

SAC GFCM Sub-Committee on Stock Assessment

Date*	20	October	2010	Code*	PIL0310Oma
Authors*	Omar KADA & My Hachem IDRISSI				
Affiliation*	Institut National de Recherche Halieutique - Centre Régional de Nador (INRH-Maroc)				
Species Scientific name*	<p>1 Source: GFCM Priority Species</p> <p>2 Source: -</p> <p>3 Source: -</p>				
Geographical area*	Alboran sea				
Geographical Sub-Area (GSA)*	03 - Southern Alboran Sea				
Combination of GSAs	1				
	2				
	3				

SAC GFCM - Sub-Committee on Stock Assessment (SCSA)

Assessment form

Sheet #0

Basic data on the assessment

Code: PIL0310Oma

Date*	20	Oct	2010	Authors*	Omar KADA & My Hachem IDRISSE
-------	----	-----	------	----------	-------------------------------

Species Scientific name*	Sardina pilchardus - PIL	Species common name*	European pilchard
--------------------------	--------------------------	----------------------	-------------------

Data Source

GSA*	03 - Southern Alboran Sea	Period of time*	years 2007 to 2009
------	---------------------------	-----------------	--------------------

Description of the analysis

Type of data*	Size composition of commercial catches and official landings.	Data source*	INRH, National Office of Fisheries, Ministry of Fisheries
Method of assessment*	Pseudocohort analysis and yield per recruit analysis	Software used*	VIT (Leonart and Salat, 1997)

Sheets filled out

B	P1	P2a	P2b	G	A1	A2	A3	Y	Other	D	Z	C
1	1	1	---	---	1	1	---	---	---	1	1	---

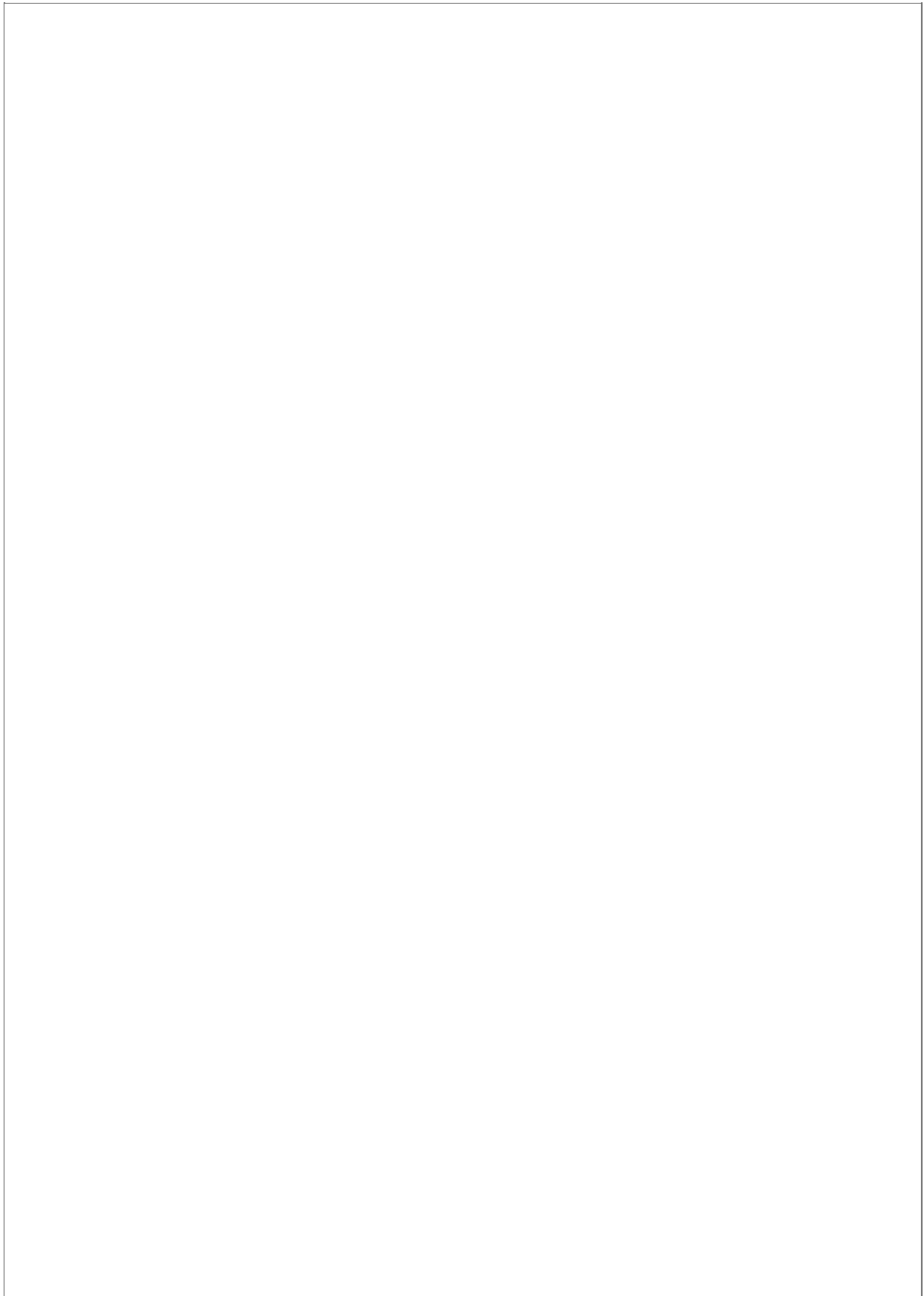
Comments, bibliography, etc.

