address generic ToRs for Regional and Species Working Groups for relevant stocks (hom.27.9a and ane.27.9a in WGHANSA1 and pil.27.7, pil.27.8abd, pil.27.8c9a, ane.27.8 and jaa.27.10a2 in WGHANSA2);

The assessments will be carried out on the basis of the Stock Annexes. The assessments must be available for audit on the first day of the meeting.

Material and data relevant to the meeting must be available to the group on the dates specified in the 2022 ICES data call.

WGHANSA1 will report by 30 May 2022 and WGHANSA2 will report by 2 December 2022 for the attention of ACOM.

According to the generic ToRs, the working group should focus on:

- a) Consider and comment on Ecosystem and Fisheries overviews where available;
- b) For the aim of providing input for the Fisheries Overviews, consider and comment on the following for the fisheries relevant to the working group:
 - i) descriptions of ecosystem impacts on fisheries
 - ii) descriptions of developments and recent changes to the fisheries
 - iii) mixed fisheries considerations, and
 - iv) emerging issues of relevance for management of the fisheries;
- c) Conduct an assessment on the stock(s) to be addressed in 2022 using the method (assessment, forecast or trends indicators) as described in the stock annex; - complete and document an audit of the calculations and results; and produce a **brief** report of the work carried out regarding the stock, providing summaries of the following where relevant:
 - i) Input data and examination of data quality; in the event of missing or inconsistent survey or catch information refer to the ACOM document for dealing with COVID-19 pandemic disruption and the linked template that formulates how deviations from the stock annex are to be [reported](#).
 - ii) Where misreporting of catches is significant, provide qualitative and where possible quantitative information and describe the methods used to obtain the information;
 - iii) For relevant stocks (i.e., all stocks with catches in the NEAFC Regulatory Area), estimate the percentage of the total catch that has been taken in the NEAFC Regulatory Area in 2021.

- iv) For category 3 and 4 stocks requiring new advice in 2022, implement the methods recommended by WKLIFE X (e.g. SPiCT, rfb, chr, rb rules) to replace the former 2 over 3 advice rule (2 over 5 for elasmobranchs). MSY reference points or proxies for the category 3 and 4 stocks
- v) Evaluate spawning-stock biomass, total-stock biomass, fishing mortality, catches (projected landings and discards) using the method described in the stock annex;
 - 1) for category 1 and 2 stocks, in addition to the other relevant model diagnostics, the recommendations and decision tree formulated by WKFORBIAS (see Annex 2 of https://www.ices.dk/sites/pub/Publication%20Reports/Expert%20Group%20Report/Fisheries%20Resources%20Steering%20Group/2020/WKFORBIAS_2019.pdf) should be considered as guidance to determine whether an assessment remains sufficiently robust for providing advice.
 - 2) If the assessment is deemed no longer suitable as basis for advice, consider whether it is possible and feasible to resolve the issue through an interbenchmark. If this is not possible, consider providing advice using an appropriate Category 2 to 5 approach;
- vi) The state of the stocks against relevant reference points;

Consistent with ACOM's 2020 decision, the basis for Fp.05.

 - 1) 1. Where Fp.05 for the current set of reference points is reported in the relevant benchmark report, replace the value and basis of Fp.05 with the information relevant to Fp.05
 - 2) 2. Where Fp.05 for the current set of reference points is not reported in the relevant benchmark report, compute the Fp.05 that is consistent with the current set of reference points and use as Fp.05. A review/audit of the computations will be organized.
 - 3) 3. Where Fp.05 for the current set of reference points is not reported and cannot be computed, retain the existing basis for Fp.05.
- vii) Catch scenarios for the year(s) beyond the terminal year of the data for the stocks for which ICES has been requested to provide advice on fishing opportunities;
- viii) Historical and analytical performance of the assessment and catch options with a succinct description of associated quality issues. For the analytical performance of category 1 and 2 age-structured assessments, report the mean Mohn's rho (assessment retrospective bias analysis) values for time-series of recruitment, spawning-stock biomass, and fishing mortality rate. The WG report should include a plot of this retrospective analysis. The values should be calculated in accordance with the "Guidance for completing ToR viii) of the Generic ToRs for Regional and Species Working Groups - Retrospective bias in assessment" and reported using the ICES application for this purpose.
- d) Produce a first draft of the advice on the stocks under considerations according to ACOM guidelines.
 - i. In the section 'Basis for the assessment' under input data match the survey names with the relevant "SurveyCode" listed ICES [survey naming convention](#) (restricted access) and add the "SurveyCode" to the advice sheet.

