

SAC GFCM

Sub-Committee on Stock Assessment

Date* **15** **September** **2011**

Code* **MUT0711Ang**

Authors* Angélique Jadaud*, Beatriz Guijarro**, Enric Massuti** and Henri Farrugio*

Affiliation* (*) IFREMER, 1 rue Jean Monnet, BP 171, 34203 Sète (France); (**) IEO- Centre Oceanogràfic de les Balears, Moll de Ponent s/n, 07015 Palma (Spain)

Species Scientific name* **1** *Mullus barbatus* - *MUT*
Source: GFCM Priority Species

2
Source: -

3
Source: -

Geographical area* Gulf of Lions

Geographical Sub-Area (GSA)* 07 - Gulf of Lions

Combination of GSAs **1**
2
3

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Assessment form

Sheet #0

Basic data on the assessment

Code: MUT0711Ang

Date*	15	Sep	2011	Authors*	Angélique Jadaud*, Beatriz Guijarro**, Enric Massuti** and Henri Farrugio*
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Species Scientific name*	Mullus barbatus - MUT	Species common name*	Red mullet

Data Source

GSA*	07 - Gulf of Lions	Period of time*	2004-2010
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Description of the analysis

Type of data*	Size composition of catches, official landings	Data source*	IFREMER and IEO
Method of assessment*	XSA and Y/R	Software used*	XSA (FLR)

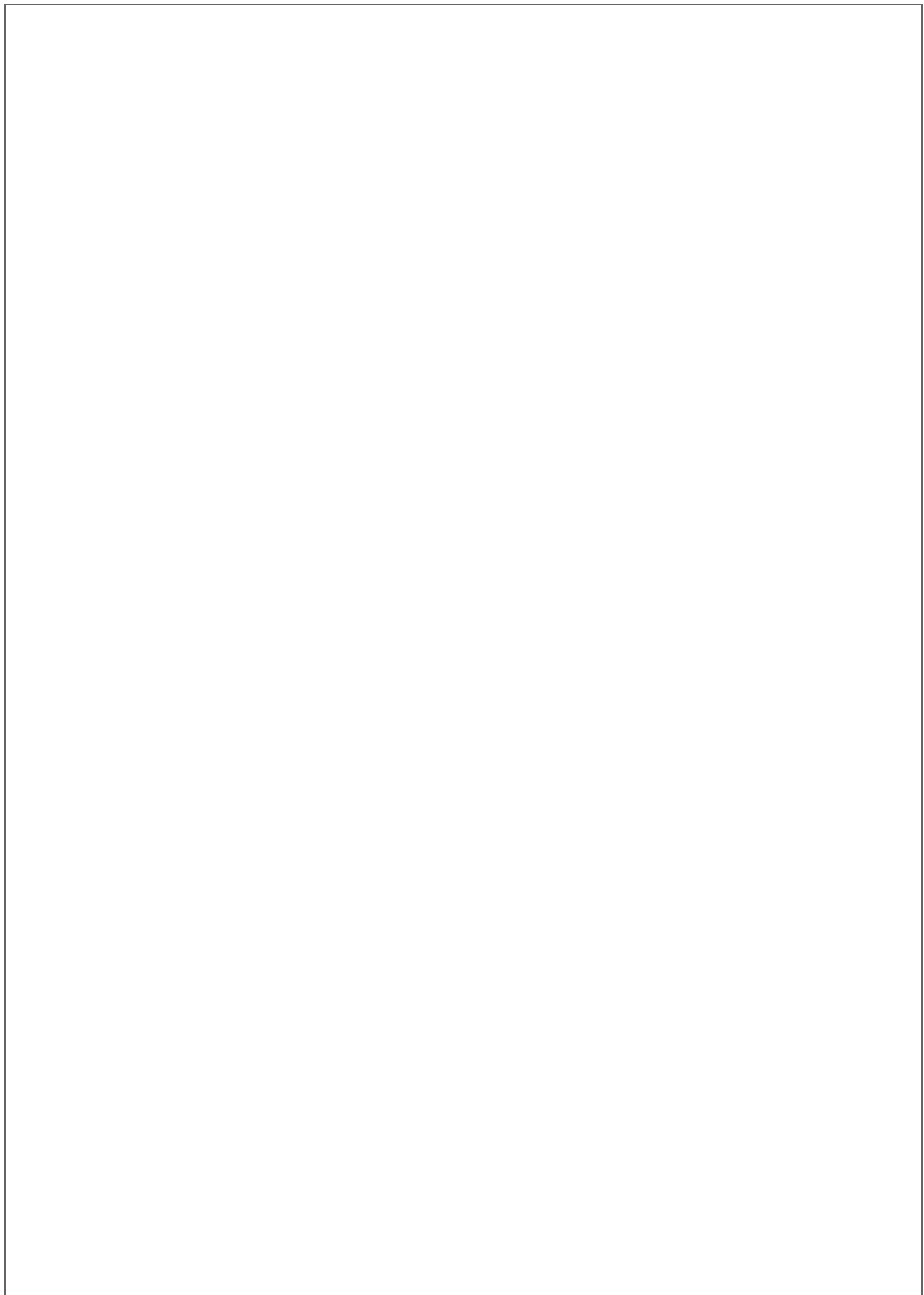
Sheets filled out

B	P1	P2a	P2b	G	A1	A2	A3	Y	Other	D	Z	C
1	1	2	2	---	1	1	1	1	---	1	1	---

Comments, bibliography, etc.

Abella, A., Caddy, J.F., Serena, F. (1997). Do natural mortality and availability decline with age? An alternative yield paradigm for juvenile fisheries, illustrated by the hake *Merluccius merluccius* fishery in the Mediterranean. *Aquat. Liv. Res.*, 10: 257–269.

