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GENERAL FISHERIES COMMISSION
FOR THE MEDITERRANEAN
COMMISSION GÉNÉRALE DES PÊCHES
POUR LA MÉDITERRANÉE

GENERAL FISHERIES COMMISSION FOR THE MEDITERRANEAN

SUB-COMMITTEE ON MARINE ENVIRONMENT AND ECOSYSTEMS (SCMEE)

REPORT OF THE SCMEE TRANSVERSAL WORKING GROUP ON SELECTIVITY*
Sète, France, 2-4 July 2008

* Available only in English

REPORT OF THE SCMEE TRANSVERSAL WORKING GROUP ON SELECTIVITY

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1. OPENING, ARRANGEMENT AND ADOPTION OF THE AGENDA

1. The first meeting of the newly established Working Group on Selectivity was held in Sète, France, from 2 to 4 July 2008. It was attended by 16 participants from Egypt, Italy, France, Morocco, Spain and Turkey (see list of participants in Appendix 2).

2. Mr Jacques Sacchi, Moderator of the Working Group, welcomed the participants and thanked them for attending this meeting.

3. Mr Srour, Deputy Executive Secretary of the General Fisheries Commission for the Mediterranean (GFCM), welcomed the participants and thanked the IFREMER-France for its kindness in hosting the meeting.

4. The meeting appointed Mr Sacchi as chairperson and nominated the rapporteurs for each agenda item as follows: Mr A. Srour for agenda items 1, 7 and 9; Mr R. Javier for agenda item 2; Mr R. Franquesa for agenda item 3; Mr J. Sacchi for agenda items 3 and 6; Mr T. MothPoulsen for agenda item 4; Messrs A. Lahnin, S. Benchoucha and M. Malouli for agenda item 5.

5. The meeting Agenda was adopted with a minor change (Appendix 1).

2. REVIEW ON RECENT STUDIES ON STATIC GEARS SELECTIVITY IN THE MEDITERRANEAN SEA

2.1. Advances on static gear selectivity in the Mediterranean

6. The objective of this session was to review the status of knowledge regarding static gear selectivity studies carried out in the GFCM areas.

7. The meeting reviewed the information provided through the presentations made. The presentations and related discussions are summarized hereafter:

Static nets

The gillnet fishery targeting European Hake (*Merluccius merluccius L.*) in the Northern Tyrrhenian Sea; catch composition and selectivity of different mesh sizes (by P. Sartor, M. Sbrana, P. Belcari, S. De Ranieri and C. Viva)

Abstract: In several Mediterranean areas, a well developed artisanal fishery with gillnets targeting European hake (*Merluccius merluccius*) is present. The present study was aimed to collect information on the commercial fishery and to perform selectivity experiments with different mesh sizes in the gillnet fishery of the Northern Tyrrhenian Sea. Horse mackerel (*Trachurus trachurus*), European hake and tub gurnard (*Chelidonichthys lucernus*) dominated the catches. Discards, mainly due to Horse mackerels, were less than 10% of the total catch in weight. The landings of *M. merluccius* were mainly composed by specimens from 25 to 70 cm total length (TL). Four mesh sizes were used for the selectivity experiments: 53 (that currently in use by the local fleet), 62.5, 70 and 82 mm. Efficiency of the four meshes was not significantly different, with respect to the total and hake catches. Selectivity on hake was assessed by Sechin and SELECT methods. Tangling was an important catch modality for hake,

as evidenced by the results of Sechin model. SELECT showed that the bi-modal function gave the best adjustment to the length-frequency distributions; the modal catch sizes were 33, 39.2, 43.6 and 51 cm of total length respectively for the 53, 62.5, 70 and 82 mm mesh sizes. Taking in account the size of first maturity for female (35.1 cm TL), 62.5 mm is the more adequate mesh to exploit hake, allowing some protection for immature specimens and, at the same time, a lower pressure on large females. The results indicated a lack of mesh size related selectivity which is in contrast to a number of experiments on gillnet selectivity on Hake from the Atlantic. The results also suggested that a considerable fraction of hake larger than the modal length was caught by entangling. This fraction could be equal to the fraction caught in the maxillas found in other experiments. The numbers caught in each mesh size was small and the results should be treated with caution. Thus until larger data sets exist from the Mediterranean it was concluded also to consider findings and gillnet selectivity results on hake from France, England and Portugal. The study also concluded that the spawning stock was far below safe threshold. Net parameters like twine thickness, hanging ratio and trammel net rigging is normally found not to change the modal length, but several experiments with other species has documented an effect of these parameters on catch efficiency and on length classes outside the modal length. Also wider selection curves have been observed.