- e) Review progress on benchmark issues and processes of relevance to the Expert Group.
 - i) update the benchmark issues lists for the individual stocks in SID;
 - ii) review progress on benchmark issues and identify potential benchmarks to be initiated in 2023 for conclusion in 2024;
 - iii) determine the prioritization score for benchmarks proposed for 2023–2024;
 - iv) as necessary, document generic issues to be addressed by the Benchmark Oversight Group (BOG)
- f) Prepare the data calls for the next year's update assessment and for planned data evaluation workshops;
- g) Identify research needs of relevance to the work of the Expert Group.
- h) Review and update information regarding operational issues and research priorities on the Fisheries Resources Steering Group SharePoint site.
- i) If not completed in 2020, complete the audit spread sheet 'Monitor and alert for changes in ecosystem/fisheries productivity' for the new assessments and data used for the stocks. Also note in the benchmark report how productivity, species interactions, habitat and distributional changes, including those related to climate-change, could be considered in the advice.

Information of the stocks to be considered by each Expert Group is available [here](#).

1.1.1 The WG work in relation to the ToRs

The generic ToRs for Regional and Species Working Groups were addressed for anchovy in Division 9.a (ane.27.9a) and horse mackerel in Division 9.a (hom.27.9a) in WGHANSA1 and for anchovy in Subarea 8 (ane.27.8), sardine in divisions 8a-b and 8d (pil.27.8abd), sardine in Subarea 7 (pil.27.7), sardine in divisions 8c and 9a (pil.27.8c9a) and jack mackerel in Subdivision 10.a.2 (jaa.27.10a2) in WGHANSA2. The assessments were carried out on the basis of the stock annexes prior to and during the meeting and coordinated as indicated in the table below. The assessments were audited during the meetings (Annex 4). WGHANSA1 and WGHANSA2 reported by 31 May 2022 and 2 December 2022 respectively for the attention of ACOM.

Stock	Stock code	Stock coordinator 1	Stock coordinator 2	Advice to be provided in 2022	Periodicity in years	Time period in the year for releasing the advice	Category	Advice basis	Notes
Anchovy (<i>Engraulis encrasicolus</i>) in Division 9.a (Atlantic Iberian waters)	ane.27.9a	Fernando Ramos	Susana Garrido	Yes	1	June	3 (south component); 3 (western component)	PA, in-year advice	Benchmarked in 2018. Two stock components, western and southern, assessed separately. Advice for period 1 July –30 June.
Horse mackerel (<i>Trachurus trachurus</i>) in Division 9.a (Atlantic Iberian waters)	hom.27.9a	Gersom Costas	Hugo Mendes	Yes	1	June	1	MSY	Benchmarked in 2017. There is a long-term management strategy, agreed between all parties, evaluated to be precautionary by ICES in 2018 and updated in 2021. For 2023, EU Commission requested ICES to provide advice based on the MSY approach.
Anchovy (<i>Engraulis encrasicolus</i>) in Subarea 8 (Bay of Biscay)	ane.27.8	Leire Citores	Leire Ibaibarriaga	Yes	1	December	1	Management plan	Benchmarked in 2013. New benchmark approved.
Sardine (<i>Sardina pilchardus</i>) in Subarea 7 (Southern Celtic Seas, and the English Channel)	pil.27.7	Joseph Ribeiro	Erwan Duhamel	Yes	1	December	3	PA	Benchmarked in 2021. Stock upgraded from category 5 to category 3. Advice can now be provided annually.

