

SAC GFCM Sub-Committee on Stock Assessment

Date*	19	September	2011	Code*	DPS0611Pér
Authors*	Pérez-Gil José Luis ¹ , Quintanilla Luis ¹ , Herrera Ester ² and Vivas Miguel ² .				
Affiliation*	1. IEO. Centro Oceanográfico Málaga, Fuengirola.29640. (Spain). Joseluis.perez@ma.ieo.es 2. IEO. Centro Oceanográfico de Murcia, POBox022, 30740, San Pedro de Pinatar. Murcia. Spain.				
Species Scientific name*	1	Source: GFCM Priority Species			
	2	Source: -			
	3	Source: -			
Geographical area*	Mediterranean Balearic 37.1.1 FAO				
Geographical Sub-Area (GSA)*	06 - Northern Spain				
Combination of GSAs	1				
	2				
	3				

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

Assessment form

Sheet #0

Basic data on the assessment

Code: DPS0611Pér

Date*	19	Sep	2011	Authors*	Pérez-Gil José Luis ¹ , Quintanilla Luis ¹ , Herrera Ester ² and Vivas Miguel ² .
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Species Scientific name*	Parapenaeus longirostris - DPS	Species common name*	Deep-water pink shrimp
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Data Source

GSA*	06 - Northern Spain	Period of time*	2001-2010
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Description of the analysis

Type of data*	Size composition of commercial landings	Data source*	Official data Regional Governments
Method of assessment*	Separable VPA - Extended Survivor Analysis (XSA)	Software used*	VPA Lowestoft (Darby and Flatman, 1994) FLR (libraries in R)

Sheets filled out

B	P1	P2a	P2b	G	A1	A2	A3	Y	Other	D	Z	C
1	1	1	---	---	1	1	4	---	---	1	1	---

Comments, bibliography, etc.

Abelló P., A. Abella, A. Adamidou, S. Jukic-Peladic, P. Maironao & M. T. Spedicato, 2002. Geographical patterns in abundance and population structure of *Nephrops norvegicus* and *Parapenaeus longirostris* (Crustacea: Decapoda) along the European Mediterranean coasts. *Scientia Marina*, 66: 125–141.

García-Rodríguez, M., J. L. Pérez Gil, E. Barcala, N. Carrasco & A. Eteban, 2007. Biology (growth and reproduction) of the Mediterranean deep-water rose shrimp (*Parapenaeus longirostris* Lucas, 1846), Crustacea, Decapoda) from the Alicante Gulf (S.E. Spain). *Rapp. Comm. int. Mer Méditerranée*, 38: 482.

García-Rodríguez, M., J. L. Pérez-Gil, E. Barcala, 2009. Some biological aspects of *Parapenaeus longirostris* (Lucas, 1846) (Decapoda, Dendrobranchiata) in the Gulf of Alicante (S: E. Spain). *Crustaceana*, 82(3):293-310

Gujjarro, B. & E. Massuti, 2006. Selectivity of diamond- and square-mesh codends in the deepwater crustacean trawl fishery off the Balearic Islands (western Mediterranean). *ICES Journ. mar. Sci.*, 63 (1): 52-67.

Ihaka, R. & R. Gentleman, 1996. R: A language for data analysis and graphics. *Journal of Computational and Graphical Statistics*, 5 (3): 299-314. <http://www.amstat.org/publications/jcgs/>.

Kapiris, K., 2004. Feeding ecology of *Parapenaeus longirostris* (Lucas, 1846) (Decapoda: Penaeidae) from the Ionian Sea (central and eastern Mediterranean Sea). *Scientia Marina*, 68 (2): 247-256.

Comments, bibliography, etc.

Rinelli, P., D. Giordano & FL. Perdichizzi, 2005. Trawl gear selectivity on the deep-water rose shrimp (*Parapenaeus longirostris* Lucas, 1846) in the Southern Tyrrhenian Sea (central Mediterranean). *Cah. Biol. Mar.*, 46 (1): 1-7.

Sanpedro, P., M. Sainza, & V. Trujillo, 2005. A simple tool to calculate biological parameters' uncertainty. Working Document. In: Workshop on Sampling Design for Fisheries Data. Pasajes (Spain).

Sbrana, M., P. Sartor & P. Belcari, 2003. Analysis of the factors affecting crustacean trawl fishery catch rates in the northern Tyrrhenian Sea (western Mediterranean). *Fisheries Research*, 65 (1-3): 271-284.

Sbrana, M., C. Viva & P. Belcari, 2006. Fishery of the deep-water rose shrimp *Parapenaeus longirostris* (Lucas, 1846) (Crustacea: decapoda) in the northern Tyrrhenian Sea (western Mediterranean). *Hydrobiologia*, 557:135–144.

Sobrino, I., C. Silva, M. Sbrana & K. Kapiris, 2005. A review of the biology and fisheries of the deep water rose shrimp, *Parapenaeus longirostris*, in European Atlantic and Mediterranean waters (Decapoda, Dendrobranchiata, Penaeidae). *Crustaceana*, 78: 1153-1184.

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Sheet B
Biology of the species

Code: DPS0611Pér

Biology

Somatic magnitude measured (LH, LC, etc)*				CL	Units*	mm
Sex	Fem	Mal	Both	Unsexed		
Maximum size observed	44	34	44		Reproduction season	All year long, with a
Size at first maturity	25.6*				Reproduction areas	Continental shelf
Recruitment size			10		Nursery areas	Continental shelf

Parameters used (state units and information sources)

		Units	Sex			
			female	male	both	unsexed
Growth model	L ∞	mm			45	
	K	year-1			0.39	
	t0	year			0.1019	
	Data source	García-Rodríguez, Pérez Gil and Barcala, 2009.				
Length weight relationship	a				0.0019	
	b				2.611	

M PROBION spreadsheet (Abella et al, 1997).

sex ratio (mal/fem) 1.23

Comments

*García-Rodríguez et al. 2009

The parameters of the size-weight relationship used in this assesment are similar to those calculated by other authors, both in the Total Length-Carapace Length linear relationship for the Gulf of Cadiz (Sobrino, 1998), as well as for the Total Weight-Carapace Length potential relationship for Atlantic waters of southern Portugal (Ribeiro-Cascalho & Arrobas, 1987) and in the Aegean Sea (Tosunoglu et al., 2007), where the values of the allometry coefficient b were also lower than 3, especially in the males.