García-Rodríguez M. and Fernández A.M. 2005. Influencia de la geometría de la malla del copo en las capturas, selectividad y rendimientos de algunas especies de peces comerciales en el Golfo de Alicante (SE de la península Ibérica). *Inf. Tec. Ins. Esp. Oceanogr.* 185.



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Sheet B
Biology of the species

Code: MUT0711Ang

Biology

Somatic magnitude measured (LH, LC, etc)*				Total length	Units*	cm
Sex	Fem	Mal	Both	Unsexed		
Maximum size observed				29(2)	Reproduction season	
Size at first maturity				8.6	Reproduction areas	
Recruitment size				5	Nursery areas	

Parameters used (state units and information sources)

		Units	Sex			
			female	male	both	unsexed
Growth model	L_{∞}					29
	K					0.6
	t0					-0.1
	Data source	Parameters from GSA 9 (1)				
Length weight relationship	a					0.0077 (2)
	b					3.1315 (2)
	M					0.72 (3)
	sex ratio (mal/fem)					

Comments

- (1) Parameters from GSA 9 (Growth, maturity ogive, natural mortality)
- (2) French National Data Collection Programme
- (3) Vector of M at age, calculated from Caddy (1991) equation using the PROBIOM Excel spreadsheet (Abella et al., 1997)

Age	M
0	1.30
1	0.79
2	0.62
3	0.54
4	0.54
5+	0.54

Mean 0.72

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Sheet P1

General information about the fishery

Code: MUT0711Ang

Data source*	IFREMER, IEO and French and Spanish official data	Year (s)*	2004-2010
Data aggregation (by year, average figures between years, etc.)*		Average 2004-2010	

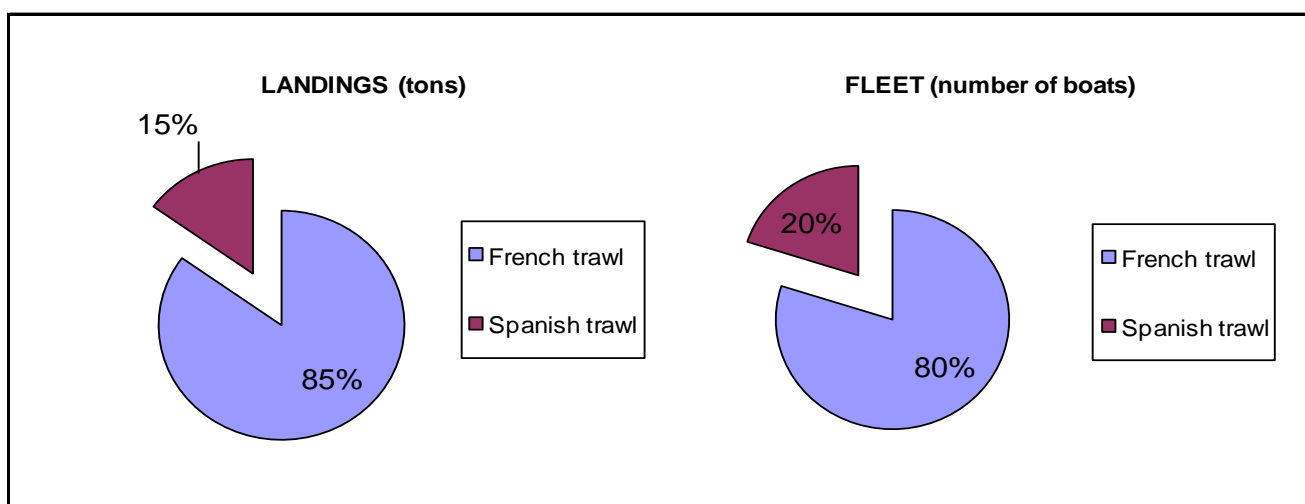
Fleet and catches (please state units)

	Country	GSA	Fleet Segment	Fishing Gear Class	Group of Target Species	Species
Operational Unit 1*	FRA	07	I - Long line (12-24 metres)	03 - Trawls	33 - Demersal shelf species	MUT
Operational Unit 2	ESP	07	E - Trawl (12-24 metres)	03 - Trawls	33 - Demersal shelf species	MUT
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
FRA 07 I 03 33 - MUT	101	Tons	157.7	D. labrax, Pagellu	No		days
ESP 07 E 03 33 - MUT	27	Tons	27.9	Pagellus spp., M	No		days
Total	128		185.6				

Legal minimum size	11 cm total length
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Comments



Comments



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Assessment form

Sheet P2a
Fishery by Operational Unit

Code: MUT0711Ang

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Data source*	IFREMER and French official data	OpUnit 1*	FRA 07 I 03 33 - MUT
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Time series

Year*	2004	2005	2006	2007	2008	2009
Catch	151	148	183	172	111	120
Minimum size	7	7	9	7	8	8
Average size Lc	13.5	14.0	13.8	14.1	15.2	13.9
Maximum size	25	29	24	24	25	26
Fleet	121	114	111	101	86	86

