

**GENERAL FISHERIES COMMISSION FOR THE MEDITERRANEAN
(GFCM)**

**WORKING GROUP ON DEMERSAL SPECIES
Málaga, Spain, 6-7 May, 2004**

OPENING OF THE MEETING

1. The fifth meeting of the SAC Working Group on Demersal Species of GFCM was held at Palacio de la Aduana, Málaga from 6 to 7 May 2004.
2. The meeting was attended by 21 scientists from 7 countries and one representative from FAO and two from EU . The list of participants is attached as Appendix A.
3. The Agenda of the Working Group was adopted (Appendix B) and the list of documents was updated (Appendix C).
4. Two rapporteurs, Constantina Karlou-Riga and Enrico Arneri were designated. Mr Enrico Arneri was nominated chairperson of the meeting.

PRESENTATIONS TO AND DISCUSSIONS BY THE WORKING GROUP

6. 18 technical papers were presented and discussed by the Working Group.
7. Assessments for 14 stocks were presented covering 6 Geographical Subareas (GSAs), and 7 species. See Appendix D.
8. Two types of documents were presented: (i) assessment documents and (ii) assessment-related documents. The conclusions and recommendations related to the assessment presented in each document and endorsed by the Working Group are listed below.

ASSESSMENT DOCUMENTS

Document n° 1: Stock assessment of hake (*Merluccius merluccius*) from the trawl fishery off the geographical sub area 01(Northern Alboran)

Document n° 2: Stock assessment of hake (*Merluccius merluccius*) from the trawl fishery off the geographical sub-area 05 (Balearic Islands)

Document n° 3: Stock assessment of hake (*Merluccius merluccius*) from the trawl fishery off the geographical sub-area 06 (Northern Spain)

12. **FISHERIES:** Hake (*Merluccius merluccius*) is one of the most important target species for the trawl fisheries developed by around 800 vessels along the GFCM geographical sub-areas Northern Alboran Sea (GSA01), Balearic Islands (GSA05) and Northern Spain (GSA06). In last years, the annual landings of this species, which are mainly composed by juveniles living on the continental shelf, were ~4000 tons in the whole area. 95% of the landings come from trawlers.
13. **SOURCE OF MANAGEMENT ADVICE:** The state of exploitation was assessed applying a length cohort analysis (LCA) and yield per recruit (Y/R) analysis on a mean pseudo-cohort (2001-2003 for GSA05 and GSA06 and 2002 for GSA5), based on size composition of trawl catches (obtained from on board and on port monthly sampling) and official landings. The input parameters set and the program (VIT) used were the same as previous assessments of the species in the area. Transition analysis were also performed, on a 20 year basis with constant recruitment, in order to simulate different management strategies directed to improve the exploitation pattern of this species in the area
14. **STOCK STATUS:** Growth overexploitation. Current level of B is very low compared to B₀.
15. **WG MANAGEMENT ADVICE AND RECOMMENDATIONS:** the WG noted that there are differences in the exploitation pattern in the three GSAs although the stock can be considered as unique. The need for sensitivity analysis and for an update of the growth and mortality parameters was raised, as well as the need to monitor discards mainly in GSA 01 and in the future to move to non equilibrium assessments. Transition analysis was made reducing the fishing effort by 20% and using 40mm square mesh size. The results showed that the increase in Y/R was higher after improving the selectivity than reducing fishing effort. There were gains in the second year after the application of this management measures. Assessment including also trawl survey data were encouraged (see general comments).The WG recommends:
 - To improve the selectivity: in comparison with the 40 mm diamond mesh size the use of 40 mm square mesh size is more effective.
 - To control the effort on nursery areas.

Document n° 4: Stock Assessment of red mullet (*Mullus barbatus*) from the trawl fishery off the geographical sub-area 01 (Northern Alboran)

Document n° 5: Stock Assessment of striped red mullet (*Mullus surmuletus*) from the trawl fishery off the geographical sub-area 05 (Balearic Islands)

Document n° 6: Stock assessment of red mullet (*Mullus barbatus*) from the trawl fishery off the whole geographical sub-area 06 (Northern Spain)

