EU request to ICES on in-year advice for anchovy (*Engraulis encrasicolus*) in Division 9.a (Atlantic Iberian waters), December 2017

Advice Summary

ICES advises that the evidence available is not sufficient to conclude that anchovy catches of 15 000 tonnes in Division 9.a in 2017 would be precautionary.

Request

The present advice is in response to the following request from the European Commission:

Background: On the basis of Council Regulation (EC) No 847/96 Article 3(1) Member States can request an in-year amendment of a TAC. In concrete terms:

When more than 75% of a precautionary TAC has been utilized before 31 October of the year of its application, a Member State with a quota for the stock for which that TAC has been fixed may request an increase in the TAC. Such a request, accompanied by relevant supporting biological information and an indication of the magnitude of the revision, shall be addressed to the Commission.

The Commission received a request from Portugal for a 20% increase in the 2017 TAC, attaching a scientific report prepared by IPMA as justification. An increase in the 2017 TAC would mean an adjusted TAC of 15 000 t. In its answer to a special request in July, ICES advised that TAC of 15 000 t is not precautionary.

Request:
- *Assess whether the evidence provided justifies a 20% TAC increase for 9.a anchovy in 2017, and whether such an increase is precautionary.*

Elaboration on the advice

This request follows after a similar request to which ICES responded in July 2017 (ICES, 2017a). With the information available in July, ICES advised that catches of 15 000 tonnes in 2017, if taken entirely in the southern part of Division 9.a, could not be considered sustainable. The response further indicated that ICES did not have sufficient information to be able to advise if this level of catch would be sustainable for the entire Division 9.a. Additional information has become available since then, most notably an estimate of stock biomass in the western part of Division 9.a, which was not available in July 2017.

To respond to the current request, ICES has assessed the scientific evidence provided in the IPMA report, which includes the estimate of stock biomass in the western part of Division 9.a, and further considered additional stock biomass indices from surveys conducted by Spain during the summer. Information on catches in 2017 from Portugal (available until the end of September) and Spain (available until mid-November) was also considered. ICES has analysed all the available information and advises that the evidence available is not sufficient to conclude that catches of 15 000 tonnes in Division 9.a can be considered precautionary in 2017. It should be noted that this result applies only to 2017 and is not a general conclusion for future years.

The anchovy stock in Division 9.a is currently considered a single stock, but it is recognized that the populations inhabiting the southern and western regions (subdivisions 9.a South and 9.a West, Figure 1) exhibit rather independent stock dynamics. Therefore, stock size indicators are presented for each of the two regions. This approach is supported by the ICES Stock Identification Methods Working Group (ICES, 2015).

Biomass estimates for both Subdivision 9.a South and Subdivision 9.a West show large fluctuations in the trends over time. The stock biomass is largely composed of one-year-old fish. There is currently no information on the recruitment (age 0 abundance in 2017) that will form the bulk of the catches and spawning stock in 2018.
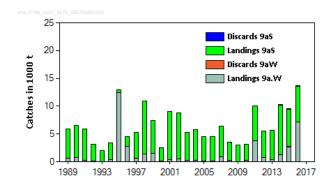
In Subdivision 9.a South (where the largest part of the catch has been historically taken), the stock biomass was estimated to be above the historical average from 2013 to 2016, but it declined below the average in 2017 (Figure 2). The harvest rates for anchovy in 9.a South, available since the early 2000s, range from 0.10 to 0.49, with an average value of 0.26. These harvest rates are estimated to result in 50–90% of the potential spawning biomass being allowed to spawn, according to an analysis of spawning biomass per recruit versus harvest rate conducted by ICES (2012; 2017b, c).
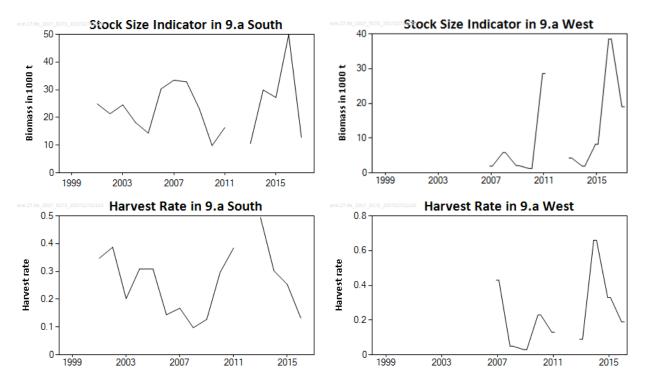
In Subdivision 9.a West, the biomass of anchovy is generally low and variable, but the biomass does increase episodically (e.g. 2011 and 2016). Biomass in 9.a West declined in 2017, although it continues to be above the historical average. The fishing fleets in 9.a West have traditionally focussed on sardine, but have occasionally targeted anchovy in years of high anchovy abundance. Harvest rates of anchovy in 9.a West, available for the last decade, are highly variable. They have ranged between 0.03 and 0.66, with an average value of 0.24.