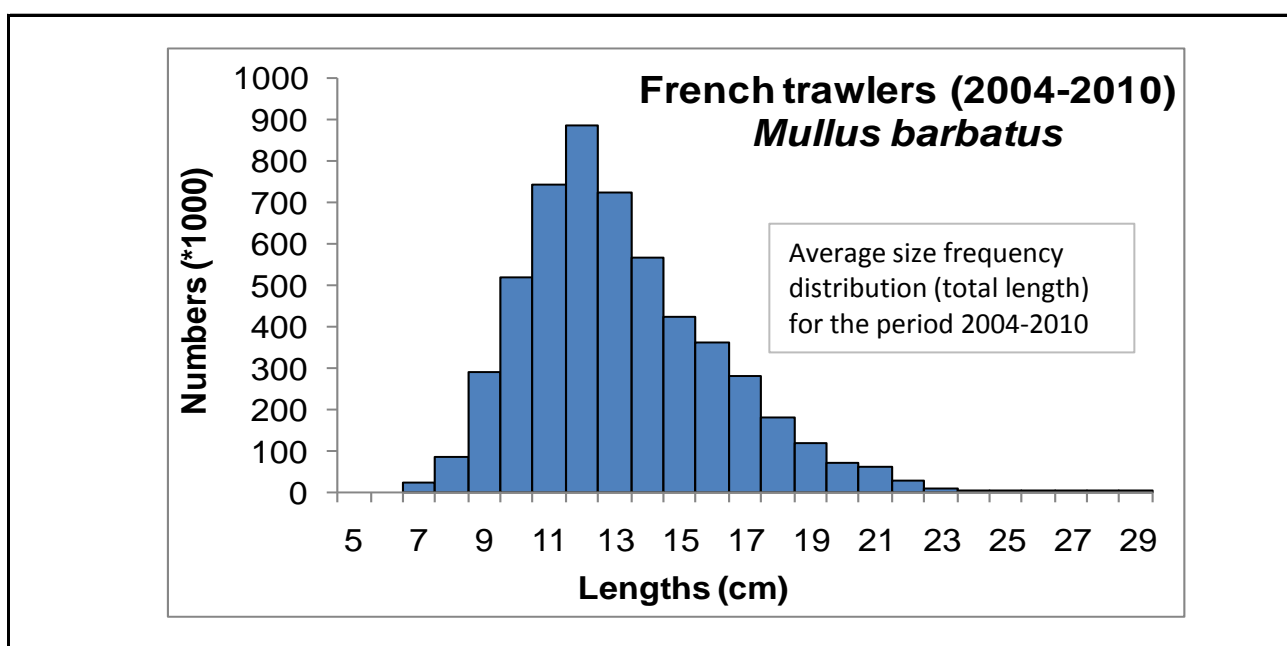
Year	2010					
Catch	219					
Minimum size	7					
Average size Lc	12.5					
Maximum size	27					
Fleet	86					

Selectivity

Remarks

L25	6.9	Parameters for 40 mm diamond mesh in the cod-end From García-Rodríguez and Fernández (2005) from GSA 06 (Northern Spain).
L50	7.8	
L75	8.9	
Selection factor	1.95	

Structure by size or age



Structure by size or age

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Assessment form

Sheet P2a
Fishery by Operational Unit

Code: MUT0711Ang

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Data source*	IEO and Spanish official data	OpUnit 2*	ESP.07.E.03.33 - MUT
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Time series

Year*	2004	2005	2006	2007	2008	2009
Catch	26	28	33	37	21	26
Minimum size	7	8	5	9	9	5
Average size Lc	13.4	14.7	14.2	15.2	16.4	14.5
Maximum size	26	29	29	27	28	26
Fleet	33	37	29	24	27	33

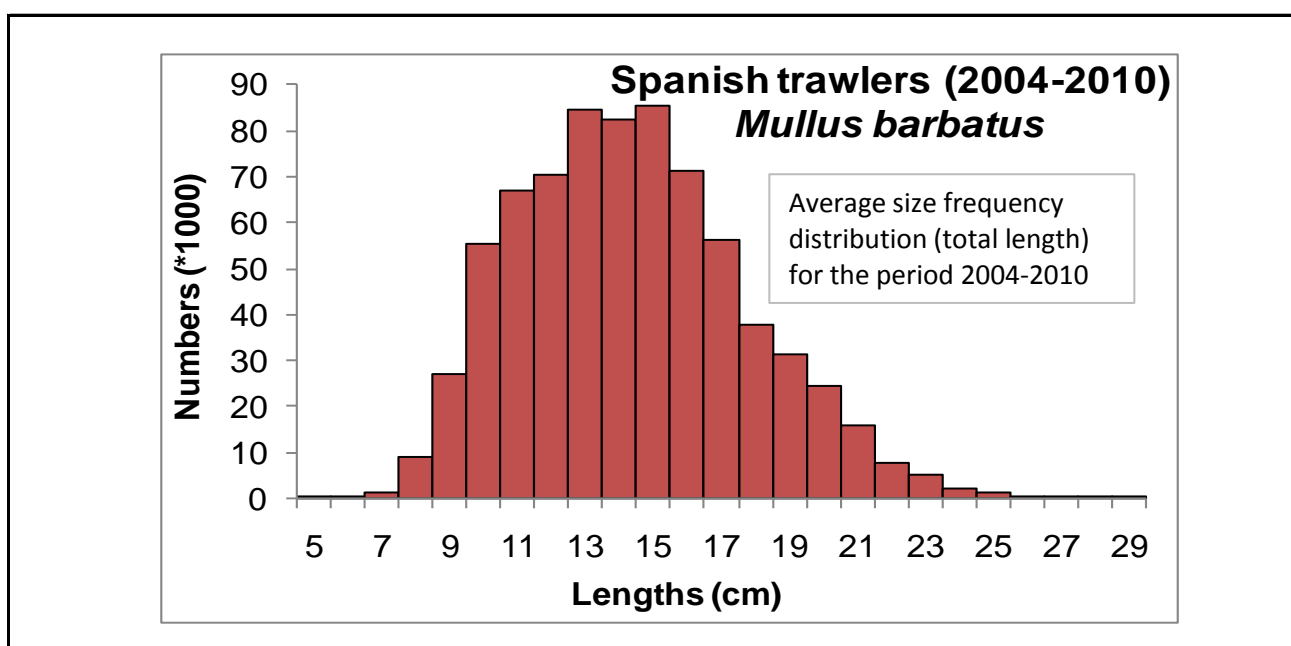
Year	2010					
Catch	25					
Minimum size	8					
Average size Lc	13.4					
Maximum size	26					
Fleet	29					

