



ASSESSMENT AND MONITORING OF THE FISHERY RESOURCES  
AND THE ECOSYSTEMS IN THE STRAITS OF SICILY

*MiPAAF*

MEDSUDMED  
GCP/RER/010/ITA

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*FAO-MedSudMed CC/10/Info 07*

**10<sup>th</sup> Meeting of the MedSudMed Coordination Committee  
Djerba, Tunisia, 13-15 March 2012**

**Stock Assessment Forms on Demersal Fisheries Resources, namely *Merluccius merluccius*. Data presented at the GFCM-SAC – Working Group on Stock Assessment on Demersal Species (Greece, 24-29 October 2011)**

## SAC GFCM Sub-Committee on Stock Assessment

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Date\* 

20	October	2011
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 Code\* 

HKE9911S.
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**Authors\***

S. Ben Meriem, F. Fiorentino, A. Arneri, L. Ceriola, V. Gancitano, O. Jarbouï, R. Mifsud
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**Affiliation\***

Institut National des Sciences et Technologies de la Mer (INSTM), Tunisia; IAMC-CNR Mazara del Vallo, Italy; Ministry for Resources and Rural Affairs (MRRA), Malta
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**Species Scientific name\***

<b>1</b>	<i>Merluccius merluccius</i> - HKE Source: GFCM Priority Species
<b>2</b>	Source: -
<b>3</b>	Source: -

**Geographical area\***

GSA 12, 13, 14, 15 and 16
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<b>Geographical Sub-Area (GSA)*</b>		<table border="1" style="width: 100%;"><tr><td style="padding: 2px 5px;">99 - Combination of GSAs</td></tr></table>	99 - Combination of GSAs
99 - Combination of GSAs			
<b>Combination of GSAs</b>	<b>1</b>	<table border="1" style="width: 100%;"><tr><td style="padding: 2px 5px;">16 - South of Sicily</td></tr></table>	16 - South of Sicily
16 - South of Sicily			
	<b>2</b>	<table border="1" style="width: 100%;"><tr><td style="padding: 2px 5px;">15 - Malta Island</td></tr></table>	15 - Malta Island
15 - Malta Island			
	<b>3</b>	<table border="1" style="width: 100%;"><tr><td style="padding: 2px 5px;">12 - Northern Tunisia</td></tr></table>	12 - Northern Tunisia
12 - Northern Tunisia			



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

Assessment form

Sheet #0  
Basic data on the assessment

Code: HKE9911S

Date*	20	Oct	2011	Authors*	S. Ben Meriem, F. Fiorentino, A. Arneri, L. Ceriola, V. Gancitano, O. Jarbou, R. Mifsud
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Species Scientific name*	Merluccius merluccius - HKE	Species common name*	HAKE
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### Data Source

GSA*	16 - South of Sicily, 15 - Malta Island, 12 - Northern Tunisia	Period of time*	2007-2010
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### Description of the analysis

Type of data*	LFD from commercial catches, landings data	Data source*	Tunisian national data collection programme, EU Data Collection Framework
Method of assessment*	LCA, Y/R analysis	Software used*	Analen, VIT4win

### Sheets filled out

B	P1	P2a	P2b	G	A1	A2	A3	Y	Other	D	Z	C
1	1	4	---	---	2	1	2	---	---	---	---	---

### Comments, bibliography, etc.

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

Assessment form

Sheet B  
Biology of the species

Code: HKE9911S

**Biology**

Somatic magnitude measured (LH, LC, etc)*				TL	Units*	cm
Sex	Fem	Mal	Both	Unsexed		
Maximum size observed			70		Reproduction season	all year
Size at first maturity			33.6		Reproduction areas	yes
Recruitment size					Nursery areas	yes

**Parameters used (state units and information sources)**

		Units	Sex			
			female	male	both	unsexed
Growth model	L <sup>∞</sup>	cm			100	
	K				0.12	
	t0	year			-0.5	
	Data source					
Length weight relationship	a				0.0048	
	b				3.1252	
	M				0.281	
	sex ratio (mal/fem)	0.48				

**Comments**

The sex ratio is calculated as F/F+M. For the analysis used the growth and a, b parameters from Italian and Tunisian data.

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

Assessment form

Sheet P1

General information about the fishery

Code: HKE9911S

Data source*	Tunisian National Data Collection Programme, EU Data Collection Framework	Year (s)*	2010
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Data aggregation (by year, average figures between years, etc.)*	By year
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### Fleet and catches (please state units)

	Country	GSA	Fleet Segment	Fishing Gear Class	Group of Target Species	Species
Operational Unit 1*	ITA	99	E - Trawl (12-24 metres)	03 - Trawls	34 - Demersal slope species	HKE
Operational Unit 2	ITA	99	F - Trawl (>24 metres)	03 - Trawls	34 - Demersal slope species	HKE
Operational Unit 3	TUN	99	F - Trawl (>24 metres)	03 - Trawls	34 - Demersal slope species	HKE
Operational Unit 4	TUN	99	H - Purse Seine (12-24 metres)	03 - Trawls	34 - Demersal slope species	HKE
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
ITA 99 E 03 34 - HKE	133	Tons	1041				
ITA 99 F 03 34 - HKE		Tons	446				
TUN 99 F 03 34 - HKE		Tons	599				
TUN 99 H 03 34 - HKE		Tons	80				
<b>Total</b>	<b>133</b>		<b>2166</b>				

Legal minimum size	EU: 20mm CL (EC 1967/2006)
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### Comments



**Comments**

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

Assessment form

Sheet P2a  
Fishery by Operational Unit

Code: HKE9911S

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Data source*	EU Data Collection Framework	OpUnit 1*	ITA 99 E 03 34 - HKE
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**Time series**

Year*	2010					
Catch	1041					
Minimum size						
Average size Lc						
Maximum size						
Fleet						

Year						
Catch						
Minimum size						
Average size Lc						
Maximum size						
Fleet						

