Horse mackerel (*Trachurus trachurus*) in Division 9.a (Atlantic Iberian waters)

ICES advice on fishing opportunities

ICES advises that when the MSY approach is applied, catches in 2021 should be no more than 128 627 tonnes.

Management of southern horse mackerel, blue jack mackerel, and Mediterranean horse mackerel under a combined TAC prevents effective control of the single-species exploitation rates and could lead to overexploitation of any of the mentioned species.

Note: This advice sheet is abbreviated due to the Covid-19 disruption. The previous advice issued for 2020 is attached as Annex 1.

Stock development over time

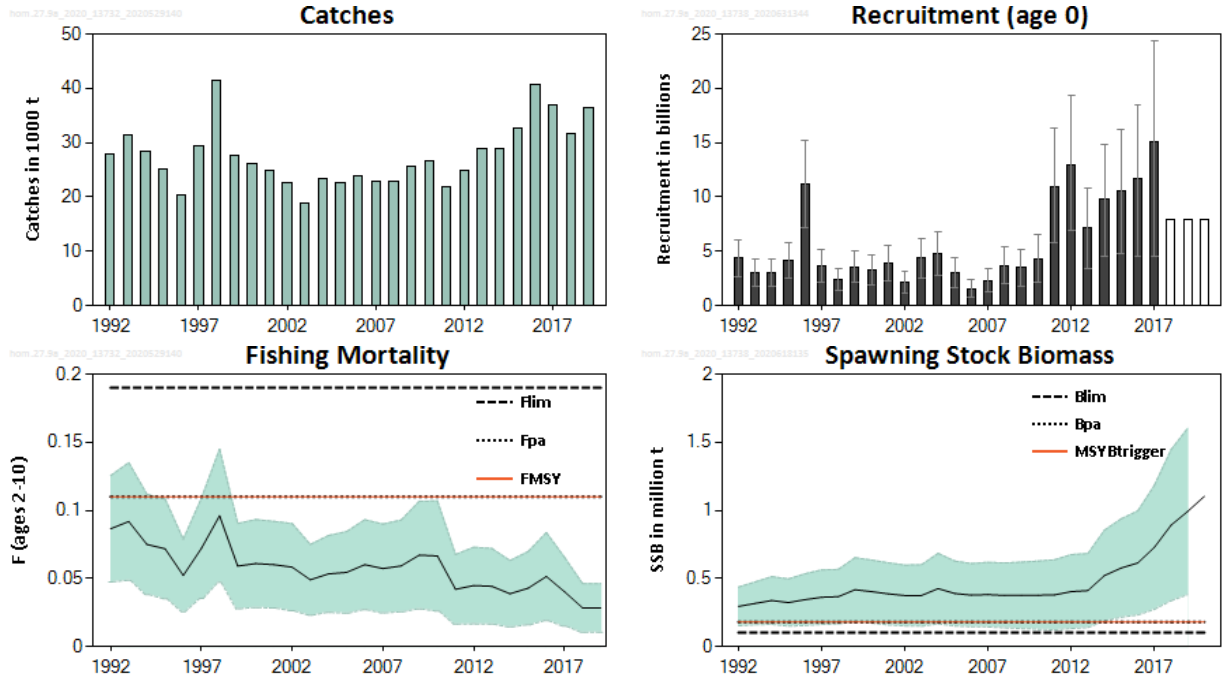

Figure 1 Horse mackerel (*Trachurus trachurus*) in Division 9.a. Summary of the stock assessment, with 95% confidence intervals displayed for recruitment (R), fishing mortality (F), and spawning–stock biomass (SSB). Unshaded recruitment is the geometric mean over 2008–2017.

Stock and exploitation status

Table 1 Horse mackerel (*Trachurus trachurus*) in Division 9.a. State of the stock and the fishery relative to reference points.

		Fishing pressure				Stock size			
		2017	2018	2019		2018	2019	2020	
Maximum sustainable yield	F_{MSY}	✓	✓	✓	Below	MSY $B_{trigger}$	✓	✓	✓ Above trigger
Precautionary approach	F_{pa},F_{lim}	✓	✓	✓	Harvested sustainably	B_{pa},B_{lim}	✓	✓	✓ Full reproductive capacity
Management plan	F_{MGT}	–	–	–	Not applicable	B_{MGT}	–	–	– Not applicable

Catch scenarios

Table 2 Horse mackerel (*Trachurus trachurus*) in Division 9.a. Assumptions made for the interim year and in the forecast.