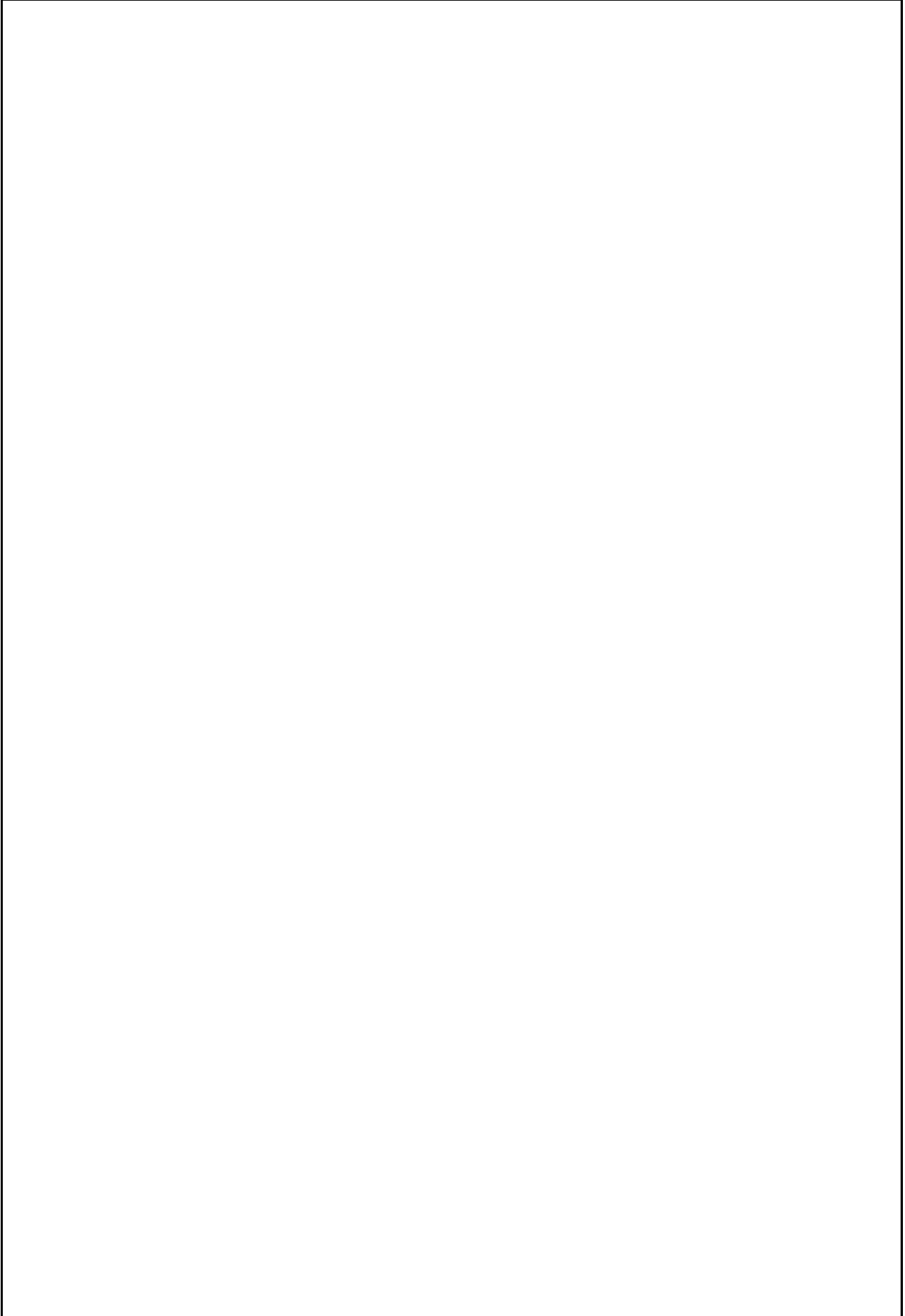
Selectivity

Remarks

L25	6.9	Parameters for 40 mm diamond mesh in the cod-end From García-Rodríguez and Fernández (2005) from GSA 06 (Northern Spain).
L50	7.8	
L75	8.9	
Selection factor	1.95	

Structure by size or age





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Assessment form

Sheet P2b
Fishery by Operational Unit

Code: MUT0711Ang

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Data source* IFREMER

OpUnit 1* FRA 07 I 03 33 - MUT

Regulations in force and degree of observance of regulations

- Fishing license: fully observed
- Engine power limited to 316 KW or 500 CV: not observed
- Cod-end mesh size (bottom trawl: square 40 mm or 50 mm diamond with derogation): not fully observed
- Fishing forbidden within 3 miles (France): not fully observed

Accompanying species

French trawl fishery developed along the continental shelf of the Gulf of Lions is a multi-specific fishery. In addition to *M. barbatus*, the following species can be considered as important in landings:

- *Mullus surmuletus*
- *Merluccius merluccius*
- *Pagellus acarne*
- *Pagellus erythrinus*
- *Trachurus* spp
- *Scyliorhinus canicula*
- *Trachinus* spp
- Triglidae
- *Scorpaena* spp
- *Octopus vulgaris*
- *Eledone* spp
- *Lophius* spp
- ...



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Sheet P2b
Fishery by Operational Unit

Code: MUT0711Ang

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Data source* IEO

OpUnit 2*

ESP 07 E 03 33 - MUT

Regulations in force and degree of observance of regulations

- Fishing license: fully observed
- Engine power limited to 316 KW or 500 CV: not observed
- Mesh size in the codend (square 40 mm or 50 mm diamond with derogation): fully observed
- Fishing forbidden <50 m depth: fully observed
- Time at sea: fully observed

Accompanying species

Spanish trawl fishery developed along the continental shelf of the Gulf of Lions is a multi-specific fishery. In addition to *M. barbatus*, the following species can be considered as important in landings:

- *Mullus surmuletus*
- *Merluccius merluccius*
- *Pagellus acarne*
- *Pagellus erythrinus*
- *Trachurus* spp
- *Scyliorhinus canicula*
- *Trachinus* spp
- Triglidae
- *Octopus vulgaris*
- *Eledone* spp
- *Lophius* spp
- ...