**Selectivity**

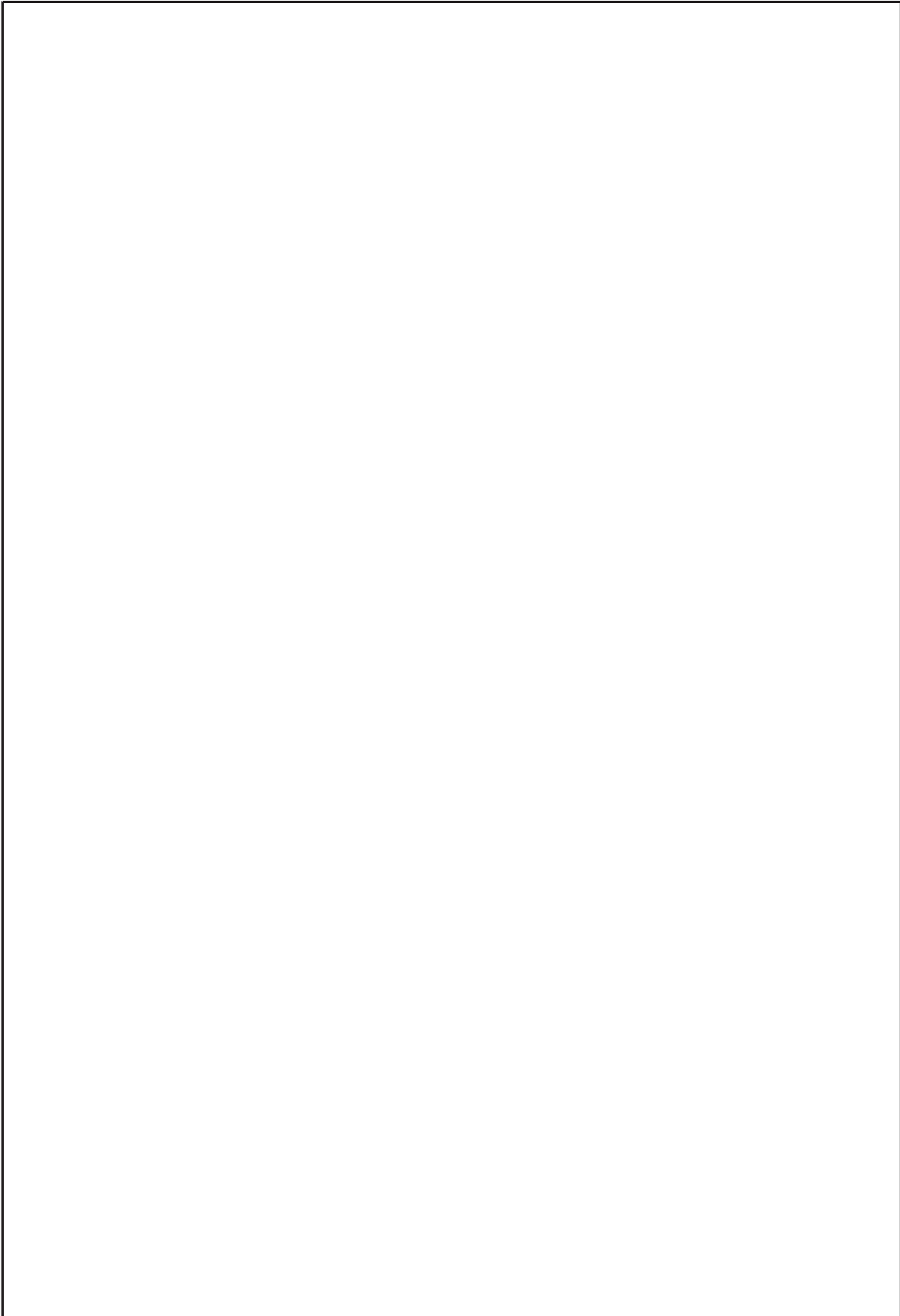
**Remarks**

L25		
L50		
L75		
Selection factor		

**Structure by size or age**

TL (cm)		44	14136
Sex Combined		46	12002
12	244523	48	8577
14	1710702	50	8240
16	2645862	52	4466
18	2583080	54	3286
20	2069657	56	4623
22	1479576	58	3330
24	1038422	60	1246
26	583865	62	2527
28	346766	64	382
30	216357	66	1333
32	129244	68	904
34	97752	70	254
36	63118		
38	42590		
40	25546		
42	19134		

**Structure by size or age**

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

Assessment form

Sheet P2a  
Fishery by Operational Unit

Code: HKE9911S

Page 2 / 4

Data source*	EU Data Collection Framework	OpUnit 2*	ITA 99 F 03 34 - HKE
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**Time series**

Year*	2010					
Catch	446					
Minimum size						
Average size Lc						
Maximum size						
Fleet						

Year						
Catch						
Minimum size						
Average size Lc						
Maximum size						
Fleet						