Figure 1   Anchovy in Division 9.a**.** The map shows the split of Division 9.a into subdivisions 9.a South and 9.a West. Note that, in turn, Subdivision 9.a South is divided into Portuguese and Spanish waters, whereas Subdivision 9.a West is divided into the so-called 9.a North, 9.a Centre–North, and 9.a Centre–South areas.

Figure 2   Anchovy in Division 9.a. Upper panel: catches in Division 9.a (in thousand tonnes) differentiated between Western and Southern regions. Discard estimates are included from 2014 onwards. Middle left panel: stock size indicator for Subdivision 9.a South (average of survey biomass estimates, from acoustic (PELAGO, ECOCADIZ) and Daily Egg Production Method (BOCADEVA) surveys). Middle right panel: stock size indicator for Subdivision 9.a West (sum of survey biomass estimates, from acoustic (PELACUS and PELAGO) surveys). Lower left panel: harvest rates in Subdivision 9.a South. Lower right panel: harvest rates in Subdivision 9.a West. Note: the harvest rates were calculated as catch/(stock size indicator), i.e. with an assumption of survey catchability being equal to one for all surveys.

To respond to this request, an analysis was conducted, taking into account all the available survey information (Table 1), as well as the known catches by region (9.a South and 9.a West) in 2017 (known until the end of September for Portugal, and until mid-November for Spain). Five scenarios of plausible annual catches in 2017 by region, and corresponding harvest rates, under an assumed total catch of 15 000 tonnes in Division 9.a, were developed (Annex 7 in ICES, 2017c).

The harvest rates, by region and for the entire Division 9.a, corresponding to the different catch scenarios in 2017 are presented in Table 2. For 9.a West, all harvest rates calculated for 2017 are within the range of historically observed harvest rates, but well above the average. For 9.a South, the harvest rates calculated for 2017 are either within or somewhat above the range of historically observed harvest rates, and well above the average. For the stock as a whole (Division 9.a), the resulting harvest rate for 2017 (0.47) is above the maximum observed historically (0.39) and well above the average (0.23).

A spawning biomass per recruit analysis is available for 9.a South (ICES, 2012; 2017b,c; Figure 3). In order to compare the results of this analysis (where harvest rates are expressed as catch/SSB) with the observed harvest rates (which are calculated as catch/(stock size indicator)) the catchability of the surveys must be considered. The maximum harvest rate calculated for 9.a South for 2017 (0.51) would correspond to a spawning biomass per recruit above 50%, provided that the catchabilities of the surveys used in the calculation of the 2017 harvest rate do not exceed approximately 1.5. This suggests that the resulting harvest rate in 9.a South would likely be precautionary. However, a similar analysis was not possible for 9.a West, owing to a lack of historical age composition data from that region, needed to develop such an analysis. In 9.a West, the availability of age information is very limited, but data are currently being collected for exploration in the next benchmark assessment. Further to this, additional sensitivity analyses are needed in the current spawning biomass per recruit analysis concerning the settings for fishery selectivity at age 2 and the possible implications on harvest rate estimates.