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Sheet A1
Indirect methods: VPA, LCA

Sex* Unsexed

Code: MUT0711Ang

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Analysis # * 1

Time series

Data	Size	Age
(mark with X)		X

Model	Cohorts	Pseudocohorts
(mark with X)	X	

Equation used	Standard catch equation	Tuning method	Extended Survivor Analysis (XSA)
# of gears	2	Software	FLR
F _{terminal}			

Population results (please state units)

	Sizes	Ages		Amount	Biomass
Minimum			Recruitment	24.31	436.46
Average			Average population	28.79	692.89
Maximum			Virgin population		
Critical			Turnover	B/SSB	SSB
				2.7	256.43
				mean - Millions	mean - Tons

Average mortality

	Total	Gear				
F ₁	0.9					
F ₂	1.1					
Z	1.92					

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

Comments

Population results as average (arithmetic mean) for the period 2004-2010:
 F1: averaged 2004-2010 Fbar 2-5; F2: averaged 2004-2010 Fbar 0-3; Z: averaged F2 + M vector (0-3); Fbar is the averaged of all F for years and ages 2-5 or 0-3

Tuning CPUE data:

- Bottom trawl survey MEDITS (20 mm mesh in the cod-end): It has been used data from the French surveys

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Assessment form

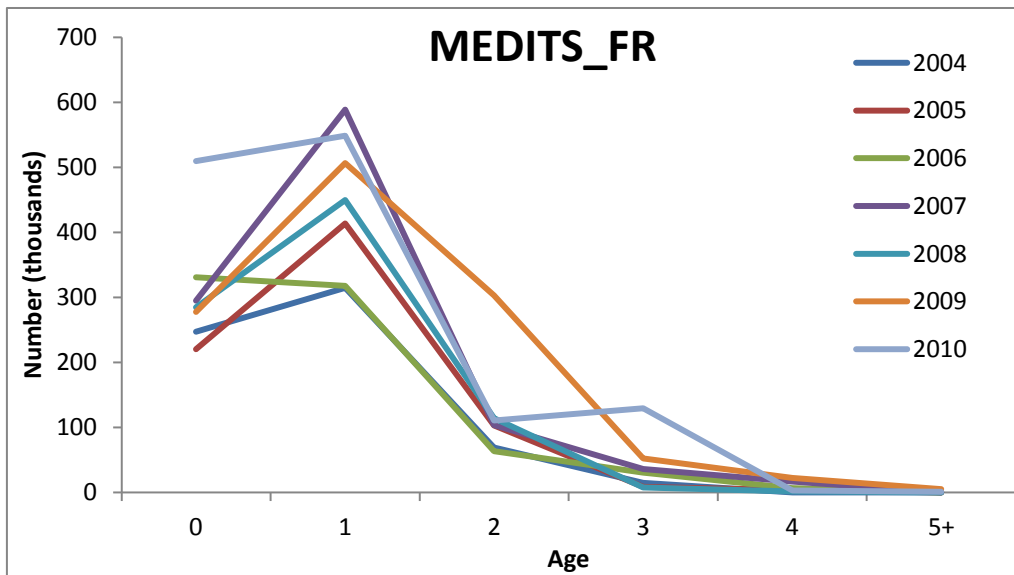
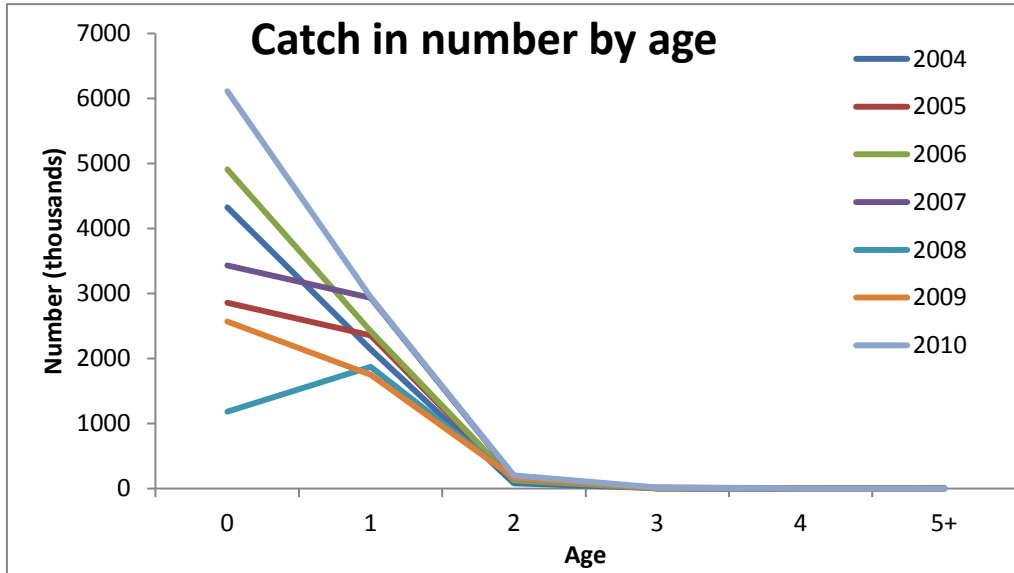
Sheet A2
Indirect methods: data

Code: MUT0711Ang

Sex*	Both	Gear*	French and Spanish trawl	Analysis # *	1
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Data source	Catch in numbers by age and CPUE for tuning
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Data