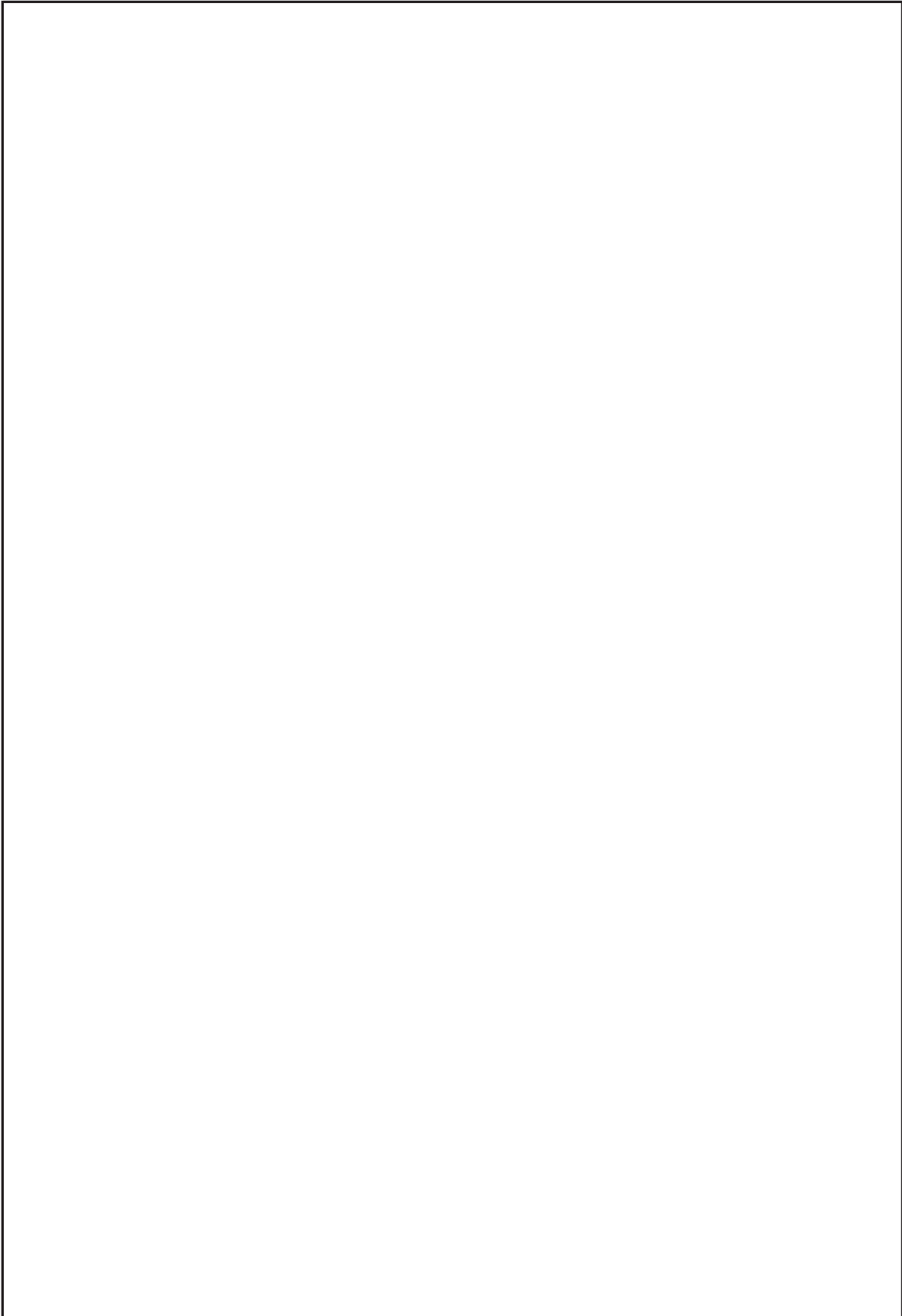
**Selectivity**

**Remarks**

L25		
L50		
L75		
Selection factor		

**Structure by size or age**

TL (cm)		44	5123
Sex Combined		46	7303
12	874	48	5011
14	8926	50	15362
16	115091	52	22824
18	502508	54	14134
20	586149	56	5454
22	417938	58	2593
24	324901	60	817
26	206590	62	397
28	88518	64	93
30	52830	66	93
32	41873	68	93
34	37204		
36	26677		
38	24690		
40	24305		
42	38013		



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

Assessment form

Sheet P2a  
Fishery by Operational Unit

Code: HKE9911S

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Data source*	Tunisian National Data Collection Programme	OpUnit 3*	TUN 99.F.03.34 - HKE
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**Time series**

Year*	2010					
Catch	599					
Minimum size						
Average size Lc						
Maximum size						
Fleet						

Year						
Catch						
Minimum size						
Average size Lc						
Maximum size						
Fleet						