Variable	Value	Notes
$F_{ages\ 2–10}$ (2020)	0.028	F_{2019}
SSB (2020)	1102627	Tonnes; deterministic short-term forecast
$R_{age\ 0}$ (2020–2021)	7957662	Thousands; 10-year geometric mean (2008–2017) reflecting recent years productivity.
Total catch (2020)	34080	Tonnes; catch corresponding to F_{2019} from a deterministic short-term forecast.
Landings (2020)	34080	Tonnes
Discards	0	Tonnes; negligible

Table 3 Horse mackerel (*Trachurus trachurus*) in Division 9.a. Annual catch scenarios. All weights are in tonnes (t).

Basis	Catches (2021)	F (2021)	SSB * (2021)	SSB *,# (2022)	% SSB change **	% Catch change ***	% Advice change ^
ICES advice basis							
MSY approach: F_{MSY}	128627	0.11	1185843	1156148	−3	+262	+10
Other scenarios							
F = 0	0	0	1190922	1287501	+8	−100	−100
$F = F_{2020}$	34080	0.028	1189558	1250868	+5	−4	−71
Management Plan ^^	55938	0.045	1188772	1229421	+3	+57	−52
$F = F_{2020} \times 1.2$	42787	0.034	1189286	1243669	+5	+20	−63
$F = F_{2020} \times 1.6$	56747	0.045	1188741	1229397	+3	+60	−51
$F = F_{2020} \times 2.0$	70559	0.057	1188196	1215291	+2	+99	−40
F_{pa}	128627	0.11	1185843	1156148	−3	+262	+10
$F_{p.05}$^^^	175909	0.15	1183847	1108191	−6	+395	+51
F_{lim}	222289	0.19	1181814	1061333	−10	+526	+90
SSB (2022) = B_{lim}	1263330	2.52	1075518	103000	−90	+3457	+981
SSB (2022) = B_{pa}	1160543	1.95	1100677	181000	−84	+3167	+893
SSB (2022) = MSY $B_{trigger}$	1160543	1.95	1100677	181000	−84	+3167	+893

*For this stock, the SSB is determined at spawning time (assumed to be mid-January) and is influenced by fisheries before spawning.
** SSB 2022 relative to SSB 2021.
*** Catches in 2021 relative to ICES estimates of catches in 2019 (35 520 tonnes) because only a fraction of the TAC is utilized.
^ Advised catches for 2021 relative to the advised catches for 2020 (116 871 tonnes).
^^ The proposed Management Plan where $F_{2021} = 0.045$ and $F_{2022} = 0.061$ corresponds to a linear increase from $F_{2020} = F_{sq}$ towards $F = F_{MSY}$ in 2025; SSB in 2022 is estimated assuming the F_{2022}.
^^^ $F_{P.05}$ is the maximum value of F applied when SSB > MSY $B_{trigger}$ and when that will result in SSB ≥ B_{lim} with a 95% probability.
# Assuming same catch scenario in 2022 as in 2021.

Quality of the assessment

In 2019 the survey was not carried out in the Portuguese area of Division 9.a. As that part of the survey covers 87% of the total stock area, the combined survey index could not be estimated. Due to this, the stock assessment was performed without the tuning index for 2019.

