SAC GFCM
Sub-Committee on Stock Assessment

Date*	**22**	**October**	**2009**	**Code***	**HKE0309Sad**

Authors*

Sadia BELCAID

Affiliation*

Institut National de Recherche Halieutique (INRH), Centre Régional de Tanger

Species Scientific name*

1 ***Merluccius merluccius - HKE***
Source: GFCM Priority Species

2
Source: -

3
Source: -

Geographical area*

Moroccan coast

Geographical Sub-Area (GSA)*

03 - Southern Alboran Sea

Combination of GSAs
1
2
3

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Assessment form

Sheet #0

Basic data on the assessment

Code: HKE0309Sad

Date*	22	Oct	2009	Authors*	Sadia BELCAID

Species Scientific name*	Merluccius merluccius - HKE	Species common name*	European hake

Data Source

GSA*	03 - Southern Alboran Sea	Period of time*	2008

Description of the analysis

Type of data*	Length frequencies	Data source*	INRH, ONP, DPM
Method of assessment*	LCA	Software used*	VIT (Lleonart and Salat, 1992)

Sheets filled out

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

Comments, bibliography, etc.

The sample were collected on the trawlers fishery landing in the port of M'diq in 2008.

Comments, bibliography, etc.

Garcia Rodriguez and Esteban, 2002.How fast does hake grow? A study on the Mediterranean hake (Merluccius merluccius L.) comparing whole otoliths readings and length frequency distributions data. Scientia marina, SCI. MAR., 66 (2): 145-156.

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Assessment form — **Sheet B** — **Biology of the species**

Code: HKE0309Sad

Biology

Somatic magnitude measured (LH, LC, etc)*		LT		Units*	cm

Sex	Fem	Mal	Both	Unsexed		
Maximum size observed			53		Reproduction season	all year, summer
Size at first maturity			33		Reproduction areas	
Recruitment size					Nursery areas	

Parameters used (state units and information sources)

			Sex			
		Units	female	male	both	unsexed
Growth model	L∞	cm			106.8	
	K	an-1			0.2	
	t0	an			0.0028	
	Data source	Garcia Rodriguez and al, 2002 - Spain				
Length weight relationship	a				0,72 10-5	
	b				2.994	
	M				0.5	

sex ratio (mal/fem)	

Comments

Garcia rodriguez and Esteban, 2002. How fast does hake grow? A study on the Mediterranean hake (Merluccius merluccius L.) comparing whole otoliths readings and length frequency distributions data*; SCIENTIA MARINA, SCI. MAR., 66 (2): 145-156

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Assessment form

Sheet P1

General information about the fishery

Code: HKE0309Sad

Data source*	INRH, ONP, DOM	Year (s)*	2008
Data aggregation (by year, average figures between years, etc.)*	by year		

Fleet and catches (please state units)

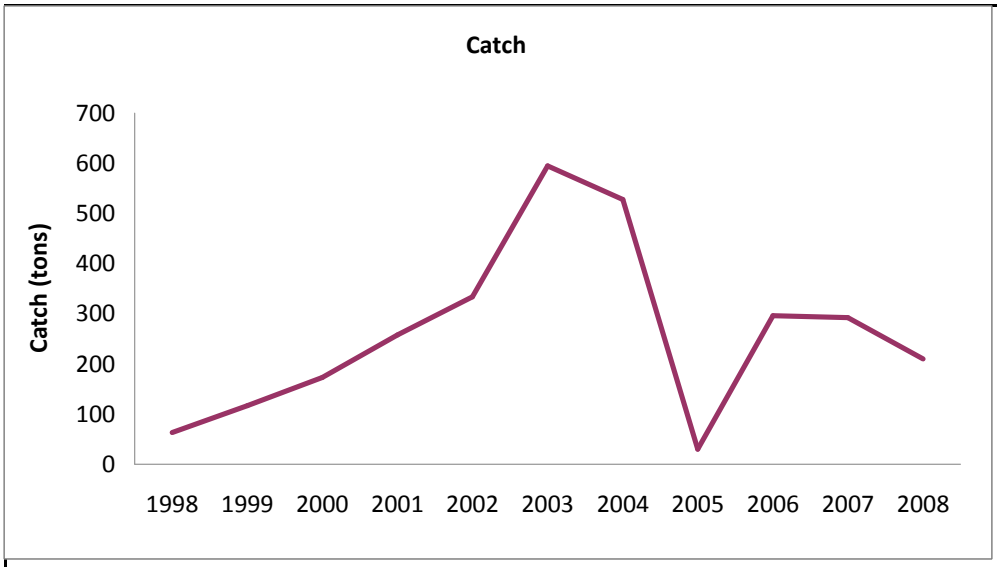
	Country	GSA	Fleet Segment	Fishing Gear Class	Group of Target Species	Species
Operational Unit 1*	MAR	03	E - Trawl (12-24 metres)	03 - Trawls	33 - Demersal shelf species	HKE
Operational Unit 2						
Operational Unit 3						
Operational Unit 4						
Operational Unit 5						