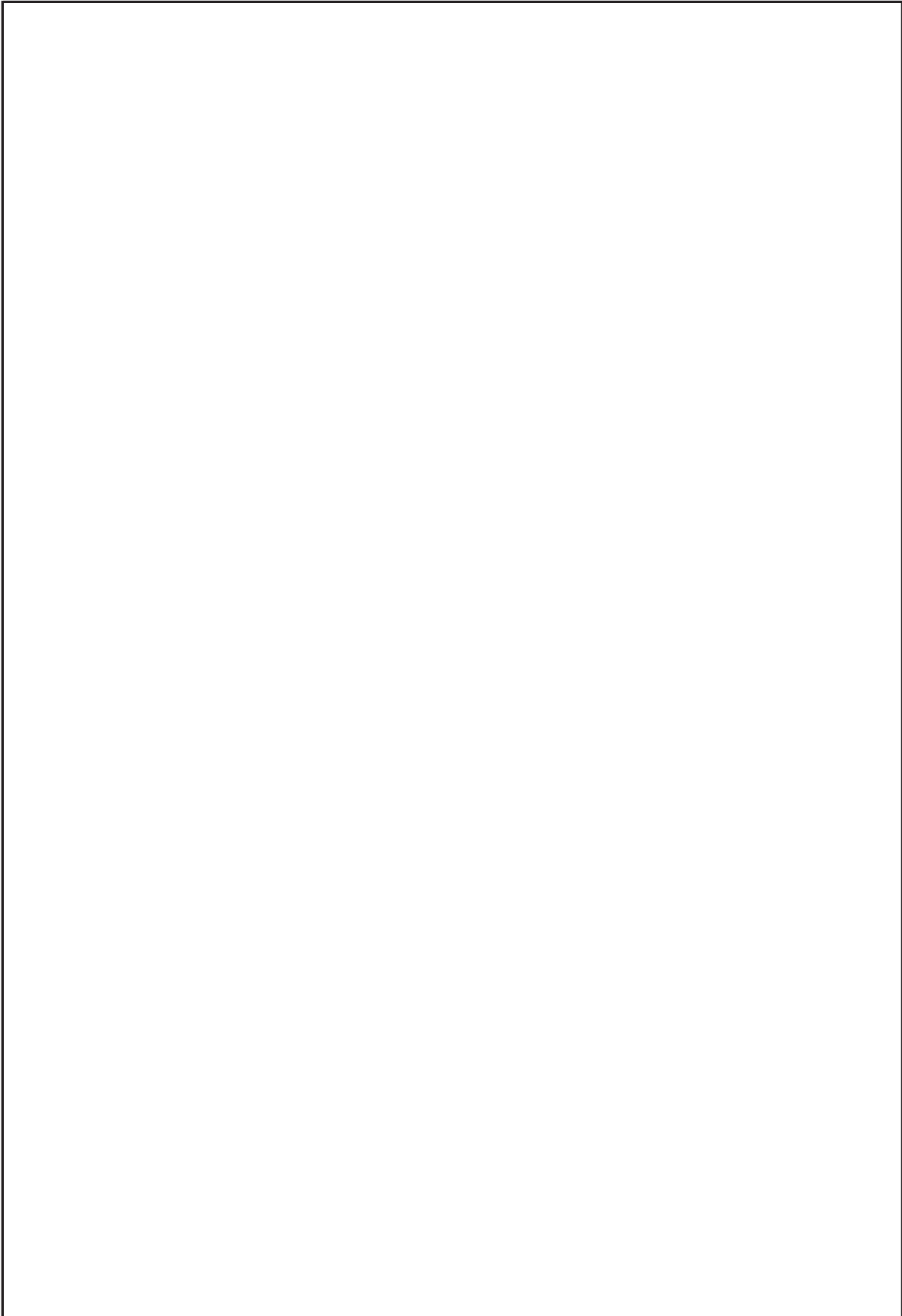
**Selectivity**

**Remarks**

L25		
L50		
L75		
Selection factor		

**Structure by size or age**

TL (cm)		40	21508
Sex Combined		42	19729
8	12763	44	15383
10	37012	46	12929
12	97481	48	12440
14	370371	50	9020
16	910015	52	10844
18	1036458	54	6019
20	607780	56	8869
22	308400	58	7735
24	227586	60	2581
26	190454	62	2311
28	156652	64	740
30	111988	66	740
32	78055	68	740
34	46075	70	370
36	29716		
38	19796		





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

Assessment form

Sheet P2a  
Fishery by Operational Unit

Code: HKE9911S

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Data source*	Tunisian National Data Collection Programme	OpUnit 4*	TUN 99.H.03.34 - HKE
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**Time series**

Year*	2010					
Catch	80					
Minimum size						
Average size Lc						
Maximum size						
Fleet						

Year						
Catch						
Minimum size						
Average size Lc						
Maximum size						
Fleet						

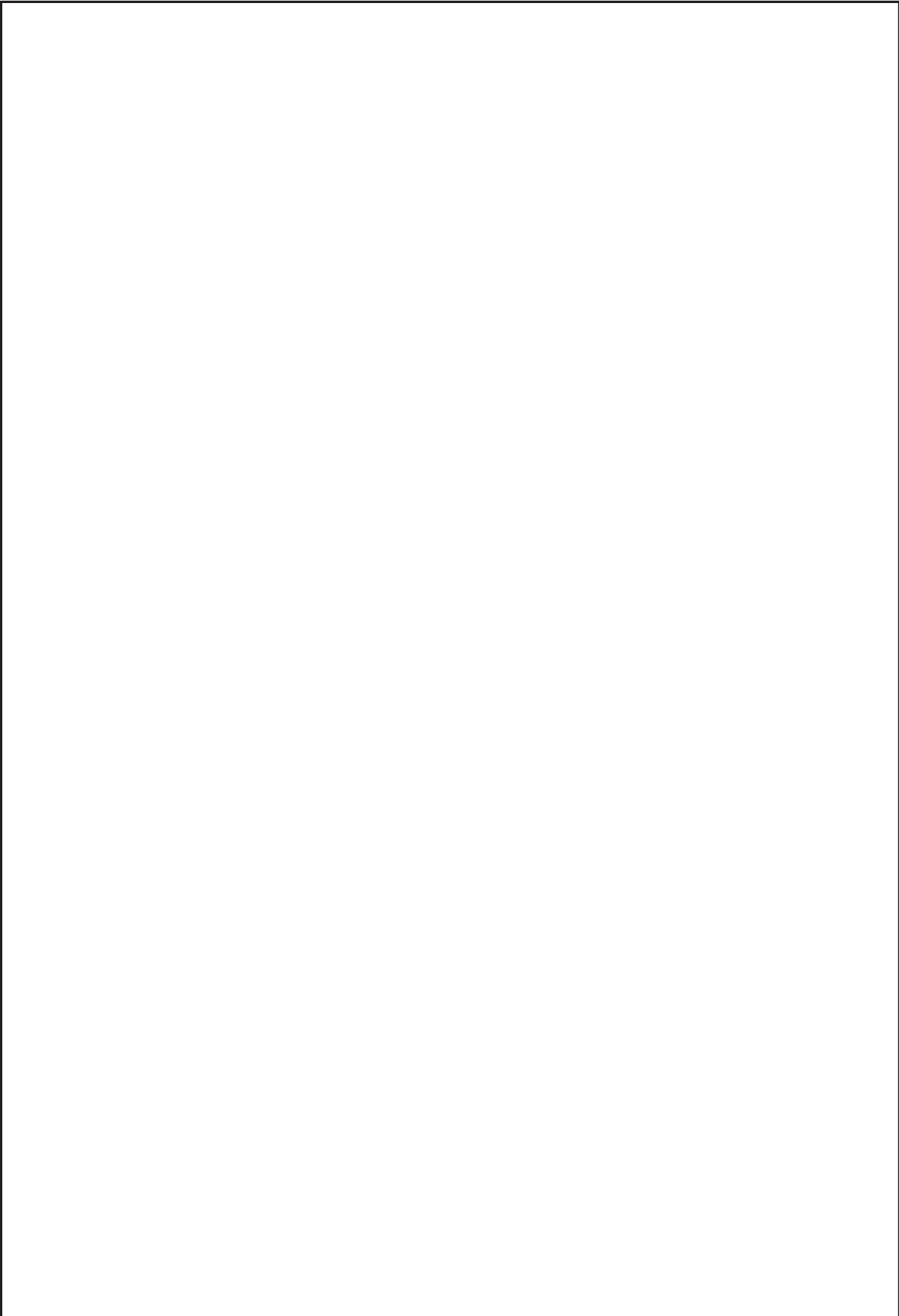
**Selectivity**

**Remarks**

L25		
L50		
L75		
Selection factor		

**Structure by size or age**

TL (cm)		46	236
Sex Combined		48	474
14	872	50	308
16	31812	52	142
18	10694	54	142
20	43619		
22	96293		
24	128774		
26	88481		
28	59035		
30	54539		
32	50008		
34	19683		
36	9721		
38	5015		
40	1973		
42	474		
44	355		



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

Assessment form

Sheet A1  
Indirect methods: VPA, LCA

Sex\* F+M 2010

Code: HKE9911S

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### Time series

Analysis # \* LCA

Data	Size	Age
(mark with X)	X	

Model	Cohorts	Pseudocohorts
(mark with X)		X

Equation used	VPA	Tunig method	
# of gears	4	Software	VIT 4 win
F <sub>terminal</sub>	Fterm 0.28 SC;		