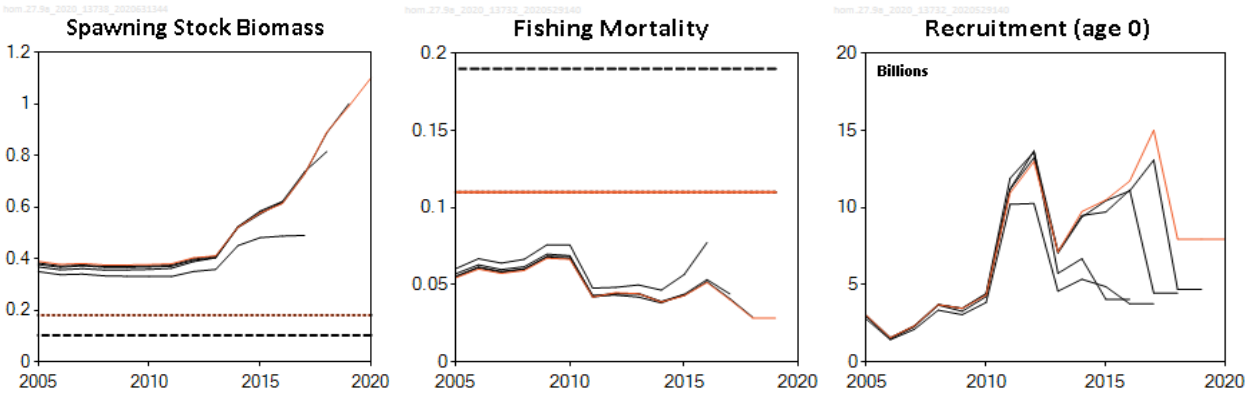

Figure 2 Horse mackerel (*Trachurus trachurus*) in Division 9.a. Historical assessment results. For each line in the recruitment plot, the last two values are assumed as the geometric mean of the available time-series. In the 2020 assessment, the last three values are the geometric mean of 2008–2017. Biomass in million tonnes. Horizontal lines refer to reference points shown in Figure 1.

Issues relevant for the advice

The advice pertains to *T. trachurus*, while the total allowable catch (TAC) is set for all *Trachurus* species, including *T. picturatus* (blue jack mackerel) and *T. mediterraneus* (Mediterranean horse mackerel). Part of the catches consist of other *Trachurus* spp. than *T. trachurus*, and this percentage can vary from year to year. Estimates indicate that in 2019, less than 10% of the catch consisted of *Trachurus* spp.other than *T. trachurus* (2377 tonnes). ICES considers that management of several species under a combined TAC prevents effective control of the single-species exploitation rates, and could lead to overexploitation of any of the species.

History of the advice, catch, and management

Table 4 Horse mackerel (*Trachurus trachurus*) in Division 9.a. ICES advice, agreed TAC, and official landings. All weights are in tonnes.

Year	ICES advice*	Catch corresponding to advice (*T. trachurus*)	Agreed TAC (*Trachurus* spp.)	ICES catches (*T. trachurus*) ^^^
1987	Not assessed	-	72500 **	55000 ^
1988	Mesh size increase	-	82000 **	56000 ^
1989	No increase in F; TAC	72500	73000 **	56000 ^
1990	F at $F_{0.1}$; TAC	38000	55000 ^	49000 ^
1991	Precautionary TAC	61000	73000 ^	22000
1992	If required, precautionary TAC	61000	73000 ^	27858
1993	No advice	-	73000 ^	31521
1994	*Status quo* prediction (Catch at *status quo* F)	55000	73000 ^	28441
1995	No long-term gains in increasing F (Catch at *status quo* F)	63000	73000 ^	25147
1996	No long-term gains in increasing F (Catch at *status quo* F)	60000	73000 ^	20400
1997	No advice	-	73000 ^	29491
1998	F should not exceed the F (94–96)	59000	73000 ^	41564
1999	No increase in F	58000	73000 ^	27733
2000	$F < F_{pa}$	< 59000	68000 ^	26160
2001	$F < F_{pa}$	< 54000	68000 ^	24910
2002	F < 0.113	< 34000	57500 ^	22506
2003	Average of last 3 years	< 49000	55200 ^	18887
2004	Should not exceed the recent average (2000–2002)	< 47000	55000 ^	23252
2005	Should not exceed the recent average (2000–2002)	< 25000	55000 ^	22695
2006	Should not exceed the recent average (2000–2004, excluding 2003)	< 25000	55000 ^	23902
2007	Same advice as last year	< 25000	55000 ^	22790
2008	Same advice as last year	< 25000	57800 ^	22993
2009	Same advice as last year	< 25000	57800 ^	25737
2010	Same advice as last year	< 25000	31100 ^^	26556
2011	Same advice as last year	< 25000	29585 ^^	21875
2012	No increase in F	< 30800	30800 ^^	24868
2013	No increase in F	< 26000	30000 ^^	28993
2014	MSY approach	< 35000	35000 ^^	29017
2015	MSY approach	< 71824	59500 ^^	32723
2016	MSY approach	≤ 68583	68583 ^^	40730
2017	MSY approach	≤ 73349	73349 ^^	36946
2018	MSY approach	≤ 55555	55555 ^^	31661
2019	MSY approach	≤ 94017	94017 ^^	35520
2020	MSY approach	≤ 116871	116871^^	
2021	MSY approach	≤ 128627		