The estimates made for the VBGF parameters show, that, although the Linf values were similar, the values for the growth rate (K) used in this assesment are lower than those presented by other authors both for the Mediterranean (Ardizzone et al., 1990; D'Ongia et al., 1998) and for the Atlantic (Ribeiro-Cascalho, 1988; Sobrino, 1998), with males exhibiting higher growth rates than females. From these results, the estimated sizes per age class show that the males would reach 13.2 mm CL and the females 14.8 mm CL in the first year, which would indicate a life expectancy of 4 and 6 years for males and females, respectively. These results yield a life span twice as long as the 2 and 3 years, for males and females, that Frogliá (1982) found for Sicilian waters and Sobrino et al. (2005) in the Atlantic waters of the Gulf of Cadiz, as attributed to each generation of *P. longirostris*.

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Sheet P1

General information about the fishery

Code: DPS0611Pér

Data source*	I.E.O. Sampling and Information Network.	Year (s)*	2001-2010
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*	ESP	06	E - Trawl (12-24 metres)	03 - Trawls	33 - Demersal shelf species	DPS
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
ESP 06 E 03 33 - DPS	600	Tons	138*				boat/day
			* average				
			2001-2010				
Total	600						

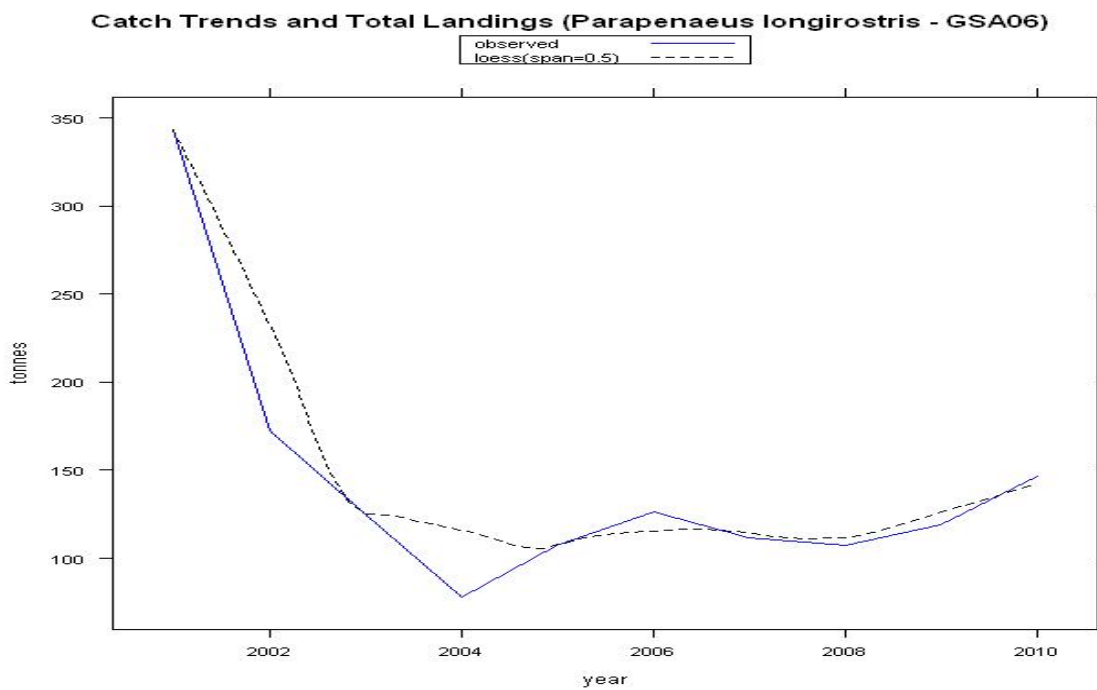
Legal minimum size

Comments

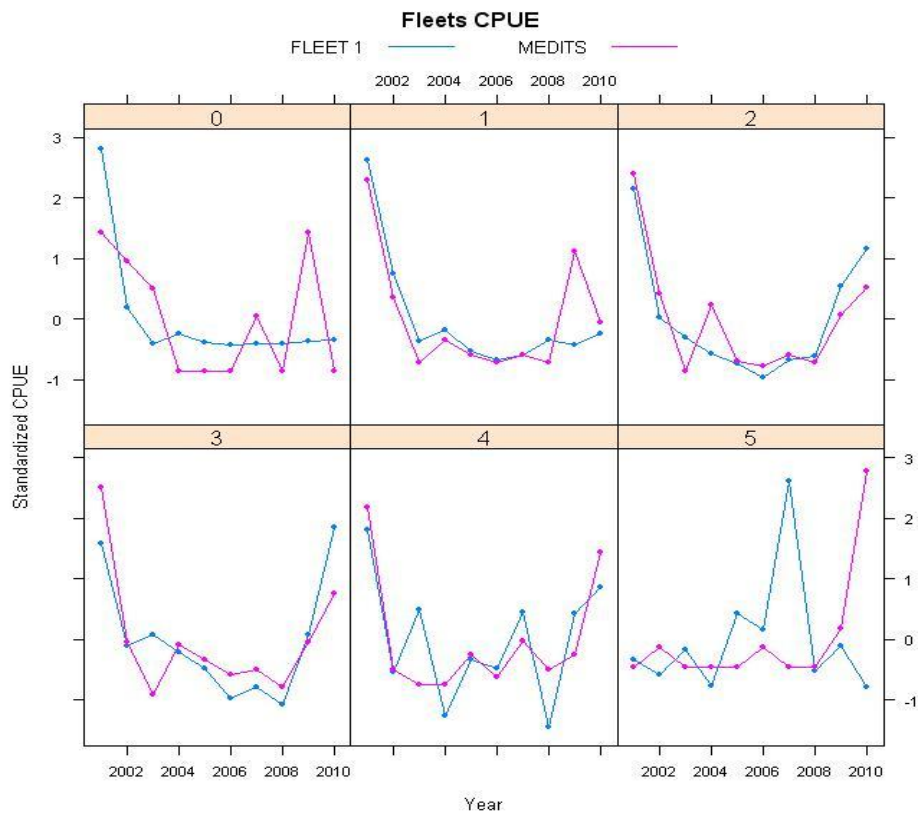
From official data, the total trawl fleet of the whole geographical sub-area 06 (Northern Spain) is made up by 558 (year 2010) boats, around 180 boats capture deep pink shrimp: on average, 47 TRB, 58 GT and 297 HP. (Some of these units (smaller vessels) operate almost exclusively on the shallow and deep continental shelf (targeted at red mullet, octopus, hake and sea breams), others (bigger vessels) operate almost exclusively on the upper and middle slope (targeted at decapod crustaceans) and the rest can operate indistinctly on the continental shelf and slope fishing grounds, depending on the season, the weather conditions and also economic factors (e.g. landings price). The percentage of these trawl fleet segments have been estimated* around 30, 40 and 30% of the boats, respectively. The pink shrimp is caught as a by-catch in the deep continental shelf and the upper slope.