### Population results (please state units)

	Sizes	Ages		Amount	Biomass
Minimum	8	0.195	Recruitment	35	
Average	21.4	1.5	Average population	41	2651
Maximum	72	10	Virgin population		
Critical	20	1.36	Turnover		
	cm	year		millions	t

### Average mortality

	Total	Gear					
		Italian 12-24	Italian >24	TUN TRW	TUN TRAM		
F <sub>1</sub>	0.63	0.25	0.14	0.24	0.017		
F <sub>2</sub>							
Z							

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

### Comments

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

Assessment form

Sheet A1  
Indirect methods: VPA, LCA

Code: HKE9911S

Page 2 / 2

Sex\* Sex combined

Analysis # \* LCA

**Time series**

Data	Size	Age
(mark with X)	X	

Model	Cohorts	Pseudocohorts
(mark with X)		X

Equation used	VPA	Tunig method	
# of gears	4	Software	vit 4 win
F <sub>terminal</sub>	Fterm 0.198 SC;		

**Population results (please state units)**

	Sizes	Ages		Amount	Biomass
Minimum	9	0.08	Recruitment	37	
Average	21.4	0.61	Average population	26	1194
Maximum	72	4.87	Virgin population		
Critical	18	0.4	Turnover		
	cm	year		millions	t

**Average mortality**

	Total	Gear					
		Italian 12-24	Italian >24	TUN TRW	TUN TRAM		
F <sub>1</sub>	1.32	0.52	0.3	0.45	0.04		
F <sub>2</sub>							
Z							

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

**Comments**

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

Assessment form

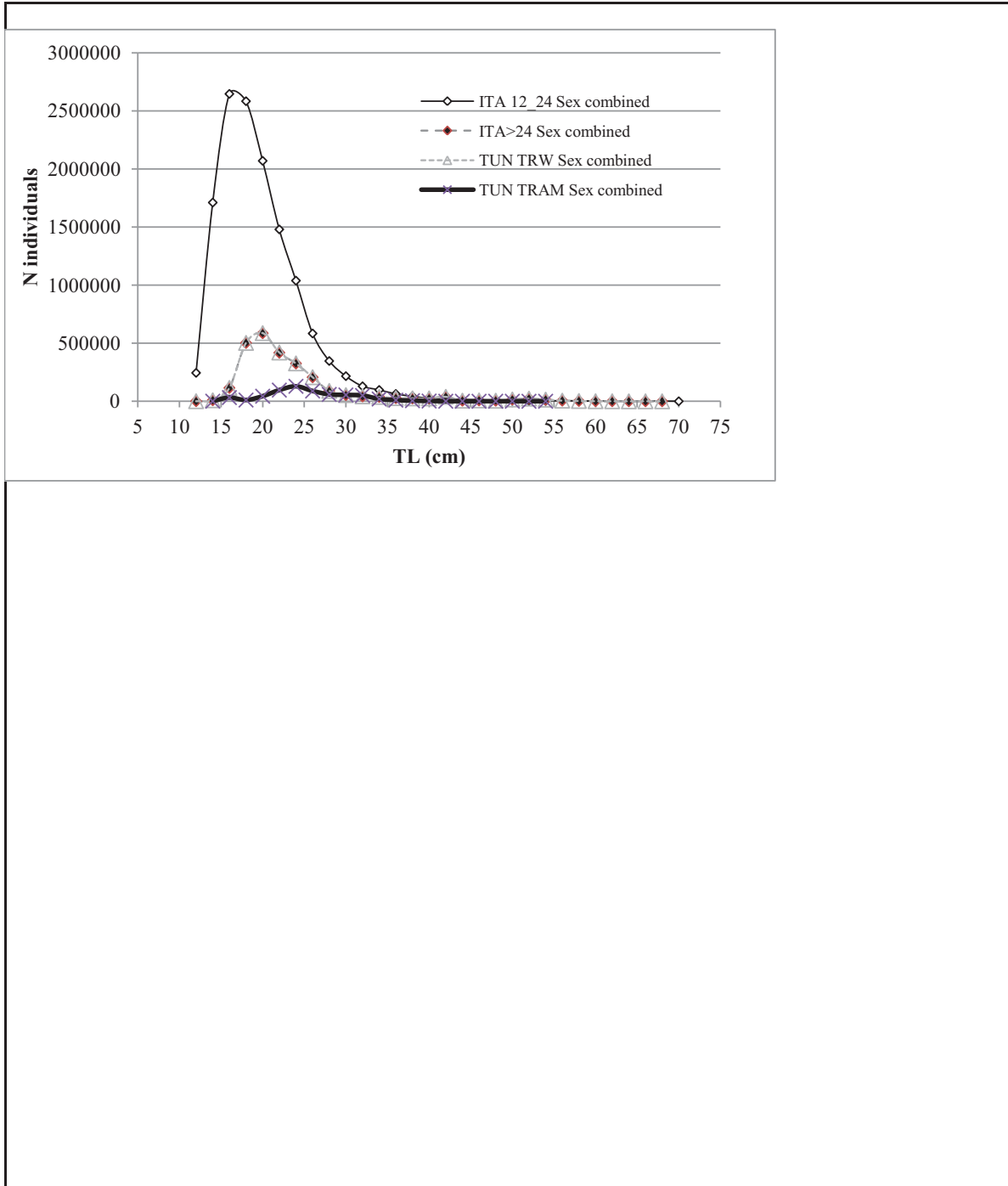
Sheet A2  
Indirect methods: data

Code: HKE9911S

Sex*	Sex combined	Gear*	TRAWL& Trammel	Analysis # *	VPA
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Data source	LFD
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**Data**