Cadima E.L., 2001. Manuel d'évaluation des ressources halieutiques. FAO document technique. N° 393, FAO. 162p.

Leonard J. et J. Salat, 2000. VIT for windows (version 1.2): software for fisheries analysis. Inf. tech. Sci. Mar.

N. EL Ouamari et N. Abid, 2003. Etat d'exploitation du stock de la sardine en Méditerranée marocaine, SCES, Tanger, 2003.

O. Kada et N. EL Ouamari, 2005. Etat d'exploitation du stock de la sardine en Méditerranée marocaine, SCES, Rome, 2005.

A large, empty rectangular box with a thin black border, occupying most of the page. It is intended for handwritten or typed text, specifically comments and a bibliography as indicated by the header.

SAC GFCM - Sub-Committee on Stock Assessment (SCSA)

Assessment form

Sheet B
Biology of the species

Code: PIL03100ma

Biology

	Somatic magnitude measured (LH, LC, etc)*			total length	Units*	cm
	Sex	Fem	Mal	Both	Unsexed	
Maximum size observed					22.5	Reproduction season
Size at first maturity					13.3	Reproduction areas
Recruitment size						Continental shelf
						Nursery areas
						Continental

Parameters used (state units and information sources)

		Units	Sex			
			female	male	both	unsexed
Growth model	L [∞]	cm				21.3
	K	cm/an				0.56
	t0	an				-0.67
	Data source	INRH Nador				
Length weight relationship	a					0.0066
	b					3.0582
	M					0.2
	sex ratio (mal/fem)					

Comments

Data of growth and reproduction of the sardine "Sardina pilchardus" are resulting from biological study on this specie

A large empty rectangular box intended for handwritten or typed comments.

SAC GFCM - Sub-Committee on Stock Assessment (SCSA)

Assessment form

Sheet P1

General information about the fishery

Code: PIL03100ma

Data source*	Size composition of landings from sampling, catch d	Year (s)*	average from 2007 to 2009
Data aggregation (by year, average figures between years, etc.)*		A pseudo cohort was created averaging data from 2007 to 2009	

Fleet and catches (please state units)

	Country	GSA	Fleet Segment	Fishing Gear Class	Group of Target Species	Species
Operational Unit 1*	MAR	03	G - Purse Seine (6-12 metres)	01 - Surrounding Nets	31 - Small gregarious pelagic	PIL
Operational Unit 2						
Operational Unit 3						
Operational Unit 4						
Operational Unit 5						