15. **FISHERIES:** Red mullets (*Mullus barbatus* and *Mullus surmuletus*) are one of the most important target species for the trawl fisheries developed by around 800 vessels along the GFCM geographical sub-areas Northern Alboran Sea (GSA01), Balearic Islands (GSA05) and Northern Spain (GSA06). In the last years, the annual landings of these species, which are mainly exploited in coastal areas on the continental shelf, were ~2200 tons in the whole area. Although both species are mixed in the official landings data, *M. surmuletus* predominates in the GSA05 catches (~80%), while in GSA01 and GSA06 the most important species is *M. barbatus* (~80%).
16. **SOURCE OF MANAGEMENT ADVICE:** The state of exploitation of these demersal resources was assessed by applying length cohort analysis (LCA) and yield per recruit (Y/R) analysis on a mean pseudo-cohort, based on size composition of trawl catches (obtained from on board and on port monthly samplings) and official landings. The software used to perform the analysis was the VIT programme and the input parameters sets were obtained from available previous assessments. Transition analysis was also performed in order to simulate different management strategies. The present work is the first attempt to assess the state of exploitation of red and striped mullets caught by trawlers in the whole Spanish Mediterranean coast.
17. **STOCK STATUS:** *Mullus surmuletus* in GSA 05 is fully exploited. *Mullus barbatus* in GSA 01 and 06 is overexploited. Growth overfishing was detected for *Mullus barbatus*.
18. **WG MANAGEMENT ADVICE AND RECOMMENDATIONS:** The exploitation pattern for *Mullus barbatus* is different in the two GSAs and this is due probably to different seasonal targeting by the fishermen. In the Alboran Sea (GSA 01) fishery is more concentrated on the recruitment. The WG noted that this was the first assessment of red mullets (*Mullus* sp.) stocks in these GSAs. The best available data were used while longer time series including catch from other gears will have to be used in the future. Transition analysis was made reducing the fishing effort by 20% and using 40mm square mesh size. The results showed that the increase in Y/R was higher after improving the selectivity than reducing fishing effort. There were gains in the second year after the application of this management measures. The need for sensitivity analysis and for an update of the growth and mortality parameters was raised (see general comments), as well as the need to monitor discards. The need of a vector of natural mortality was stressed. Assessment including also trawl survey data were encouraged (see general comments). The WG recommends:
 - For *Mullus surmuletus*: do not increase the fishing effort.
 - For *Mullus barbatus*: a more effective control in closed coastal areas in order to protect recruitment. Seasonal closures are encouraged.
 - To improve the selectivity for both species with a more strict control of the legal mesh size, moreover, in comparison with the 40 mm diamond mesh size, the use of 40 mm square mesh size would improve the exploitation pattern.

Document n° 7 : Etat des stocks des principales ressources démersales en Méditerranée marocaine, *Mullus barbatus* and *Parapenaeus longirostris* in GSA 03.

19. **FISHERIES:** The main demersal resources are *Mullus barbatus* and *Parapenaeus longirostris*. They are target species for trawlers. The fleet consists of 120 trawlers. Trawler catches are landed mainly in three harbours: Nador (62.6%), Al Hoceima (23.2%) and M'diq (14.2%). Landings of these two species constitute 12% of the total demersal landings. *Mullus barbatus* is the target species in coastal areas while *Parapenaeus longirostris* is fished offshore in deeper waters. The two fishing activities partially overlap.
20. **SOURCE OF MANAGEMENT ADVICE:** An analysis of length frequency distribution obtained from sampling of landings has been performed by means of analytical models (VPA based on pseudocohort) for the main resources exploited by the Mediterranean fleet of Morocco. The Y/R analysis was utilised to test the behaviour of the populations to different exploitation levels. A vector of natural mortality was used to account for changes by age.
21. **STOCK STATUS:** *Mullus barbatus* is overexploited and *Parapenaeus longirostris* is fully exploited.
22. **WG MANAGEMENT ADVICE AND RECOMMENDATIONS:** the possibility of reducing the fishing mortality in coastal areas by moving the fleet activity further offshore was discussed with its implications on the level of exploitation of *Parapenaeus longirostris* : this was considered feasible only under a strict control of the fishing capacity. The WG recommends:
 - A reduction of the fishing effort in coastal areas which could be achieved by transferring part of the fishing effort to more offshore fishing grounds.
 - Enforcement of legal mesh size regulations and of coastal areas closures.

Document n° 8: VPA assessment of Mediterranean Spanish *Aristeus* stocks (2003): GSA 01 (Northern Alborán Sea).