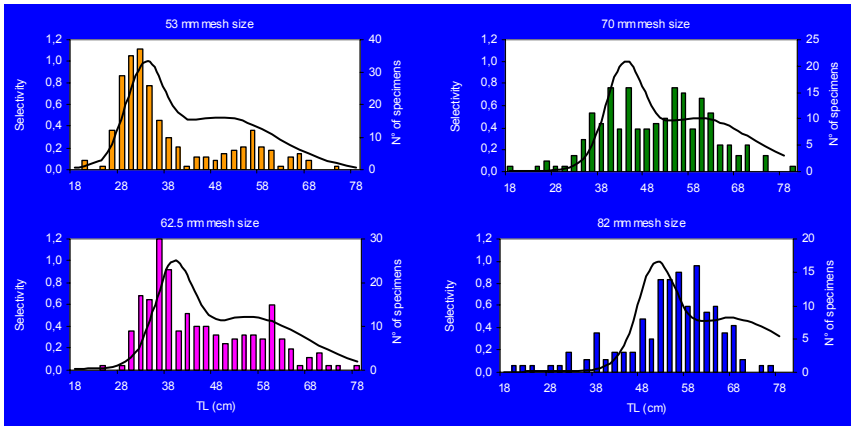

Figure 1: **Gillnet selectivity for Hake in the Northern Tyrrhenian Sea (Western Mediterranean); Select model - modal lengths (cm)/mesh size (cm): 33/5.3, 38.9/62.5/ 43.6/7, 51.1/8.2. (from Sartor et al., 2008)**

8. The Working Group concluded that in cases where spawning stock needed to be preserved, it would be an option to investigate the possibility to legislate on twine diameter and hanging ratio and a possible maximum mesh size as well. The meeting noted the reduced number of sampled individuals to make such conclusions and discussed about how the entangled fishes in the net could make more difficult some selectivity analysis. It was indicated that entangling of some individuals occurs after they have been catch by the maxillaries.

9. A view was expressed that effectively twine thickness is important in tangling and eventually in the final catch. Decreasing twine thickness tangling effect is increased. Some studies carried out in the Baltic Sea showed that changes in twine thickness affect only capturability. The importance of twine mono and multifilament effects on the catch was also commented.

10. The Working Group also noted that selectivity has a similar effect in commercial and accessory species. There are almost no discard, being all the species of potentially commercial interest. Furthermore, the percentages of protected species are very low or virtually zero (dolphins, turtles, etc.).

11. The need for standardizing some gear characteristics, such as net total length, was stressed.

Size selectivity of trammel nets used in the common sole, Solea solea fishery, in the Thracian Sea (NE Mediterranean) *(*by A. Adamido, A. Kallionotis and R. Holst – presented by J. Sacchi)

Abstract: The common sole, *Solea solea* (Linaeus, 1758) is one of the most commercially important flatfish for the Greek fisheries. The main proportion of the sole catches (>70%) is fished in the N. Aegean Sea, mostly by trammel nets (60%-95%) according to National Statistical Service of Greece (NSSG). Few studies are available on the selectivity parameters of passive gears in Greek waters [1, 2, 3] and none of them concerns the flatfish fishery. The size selectivity of trammel nets used in the Thracian Sea (Greece) sole fishery was estimated using catch-at-length data from five mesh sizes (44, 56, 68, 84, 110 mm full mesh). Selectivity of nets and variation between vessels were calculated using standard selectivity software (EC and CC Constat models). The bi-modal curve provided the best fits. The modal fish length for largest retention was 3.5 times mesh size. The optimum mesh sizes were compared to commercial practice. No significant difference between the vessels' fishing efficiency was shown.

12. A discussion followed this presentation focusing on possible effects on selectivity of using mono-or multi-filament twine. Some results cited showed clear differences.