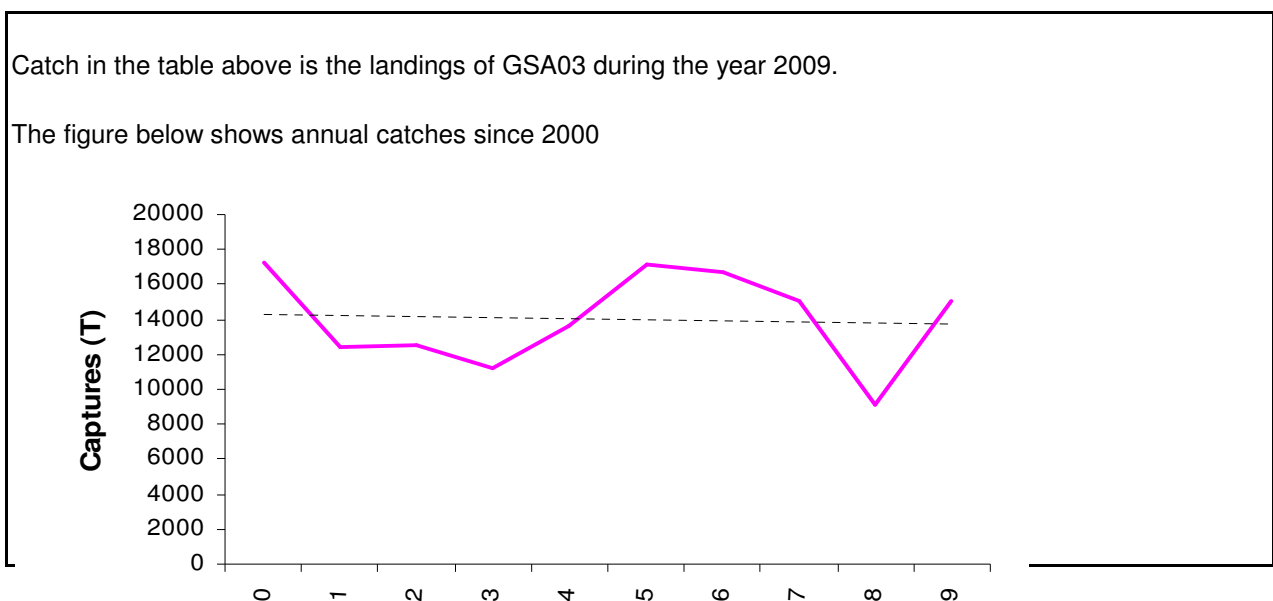
Operational Units*	Fleet (n° of boats)*	Kilos or Tons	Catch (species assessed)	Other species caught	Discards (species assessed)	Discards (other species caught)	Effort units
MAR 03 G 01 31 - PIL	141	Tons	15075.8855	See sheet P2b			days
Total	141		15075.8855				

Legal minimum size

Comments

Catch in the table above is the landings of GSA03 during the year 2009.

The figure below shows annual catches since 2000



200:

200

200:

200:

200:

200:

200:

200

200:

200:

Années

--	--	--	--	--	--	--	--	--	--

SAC GFCM - Sub-Committee on Stock Assessment (SCSA)

Assessment form

Sheet P2a
Fishery by Operational Unit

Code: PIL0310Oma

Page 1 / 1

Data source*	Size composition of landings from biological sam	OpUnit 1*	MAR 03 G 01 31 - PIL
--------------	--	-----------	----------------------

Time series

Year*	2007	2008	2009			
Catch	13574.112	9111.421	15075.8855			
Minimum size	8	9	10			
Average size Lc	16.53	16.66	15.37			
Maximum size	22	23.5	22.5			
Fleet	147	137	141			

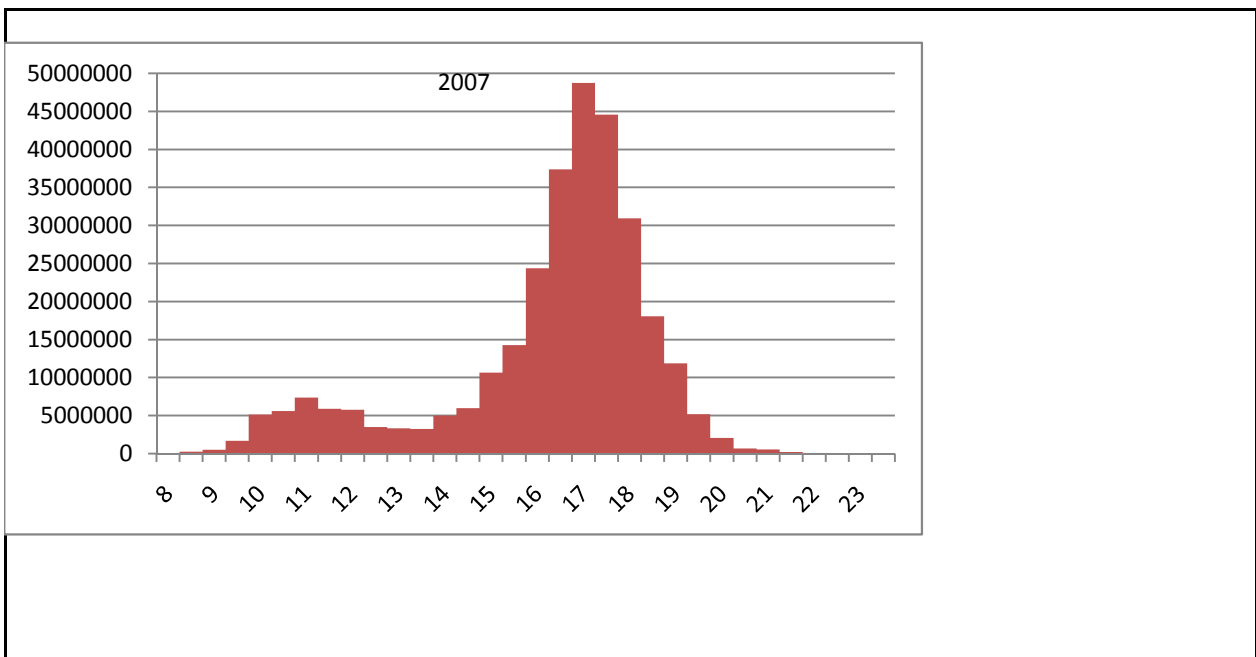
Year						
Catch						
Minimum size						
Average size Lc						
Maximum size						
Fleet						