(*) Alemany F. and F. Álvarez (2003) Determination of effective fishing effort on hake *Merluccius merluccius* in a Mediterranean trawl fishery. *Sci. Mar.*, 67(4): 491-499.

Comments



Since 2001 there was a declining trend in landings, from 341 tons in 2000 to the lowest in the series in 2004 (76 tons). Since 2005, landings increase to 123 tons. In the last years catch remain stabilized around 120 tons. It seems that from 2008 the landings have started to increase slightly.



1/ Fleet 1: GSA01 (All ports), Kgr/fishing day

2/ MEDITS_ES: Abundance indices (n/Km2)

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Sheet P2a
Fishery by Operational Unit

Code: DPS0611Pér

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Data source*	I.E.O. Sampling and Information Network.	OpUnit 1*	ESP 06 E 03 33 - DPS
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Time series

Year*	2001	2002	2003	2004	2005	2006
Catch	331.0	165.0	116.0	76.0	102.0	42.7
Minimum size	10	13	12	11	14	15
Average size Lc	24.2	24.2	26.4	25.4	26.8	27.0
Maximum size	41	41	41	41	43	42
Fleet	228	227	221	219	217	215

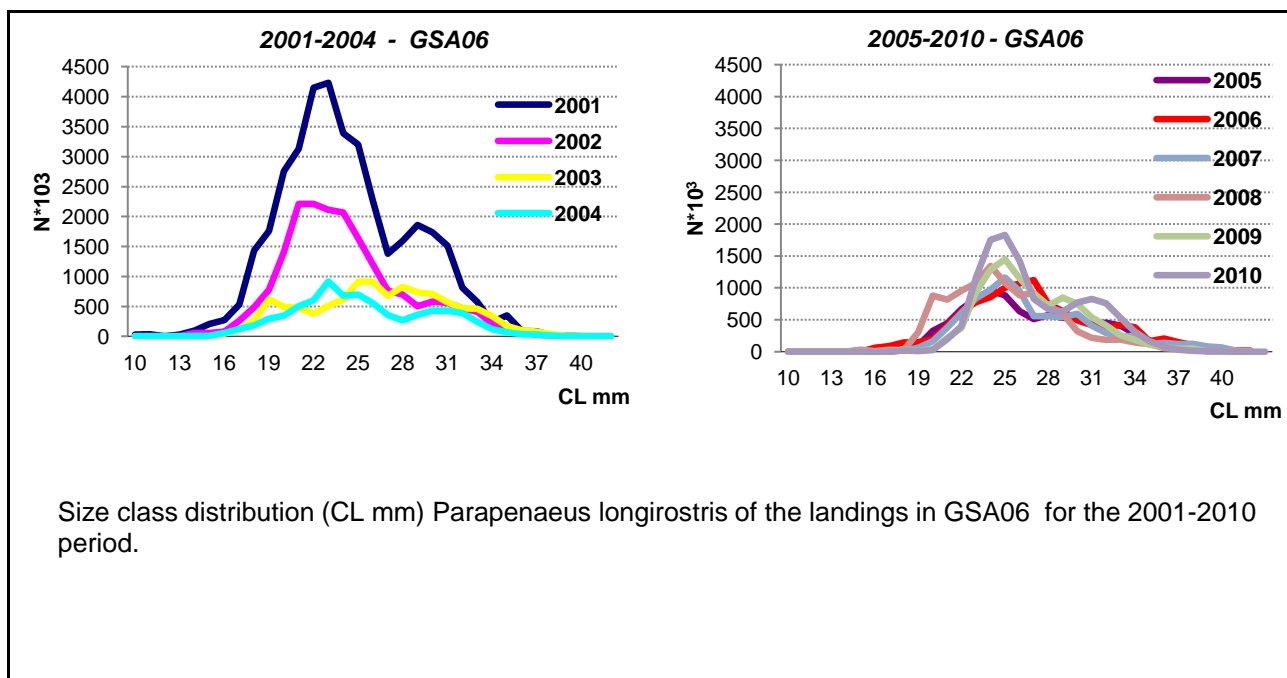
Year	2007	2008	2009	2010		
Catch	107	104	116	141		
Minimum size	16	15	16	15		
Average size Lc	27.0	27.2	27.1	27.1		
Maximum size	43	42	41	42		
Fleet	207	187	170	168		

Selectivity

Remarks

L25	14.7	B. Guijarro and E. Massutí, 2006. Selectivity of diamond- and square-mesh codens in the deepwater crustacean trawl fishery off the Balearic Islands (western Mediterranean). ICES-icesjms.63:52-67(2006)
L50	16.6	
L75	18.5	
Selection factor		