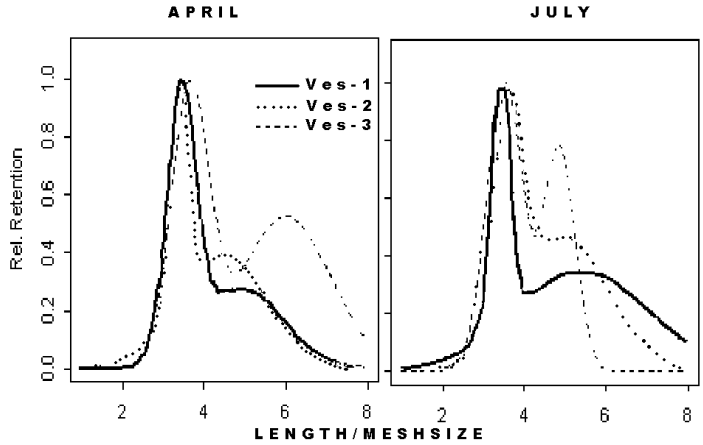

Figure 2: **Selectivity curves per vessel for both trials (from Adamidou et al., 2008)**

Traps and pots

Fishery Pot selectivity in artisanal *Octopus vulgaris* fishery off the south Iberian Peninsula (Spain) *(*by J. Rey, A. Juarez, Z. Romero, J. Baro, I. Sobrino)

Abstract: *Octopus vulgaris* is the main cephalopod species of the trawl and artisanal fisheries in south Iberian Peninsula. Artisanal Octopus fishery use mainly pots and traps in the area. An experimental artisanal study has been performed in two locations of south Spain, Isla Cristina (Atlantic) and Fuengirola (Mediterranean). Four different kinds of pots (capacities of 3.7, 4.4, 6.3 and 6.5 litres) and one trap have been set in lines and samples have been taken fortnightly during two years (march 2005 to march 2007). A commercial 12 litres pot catches have also been considered in selectivity analysis. Catches and selectivity results were compared, showing a high correlation between pot capacity and octopus size ranges. The sloped plastic pots (SP), with the largest capacity (6.5 litres), showed catches with the highest mean individual weights. The smallest gear, the flat clay pots (FC) captured mostly small individuals. Modal classes and mean values increase with pot capacity. Selectivity analysis were made using SELECT models, showing the normal functions and the best fittings to

experimental data. Another important source of variability is the population structure in each area, being mean weights always higher in the Mediterranean area for all kinds of pots.

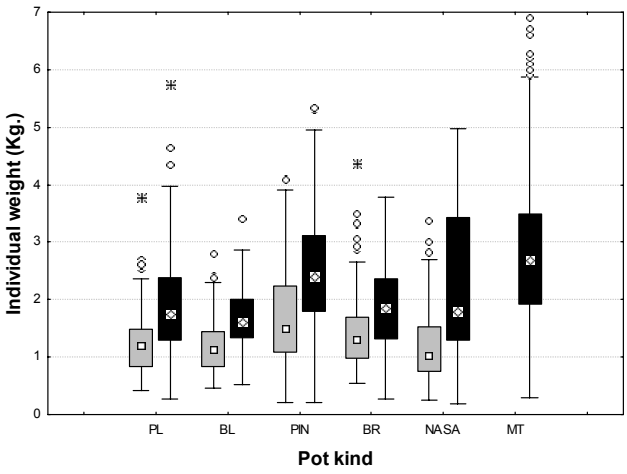

Figure 3. **Individual weight range by pot kind and area (Atlantic; grey boxes and Mediterranean; black boxes). Circles and crosses show outliers and extreme values respectively. PL (6.3 litres), BL (3.7 l), PIN (6.5 l), BR (4.4 l), NASA (trap) and MT (commercial pot, 12 l.).**

13. Following a discussion on some characteristics of the fishery, the meeting noted that pot selectivity showed clear differences concerning pot capacity (volume). Bigger pots fished a wider range of sizes, with bigger individuals. All pot kinds could potentially catch small individuals, but these are often more abundant in small pots. No differences have been appreciated on selectivity between males and females.

14. Other selectivity factors as pot material (clay or plastic), shape and pot entrance diameter have been tested, although results did not show any clear tendency.

15. The loss of pots and traps are common (favoring sometimes the ghost fishing effect) being one of the problems of this fishery, as well as conflicts between fisheries caused by ground occupation.

16. With reference to this study, the meeting concluded that with different pots in two different areas, it is difficult to select one pot kind as the more selective or more advantageous. To weight up the pros and cons of each pot type several different issues should be considered, such as population characteristics (mean sizes, distribution, etc.), number of boats, fleets conflicts, loses of gears, impacts, etc.