Selectivity

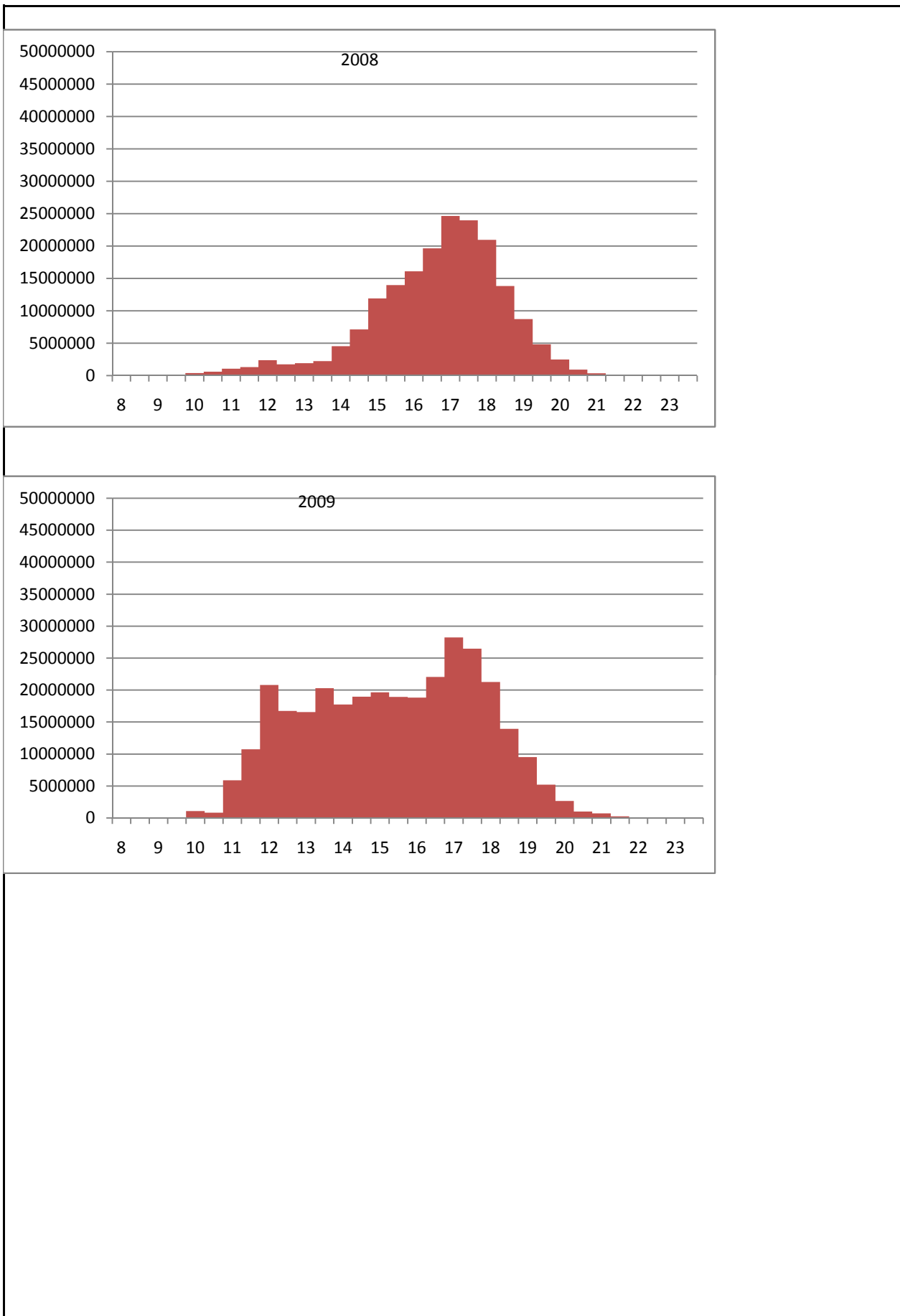
Remarks

L25		O. KADA, 2002
L50	13.3	
L75		
Selection factor		

Structure by size or age



Structure by size or age



SAC GFCM - Sub-Committee on Stock Assessment (SCSA)