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

Assessment form

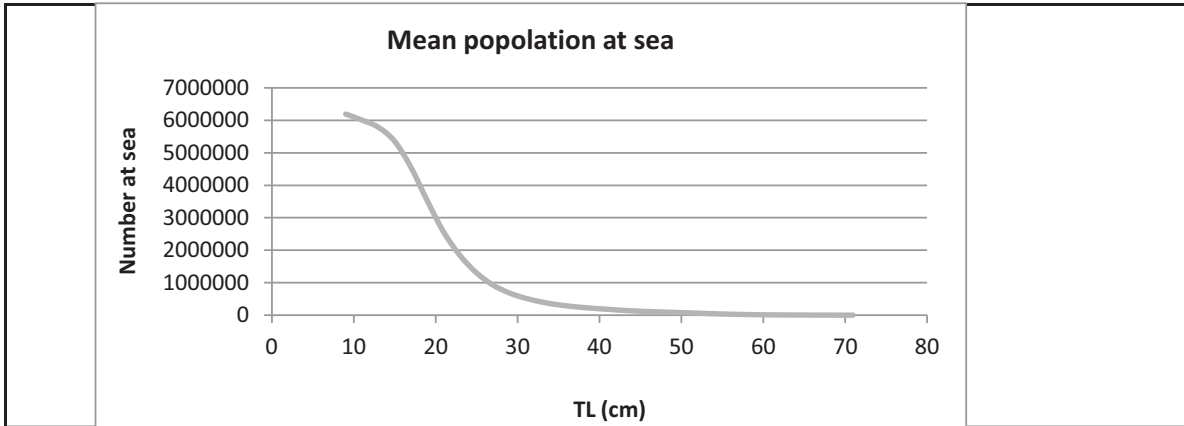
Sheet A3  
Indirect methods: VPA results

Code: HKE9911S

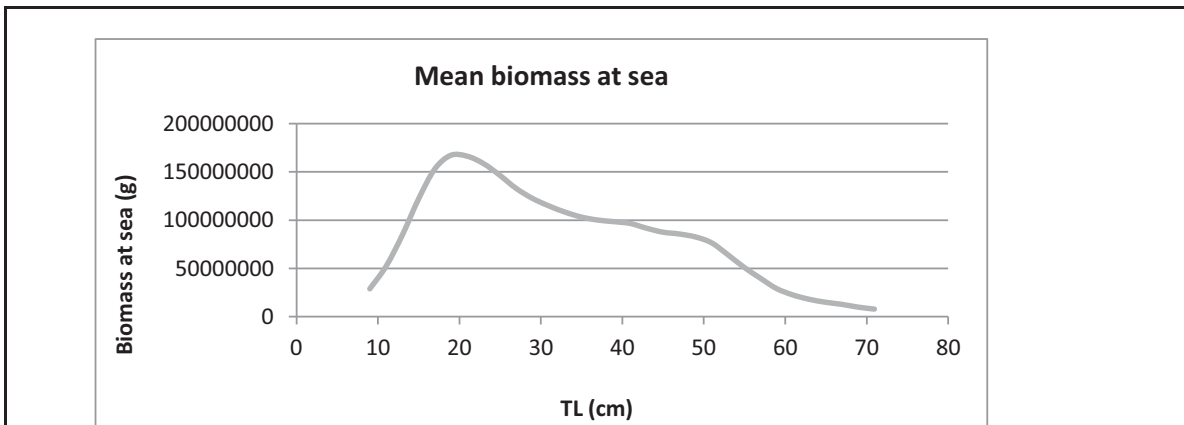
Page 1 / 2

Sex*	Sex comb	Gear*	Trawl & trammel	Analysis #*	VPA
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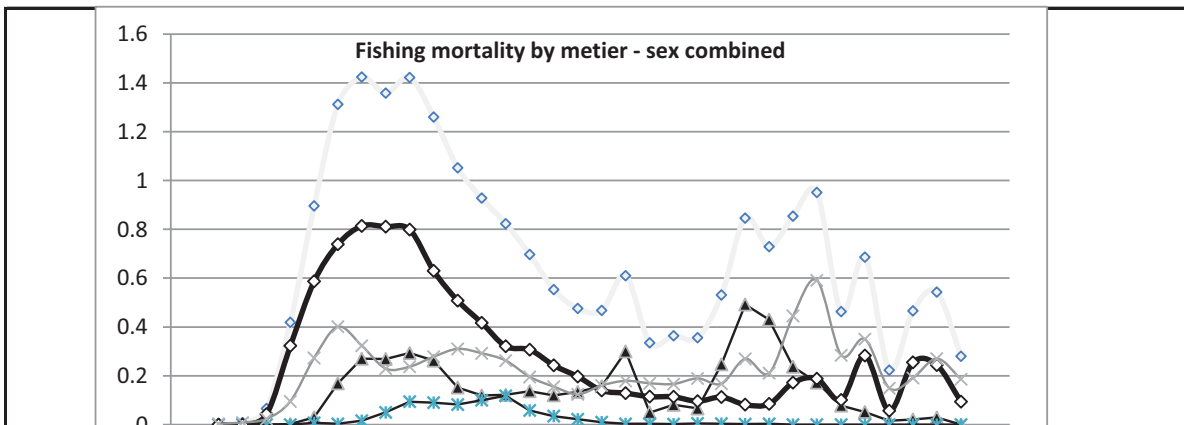
**Population in figures**



**Population in biomass**



**Fishing mortality rates**



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

Assessment form

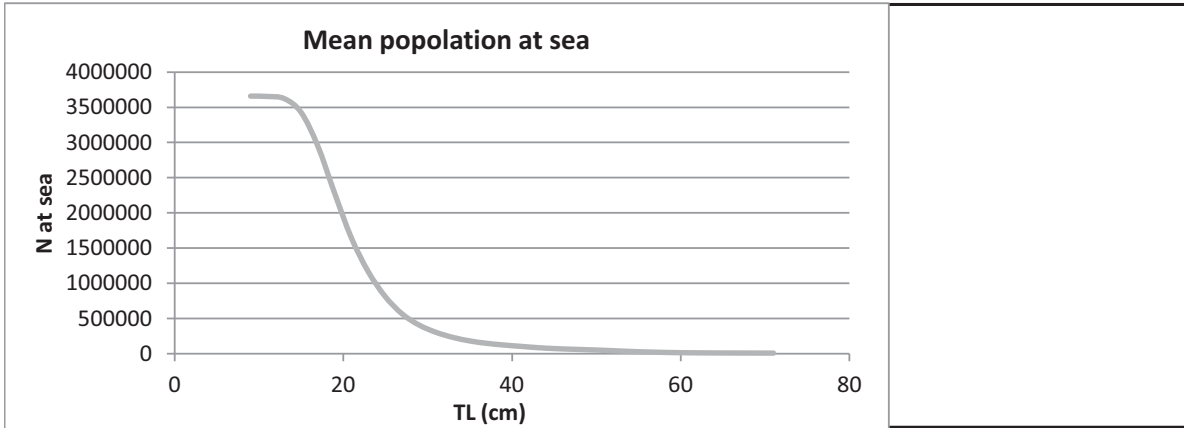
Sheet A3  
Indirect methods: VPA results