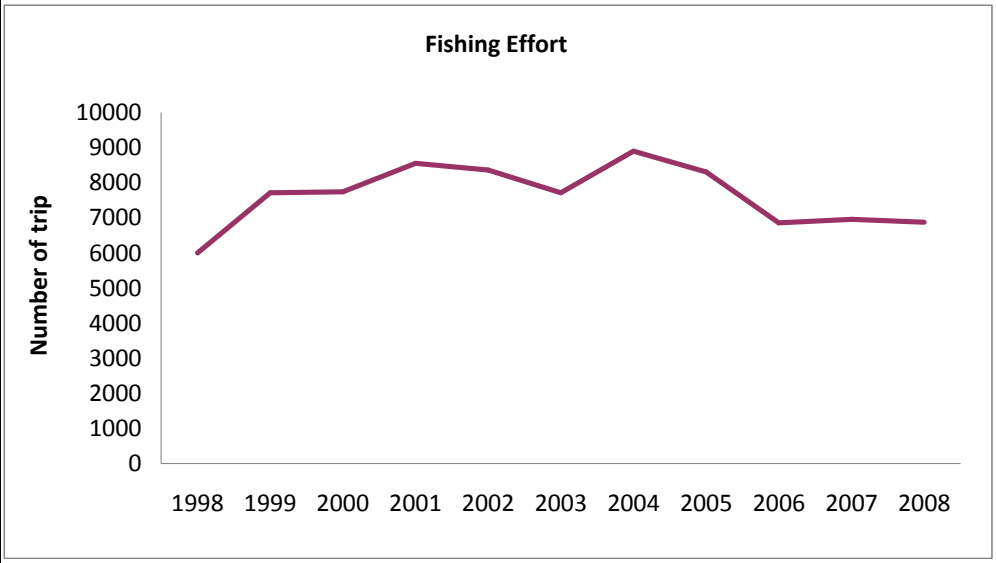
Operational Units*	Fleet (n° of boats)*	Kilos or Tons	Catch (species assessed)	Other species caught	Discards (species assessed)	Discards (other species caught)	Effort units
MAR 03 E 03 33 - HKE	114	Tons	210				Fishing trip
Total	114		210				