Assessment form

Sheet P2b
Fishery by Operational Unit

Code: PIL03100ma

Page 1 /

Data source*

OpUnit 1*

MAR 03 G 01 31 - PIL

Regulations in force and degree of observance of regulations

- Fishing license: fully observed
- Length of purse seine (200m): fully observed
- Mesh size (11 mm stretched): fully observed
- Moule (50 individuals): fully observed

Accompanying species

The accompanying species of the sardine are :

- Chinchard "*Trachurus trachurus*"
- Bogue "*Boops boops*"
- Anchois "*Engraulis encrasicolus*"



SAC GFCM - Sub-Committee on Stock Assessment (SCSA)

Assessment form

Sheet G
Indirect methods. Global model

Code: PIL0310Oma

Analysis #*

Page 1 /

Data source*	<input type="text"/>	Gear*	1
--------------	----------------------	-------	---

Model characteristic

Type of model*	Pseudo cohort analysis "LCA"	Fitting criterion	<input type="text"/>
Software	VIT	Bibliographical source	<input type="text"/>

Data

Year	2007	2008	2009	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
Catch	13574.112	9111.421	15075.8855	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
Effort	589958	362405	335355	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
CPUE	0.023	0.029	0.053	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>

Year	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
Catch	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
Effort	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
CPUE	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>

Adjustment

RMS	<input type="text"/>
-----	----------------------

Results

Carryng capacity	<input type="text"/>	a	<input type="text"/>
Growth rate	<input type="text"/>	b	<input type="text"/>
Catchability	<input type="text"/>	<input type="text"/>	<input type="text"/>
MSY	<input type="text"/>	<input type="text"/>	<input type="text"/>
EMSY	<input type="text"/>	TACMSY	<input type="text"/>
E0.1	<input type="text"/>	TAC0.1	<input type="text"/>
Ecurrent	<input type="text"/>	<input type="text"/>	<input type="text"/>

Comments

Comments

SAC GFCM - Sub-Committee on Stock Assessment (SCSA)

Assessment form

Sheet A1
Indirect methods: VPA, LCA

Code: PIL03100ma

Page 1 / 1

Sex* unsexed

Analysis # * 1

Time series

Data	Size	Age
(mark with X)	x	

Model	Cohorts	Pseudocohorts
(mark with X)		x

Equation used	catch equation	Tuning method	
# of gears	1	Software	VIT (Lleonart and Salat, 1997)
F _{terminal}	0.4		

Population results (please state units)

	Sizes	Ages		Amount	Biomass
Minimum			Recruitment		1623.01
Average			Average population		16745
Maximum			Virgin population		
Critical	15.5	1.723	Turnover		
					SSB
					11402.46

Average mortality

	Total	Gear					
F ₁	0.569						
F ₂							
Z	0.769						

(F1 and F2 represent different possible calculations. Please state them)

Comments

SAC GFCM - Sub-Committee on Stock Assessment (SCSA)