Document n° 9: VPA assessment of Mediterranean Spanish *Aristeus* stocks (2003): GSA 05 (Balearic Islands)

Document n°10: VPA assessment of Mediterranean Spanish *Aristeus* stocks (2003): GSA 06 (Spanish Coast).

23. **FISHERIES:** There are no relevant changes to the description of the fisheries given in the 2003 WG report. However the overall landings decline of *A. antennatus* in recent years have been followed by a decrease of the number of trawlers fishing red shrimp. Long-term series of the landing and effort shows various phases, but the overall trend is clearly downward. Data series of mean sizes in the landings from 1996 to 2003 shows fluctuations about 26 and 24 mm CL for males, and 29 and 34 mm CL for females. *Aristeus* discards are negligible in this fishery. There is biological information on growth, maturity,

length-weight coefficients and natural mortality rates applicable to the management units. The monthly sampling programme of the landings produces reliable length frequency distributions (LFDs.) and fishing effort figures. The data were considered to be adequate for an age-based assessment (after length/age conversion) that has been done.

24. **SOURCE OF MANAGEMENT ADVICE:** Size composition of landings from 1996 to 2003 was used to run a standard VPA. Extended Survivor Analysis was followed as a tuning method applying the Lowestoft VPA program on age groups generated by slicing the length distribution with L2AGE program. MFDPR program was used for short time prediction and MFYPR was used for a yield per recruit estimation.
25. **STOCK STATUS:** VPA detected some sign of slight overexploitation.
26. **WG MANAGEMENT ADVICE AND RECOMMENDATIONS:** the WG welcomed the application of VPA as a non equilibrium assessment method. The assessment analysis by sex was considered as essential but for management purposes the assessment should be then merged, keeping in mind that the fishery is targeting females which are segregated by depth. Short term predictions suggest that at current level of fishing mortality the stock biomass will continue to decrease. Long term Y/R predictions show that females are overexploited with current F level well above Fmax. The Y/R curve is very flat topped in males. The WG noted that fishing mortality is not increasing but SSB is decreasing in short term predictions. Therefore indications are sometimes contradictory. The need to compare independent estimates of biomass from direct methods (trawl surveys) was strongly recommended. Taking into account also previous assessments the WG recommends:
 - Do not increase the fishing effort.

Document n° 13 : Assessment of demersal resources in the Sardinian seas (GSA 11):the case studies of “giant red shrimp” and “red mullet”

27. **FISHERIES:** The red shrimp and the red mullet are commercially two of the most important species in the Sardinian seas where the biology, population dynamics, and feeding ecology have been studied intensively in the past fifteen years. During these last 10 years, in GSA 11, the trawling-fleet is remarkably changed. The change has mostly consisted in a general increase of the number of vessels (from 62 in 1991 to 71 in 2000) and by the replacement of the old, low-tonnage wooden boats by larger steel boats. For the entire GSA an increase of 120 % and 50 % for boats over 70-100 Tons class and >100 Tons class respectively occurred. We also observe a decrease for the smaller boats (<30 GRT).
28. **SOURCE OF MANAGEMENT ADVICE:** the data refer to 10 summer trawl surveys carried out between 1994 and 2003. Density and biomass indexes were used. Length frequency distribution were break down in age groups. Total mortality Z was estimated with length converted catch curve analysis. For natural mortality Pauly's regression was used. The trend of the mortality rate has

been correlated with the variation of the fishing effort recorded between 1994 and 2003. Y/R analysis was performed as a function of F and t_c . Assessment was performed considering both the whole GSA 11 and three zones with different exploitation levels.

29. **STOCK STATUS:** for giant red shrimp (*Aristaeomorpha foliacea*) the biomass shows a gradual increase while for red mullet (*Mullus barbatus*) shows an oscillating trend. The analysis of the yield per recruit for both species evidences the good ecological conditions of the resource. The estimated F levels suggest that the resource is close to full exploitation.
30. **WG MANAGEMENT ADVICE AND RECOMMENDATIONS:** The WG noted the different level of exploitation in the different zone inside the GSA11 and highlighted the good condition of the stocks but the possible local overexploitation of some zones. Moreover the strong increase in fishing effort since 1996 generated some concern. A system of temporarily closed areas can reduce local situations of overexploitation. The WG recommends:
 - Do not increase the fishing effort.

Document n° 20 : Exploitation et ecobiologie du Serre, *Pomatomus saltatrix* dans le golfe de Gabes (Tunisie) GSA 14.