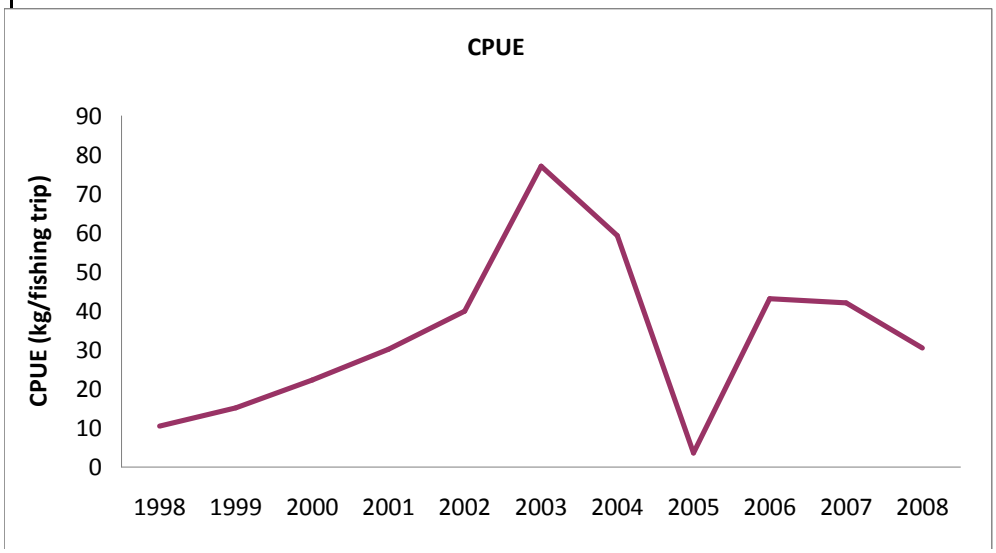
Legal minimum size	20

Comments

Comments


Catch
Catch (tons)
700
600
500
400
300
200
100
0
1998 1999 2000 2001 2002 2003 2004 2005 2006 2007 2008


Fishing Effort
Number of trip
10000
9000
8000
7000
6000
5000
4000
3000
2000
1000
0
1998 1999 2000 2001 2002 2003 2004 2005 2006 2007 2008


CPUE
CPUE (kg/fishing trip)
90
80
70
60
50
40
30
20
10
0
1998 1999 2000 2001 2002 2003 2004 2005 2006 2007 2008

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Assessment form

Sheet P2a
Fishery by Operational Unit

Code: HKE0309Sad

Data source*	INRH, ONP, DPM	OpUnit 1*	MAR 03 E 03 33 - HKE

Time series

Year*	1998	1999	2000	2001	2002	2003
Catch	63	117	173	258	334	595
Minimum size						
Average size Lc						
Maximum size						
Fleet						

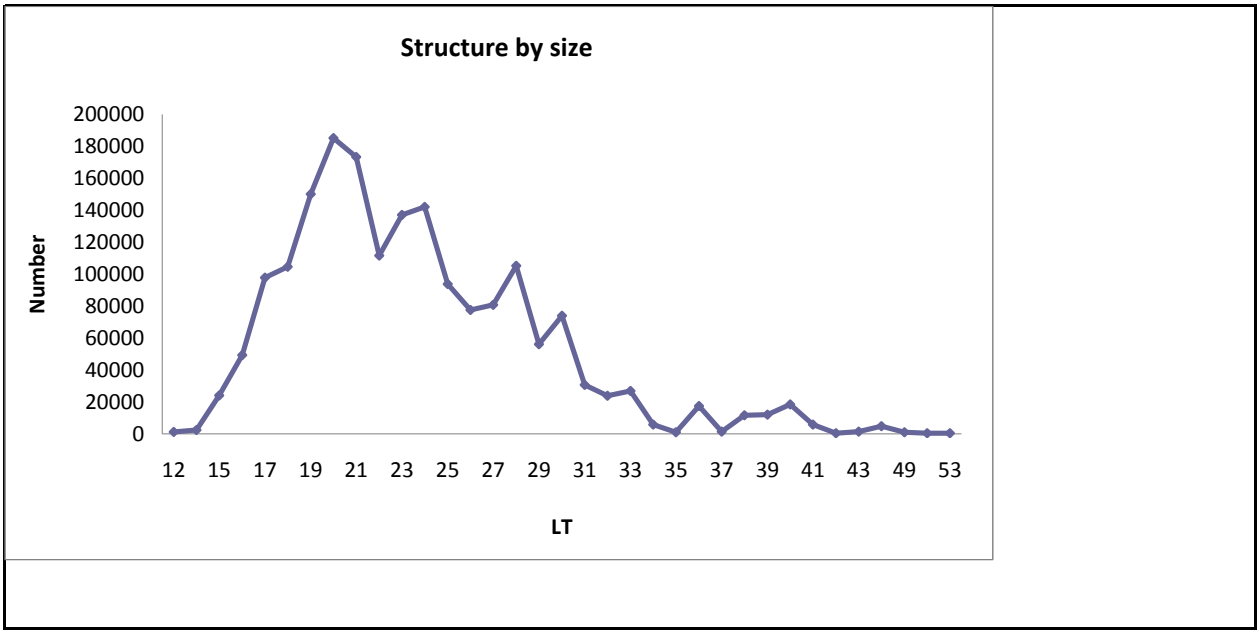
Year	2004	2005	2006	2007	2008	
Catch	528	30	296	293	210	
Minimum size					12	
Average size Lc					23.56	
Maximum size					53	
Fleet					114	