Assessment form

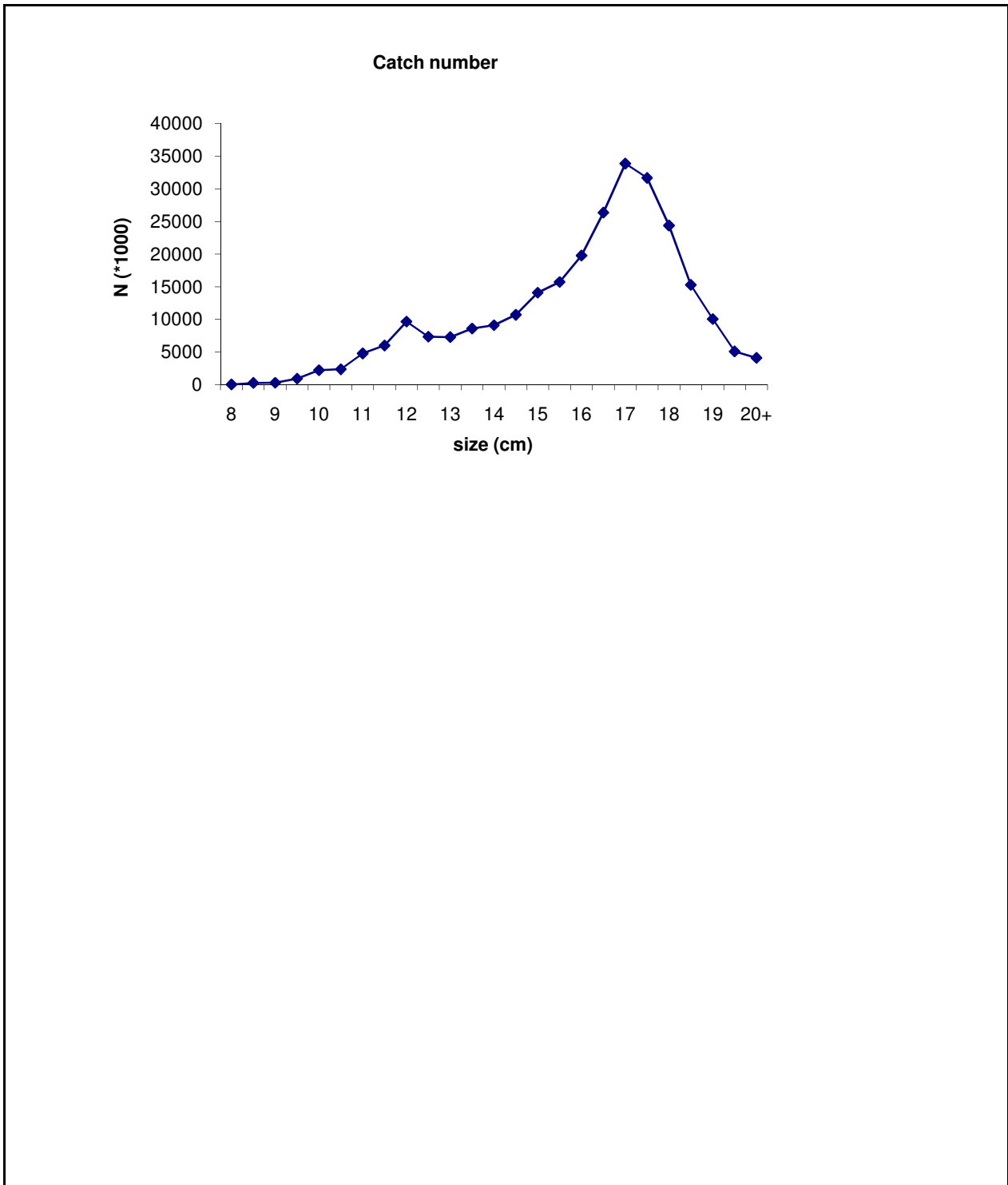
Sheet A2
Indirect methods: data

Code: PIL0310Oma

Sex*	unsexed	Gear*	purse seine	Analysis # *	1
------	---------	-------	-------------	--------------	---

Data	A pseudocohort created using data for year 2007.
------	--

Data



SAC GFCM - Sub-Committee on Stock Assessment (SCSA)