Stock	Stock code	Stock coordinator 1	Stock coordinator 2	Advice to be provided in 2022	Periodicity in years	Time period in the year for releasing the advice	Category	Advice basis	Notes
Sardine (<i>Sardina pilchardus</i>) in divisions 8.a–b and 8.d (Bay of Biscay)	pil.27.8abd	Lionel Pawlowski	Andres Uriarte	Yes	1	December	1	MSY	Inter-benchmarked in 2019.
Sardine (<i>Sardina pilchardus</i>) in divisions 8.c and 9.a (Cantabrian Sea and Atlantic Iberian waters)	pil.27.8c9a	Isabel Riveiro	Laura Wise	Yes	1	December	1	MSY	Benchmarked in 2017 and Inter-benchmarked in 2021; reference points changed in 2019 and 2021, in the context of the evaluation of a management and recovery plan. In 2021 ICES received a request from Portugal and Spain EU members to evaluate a harvest control rule (HCR) that will be part of a management plan for 2021–2026. ICES found that the generic HCR was precautionary with maximum allowed catches between 30 000 and 50 000 tonnes. For 2023, the EU Commission requested ICES to provide advice based on the MSY approach. The precautionary generic HCR should be included in the catch scenario table.
Jack mackerel (<i>Trachurus pictoratus</i>) in Subdivision 10.a.2 (Azores grounds)	jaa.27.10a2	Dália Reis		Yes	2	December	5	PA	

1.2 Report structure

Ad hoc and generic ToRs relative to the stocks for which assessment is required are dealt stock by stock in respective chapters of the report: anchovy in Subarea 8 (Section 3), anchovy in Division 9.a (Section 4), sardine in divisions 8.a-b and 8.d (Section 6), sardine in Subarea 7 (section 7), sardine in divisions 8.c and 9.a (Section 8), horse mackerel in Division 9.a (Section 9) and jack mackerel in Subdivision 10.a.2 (Section 10). Ongoing work to improve the management advice for anchovy in Division 9.a is summarised in section 1.10.

The list of participants, the working documents presented, the stock annexes, the audits and a summary of the joint WGACEGG-WGHANSA session conducted on 23rd and 25th May are provided as annexes.

1.3 Conduct of the meeting

WGHANSA1 took place by correspondence from 23 to 27 May 2022. WGHANSA2 took place in Lisbon (Portugal) from 21 to 25 November 2022.

1.3.1 List of participants

The full lists of participants to WGHANSA1 and WGHANSA2 are given in Annex 1. All the participants abided with the ICES code of conduct, and none had conflicts of interest that prevented them acting with scientific independence, integrity and impartiality.

1.3.2 Timing of the meeting

WGHANSA continues to have two meetings per year: in June, by correspondence, to address generic ToRs for the stocks of anchovy in 9.a and horse mackerel in 9.a and, in November, in a physical meeting, for the remaining stocks. The participants recognise that two meetings per year (one of them by correspondence) is not an ideal situation and admit that the duration of the June meeting could be shorten. However, this year, the five days duration of WGHANSA1 allowed to cope with a delay in the acoustic survey results that are used as input for the assessment of anchovy in 9.a. So, overall WGHANSA considers that the timing and duration of the meetings are adequate.

1.3.3 Interactions with other expert groups

The Working Group on Acoustic and Egg Surveys for small pelagic fish in Northeast Atlantic (WGACEGG) is the main working group interacting with WGHANSA. Both working groups continue improving their interaction by creating dedicated time slots during their own meetings. On the first and third days of WGHANSA1, there was a joint session between the two groups where the results of the PELAGO and PELACUS spring surveys were presented and discussed (see Annex 5). Similarly, on the first day of WGACEGG there was a joint session between the two working groups where the results of the surveys were presented and discussed. Beyond improving communication and promoting joint discussions, these joint sessions allowed to have the acceptance of WGACEGG on the survey results before their inclusion in the stock assessment.

During WGHANSA1, the ICES secretariat presented the status of the Regional Database and Estimation System (RDBES). According to the workplan, in 2023 the RDBES and InterCatch will

be used in parallel and from 2024 onwards only RDBES will be used. Therefore, all stock coordinators were encouraged to participate in the workshops about RDBES that will be carried out along the year.

Based on past interactions with WKCOLIAS (Workshop on Atlantic chub mackerel (*Scomber colias*)), this year WGHANSA was contacted by the Horizon 2020 EuroSea project (<https://eu-rosea.eu/>) to present the work on Atlantic chub mackerel they are conducting within the task “Connecting CMEMS and fishery communities to increase uptake, and inform development of products for fishery management”. The work entitled “Assessing the impact of external environmental drivers on Atlantic Chub Mackerel (*Scomber colias*) population dynamics” was presented on the first day of WGHANSA1 (Annex 2).