31. **FISHERIES:** *Pomatomus saltatrix* is caught by purse seine (55%), gill nets (40%) as well as bottom trawls (5%). Landings for 2003 were around 1000 tonnes.
32. **SOURCE OF MANAGEMENT ADVICE:** State of stock was assessed by applying a LCA using the VIT software.
33. **STOCK STATUS:** Fully exploited. Annual mean biomass was estimated at 1570 tonnes.
34. **WG MANAGEMENT ADVICE AND RECOMMENDATIONS:**
 - Do not increase the fishing effort.

ASSESSMENT RELATED DOCUMENTS

Document n° 11: Use of bottom trawl surveys data (program MEDITS) for stocks assessment. Particular case of France (GSA 7 and 8)

35. **Summary:** In the case of the Gulf of Lions and the eastern coast of Corsica, two approaches are proposed. It is thought that these approaches can be used over the whole MEDITS area, from Gibraltar strait to the Aegean sea. The first approach is classical and mainly based on the analysis of the trends in abundance indices, either in weight or in number, of the 36 species (fish, crustaceans and

cephalopods) of the reference list. Some examples are given which can show the various trends of some species in both areas. Seven species were analysed: *Mullus barbatus*, *Mullus surmuletus*, *Merluccius merluccius*, *Aristeomorpha foliacea*, *Parapenaeus longirostris*, *Nephrops norvegicus* and *Pagellus bogaraveo*. The second approach is based on multispecies dynamic indicators both at the populations and community levels. For these indicators, reference directions are well established : we know whether fishing activities will increase or decrease the indicator and so we know the direction to be avoided. This approach has been developed on the data from various French bottom surveys and the particular example of the French Mediterranean waters is given.

36. **WG comments:** The WG endorses the multi-species and multi-indicator approach and moreover strongly recommends the future use of trawl survey data in connection with assessments based on landings and effort data (see general comments).

Document n° 12 : Assessment of the stock status of hake *Merluccius merluccius*, red mullet *Mullus barbatus* and Norway lobster *Nephrops norvegicus* in Geographical Subarea 09 Ligurian, Northern and Central Tyrrhenian Sea.

37. An update of data relating to these three species were presented together with a series of approaches to the problem of Biological Reference Points. Trawl survey and commercial catches data were used, as well as additional information on the spatial distribution of fishing effort.
38. **WG comments:** The WG welcomes the exercise and encourages the presentation of this analysis according to the WG requirements.

Document n° 14 : Estimation of Reference Parameters through Survival Analysis

39. **Summary:** Reference Parameters are estimated through the Survival Analysis based on trawl surveys data. Robustness of estimations is checked out with real and simulated data. A general methodology for the simulation of catches and survival is introduced. The total mortality and the effective age at first capture appear as very robust estimation against variations of natural mortality. The life expectancy has been proposed as a robust indicator of the survival. Preliminary results for the Spanish coast and Gulf of Lions (GSAs 1, 6 and 7) are consistent with the assessments presented at this and previous WGs. In particular the improvement in selectivity seems to be more effective than effort reduction, and that hake stock in Spanish coasts is in worse condition than in the Gulf of Lion.
40. **WG comments:** The WG welcomes this first application of the method to real data coming both from trawl surveys and commercial samplings and encourages the authors to present this analysis according to the WG requirements.

Document n° 15 : Identifying nursery areas: a synopsis of case studies in the Strait of Sicily

41. **Summary:** A series of elaboration of trawl surveys data were presented aiming at the definition of nursery areas in the strait of Sicily (GSAs 15 and 16). Species covered are *Mullus barbatus*, *Merluccius merluccius*, *Parapenaeus longirostris*, *Pagellus erythrinus*, *Illex coindetii* and *Phycis blennoides*.
42. **WG comments:** WG welcomes the contribution and endorses the suggestion of establishing a common framework for the definition of nursery areas.

Document n° 16 : Estimation bottom trawl discards in the northwestern Mediterranean

43. **Summary:** An estimation of the discards produced by bottom trawling in the Mediterranean was presented. It is based on results from a number of research projects. The number of species affected by trawling is high, of the order of hundreds of species, and most of them are discarded. Discards represent a component of the fishing mortality that often cannot be taken into account in the assessment of the fishing resources when using commercial data. Discards in shallow waters are higher than in deeper ones, both in number of species and in weight. The main reason for discarding is the lack of commercial value. Regarding the species with commercial value, the discarded catch consists of smaller individuals. In the study area, as in general in the Mediterranean, the landings of the target species show a clear seasonality
44. **WG comments:** the WG recognises the importance of discards estimation and recommends the inclusion of these estimates in the assessments, if possible in a way allowing to obtain separate F vectors from landed and discarded catches.