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Assessment form

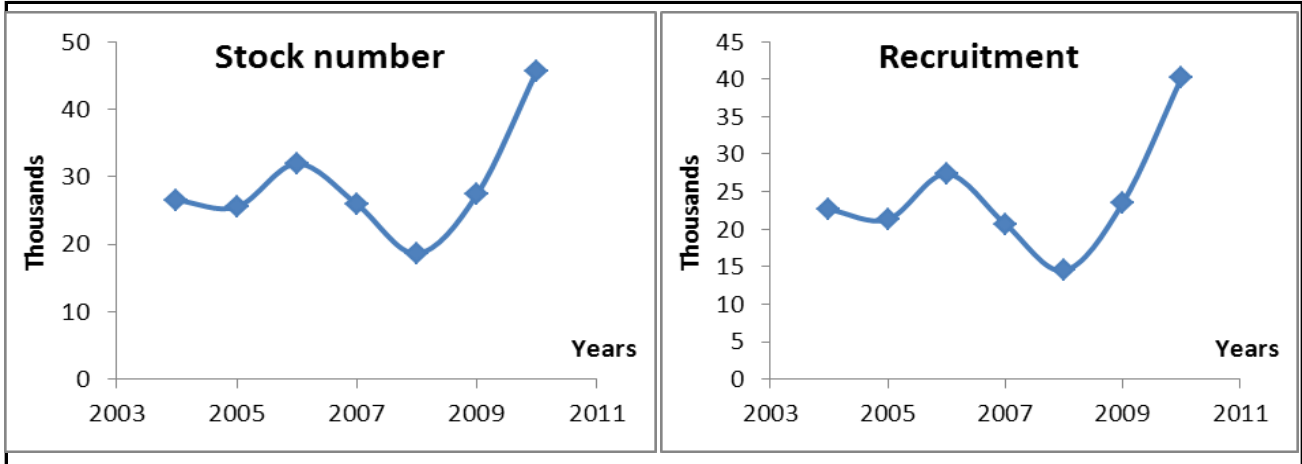
Sheet A3
Indirect methods: VPA results

Code: MUT0711Ang

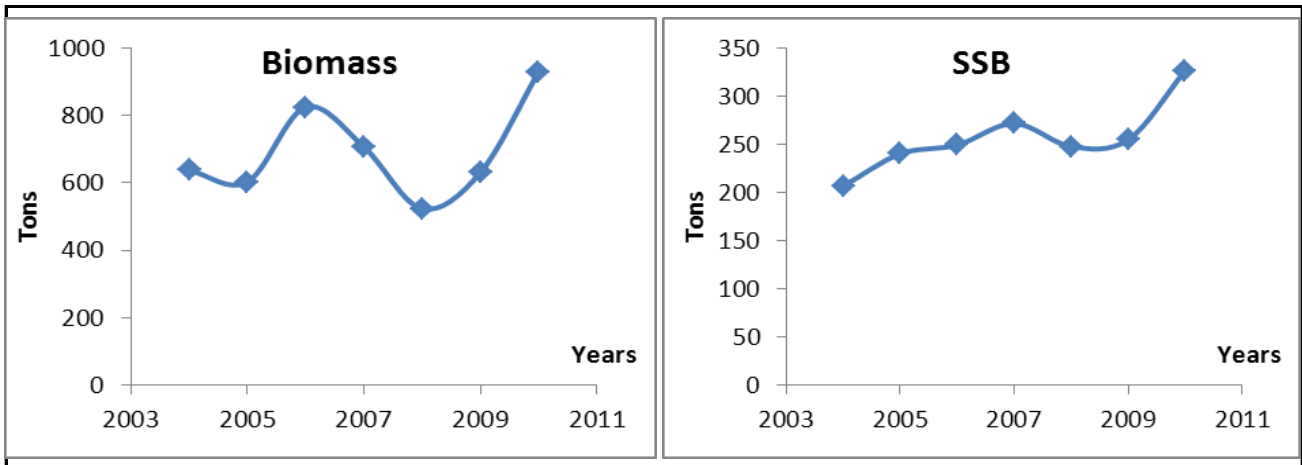
Page 1 / 1

Sex*	Unsexed	Gear*	French and Spanish trawl	Analysis #*	1
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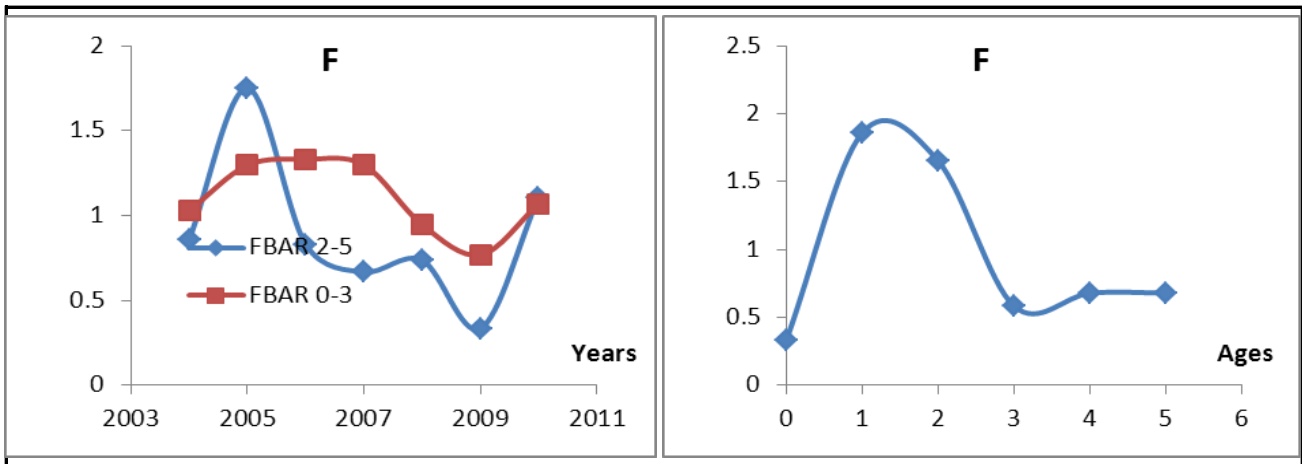
Population in figures