* Advice referred to divisions 8.c and 9.a until 2010, and to Division 9.a since then due to a change in the stock definition.
** Division 8.c, subareas 9 and 10, and CECAF Division 34.1.1 (EU waters only).
^ Division 8.c and Subarea 9.
^^ Subarea 9.
^^^ Not including Spanish catches in 9.a South-Cadiz, considered to be less than 2% of the total catches in recent years.

Summary of the assessment

Table 5 Horse mackerel (*Trachurus trachurus*) in Division 9.a. Assessment summary. High and low refer to 95% confidence intervals.

Year	Recruitment			Spawning-stock biomass			Catches	Fishing mortality		
	R (age 0)	High	Low	SSB**	High**	Low**		F (ages 2–10)	High	Low
	thousands			tonnes			tonnes			
1992	4386350	6084451	2685676	295376	437363	153390	27858	0.087	0.126	0.048
1993	3071000	4324647	1815466	317063	474573	159552	31521	0.092	0.135	0.049
1994	3030910	4280679	1779793	338414	513551	163278	28441	0.075	0.112	0.038
1995	4152710	5815278	2488448	323479	496715	150242	25147	0.072	0.108	0.035
1996	11171200	15226107	7115466	344567	534621	154513	20400	0.052	0.079	0.026
1997	3675310	5140775	2209193	362576	563124	162028	29491	0.072	0.109	0.035
1998	2356190	3362184	1350384	366600	566905	166294	41564	0.096	0.145	0.047
1999	3591840	5051332	2133561	417440	652522	182358	27733	0.059	0.090	0.028
2000	3275730	4643091	1909336	403472	635090	171853	26160	0.061	0.093	0.029
2001	3872940	5480765	2266144	387355	615167	159542	24910	0.060	0.092	0.028
2002	2191290	3182131	1201098	374790	598489	151091	22506	0.058	0.090	0.026
2003	4347940	6179364	2519435	375185	601198	149172	18887	0.049	0.075	0.023
2004	4793460	6813005	2778355	425933	684659	167208	23252	0.053	0.082	0.025
2005	3015470	4355567	1678724	389795	628063	151527	22695	0.055	0.084	0.025
2006	1573420	2350864	799628	377885	609665	146106	23902	0.060	0.093	0.027
2007	2334770	3449108	1229782	381525	618714	144337	22790	0.057	0.090	0.025
2008	3706150	5451761	1979613	375688	613775	137601	22993	0.059	0.093	0.026
2009	3468690	5185852	1757414	376114	620030	132199	25737	0.067	0.107	0.028
2010	4330660	6527840	2172787	377443	627684	127201	26556	0.067	0.107	0.026
2011	10955800	16307266	5785165	380175	637126	123225	21875	0.042	0.068	0.0165
2012	12987600	19318733	6890043	403738	675625	131852	24868	0.045	0.073	0.0167
2013	7132010	10820064	3443976	411265	682873	139656	28993	0.044	0.072	0.0165
2014	9746380	14797535	4547093	521876	855296	188455	29017	0.039	0.063	0.0145
2015	10498300	16192649	4777778	576836	937938	215734	32723	0.043	0.070	0.0160
2016	11726200	18481634	4590484	614174	996309	232039	40730	0.051	0.084	0.0192
2017	15021300	24324166	4523776	728804	1184043	273565	36946	0.040	0.066	0.0150
2018	7957662*			891175	1445300	337049	31661	0.028	0.046	0.0106
2019	7957662*			992092	1603035	381148	36536	0.028	0.046	0.0106
2020	7957662*			1102627						

* Geometric mean (2008–2017). The R_{2018} was replaced by the geometric mean because of lack of information from the 2019 survey.
** SSB is estimated at spawning time (mid-January).

Sources and references

ICES. 2020. Working Group on Southern Horse Mackerel, Anchovy and Sardine (WGHANSA). Draft report. ICES Scientific Reports. 2:41. 513 pp. http://doi.org/10.17895/ices.pub.5977. Publication of the full report is expected end of 2020.

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