Assessment form

Sheet A3
Indirect methods: VPA results

Code: PIL0310Oma

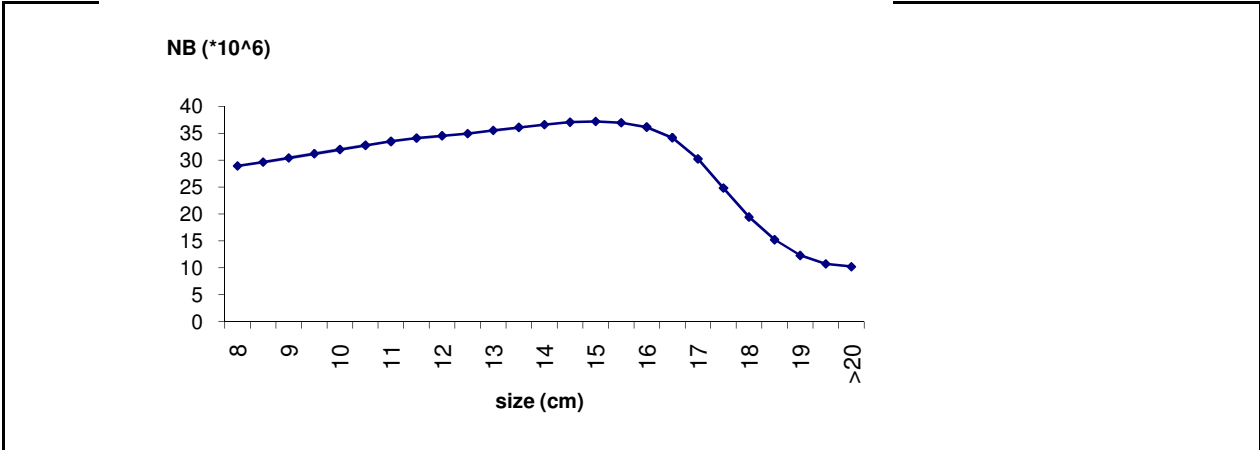
Page 1 /

Sex*

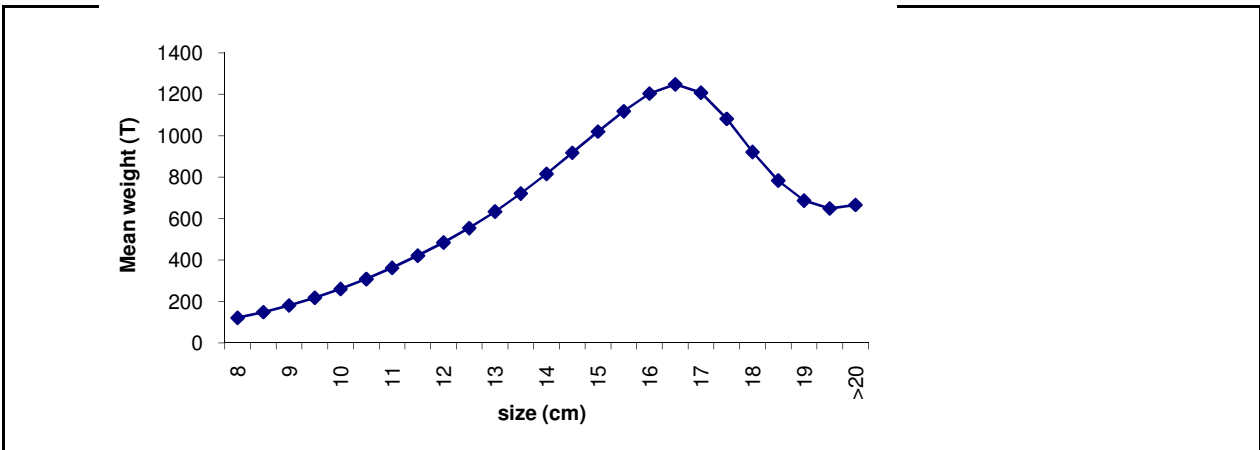
Gear*

Analysis #*

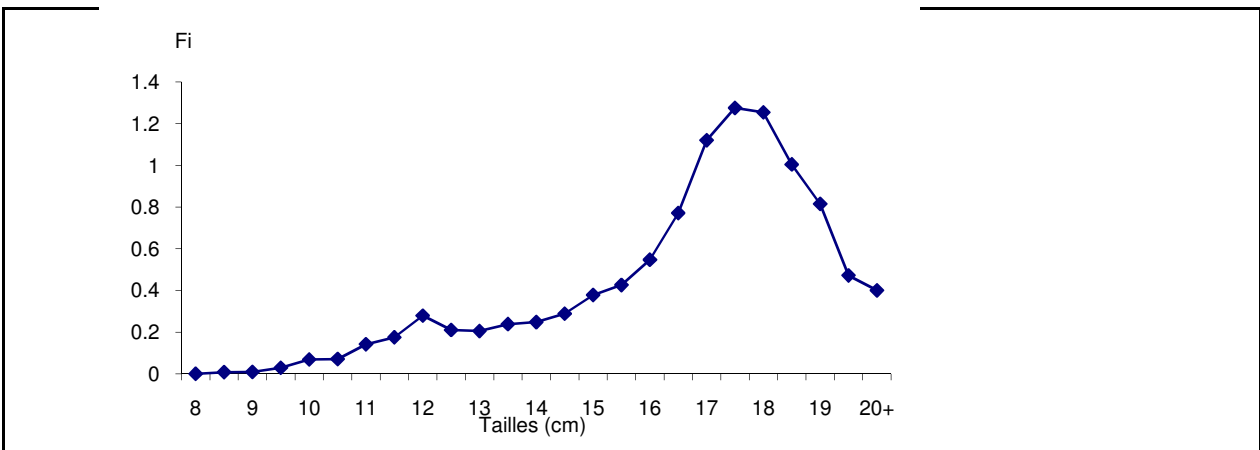
Population in figures



Population in biomass



Fishing mortality rates



SAC GFCM - Sub-Committee on Stock Assessment (SCSA)

Assessment form

Sheet D
Diagnosis

Code: PIL0310Oma

Indicators and reference points

Criterion	Current value	Units	Reference Point	Trend	Comments
B					
SSB					
F					
Y					
CPUE					

Stock Status* Use one (or both) of the following two systems for the stock assessment status description