Stock identity and sub-stock structure of anchovy in division 9.a continues to be one of the major concerns of WGHANSA. This year WGHANSA compiled all the available information about the stock identity of anchovy in division 9.a (surveys, catches, life-traits, morphometrics, genetics, etc.). The summary of the available genetic studies was conducted by the Working Group on Application of Genetics in Fisheries and Aquaculture (WGAGFA). The resulting working document was presented and discussed in WGHANSA (see Annex 2) and was submitted to the Stock Identification Methods Working Group (SIMWG) for consideration. SIMWG2022 concluded that genetic studies up to now provide conflicting results due to the confounding between two ecotypes and two mitochondrial lineages and suggested these differences should be considered in future sampling programs and analyses. However, no further consideration was given to the rest information provided.

1.4 Quality of the fisheries data

The differences between the WG estimates and official data in 2021 were minimal, and as is the usual procedure, estimates of the working group were used to perform the assessment in all cases.

1.5 Overview of sampling activities

The 2021 sampling summary by stocks on national basis is the following:

Anchovy 9a

Country	Official Catch	% of catch sampled	No. samples	No. measured	No. Aged
Spain	8120	100%	19	2259	5699
Portugal	9638	100%	28	2331	2331
Total	17758	100%	47	4590	8030

Horse Mackerel 9a

Country	Official Catch	% of catch sampled	No. samples	No. measured	No. Aged
Portugal	14627	100%	215	2228	386
Spain	10094	94%	178	12474	868
Total	24721	97%	393	14702	1254

Anchovy 8

Country	Official Catch	% of catch sampled	No. samples	No. measured	No. Aged
Spain	27918	100%	215	24354	2233
France	64	0%	0	0	1886
Total	72982	100%	215	24354	2233

Sardine 8abd

Country	Official Catch	% of catch sampled	No. samples	No. measured	No. Aged
France	20370	100%	31	1869	1794
Spain	5828	100%	202	25328	992
Total	26198	100%	233	27197	2786

Sardine 8c9a

Country	Official Catch	% of catch sampled	No. samples	No. measured	No. Aged
Portugal	26851	100%	119	11417	1720
Spain	13834	100%	112	11678	3828
Total	40685	100%	231	23095	5548

Blue jack mackerel in 10.a2

Country	Official Catch ¹	% of catch sampled ²	No. samples ³	No. measured ⁴	No. Aged ⁵
Portugal	889	8%	419	20747	23
Total					

¹ In Tonnes. 889 = 754 from artisanal Purse-seiners (includes landings for human consumption [609], and excedent landings [withdrawn] used for bait [145];

² % of catch sampled was calculated just for the PS fleet (85% of the total landings - weight) in terms of the number of trips. In this case, we have 246 fishing trips sampled (219 at market and 27 at sea) of 3075 fishing trips - 8 %. As LL+HL is a multispecific fishery, I don't have a way to do it quickly, and it represents only 15% of the official landings (weight). I know I'm mixing things here, but I don't see another way to find this percentage – In DCF, we use the number of fishing trips!

³ Market and onboard samples: 419 samples (330 market: 214 PS + 116 HOK; 89 onboard: 27 PS + 62 HOK)

⁴ Length - Market and onboard samples: 20747 individuals measured (16123 market: 12515 PS + 3608 HOK; 4624 onboard: 2935 PS + 1689 HOK);

⁵ Age/Length/Weight/Sex ratio/Sexual maturity - Commercial samples: 23 individuals measured / 1 sample

Comment for undersampling in Azores: One laboratory facility was requested and transformed into nucleic acid detection (PCR amplification) of SARS-CoV 2, reduction of staff technicians and scarce landings at the port with laboratory, and bad weather conditions led to a decrease in the number of individuals available for commercial samples.

1.6 Benchmarks and interbenchmarks

The WG updated the benchmark issues lists for the individual stocks, reviewed the progress conducted and identified potential benchmarks to be initiated in 2023 (Table 1.6.1). The WG proposed to initiate a benchmark in 2023 for anchovy in division 9.a and for horse-mackerel in division 9.a. For both stocks the scoring sheet was completed for consideration of the Benchmark Oversight Group (BOG). The benchmark proposed for anchovy in Subarea 8 for 2022-2023 was accepted by BOG but has not been settled on yet. Therefore, WG notes that the benchmarks for the two anchovy stocks could be considered together.

Table 1.6.1 History of benchmarks and proposals by WGHANSA.