Population in biomass



Fishing mortality rates



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Assessment form Sheet Y
Indirect methods: Y/R

Sex: Unsexed Code: MUT0711Ang
Analysis #: 1

of gears: 2 Software:

Parameters used

Vector F	0.25 (0); 1.60 (1); 1.52 (2); 0.34 (3); 0.52 (4); 0.52 (5+)
Vector M	1.30 (0); 0.79 (1); 0.62 (2); 0.54 (3); 0.54 (4); 0.54 (5+)
Vector N	

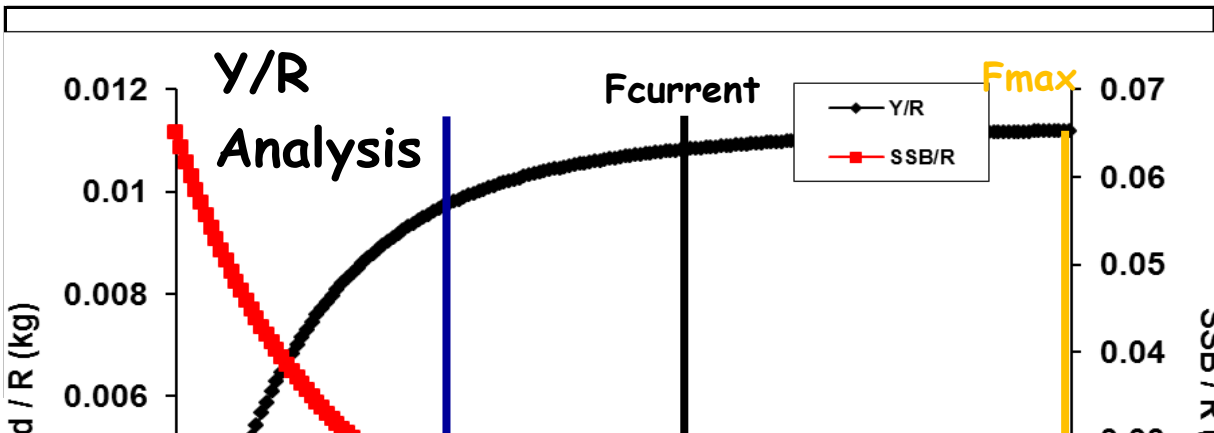
Model characteristics

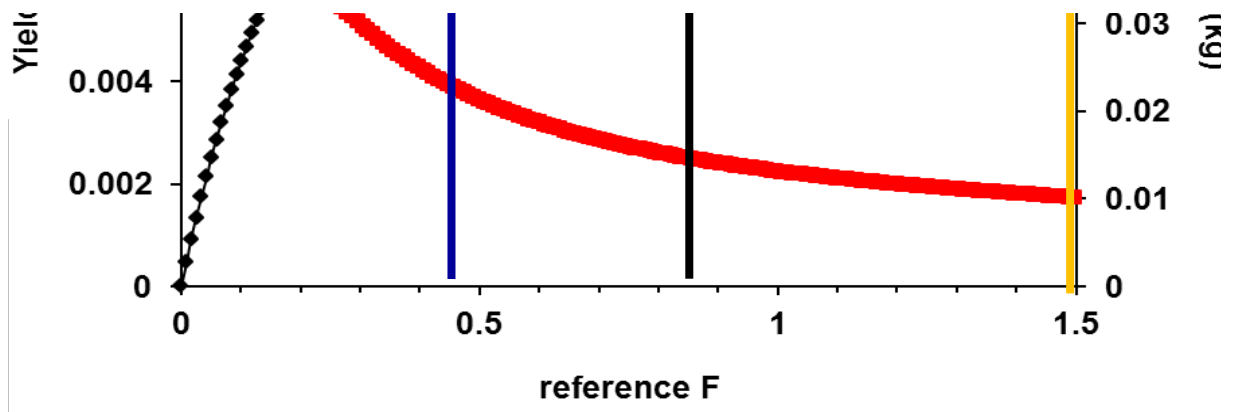
F reference calculated on the mean of the last 3 years (2008-2010) and on the ages 0-4

Results

	Total	Gear			
Current Y/R	0.0108				
Maximum Y/R	0.0112				
Y/R 0.1	0.0097				
F _{max}	1.68				
F _{0.1}	0.45				
Current B/R	0.031				
Maximum B/R	0.026				
B/R 0.1	0.04				
F ref	0.846				
	Absolute values				

Comments





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Assessment form

Sheet D
Diagnosis

Code: MUT0711Ang

Indicators and reference points

Criterion	Current value	Units	Reference Point	Trend	Comments
B	692.89	tons			
SSB	256.43	tons			
F	0.846	Absolut	0.45		(F0.1= F reference point); Fmax= 1.68
Y	0.01	kg	0.01		
CPUE					

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

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

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

Comments

It was recommended to use the status “stock in overfishing status ” instead of “Overexploited”.
In the assesement forms we filled “none” instead of “overexploited”.

This stock is in overfishing status with intermediate abundance

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Assessment form

Sheet Z

Objectives and recommendations

Code: MUT0711Ang

Management advice and recommendations*

In consideration to F0.1 as reference point, it is recommended to decrease fishing mortality

Advice for scientific research*

This year, the assessment has been improved by applying an Extended Survivor Analysis, instead of a pseudo-cohort analysis as done in previous years.