Selectivity

L25	
L50	
L75	
Selection factor	

Remarks

Structure by size or age



Structure by size or age

The sampling does not cover all size classes with the same frequency

Data source*	MINISTERY OF FISHERY AND AGRICULTURE	OpUnit 1*	MAR 03 E 03 33 - HKE

Regulations in force and degree of observance of regulations

Fishing licence: Fully observed
Trawl mesh size : ≥50 mm (mesh streched)
Minimum landing size = 20 cm
Interdiction of fishing under 80 m deep in the aerea between Tangier and Al Hoceima,
Interdiction of fishing under 3 miles in the area between Al Hoceima and Saidia.

,

Accompanying species

the deep water pink shrimp , pagellus acarne, Mullus spp, , Boops boops, Gadus poutassou, Octopus vulgaris and Sepia spp.

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Assessment form

Sheet G
Indirect methods. Global model

Code: HKE0309Sad

Analysis #*	

Data source*		Gear*	

Model characteristic

Type of model*		Fitting criterion	
Software		Bibliographical source	

Data

Year							
Catch							
Effort							
CPUE							

Year							
Catch							
Effort							
CPUE							

Adjustment

RMS	

Results

Carryng capacity		a	
Growth rate		b	
Catchability			
MSY			
EMSY		TACMSY	
E0.1		TAC0.1	
Ecurrent			

Comments

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Assessment form

Sheet A1
Indirect methods: VPA, LCA

Code: HKE0309Sad

Sex*	both

Analysis # *	LCA

Time series

Data	Size	Age
(mark with X)	X	

Model	Cohorts	Pseudocohorts
(mark with X)		X

Equation used	Standard VPA	Tunig method	
# of gears	1	Software	VIT(Lleonard and smart, 1992)
$F_{terminal}$	0.5		

Population results (please state units)

	Sizes	Ages		Amount	Biomass
Minimum	12		Recruitment	258138505	
Average	23.56		Average population		973360445.3
Maximum	53		Virgin population		7281561791
Critical	22		Turnover		240.87

Average mortality

		Gear					
	Total						
F_1	1.851	F1 = Mean F					
F_2	1.237	F2 = Global F					
Z							

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

Comments

---	Biomass	Percentage
Recruitment	316412722,5	13,5
Growth	2028145842	86,5
Natural death	486680222,7	20,76
Fishing	1857878342	79,24
R/B(mean)	32,51	
D/B(mean)	240,87	
B(max)/B(mean)	87,45	
B(max)/D	36,3	

SAC GFCM - Sub-Committee on Stock Assessment (SCSA)	
Assessment form	**Sheet A1** **Indirect methods: VPA, LCA**

Code: HKE0309Sad

Sex*	

Analysis # *	

Time series

Data	Size	Age
(mark with X)		

Model	Cohorts	Pseudocohorts
(mark with X)		

Equation used		Tunig method	
# of gears		Software	
$F_{terminal}$			

Population results (please state units)

	Sizes	Ages		Amount	Biomass
Minimum			Recruitment		
Average			Average population		
Maximum			Virgin population		
Critical			Turnover		