Stock	Stock code	History of Benchmarks	WGHANSA 2022 Proposal 2023-2024
Anchovy (<i>Engraulis encrasicolus</i>) in Division 9.a (Atlantic Iberian waters)	ane.27.9a	Full Benchmark 2018	Benchmark proposed for 2023-2024
Horse mackerel (<i>Trachurus trachurus</i>) in Division 9.a (Atlantic Iberian waters)	hom.27.9a	Full benchmark 2011 Full benchmark 2017	Benchmark proposed for 2023-2024
Anchovy (<i>Engraulis encrasicolus</i>) in Subarea 8 (Bay of Biscay)	ane.27.8	Full benchmark 2013	Benchmark proposed for 2022-2023 and accepted by BOG. It has not been settled on yet, so delayed for 2023-2024.
Sardine (<i>Sardina pilchardus</i>) in Subarea 7 (Southern Celtic Seas, and the English Channel)	pil.27.7	Full benchmark 2013 Full benchmark 2017 Full benchmark 2021	-
Sardine (<i>Sardina pilchardus</i>) in divisions 8.a–b and 8.d (Bay of Biscay)	pil.27.8abd	Full benchmark 2013 Full benchmark 2017 Inter-benchmark 2019	Benchmark to be proposed for 2024-2025
Sardine (<i>Sardina pilchardus</i>) in divisions 8.c and 9.a (Cantabrian Sea and Atlantic Iberian waters)	pil.27.8c9a	Full benchmark 2013 Full benchmark 2017 Reference points updated in 2021 Inter-benchmark 2021	-
Jack mackerel (<i>Trachurus pictoratus</i>) in Subdivision 10.a.2 (Azores grounds)	jaa.27.10a2	-	-

1.7 Mohn's rho

Mohn's rho values for Category 1 and 2 stocks have been uploaded at <https://community.ices.dk/ExpertGroups/Lists/Retrobias/overview.aspx> and they are summarised in Table 1.7.1. Further details and corresponding plots are provided in the respective chapters of the report.

Table 1.7.1. Mohn's rho values calculated by WGHANSA for Category 1 and 2 stocks.

Stock	Stock code	Terminal year of catch data	Number of retrospective assessments used	F_{bar} rho value	SSB rho: was the intermediate year used as the terminal year?	SSB rho value	R rho: was the intermediate year used as the terminal year?	R rho value
Horse mackerel (<i>Trachurus trachurus</i>) in Division 9.a (Atlantic Iberian waters)	hom.27.9a	2021	5	0.153	No	0.062	No	-0.079
Anchovy (<i>Engraulis encrasicolus</i>) in Sub-area 8 (Bay of Biscay)	ane.27.8	2022	5	-0.146*	Yes	0.177	Yes	-0.295
Sardine (<i>Sardina pilchardus</i>) in divisions 8.a–b and 8.d (Bay of Biscay)	pil.27.8abd	2021	5	-0.301	No	0.42	No	0.08
Sardine (<i>Sardina pilchardus</i>) in divisions 8.c and 9.a (Cantabrian Sea and Atlantic Iberian waters)	pil.27.8c9a	2021	5	0.350	Yes	-0.333	Yes	-0.139

*Corresponds to the harvest rate Mohn's rho.

1.8 Transparent assessment framework (TAF)

The Transparent Assessment Framework (TAF) is an online open resource of ICES stock assessments for each assessment year. All data input and output are fully traceable and versioned using a sequence of R scripts. This allows anyone to easily find, reference, download, and run the assessment.

In 2022, WGHANSA continued making progress towards implementing the assessments into TAF, but the work is not finished yet. For anchovy in division 9.a different repositories were created for each of the stock components (western and southern). The western component was

fully implemented in TAF. The assessment of the southern component could not be implemented in TAF as it is conducted with GADGET and it is run in external high-computing facilities. However, once the model outcomes are available, the process to automatically generate the working document on the assessment of the western component of anchovy in 9.a was uploaded into TAF. The stocks of anchovy in Subarea 8, sardine in Subarea 7 and sardine in divisions 8.c and 9.a were fully implemented in TAF. Furthermore, some of the sections for anchovy in Subarea 8 was semi-automatically generated using markdown and some progress was made to automatically produce a draft of the advice sheet for sardine in Subarea 7. The WG will continue working inter-seasonally to finalise the implementation in TAF of the assessment of horse mackerel in division 9.a, sardine in divisions 8.a-b and 8.d and jack mackerel in Subdivision 10.a.2.