Size selectivity of basket traps for the gastropod *Nassarius mutabilis* in the Adriatic Sea (by G. Fabi and F. Grati)

Abstract: Fishing of *Nassarius mutabilis* is performed along the coast of the central and northern Adriatic Sea from fall to spring by small-scale vessels using basket traps provided with a 19-mm mesh. This activity usually gives higher income than any other set gear, but in the last years landings have shown a general decrease. Management measures regard Minimum Landing Size (shell height = 20 mm) and mesh opening of the sieve used to sort individuals larger than MLS. Nevertheless, great amounts of small specimens are commonly marketed. In order to avoid the catch of undersized individuals, the selectivity of basket traps was evaluated in a comparative study. Three experimental nets (colour white; mesh openings 23, 26, 28-mm) were fished in conjunction with two commercial nets (mesh opening 19-mm) of different colours (black and white) and one control net (colour white; mesh opening 5-mm). One hundred and twenty traps were randomly arranged in one set deployed on a muddy

bottom (10 m depth) and drawn up five times in September. According to the professional fishing practice, traps were baited with horse mackerels and soaking time was 24 hours. Size selectivity was estimated with the SELECT method commonly adopted for trouser trawl experiments using CC2000 software (Constat, 2000). Selectivity parameters were estimated for a pool of curves, but the logistic model gave the best results. Goodness of fit test based on model deviance gave high p-values in all cases, being the lowest one 0.74 for the 19-mm trap (black). H50 increased from 15.9 mm for the white 19-mm trap up to 24.1 mm for the 28-mm one. Around 3,000 specimens were caught with the control traps, 988 with the black 19-mm traps, 576 with the white 19-mm traps, 263 with the 23-mm traps, 114 with the 26-mm traps and 7 with the 28-mm ones. Percentage of individuals larger than MLS gradually increased from 14% in the control 5-mm traps up to 100% in the 26-mm and 28-mm ones. Comparison between black and white 19-mm traps did not show any significant difference, both in terms of H50 and of catch yields.

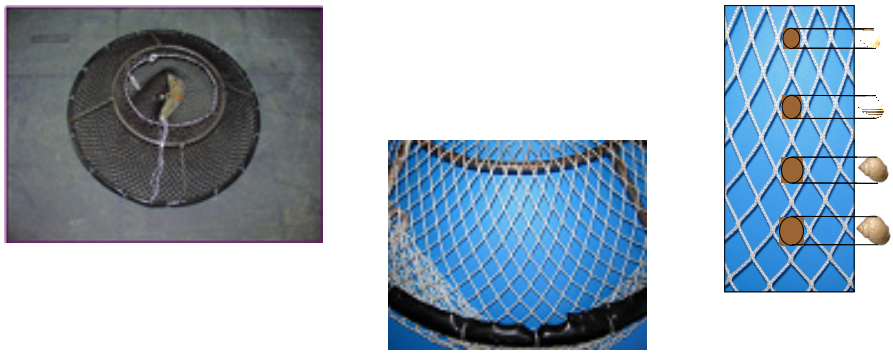

Figure 4**: Pots for *Nassa mutabilis*. Hanging Ratio and Selectivity decrease from the base to the upper part (from Fabi and Grati, 2008)**

17. These results indicate that the 19-mm mesh commonly used by fishermen is not adequate to rationally exploit *N. mutabilis* due to the great amount of undersized specimens in catches, while the 23-mm mesh can represent a good compromise between commercial fishing yields and protection of small individuals. Differences between Sechin and SELECT models results were discussed. Sechin method only consider the mesh perimeter (constant value), giving an unrealistic selection function. Nevertheless, SELECT method takes into account the hanging ratio, and consequently selectivity decrease from the base to the upper part of the trap, resulting as a more realistic function.

18. It was recalled that there are several possibilities to measure a gear mesh. Stretched length (from knot to knot) could be easily measured taking the distance between 11 knots, divide by 10 and multiply by two. Other measurements, as mesh area, are being at present considered to manage fisheries and ICES has developed electronic portable equipment “Gauge OMEGA” to standardize these measurements. The main problem of this equipment is its high price, not favoring a widespread use.

2.2. Review of the main technical parameters of static gears selectivity and selectivity database

19. The Working Group made a tentative to elaborate a complete list of different aspects affecting selectivity in different static gears, excluding those parameters affecting efficiency instead of selectivity. The case of hook and lines was chosen as an example to show what technical parameters must be selected according to their role in the selectivity process. Parameters examples are numerous, affecting selectivity in many ways. However, in the list of the most relevant parameters the most important ones are: the main line, the breaking strength of the branch line, hook dimensions and the

type and size of the bait. Once the main selectivity parameters are selected, they must be included in a selectivity database with their main results and references.

20. To illustrate this processes, a short resume of gillnet selectivity papers published up to date in European countries was presented. A total of 11 papers are shared mainly concerning a few number of demersal species (*Diplodus annularis*, *Merluccius merluccius*, *Mullus* sp., *Pagellus* sp., etc.). Mr Sacchi gave as example the framework of database built for gillnet selectivity study (Appendix 3).