Average mortality

		Gear					
	Total						
F_1							
F_2							
Z							

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

Comments

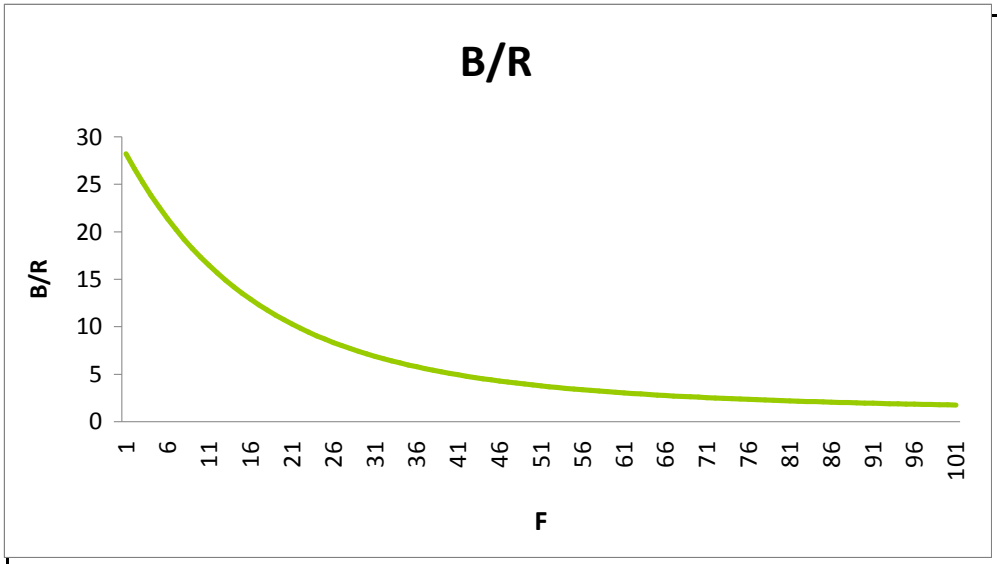
SAC GFCM - Sub-Committee on Stock Assessment (SCSA)	
Assessment form	**Sheet A2** **Indirect methods: data**