1.9 Ecosystem and Fisheries overviews

The audit spread sheet 'Monitor and alert for changes in ecosystem/fisheries productivity' has been completed for all the stocks.

No additional progress has been made on these ToRs.

1.10 Workplan for anchovy in division 9.a

In the last months special efforts are being devoted to improving the assessment and management advice of anchovy in division 9.a. Most recent advances were presented and discussed in WGHANSA1 (Annex 2):

- "Stock structure anchovy 27.9.a" by S. Garrido, N. Rodriguez-Ezpeleta, F. Ramos, M. Rincón, D. Feijó, A. Moreno, R. Castilho, N. Díaz, R.R. Da Fonseca, S.M. Francisco, A. Manuzzi, G. Silva, et al.
- "Current work towards the improvement of scientific advice" by S. Garrido, L. Wise and A. Silva.
- "Life history parameters on anchovy 9.a western component" by L. Wise, A. Silva, A. Uriarte and S. Garrido.
- "Reproductive characteristics of western component of anchovy in 9.a" by S. Garrido, A.M. Costa, C. Nunes, P. Pechirra, H. Mendes, D.S.R. Milhazes, A.V. Silva, C. Silva, L. Wise, A. Silva, et al.
- "Exploratory assessment of anchovy 9.a-west using a surplus production model" by A. Silva, L. Wise, F. Ramos, M. Rincón, S. Garrido, A. Uriarte and T. Mildenerberger.

The working group acknowledged all the work done and considered the results made so far very encouraging. To support further progress, WGHANSA agreed on the following two actions. On the one hand, WGHANSA will submit the working document on stock structure with the most updated information to SIMWG for their consideration (see also section 1.3.3). On the other hand, WGHANSA proposes to conduct a dedicated workshop in the first quarter of 2023 to evaluate by Management Strategy Evaluation the performance of constant harvest rate rules that could be used as an alternative to the current advice rule. The proposed draft Terms of Reference for such workshop are the following:

The Workshop on the Management Strategy Evaluation of constant harvest rates strategies for anchovy in Division 9a (WKANEMSE), will meet to:

- a) develop a Management Strategy Evaluation framework to test alternative advice rules for anchovy in Division 9a (Iberian Atlantic waters);

- b) identify constant harvest rate rules that could be appropriate to provide advice for this stock and compare them with respect to the current basis for advice (1-over-2 rule with 80% uncertainty cap and biomass safeguard).

1.11 Research needs

Beyond the specific issues identified for each stock, the WG identified the following topics of general interest for future research:

- For the stocks assessed using Stock Synthesis, explore the possibility of conducting the short-term forecast with Stock Synthesis.
- Evaluate the possibility of conducting stochastic short-term forecasts. This would allow to estimate the probability of SSB or F being below/above PA and MSY reference points.
- Continue exploring methods to provide management advice for short-lived stocks in Category 3. In particular, explore alternative methods for the initial catch for the first year of the 1-over-2 and test them within a management strategy evaluation (MSE) framework.
- For stocks for which a MSE framework is available, further investigate potential discrepancies between ICES MSY advice rule and alternative precautionary harvest control rules. Approaches to better communicate these alternative options to managers and stakeholders are needed.
- Further investigate the assessment bias found in the MSE frameworks developed for sardine in divisions 8.c and 9.a and sardine in divisions 8.a-b and 8.d and assess their impact when evaluating harvest control rules and when calculating reference points based on the MSE framework.
- The exact boundaries of some of the stocks assessed by WGHANSA are unclear and further studies are needed.
- Some of the stocks assessed by WGHANSA (e.g. anchovy in Subarea 8 and sardine in divisions 8.a-b and 8.d) have shown clear trends in recent years in some biological parameters such as weight-at-age and maturity-at-age. While the underlying reasons have to be further studied, the potential continuation in time of these patterns need to be monitored in following years.
- For stocks like anchovy in division 9.a for which advice is provided separately by components, compare the impact of management measures taken for the whole stock or by components.
- The transition to the Regional Database and Estimation System (RDBES) will require substantial work from regional and species working groups, beyond the usual terms of reference. This work will need to be planned and coordinated in the ICES community to ensure a smooth and efficient transition.