Document n° 17 : Commercial application of a sort grid to reduce juvenile hake (*Merluccius merluccius*, L.) catches in the western Mediterranean demersal trawl fishery

This document was received but not presented.

Document n° 18: Genetic stock structure analysis revealed single population units in the Adriatic shared stocks of demersal species.

45. Two genetic research projects (financed in parallel by FAO-AdriaMed and the Italian Ministry of Agriculture and Forestry Policies) have been carried out to identify population status and structure within the Adriatic shared stocks of the demersal resources, which are bio-economically relevant for SCSA in the Mediterranean. The sampling and genetic methodologies adopted in the project

were standardised as possible for all species by means of MEDITS samplings and microsatellite marker analysis. Genetic estimators for population status (i.e. genetic polymorphism in terms of allele diversity, heterozygosity, fitting of Hardy-Weinberg equilibrium) and structure (i.e. genetic differentiation in terms of fixation indexes, gene flow rates) were applied using dedicated statistical software. The species studied were *Sepia officinalis*, *Loligo vulgaris*, *Nephrops norvegicus*, *Lophius budegassa*, *Mullus barbatus*, *Merluccius merluccius* and *Solea vulgaris*.

46. **WG comments:** The WG welcomed the document and considered it as an important contribution to stock identification for assessment purposes.

GENERAL COMMENTS AND RECOMMENDATIONS

47. The need for the use of trawl survey data together with commercial sampling data to produce more complete and reliable assessments was repeatedly stressed.
48. The need to update biological parameters (e.g. growth and mortality) used in the assessment was highlighted. Sensitivity analysis due to uncertainty of natural mortality was suggested.
49. A common methodological framework for the estimation of mortality and growth parameters should be established.
50. The establishment of a Working Group on selectivity is recommended. This WG will have to address a common protocol of methodology in order to proceed with specific experimental work.
51. *Pomatomus saltatrix* is proposed to be considered for inclusion in the list of priority species.
52. No assessments of shared stocks have been presented.
53. The WG recommends that participation of more scientists from more countries to be financially supported.
54. The facilitator of the WG, if not supported by his national government should be supported by the GFCM.
55. The WG reminds the scientists that assessments must be presented in a complete way with all the data, parameters, results, conclusions and recommendations. All the documentation must be sent to the facilitator for dispatching in due time.
56. The documents produced by this meeting will be available at : <ftp://cucafera.icm.csic.es/pub/scsa/>

SCIENTIFIC ADVISORY COMMITTEE - GFCM
Sub-Committee of Stock Assessment -Working Group on Demersal Species
Málaga, Spain 6-7 May 2004

Appendix A
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Appendix B
Sub-Committee of Stock Assessment
Working Group on Demersal species
Málaga, Spain, 6-7 May, 2004

AGENDA

Thursday 6th May 2004

- 9:00: Opening of the meeting, election of the chairman and of rapporteurs
- 9:30-9:45: Adoption of the agenda and planning of the session;
- 9:45-11: Presentation and discussion of new assessments : documents 1-6 of list of working documents
- 11-11:30: coffee break
- 11:30-13:30 Presentation and discussion of new assessments : documents 7, 11 and 12 list of working documents
- 13:30- 15:30 Lunch
- 15:30-16:00: Presentation and discussion of new assessments : document 13
- 16:00-17:00: : selectivity and discards: documents 16, 17(?) and 18
- 17:00-17:30 coffee break
- 17:30-18:00 nursery areas and sensitive habitats: document 15
- 18:00-18:30: biological reference points: document 14

- Friday 7th of May 2004
- 9.00-10:00: Presentation and discussion of new assessments : documents 8, 9 and 10 of list of working documents
- 10-10:30: population studies: document 17
- 11:00: coffee break
- 11:30-16:30 Preparation of final report
- 16:30-18:30 Adoption of the report

Appendix C
G.F.C.M. SAC Working Group on the Assessment of Demersal stocks Málaga 6-7 May 2004
List of Working Documents presented