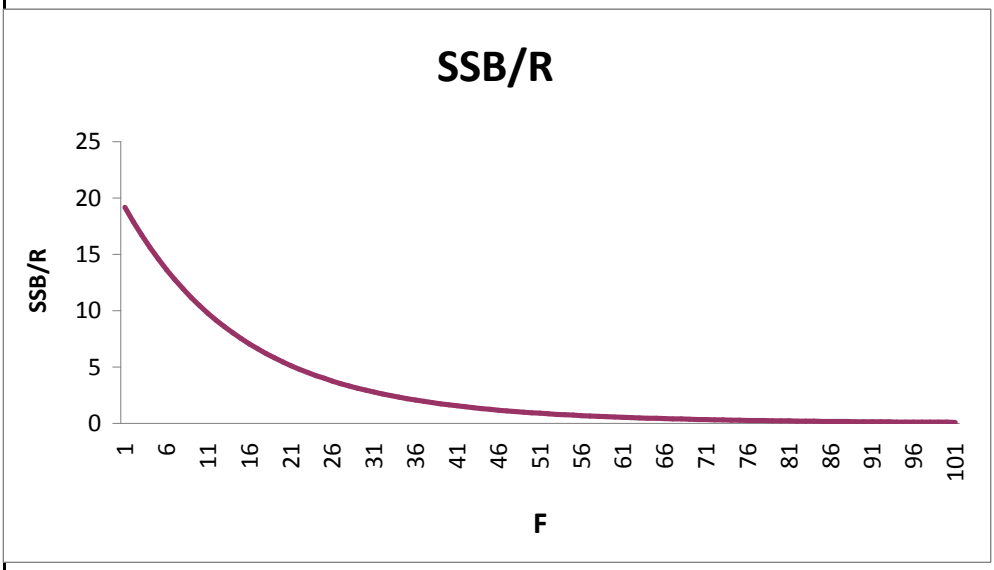
Code: HKE0309Sad

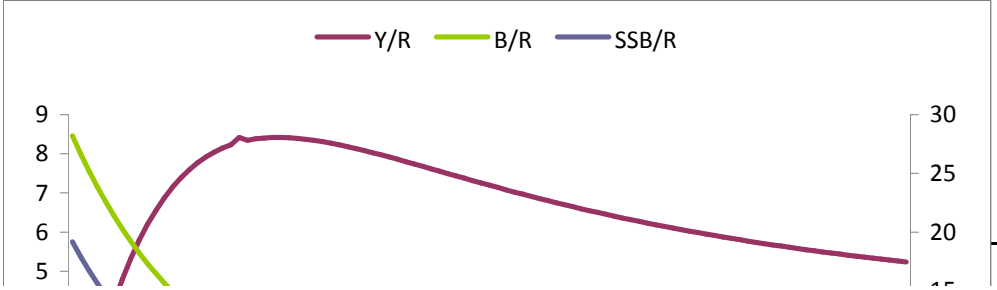
Sex*	BOTH	Gear*	TRAWL	Analysis # *	VPA

Data source	Lenght frequencies, biological sampling

Data







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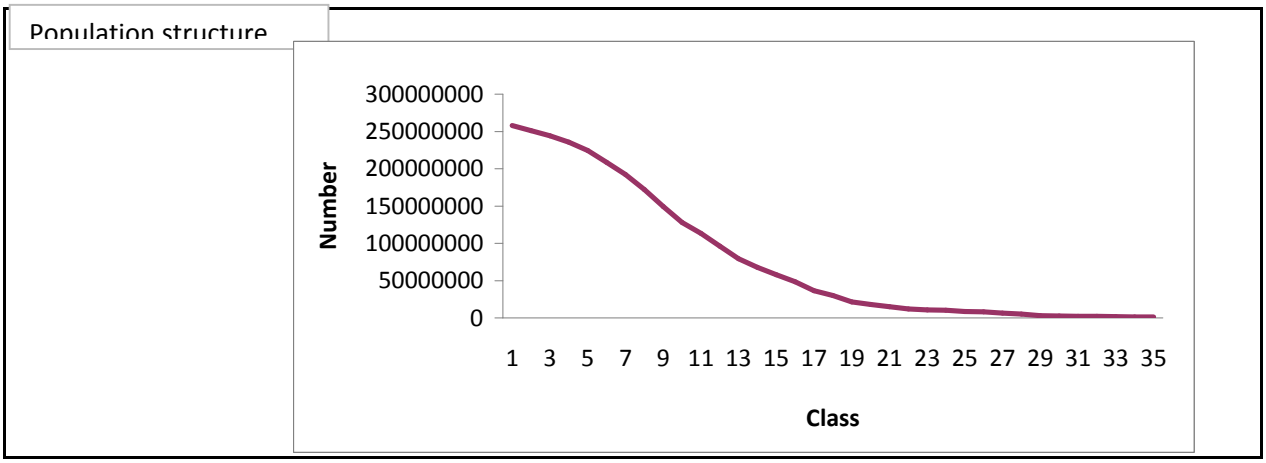
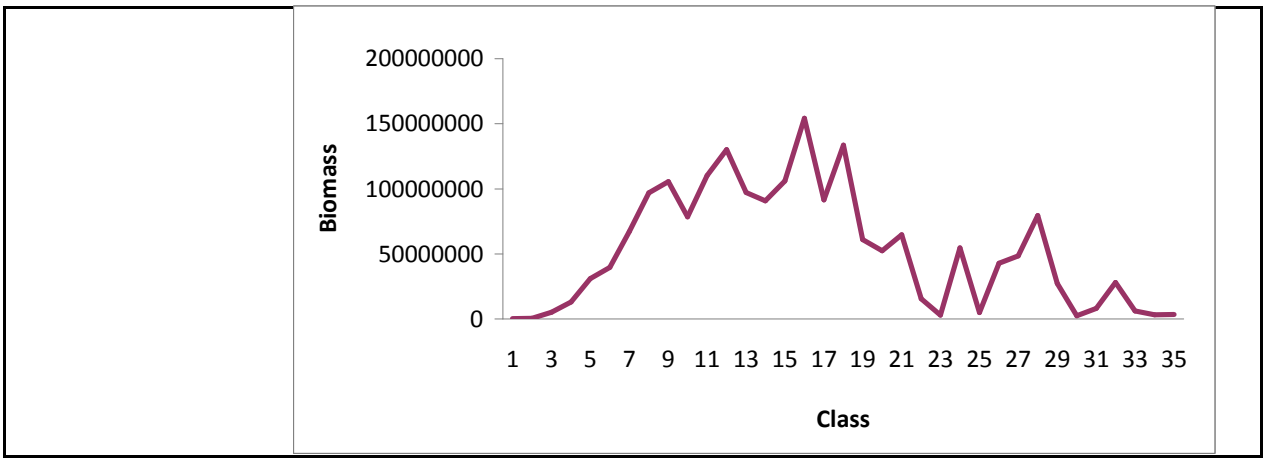
Assessment form	Sheet A3 Indirect methods: VPA results