Abstract for SCSA reporting

Authors Angélique Jadaud*, Beatriz Guijarro**, Enric Massuti** and Henri Farrugio* **Year** 2011

Species Scientific name Mullus barbatus - MUT
Source: GFCM Priority Species

Source: -

Source: -

Geographical Sub-Area 07 - Gulf of Lions

Fisheries (brief description of the fishery)*

In the Gulf of Lions (GFCM-GSA07), red mullet (*Mullus barbatus*) is exploited by both French and Spanish trawlers. Around 120 boats are involved in this fishery. According to official statistics, total annual landings for the period 2004-2010 have oscillated around a mean value of 157 tons. Most boats and catches correspond to the French trawling fleet (80% and 85% respectively). In French and Spanish landings, modal length is 14 cm.

In GSA 7, the trawl fishery is a multi-specific fishery. In addition to *M. barbatus*, the following species can be considered important by-catches: *Merluccius merluccius*, *Lophius* sp., *Pagellus* sp., *Trachurus* sp., *Mullus surmuletus*, *Octopus vulgaris*, *Eledone* sp., *Scyliorhinus canicula*, *Trachinus* sp., *Triglidae*, *Scorpaena* sp.

Length at first capture is about 7 cm. Catch is mainly composed by individuals of age 0 and 1, while the oldest age class (5+ group) is poorly represented. Catch rates showed oscillations, with an increase in the last year (2010).

Source of management advice*

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

The information used for the assessment of the stock consisted in annual size composition of French and Spanish trawler landings and biological parameters from GSA 9; growth, natural mortality (PROBIOM Excel spreadsheet, Abella et al., 1997), maturity ogive. The other biological parameters were obtained from the French National Data Collection Programme GSA 7 (length weight parameters).

The assessment of this stock has been carried out by means of Extended Survivor Analysis (XSA) for the period 2004-2010, and yield-per-recruit (Y/R) for the period 2008-2010, considering French and Spanish trawl.

Stock Status*

Exploitation rate

High fishing mortality

Stock abundance

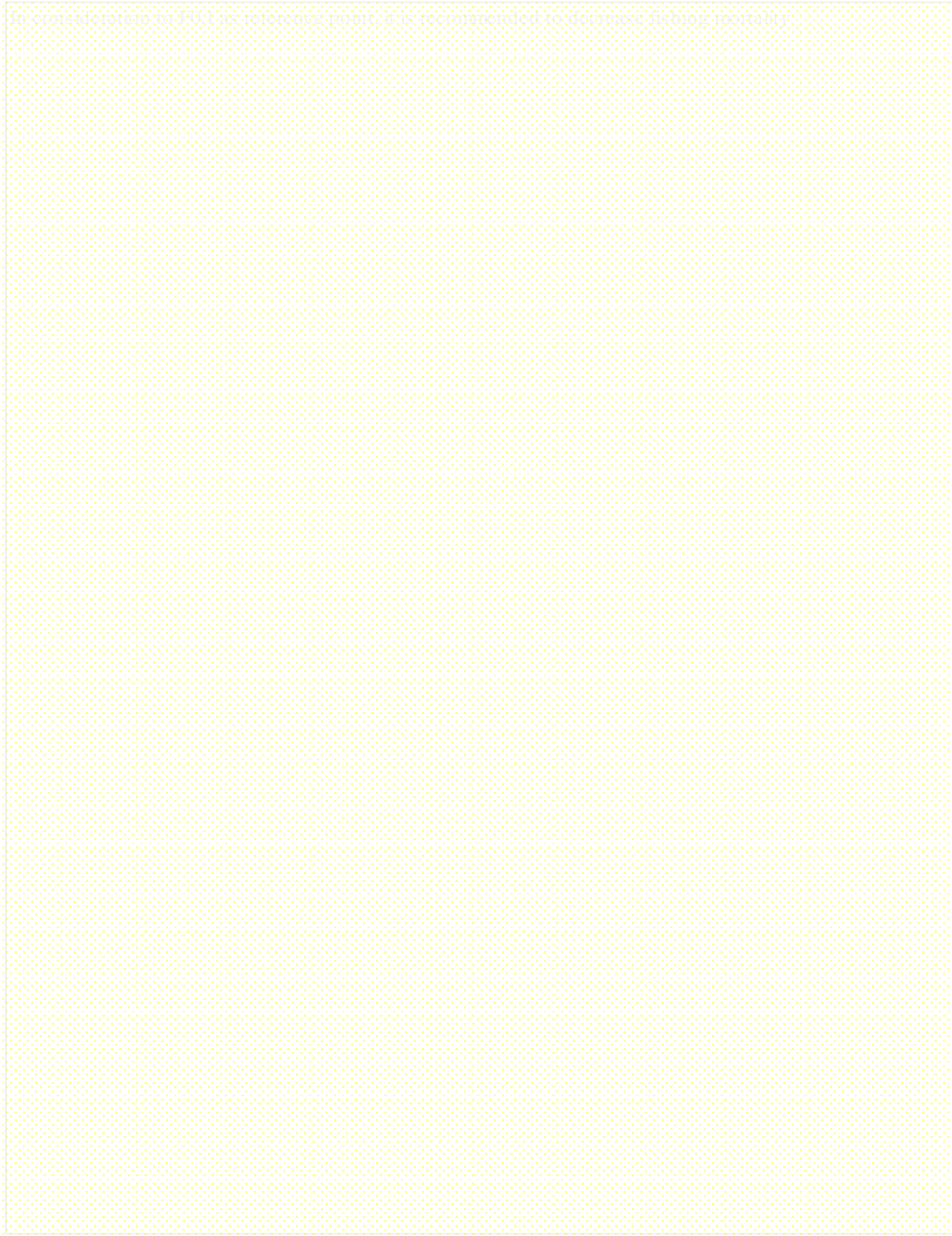
Intermediate abundance

Comments

This stock should be considered as overexploited since the assessment finds the stock to be overexploited.

This stock is currently being fished with intermediate intensity.

Management advice and recommendations*



Advice for scientific research*

For more information, please refer to the following links: [SCSA Assessment Forms](#) and [SCSA Assessment Forms](#)

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