Structure by size or age



Structure by size or age

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Assessment form

Sheet P2b
Fishery by Operational Unit

Code: DPS0611Pér

Page 1 /

Data source*

OpUnit 1*

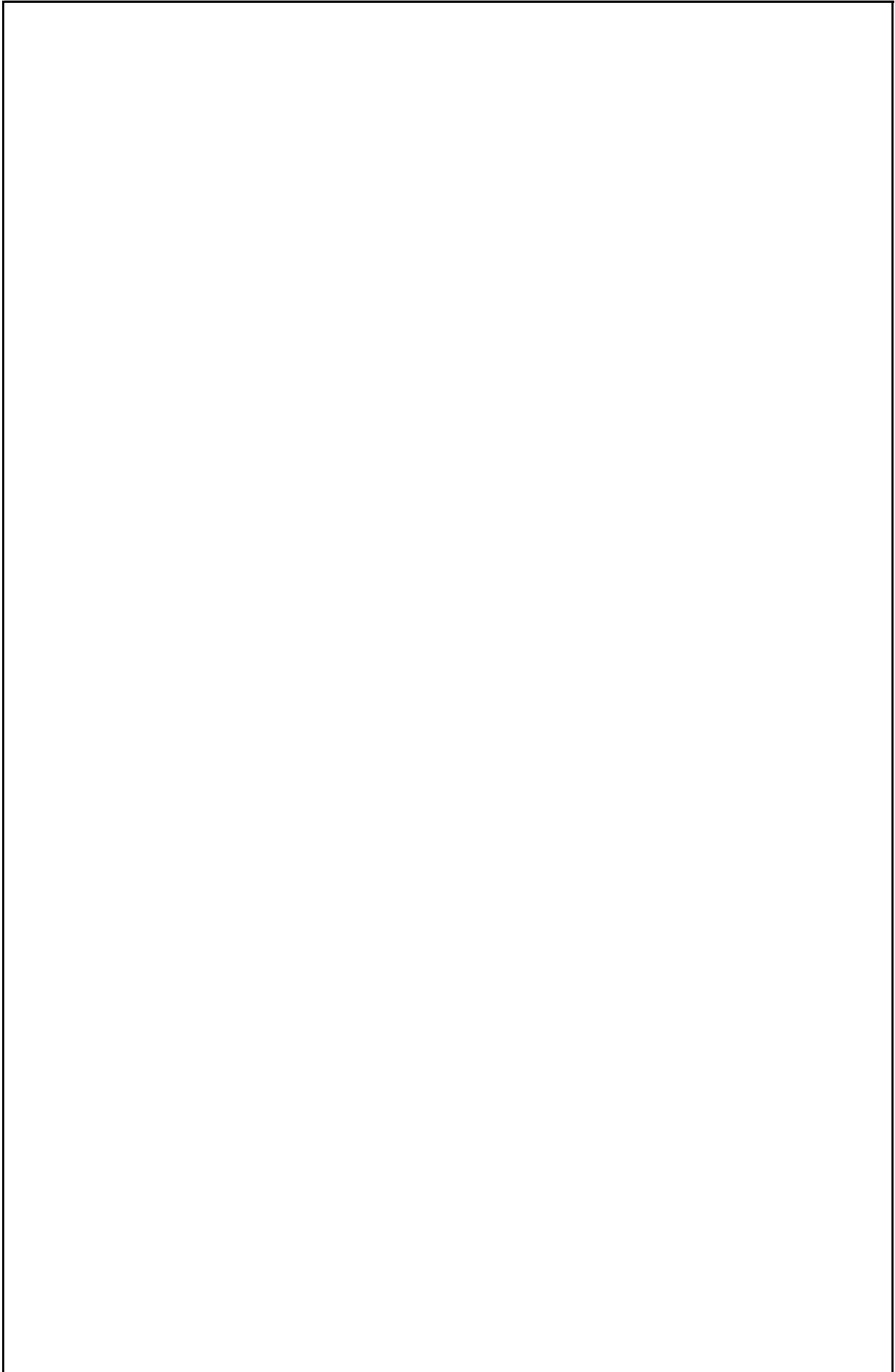
ESP 06 E 03 33 - DPS

Regulations in force and degree of observance of regulations

- Fishing license : fully observed
- Engine power limited to 316 KW or 500 HP: not fully observed
- Mesh size in the codend (40 mm square or 50 mm rhomboidal): fully observed
- Fishing forbidden within upper 50 m depth: not fully observed
- Time at sea (12 hours per day and 5 days per week): fully observed
- Minimum landing size (20 mm CL), (EC regulation 1967/2006): mostly fully observed

Accompanying species

- *Conger conger*
- *Galeus melastomus*
- *Helicolenus dactylopterus*
- *Lepidopus caudatus*
- *Lepidorhombus spp.*
- *Lophius spp.*
- *Merluccius merluccius*
- *Micromesistius poutassou*
- *Mullus barbatus*
- *Mullus surmuletus*
- *Nephrops norvegicus*
- *Octopus vulgaris*
- *Pagellus bogaraveo*
- *Phycis blennoides*
- *Scylliorhinus canicula*
- *Scorpaena spp.*
- *Trisopterus minutus capelanus*



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Assessment form

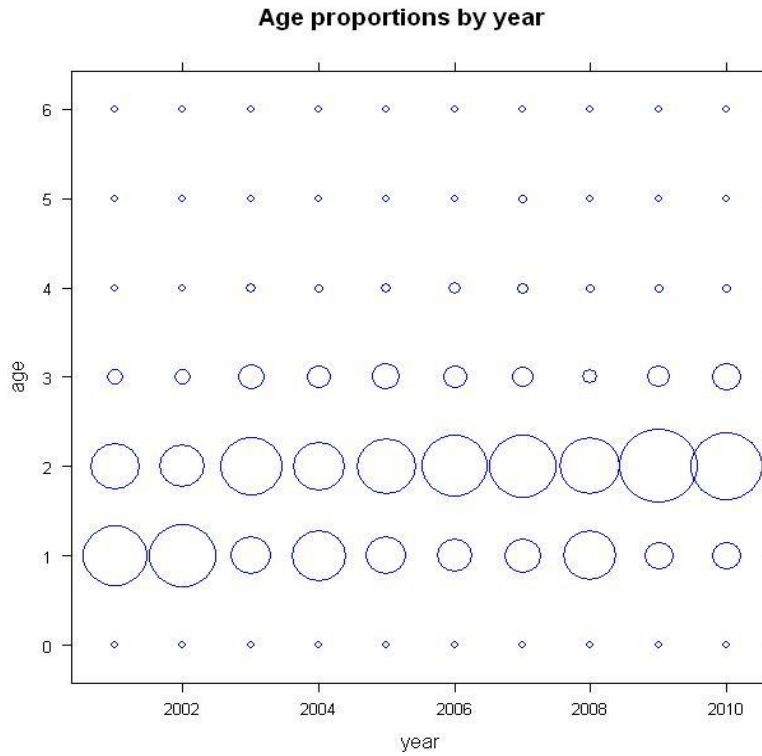
Sheet A2
Indirect methods: data

Code: DPS0611Pér

Sex*	B	Gear*	Trawl	Analysis # *	VPA
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Data	Catch number by age
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Data



Exploitation is based on young age classes, mainly 2 and 1 year old individuals.