Sex*	both	Gear*	trawl	Analysis #*	VPA

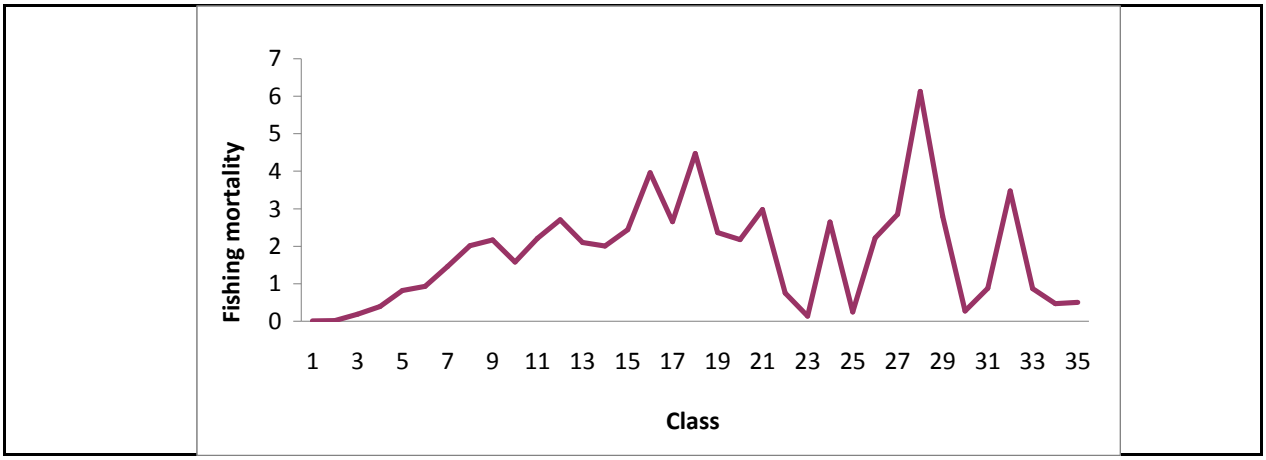
Population in figures



Population in biomass



Fishing mortality rates



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Assessment form — **Sheet Y** — **Indirect methods: Y/R**

Code: HKE0309Sad

Sex	Both

Analysis #	Y/R

# of gears	TRAWL	Software	VIT (Lleonard and Salat, 1992)

Parameters used

Vector F	0,009;0,018;0,185;0,391;0,816;0,932;1,456;2,016;2,166;1,583;2,213;2,705;2,1;2,006;2,445;3,
Vector M	0.5
Vector N	