For all these reasons, ICES advises that the evidence and knowledge available are not sufficient to conclude that catches of 15 000 tonnes in 2017 would be precautionary.
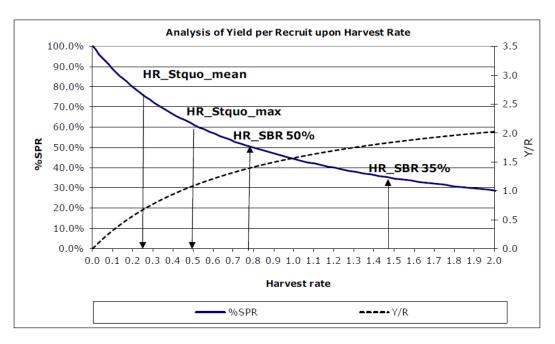

Figure 3   Anchovy in Subdivision 9.a South. Spawning biomass per recruit and yield per recruit as a function of harvest rate (where harvest rate is defined as catch/SSB). The analysis uses a selectivity-at-age fitted to observed catch proportions-at-age with a presumed F-at-age 1 = 1.0.

Table 1   Anchovy in Division 9.a. Biomass estimates (in tonnes) from each survey series on a regional basis.

Year	Acoustic survey biomass estimates								DEPM
	Spring				Summer	Autumn			Summer
	Sp. survey 9.a N	Port. survey 9.a C-N to 9.a C-S	Sp.+Port. Surveys 9.a West	Port. survey 9.a South	Sp. survey 9.a South	Port. survey 9.a C-N to 9.a C-S *	Port. survey 9.a South	Sp. survey 9.a South	Sp. survey 9.a South
	PELACUS	PELAGO	PELACUS+PELAGO	PELAGO	ECOCADIZ	JUVESAR	SAR-NOV	ECOCADIZ RECLUTAS	BOCADEVA
Months	March–April	March–April	March–April	March–April	July		Oct–Nov	Oct–Nov	June–July
1998							30695		
1999		596		24763					
2000							33909		
2001		368		24913			25578		
2002		1542		21335					
2003		112		24565					
2004					18177				
2005		1062		14041					14637
2006		0		24082	36521				
2007	0	1945	1945	38020	28882		23723		
2008	306	5505	5811	34162					31527
2009	26	2089	2115	24745	21580				
2010	42	1188	1230	7395	12339				
2011	1508	27050	28558	0					32757
2012	45							13680	
2013	0	3955	3955	12700	8487				
2014	0	1947	1947	28917	29219			8113	31569
2015	0	8237	8237	33100	21305	29556		30827	
2016	205	38302	38507	65345	34184	14397		19861	
2017	3566	15481	19047	13797	12229				12422

*The survey covers only partially 9.a C-S.

Table 2   Anchovy in Division 9.a. Historical series of catches (tonnes), stock size indicator (tonnes), and harvest rates (HR), and scenarios for 2017.