Code: HKE9911S

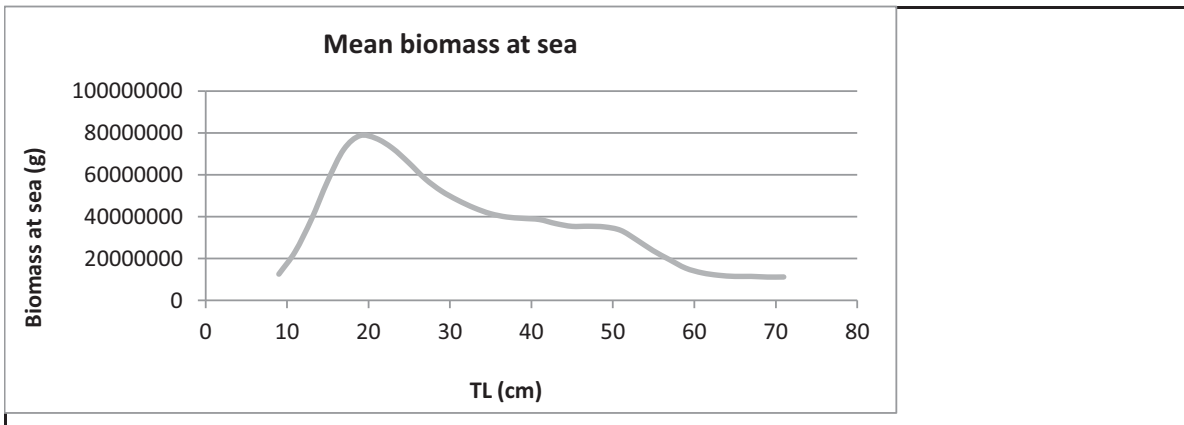
Page 2 / 2

Sex*	SC	Gear*	Trawl&trammel	Analysis #*	VPA
------	----	-------	---------------	-------------	-----

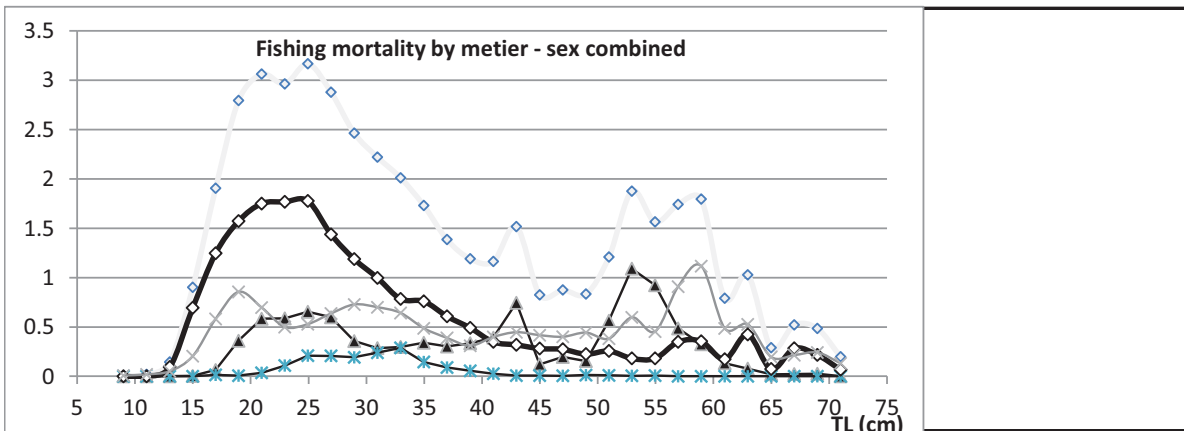
**Population in figures**



**Population in biomass**



**Fishing mortality rates**



Code: HKE9911S

Sex

Analysis #

# of gears		Software	
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**Parameters used**

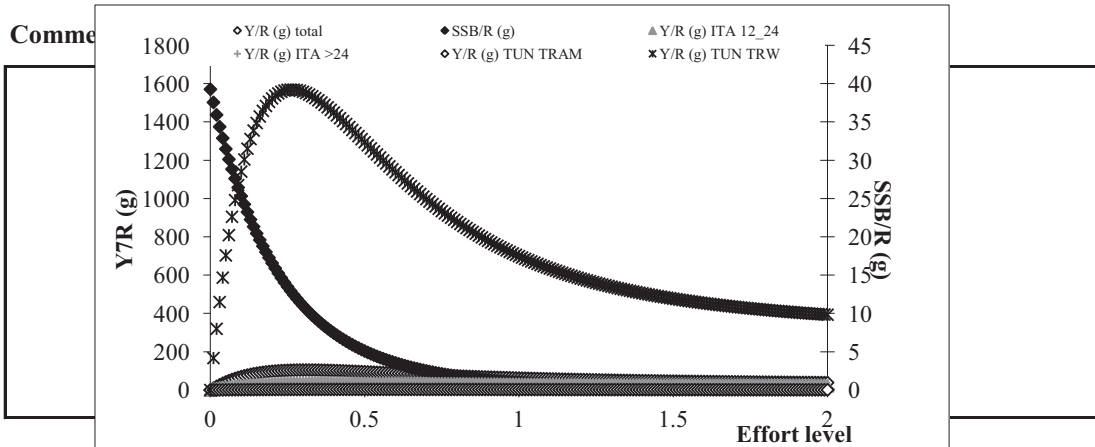
Vector F	
Vector M	
Vector N	

**Model characteristics**

Values of VPA and Y/R analysis were estimated by sex combined only 2010 data.