N	GSA	Authors	Title	Abs	Doc
1)	1	J. L. Pérez Gil, A. Fernández, J. Baro, M. González, E. Massutí, A. Quetglas and L. Quintanilla	Stock assessment of hake (<i>Merluccius merluccius</i>) from the trawl fishery off the geographical sub area 01(Northern Alboran)	X	X
2)	5	J. L. Pérez Gil, A. Fernández, J. Baro, M. González, E. Massutí, A. Quetglas and L. Quintanilla	Stock assessment of hake (<i>Merluccius merluccius</i>) from the trawl fishery off the geographical sub-area 05 (Balearic Islands)	X	X
3)	6	J. L. Pérez Gil, A. Fernández, J. Baro, M. González, E. Massutí, A. Quetglas and L. Quintanilla	Stock assessment of hake (<i>Merluccius merluccius</i>) from the trawl fishery off the geographical sub-area 06 (Northern Spain)	X	X
4)	1	A. Quetglas, E. Massutí, J. del Árbol, J. Baro, A. Fernández, M. González, J. L. Pérez-Gil and L. Quintanilla	Stock Assessment of red mullet (<i>Mullus barbatus</i>) from the trawl fishery off the geographical sub-area 01 (Northern Alboran)	X	X
5)	5	A. Quetglas, E. Massutí, J. del Árbol, J. Baro, A. Fernández, M. González, J. L. Pérez-Gil and L. Quintanilla	Stock Assessment of striped red mullet (<i>Mullus surmuletus</i>) from the trawl fishery off the geographical sub-area 05 (Balearic Islands)	X	X
6)	6	A. Quetglas, E. Massutí, J. del Árbol, J. Baro, A. Fernández, M. González, J. L. Pérez-Gil and L. Quintanilla	Stock assessment of red mullet (<i>Mullus barbatus</i>) from the trawl fishery off the whole geographical sub-area 06 (Northern Spain)	X	X
7)	3	A. Slimani et H. Hamdi	Etat des stocks des principales ressources démersales en Méditerranée marocaine	X	X
8)	1	A. Carbonell, I. González, J. L. Pérez Gil, A. Esteban.	VP A assessment of Mediterranean Spanish Aristeus stocks (2003): Management Unit 1 (Northern Alborán Sea).	X	X
9)	5	A. Carbonell, I. González, M. Gaza, J.L. Fernández	VP A assessment of Mediterranean Spanish Aristeus stocks (2003): Management Unit 5 (Balearic Islands)	X	X
10)	6	A. Carbonell, I. González, J.L. Pérez Gil, A. Esteban	VP A assessment of Mediterranean Spanish <i>Aristeus</i> stocks (2003): Management Unit 6 (Spanish Coast).	X	X
11)	7	A. Souplet, Y. Cheret, A. Jadaud	Use of bottom trawl surveys data (program MEDITS) for stocks assessment. Particular case of France	X	X
12)	9	A. Abella	Assessment of hake, red mullet and Nephrops in GSA 9		
13)	11	Sabatini A., Cucu D., Murenu M., Follasa M.C., Cau A.	Assessment of demersal resources in the sardinian seas (GSA 11):the case studies of “giant red shrimp” and “red mullet”	X	
14)		Ferrandis, E., Hernández P., Lloris D. and L. Gil de Sola	Estimation of Reference Parameters through Survival Analysis	X	

15)	15-16	F. Fiorentino, G. Garofalo, M. Grisina, M. Camilleri and S. Ragonese	Identifying nursery areas: a synopsis of case studies in the Strait of Sicily		
16)		P.Martin	Estimation bottom trawl discards in the northwestern Mediterranean	X	
17)	6	F. Sardà, F. Sardà-Palomera and B. Moli	Commercial application of a sort grid to reduce juvenile hake (<i>Merluccius merluccius</i> , L.) catches in the western Mediterranean demersal trawl fishery	X	
18)		M. Ferretti			
19)	17-18	Ilaria Guarnero, Flavio Garoia, Elisabetta Cilli, Monica Landi, Raffaele Di Placido, Alessia Cariani, Andrea Ramsak, Piero Mannini, Corrado Piccinetti, Fausto Tinti	Multi-species genetic stock structure analysis revealed single population units in the demersal Adriatic shared stocks	X	
20)	14	O. Jarboui, M. Ghorbel, K. Dhieb and A. Bouain	Exploitations et Ecobiologie du Serre <i>Pomatomus saltatrix</i> dans le Golfe de Gabes		