TAC	Year	Subdivision 9.a West			Subdivision 9.a South			Total Division 9.a		
		Catches	Stock size^	HR*	Catches	Stock size^^	HR*	Catches	Stock size^^^	HR*
	1999	1466			5942	24763	0.24	7409		
	2000	142			2360		n.a	2502		
	2001	444			8655	24913	0.35	9098		
	2002	543			8262	21335	0.39	8806		
	2003	301			4968	24565	0.20	5269		
	2004	226			5617	18177	0.31	5844		
	2005	92			4423	14339	0.31	4515		
	2006	110			4381	30301	0.14	4491		
	2007	844	1945	0.43	5610	33451	0.17	6454	35396	0.18
	2008	303	5811	0.05	3204	32845	0.10	3508	38655	0.09
	2009	59	2115	0.03	2954	23163	0.13	3013	25278	0.12
	2010	281	1230	0.23	2929	9867	0.30	3210	11097	0.29
7600	2011	3782	28558	0.13	6294	16379	0.38	10076	44937	0.22
8600	2012	779		n.a	4810		n.a	5589		n.a
8800	2013	392	3955	0.10	5240	10593	0.49	5632	14548	0.39
9700	2014	1281	1947	0.66	9051	29902	0.30	10332	31849	0.32
10600	2015	2717	8237	0.33	6880	27203	0.25	9597	35440	0.27
15000	2016	7140	38507	0.19	6599	49764	0.13	13739	88272	0.16
Summaries 2007–2016	Average	1758	10256	0.24	5357	25907	0.25	7115	36163	0.23
	Max HR			0.66			0.49			0.39
	Min HR			0.03			0.10			0.09
		Subdivision 9.a West			Subdivision 9.a South			Total Division 9.a		
		Catches	Stock size^	HR*	Catches	Stock size^^	HR*	Catches	Stock size^^^	HR*
Scenarios for 2017**	A 9.a South	9321	19047	0.49	5679	12816	0.44	15000	31863	0.47
	B 9.a South	10069	19047	0.53	4931	12816	0.38	15000	31863	0.47
	C 9.a South	10349	19047	0.54	4651	12816	0.36	15000	31863	0.47
	A 9.a West	8460	19047	0.44	6540	12816	0.51	15000	31863	0.47
	B 9.a West	8797	19047	0.46	6203	12816	0.48	15000	31863	0.47

* Harvest rates are calculated as catch/(stock size indicator), i.e. under an assumption of survey catchability being equal to one for all surveys.

^ Sum of PELACUS (in 9.a N) and PELAGO (in 9.a C-N and C-S) survey estimates.

^^ Average of PELAGO (in 9.a South), ECOCADIZ and BOCADEVA survey estimates.

^^^ Sum of stock size indicator in 9.a West and 9.a South.

** Scenarios for the catches by region in 2017 under a total catch of 15 000 t in Division 9.a. Scenario A (for 9.a South or 9.a West) is based on the maximum catch observed historically in quarter 4 in that region. Scenario B (for 9.a South or 9.a West) is based on the expected catch in quarter 4 in that region, using the historical average of the ratio of catches in the fourth quarter versus catches in the first three quarters of the year. Scenario C (only applied for 9.a South) assumes a minimum catch in quarter 4 in that region. In all scenarios, catches in the other region are those required to obtain a total catch of 15 000 t in Division 9.a.

Legend of colours for Harvest Rates in 2017 (the likelihood of each scenario was determined based on historical records and the 2017 catches known at the time of writing of this advice):

Likely values		Unlikely Low	
Maximum potential values		Unlikely maximum values	

Sources and references

ICES. 2012. Report of the Working Group on Southern Horse Mackerel, Anchovy and Sardine (WGHANSA), 23–28 June 2012, Azores (Horta), Portugal. ICES CM 2012/ACOM:16. 544 pp.

ICES. 2015. Interim Report of the Stock Identification Methods Working Group (SIMWG), 10–12 June 2015, Portland, Maine, USA. ICES CM 2015/SSGEPI:13. 67 pp.

ICES. 2017a. EU request to ICES on in-year advice fror Anchovy (*Engraulis encrasicolus*) in Division 9.a (Atlantic Iberian waters). *In* Report of the ICES Advisory Committee, 2017. ICES Advice 2017. sr.2017.14.

ICES. 2017b. Anchovy (*Engraulis encrasicolus*) in Division 9.a (Atlantic Iberian waters). *In* ICES Advice 2017. ICES Advice on fishing opportunities, catch, and effort Bay of Biscay and the Iberian Coast Ecoregion. ane.27.9a.

ICES. 2017c. Working Group on Southern Horse Mackerel, Anchovy and Sardine (WGHANSA), 24–29 June 2017, Bilbao, Spain. ICES CM 2017/ACOM:17.