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Assessment form

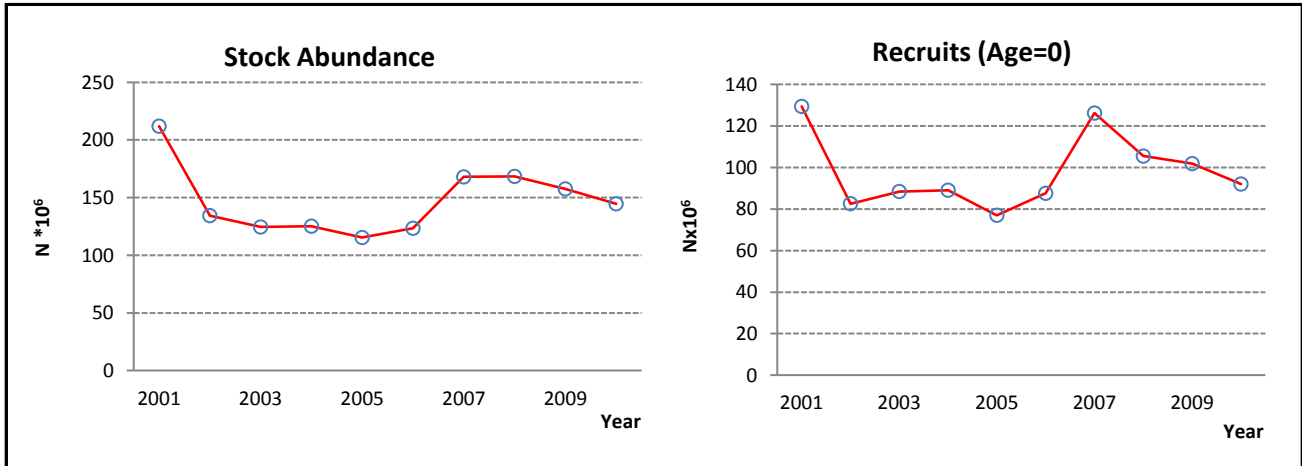
Sheet A3
Indirect methods: VPA results

Code: DPS0611Pér

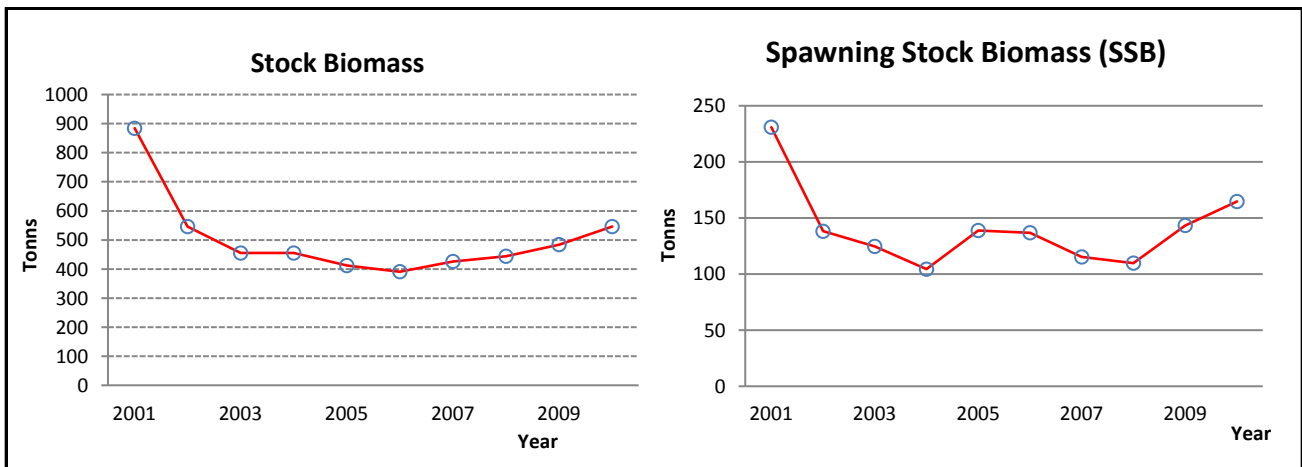
Page 1 / 4

Sex*	B	Gear*	Trawl	Analysis #*	VPA
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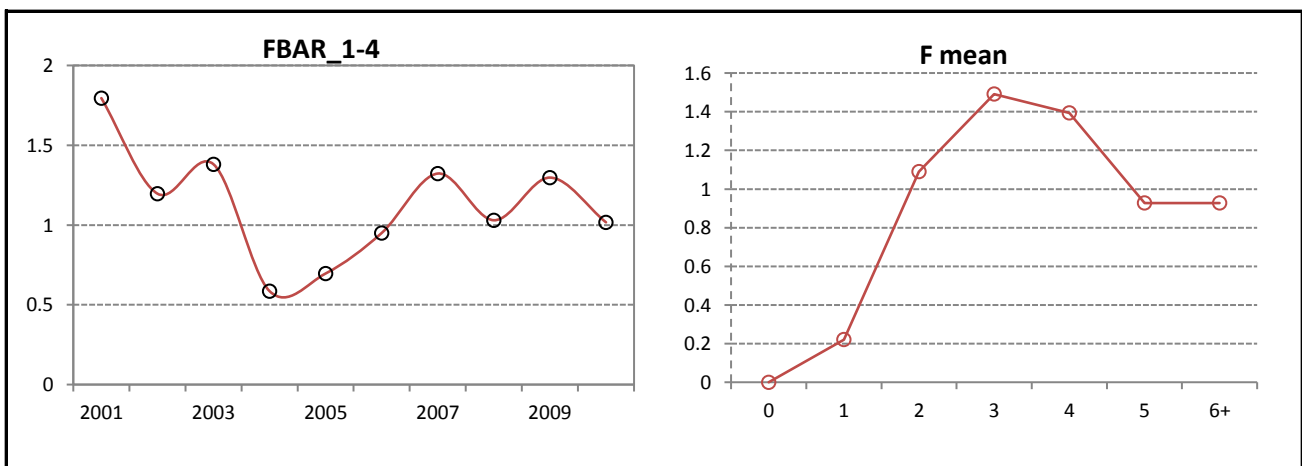
Population in figures