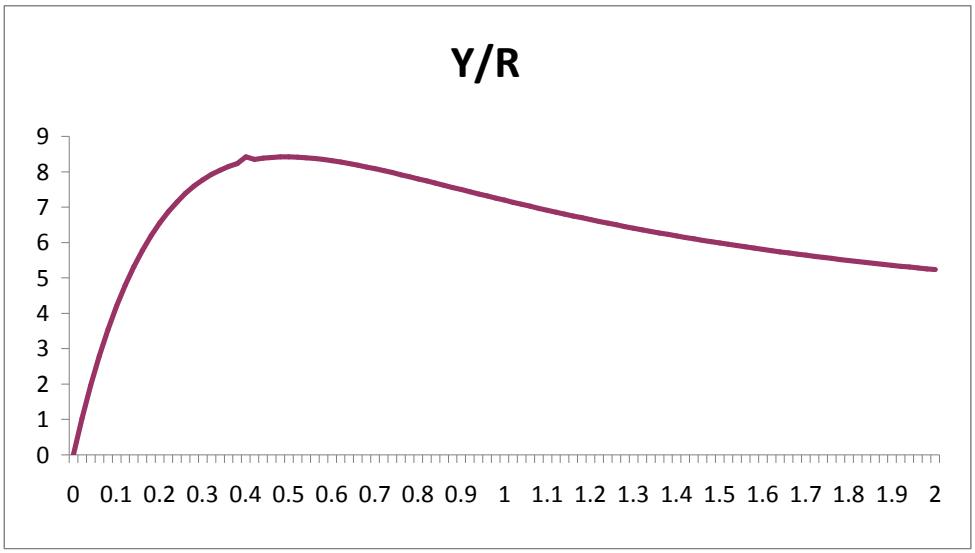
Model characteristics

Results

	Total	Gear			
Current YR	7.197				
Maximum Y/R	8.419				
Y/R 0.1	8.419				
F_{max}	0.5				
$F_{0.1}$	0.4				
Current B/R	3.771				
Maximum B/R	28.208				
B/R 0.1	10.281				

Comments

Comments


Y/R
9
8
7
6
5
4
3
2
1
0
0 0.1 0.2 0.3 0.4 0.5 0.6 0.7 0.8 0.9 1 1.1 1.2 1.3 1.4 1.5 1.6 1.7 1.8 1.9 2

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Assessment form	**Sheet D Diagnosis**

Code: HKE0309Sad

Indicators and reference points

Criterion	Current value	Units	Reference Point	Trend	Comments
B	1E+09	Kg/day			
SSB	0.897				
F	1.851	Fmax		0.5	
Y			F0,1	0.4	
CPUE	31	Kg/day			

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

Unidimensional

☐	? - (or blank) **Not known or uncertain**. Not much information is available to make a judgment;
☐	U - **Underexploited, undeveloped or new fishery**. Believed to have a significant potential for expansion in total production;
☐	M - **Moderately exploited**, exploited with a low level of fishing effort. Believed to have some limited potential for expansion in total production;
☐	F - **Fully exploited**. The fishery is operating at or close to an optimal yield level, with no expected room for further expansion;
☉	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;
☐	D - **Depleted**. Catches are well below historical levels, irrespective of the amount of fishing effort exerted;
☐	R - **Recovering**. Catches are again increasing after having been depleted or a collapse from a previous;

Bidimensional

Exploitation rate

☐	No or low fishing
☐	Moderate fishing
☉	High fishing mortality
☐	Uncertain / Not assessed

Stock abundance

☐	Virgin or high abundance
☐	Intermediate abundance
☉	Low abundance

☐	Depleted
☐	Uncertain / Not assessed

Comments

The result of the model show that this stock is overexpoilted
The expoitation is based on recruits

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Assessment form	**Sheet Z** **Objectives and recommendations**

Code: HKE0309Sad

Management advice and recommendations*

It is recommanded to decrease the fishing mortality

Advice for scientific research*

Accomplish the biological study through landing longliners and trawlers sampling in order the estimate the biologic parameters for European hake in Moroccan coast;

Accomplish the stock assessment of this species exploited by longliners in Moroccan caost,

It is adviced to use the surveys data and run the software SURBA in order to compare the two results,

Under take survey regulary.