Unidimensional	<input type="checkbox"/>	? - (or blank) Not known or uncertain. Not much information is available to make a judgment;
	<input type="checkbox"/>	U - Underexploited, undeveloped or new fishery. Believed to have a significant potential for expansion in total production;
	<input type="checkbox"/>	M - Moderately exploited, exploited with a low level of fishing effort. Believed to have some limited potential for expansion in total production;
	<input type="checkbox"/>	F - Fully exploited. The fishery is operating at or close to an optimal yield level, with no expected room for further expansion;
	<input type="checkbox"/>	O - Overexploited. The fishery is being exploited at above a level which is believed to be sustainable in the long term, with no potential room for further expansion and a higher risk of stock depletion/collapse;
	<input type="checkbox"/>	D - Depleted. Catches are well below historical levels, irrespective of the amount of fishing effort exerted;
	<input type="checkbox"/>	R - Recovering. Catches are again increasing after having been depleted or a collapse from a previous;

Bidimensional	Exploitation rate		Stock abundance			
	<input type="checkbox"/>	No or low fishing	<input type="checkbox"/>	Virgin or high abundance	<input type="checkbox"/>	Depleted
	<input type="checkbox"/>	Moderate fishing	<input type="checkbox"/>	Intermediate abundance	<input type="checkbox"/>	Uncertain / Not assessed
	<input type="checkbox"/>	High fishing mortality	<input type="checkbox"/>	Low abundance		
	<input type="checkbox"/>	Uncertain / Not assessed				

Comments

Overall, the captures have been stable along the period covered by the landing statistics, with some fluctuation around an average value.

Effort levels (number of vessels) have been stable, and the Moroccan regulation establishes that it is not allowed to increment the fleet nor the power of the vessels since 1993.

The fishery targets mostly the large sizes (above 15-16 cm) of sardine, with a low pressure on the smaller sizes, even though there is a small seasonal fishery targetting juveniles in the eastern part of the fishing area.

The LCA and Y/R analyses indicate that the current fishing mortality is a little above $F_{0.1}$, but with no large decrease in Biomass per Recruit.

Based on these observations, the WG considers that the stock can be considered as fully exploited.

SAC GFCM - Sub-Committee on Stock Assessment (SCSA)

Assessment form

Sheet Z

Objectives and recommendations

Code: PIL0310Oma

Management advice and recommendations*

It is recommended to :

- a) Not to increase fishing effort;
- b) Maintain the current relative exploitation pattern, with a concentration on adults and reduced mortality on young/juvenile sardines. Accordingly, the fishery targeting juveniles in the eastern part of the zone should be monitored, and not allowed to increase beyond current levels ;

Advice for scientific research*

Abstract for SCSA reporting

Authors

Omar KADA & My Hachem IDRISSE

Year

2010

Species Scientific name

Sardina pilchardus - PIL

Source: GFCM Priority Species

Source: -

Source: -

Geographical Sub-Area

03 - Southern Alboran Sea

Fisheries (brief description of the fishery)*

On the scale of moroccan mediterranean sea and in term of importance of landings small pelagics, sardine is ranked first in an annual production of 14000 tons. Fishing of sardine is practiced mainly by approximately 140 purse seiners in seven ports.

Source of management advice*

(brief description of material -data- and methods used for the assessment)

The evaluation of the state of the stock was based on the Lenght Cohort Analysis (LCA) using the VIT software. Data collected from 2007 to 2009 were used.

Stock Status*

F - Fully exploited. The fishery is operating at or close to an optimal yield level, with no expected room for further expansion;

Exploitation rate

Moderate fishing mortality

Stock abundance

Uncertain / Not assessed

Comments

Overall, the captures have been stable along the period covered by the landing statistics, with some fluctuation around an average value.
Effort levels (number of vessels) have been stable, and the Moroccan regulation establishes that it is not allowed to increment the fleet nor the power of the vessels since 1993.
The fishery targets mostly the large sizes (above 15-16 cm) of sardine, with a low pressure on the smaller sizes, even though there is a small seasonal fishery targetting juveniles in the eastern part of the fishing area.
The LCA and Y/R analyses indicate that the current fishing mortality is a little above $F_{0.1}$, but with no large decrease in Biomass per Recruit.
Based on these observations, the WG considers that the stock can be considered as fully exploited.

Management advice and recommendations*

It is recommended to :

- a) Not to increase fishing effort;
- b) Maintain the current relative exploitation pattern, with a concentration on adults and reduced mortality on young/juvenile sardines. Accordingly, the fishery targeting juveniles in the eastern part of the zone should be monitored, and not allowed to increase beyond current levels ;

Advice for scientific research*