Population in biomass



Fishing mortality rates



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Assessment form

Sheet A3
Indirect methods: VPA results

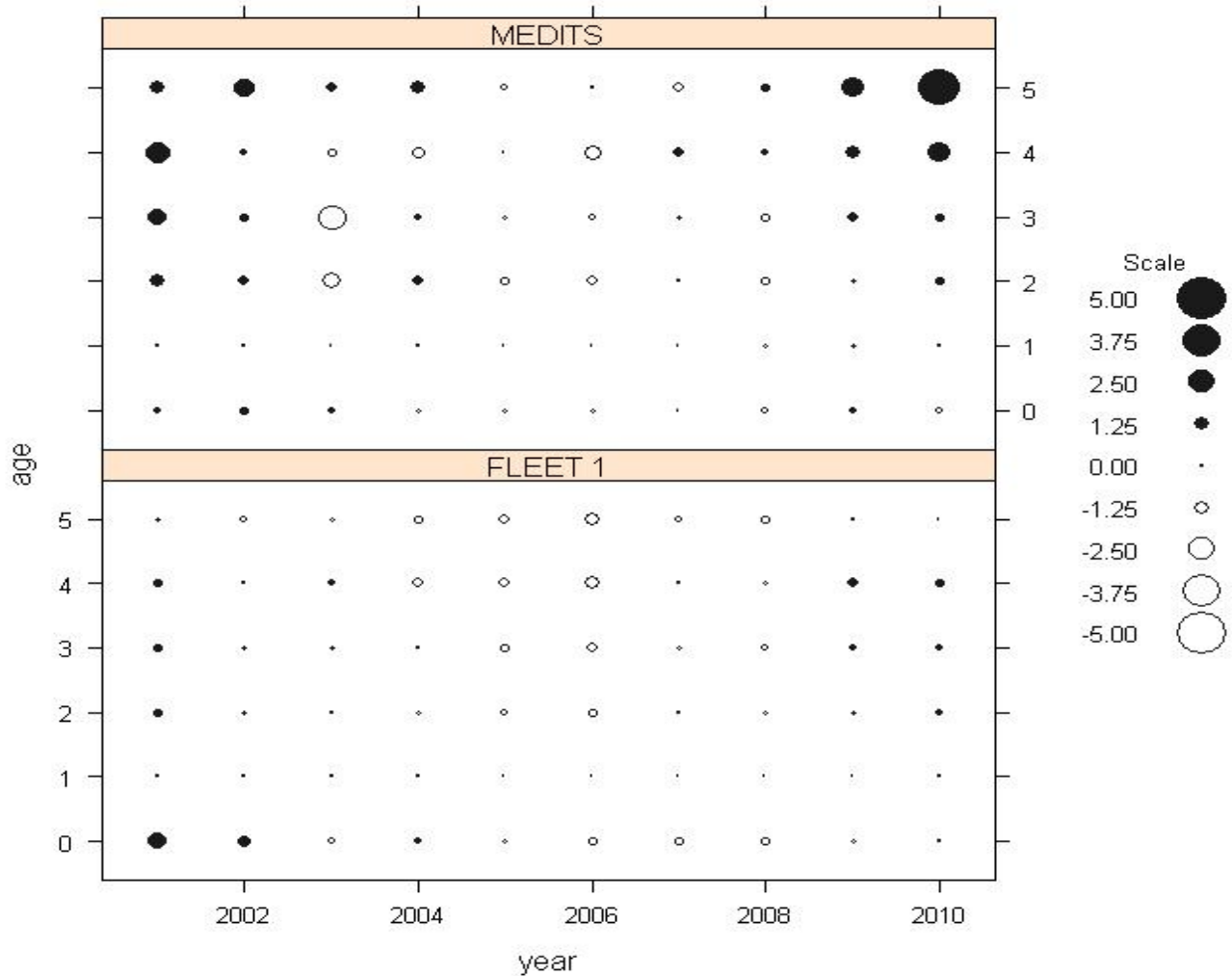
Code: DPS0611Pér

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Sex*	B	Gear*	Trawl	Analysis #*	XSA-Log catch. Residuals
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Population in figures

Log catchability residuals by fleet



Log catchability residual plots.
No unusual pattern of residuals and conflicts between ages is observed.