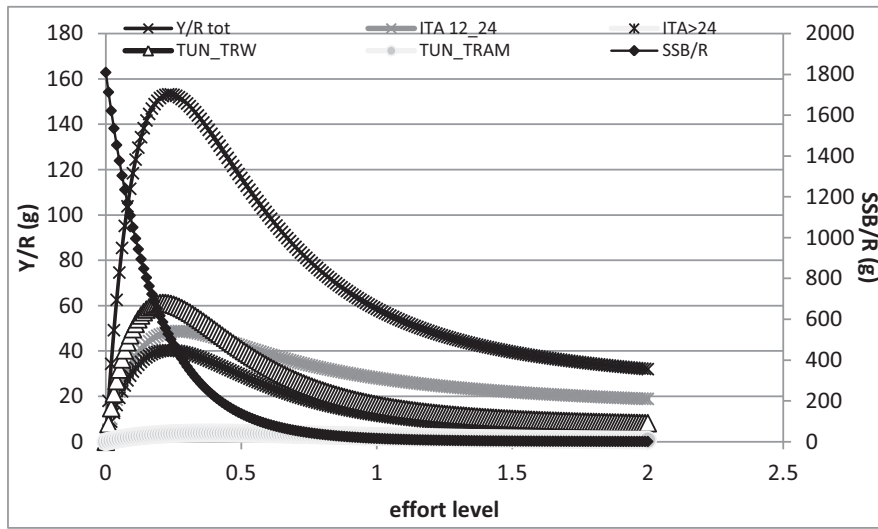
**Results**

	Total	Gear			
		ITA 12_24	ITA >24	TUN TRAWL	TUN TRAM
Current YR	62.4-58.6				
Maximum Y/R					
Y/R 0.1	101.29-148.8				
$F_{max}$					
$F_{0.1}$					
Current B/R	76.4-32.3				
Maximum B/R					
B/R 0.1	691-747.8				
Current SSB/R	38.5-16.3	value left	by ITA param.		
SSB/R 0.1	585.3-686.2	value right	by TUN param.		
SSB/R virgin	1571-1810				





Comments



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

Assessment form

Sheet D  
Diagnosis

Code: HKE9911S

**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

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

<b>Bidimensional</b>	<b>Exploitation rate</b>		<b>Stock abundance</b>	
	<input type="radio"/>	No or low fishing	<input type="radio"/>	Virgin or high abundance
	<input type="radio"/>	Moderate fishing	<input type="radio"/>	Intermediate abundance
	<input 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**

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### Abstract for SCSA reporting

**Authors**

S. Ben Meriem, F. Fiorentino, A. Arneri, L. Ceriola, V. Gancitano, O. Jarboui, R. Mifsud

**Year**

2011

**Species Scientific name**

Merluccius merluccius - HKE

Source: GFCM Priority Species

Source: -

Source: -

**Geographical Sub-Area**

16 - South of Sicily, 15 - Malta Island, 12 - Northern Tunisia

**Fisheries (brief description of the fishery)\***

**Source of management advice\***

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

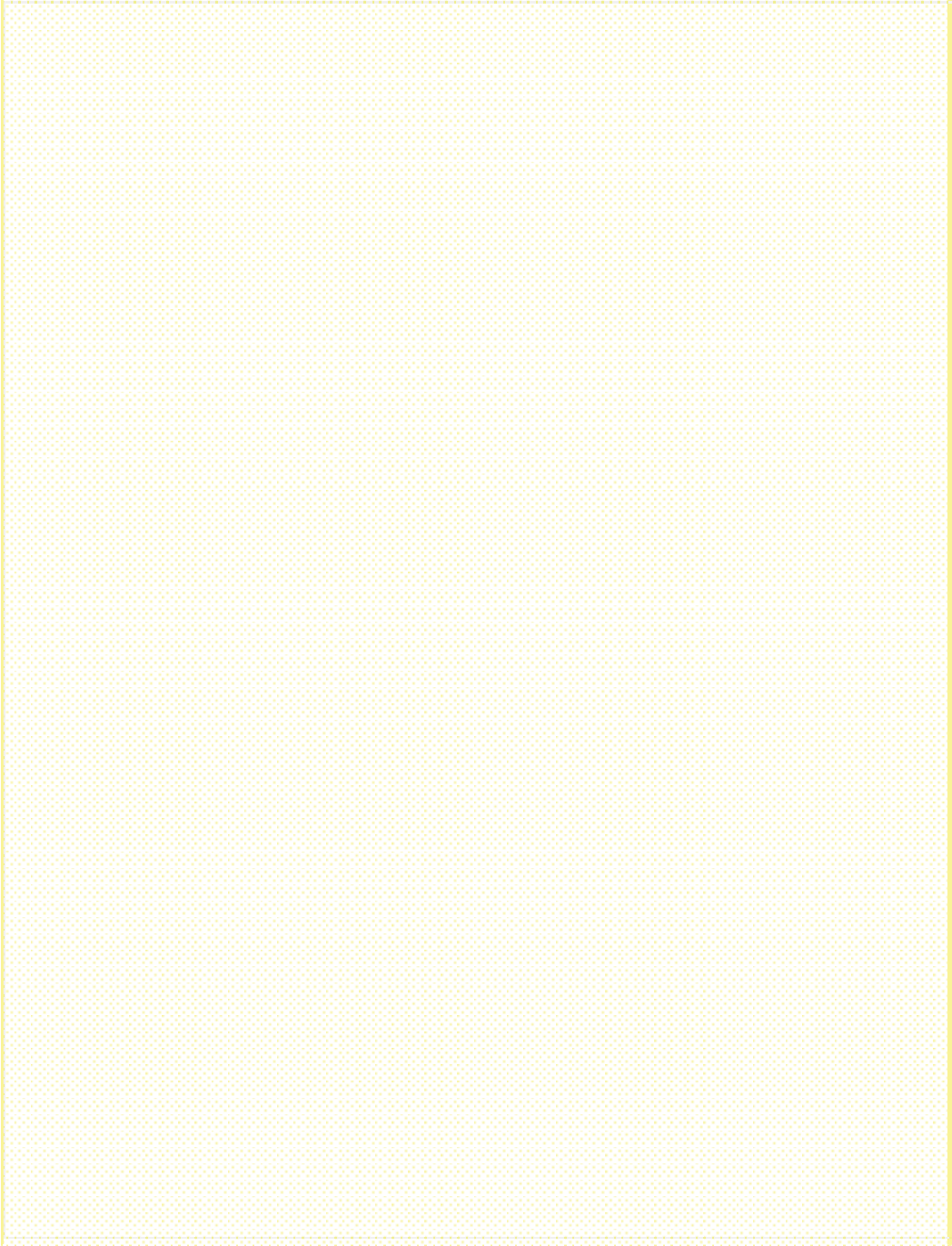
**Stock Status\***

**Exploitation rate**

**Stock abundance**

**Comments**

**Management advice and recommendations\***



**Advice for scientific research\***