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Assessment form

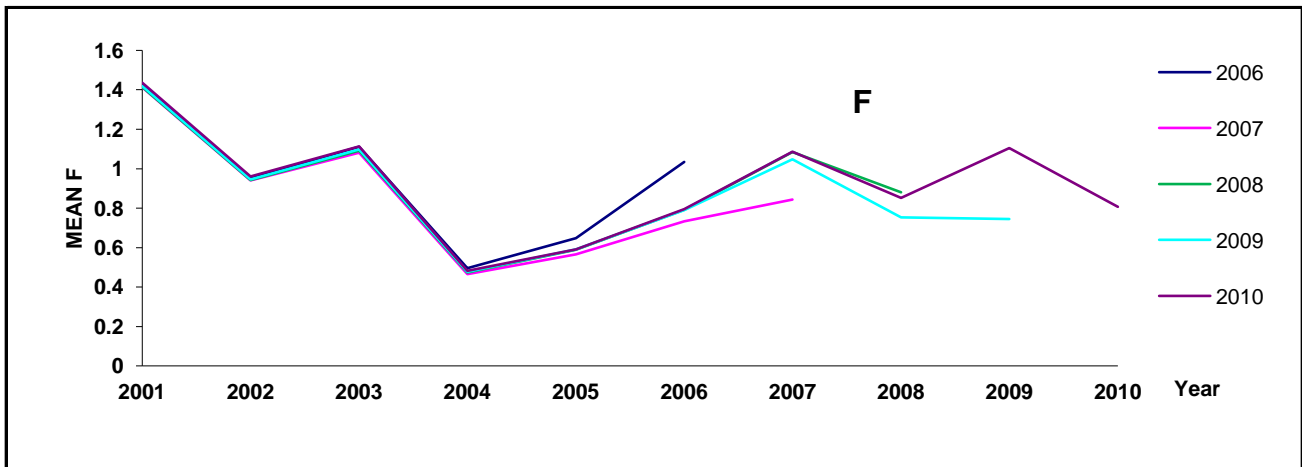
Sheet A3
Indirect methods: VPA results

Code: DPS0611Pér

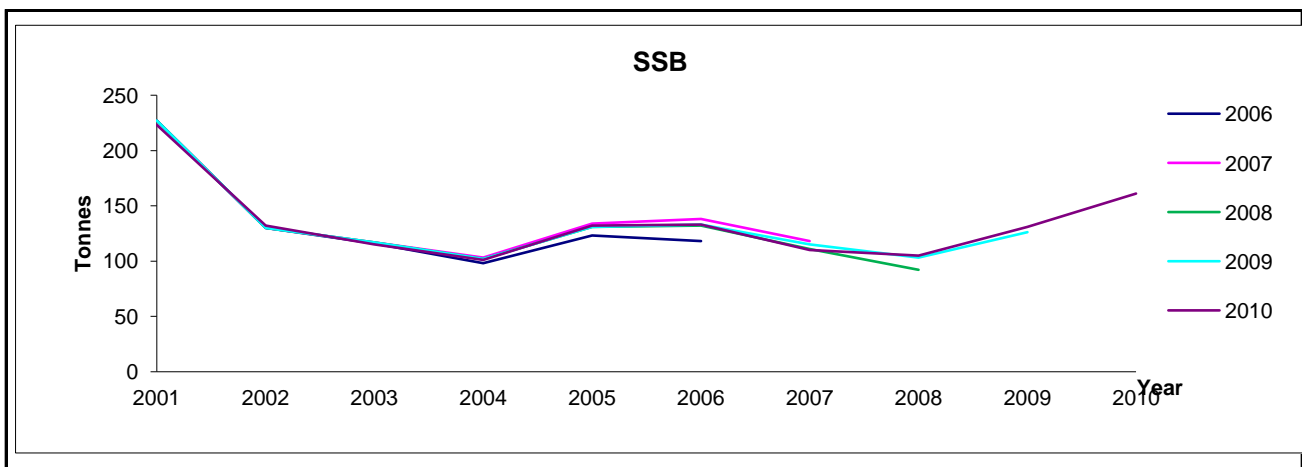
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Sex*	B	Gear*	Trawl	Analysis #*	XSA_Retrospective
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Population in figures



Population in biomass



Fishing mortality rates



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Assessment form

Sheet A3
Indirect methods: VPA results

Code: DPS0611Pér

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Sex*	B	Gear*	Trawl	Analysis #*	VPA
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Population in figures

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Population in biomass

--

Fishing mortality rates

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SAC GFCM - Sub-Committee on Stock Assessment (SCSA)	
Assessment form	Sheet Y Indirect methods: Y/R

Sex	U
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Code: DPS0611Pér	
Analysis #	

# of gears		Software	Excel sheet
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Parameters used

Vector F	0.0 - 0.221 - 1.09 - 1.49 - 1.39 - 0.92 - 0.92
Vector M	1.25 - 0.82 - 0.39 - 0.28 - 0.24 - 0.22 - 0.21
Vector N	
age	0 - 6+
Fref	FBAR 1-4

Model characteristics

From calculated mean weights

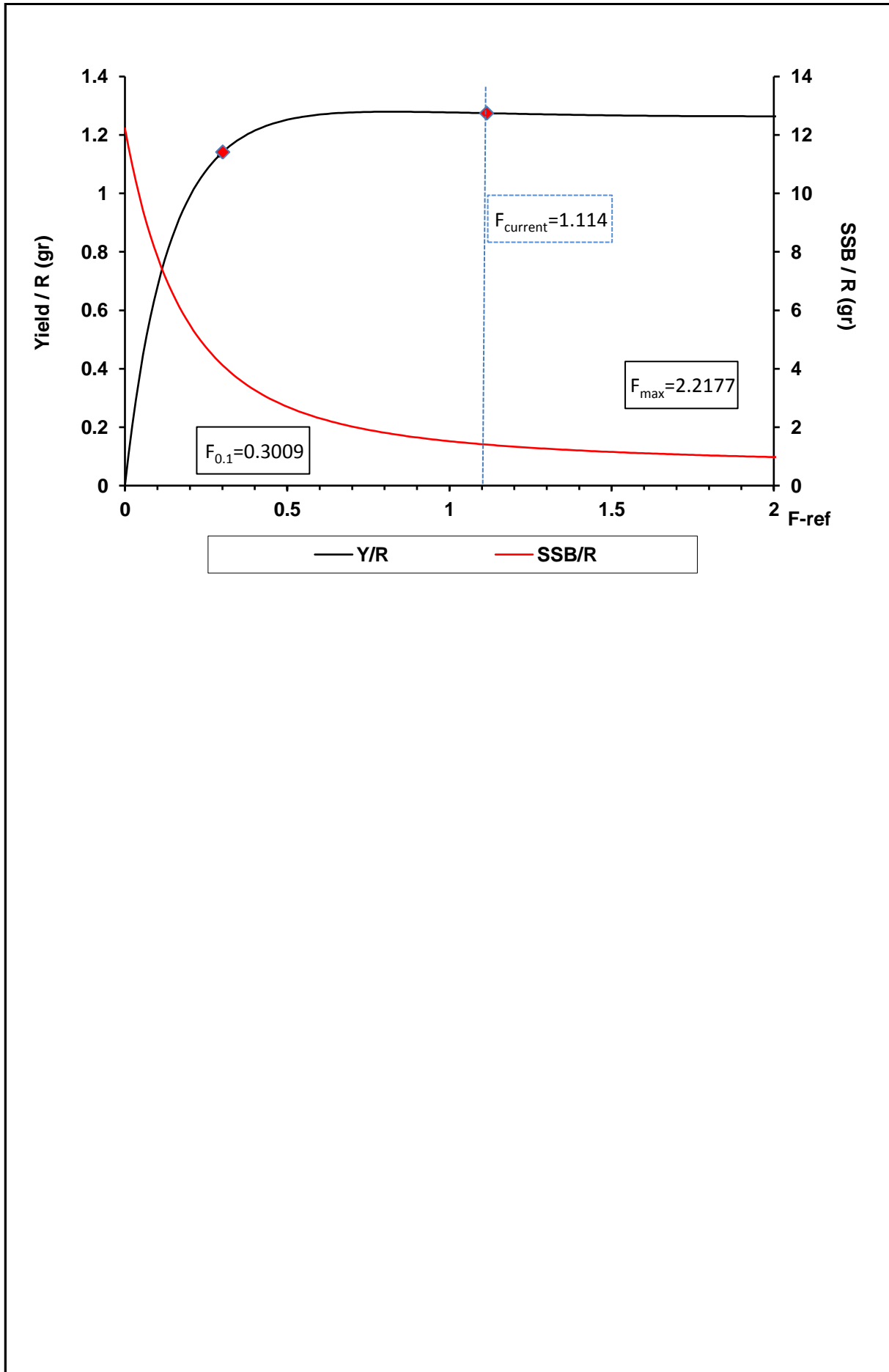
Results

	Total	Gear			
Current YR	1.274	gr			
Maximum Y/R	1.274	gr			
Y/R 0.1	1.141	gr			
F _{max}	2.210	F _{ref} = 2.726			
F _{0.1}	0.300	F _{ref} = 0.30			
Current B/R	5.110				
Maximum B/R	5.110				
B/R 0.1	8.110				
F _{ref=FBAR1-4}	F _{factor} = 1	F _{ref} = 1.1144			

Comments

<p>Yield reaches asymptotic values at a effort level double than actual. Nevertheless SSB values decrease quickly above actual effort level. Using F01 as limit management reference point, the $F_{ref} = F_{BAR1-4}$ (1.11) exceeds the Y/R $F_{0.1}$ reference point (0.30), which indicates that the stock is overexploited.</p>
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Comments



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Assessment form

Sheet D
Diagnosis

Code: DPS0611Pér

Indicators and reference points

Criterion	Current value	Units	Reference Point	Trend	Comments
B	546	tons	Bmean	+	Bmean: (504t); Bloss: (391 t); Bhigh: (884 t)
SSB	165	tons	SSBmean	+	SSBmean: (141t); SSBloss (104t); SSBhigh:(231t)
F	1.11		F0.1		FBAR1-4 (1.11) > F0.1 (0.30)
Y	141	tons	Ymean	+	Ymean (138 t); Yloss: (76 t); Yhigh:(331t)
CPUE	14.7	Kg/day	CPUEmean	+	CPUEmean:(9.2 kg/d);CPUEloss:(3.2 Kg/d);CPUEhigh:(24.2Kg/d)

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 checked="" 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"/>	Depleted
	<input type="radio"/>	Moderate fishing	<input type="radio"/>	Intermediate abundance	<input type="radio"/>	Uncertain / Not assessed
	<input checked="" type="radio"/>	High fishing mortality	<input checked="" type="radio"/>	Low abundance		
	<input type="radio"/>	Uncertain / Not assessed				

Comments

The results show a decreasing trend both in landings and total biomass of the stock from 2001 to 2004 and 2003 respectively. Landings, biomass and SSB values remain stabilized for the last 7 years with light fluctuations. Although these values are low compared with 2001 values (the highest in the series).

Exploitation is based on very young age classes, mainly 1 and 2 year old individuals, indicating a dependence on recruitments. Fishing mortality shows a decreasing trend from 2001 to 2004 but increasing in the 2005-2010 period.

The fisheries of *Parapenaeus longirostris* in the study area show important inter-annual variations in landings, biomass and SSB. Currents indicators represent a 43%, 62% and 71% respectively of the values observed nine years ago, (the highest in the serie). The Y/R analysis shows that the Fref (1.11) exceeds the Y/R F0.1 reference point (0.30).

It can be concluded that pink shrimp in GSA06 is overexploited.

The oscillation found for this species is in agreement with other areas of the Mediterranean. It is assumed that environmental conditions can affect the stock in addition to the fishing mortality.

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Management advice and recommendations*

Reduce growth overfishing through::

- Reduce the effort of trawl .
- Improve the fishing pattern of the trawl fleets.

To avoid recruitmenst overfishing:

- Reduce effort in trawl
- Especial surveillance in the use of 40mm square/50 diamond mesh size in the cod end in trawl gears.

Advice for scientific research*

Abstract for SCSA reporting

Authors Pérez-Gil José Luis¹, Quintanilla Luis¹, Herrera Ester² and Vivas Miguel². **Year** 2011

Species Scientific name Parapenaeus longirostris - DPS
Source: GFCM Priority Species

Source: -

Source: -

Geographical Sub-Area 06 - Northern Spain

Fisheries (brief description of the fishery)*

Deep-water pink shrimp (*Parapenaeus longirostris*) is one of the most important crustaceans species for the trawl fisheries developed along the GFCM geographical sub-area Northern SPAIN (GSA-06). This resource is an important component of commercial landings in some ports of the Mediterranean Northern Spain and occasionally a target specie of the trawl fleet, around 260 vessels, which operate on the upper slope. During the last years, a sharp increase in landings was observed, starting in 1998 and reaching the maximum value in 2000, followed by a decreased trend during the period 2001-2004. During de period 2005-2010 stabilization in catches is observed whit an average of 138 t for this period. In 2010 the annual landings of this species amounts 141 tons in the whole area.

Advice for scientific research*