21. Excel tables were also presented for the other gear containing mean selectivity aspects, parameters, published references, etc. The meeting decided to submit to all the participants these tables in order to bring up to date and complete this information with local studies results, even if they are not published yet. The main goal of gathering together all this information is to develop a selectivity database format for static gears and eventually a standardization of selectivity studies.

Figure 5: **Studies on gillnet selectivity published on scientific journals (Mediterranean Sea and Portugal, from Grati et al.)**

3. DEVELOPMENT OF A FRAMEWORK FOR COLLECTION OF TECHNICAL, ECOSYSTEMIC AND SOCIOECONOMIC DATA RELEVANT TO THE IMPLEMENTATION OF THE SELECTIVITY MEASURES

22. The moderator of the meeting introduced this agenda item by recalling the interest for developing a framework to collect data relevant to the implementation of the selectivity measures and which should be adopted as a common standard for selectivity studies. He underlined that implementation of the selectivity measures implies to consider their biological, economical and ecological consequences on the ecosystem through main relevant indicators.

23. Although there are many aspects affecting gear selectivity, those sensitive to be controlled are preferred for fisheries management.

24. A pragmatic method to evaluate selectivity effect was proposed comparing any (experimental) gear to a “standard gear”. Standard gears should be chosen from the most usually used by fishermen, which are often the most efficient ones and eventually the best reference to compare with improved new gears.

25. Furthermore, the parameters preferred to manage fisheries are those working as economic indicators; i.e. to control effort: number of hooks, number of fishing trips, trips duration, and, for selectivity: Selectivity Factor (S.F.).

26. Noting that any experimental comparison can be regarded as statistically valid only if it is carried out on only one variable, the other parameters of selectivity have to be constant. This thus forces to choose the most relevant variable and to determine as a prerequisite the optimal values of this variable before any comparison of the biological, economic and ecological consequences. In that case, the experimental gear which must be evaluated should have the same technical characteristics as the standard gear accepted for a different value of the chosen variable.

27. The table in Appendix 3 gives for each main fishing gear category a provisory review of the main parameters which must be collected in the selectivity studies to calculate these indicators. For example, fish length and mesh size are the main parameters needed to obtain the Selectivity Factor. The GFCM–TechnoMed members were invited to complete this table for the next SCMEE meeting (Antalya, October 2008).

28. Participants further attempted to improve some criteria in the area of the data collection to contribute to the production of relevant indicators related to selectivity changes that are useful for the analysis of the effect of any technical change and which may help the management process on selectivity improvements of gears.

29. Concerning the technical and ecological indicators, some proposals were considered in the development of a framework of data collection. They take into account the: i) effects on discards; ii) survival after escapement (estimation of unaccounted mortality ratio); iii) consequences by type of material and twine and iv) others ecosystem impacts.

30. It was recalled that, at the last session of the Scientific Advisory Committee, a new table of data collection on biological consequences of implementing square mesh was proposed, including some indicators, and consideration for each the expected outcome (increase or decrease) and the qualified effect in the short and long term (positive, negative, no effect). The indicators are disaggregated by species level and consider different aspects such as: size of first capture, percentage of discards in total catches, total fishing mortality, total catch of targeted species and other marketable species, escapes, catch of undersize fish (illegal). The Working Group acknowledged that this proposal was adequate.

31. Concerning the socioeconomic aspects, some proposals on the data collection framework were developed to be taken into account in selectivity studies. At level of the routine and general collection of data, the discussion stressed the need to collect data in order to produce global analysis on selectivity, and the need to evaluate: i) impacts on sorting time ii) changing in profits and iii) impacts on employment structure

32. The Working Group considered that the table approved by the SCESS was adequate and that it could contribute to evaluate the socioeconomic effect of changes in the codend net of trawls which allows to consider the effects of these changes from the netmaker up to the market (see table 1 below).

INDICATORS	**SHORT TERM**	**LONG TERM**	**OBSERVATIONS**
Catch-landing	Decrease or stable	Increase	The improvement of selectivity supposes the reduction of catch of the small size individuals.
Effect : price-quantities/quality	Increase or equal	Decrease or equal	The reduction of landing supposes the reduction of the supply and the increasing of the price.
Costs : Gear cost Maintenance cost Fuel cost	 Increase equal decrease	 Equal equal decrease	The change of the gear supposes en initial investment that not affects other maintenance cost. The increase of the opening of the mesh supposes less resistance to water, less retention of biomass in the cod-end, in consequence less consumption of fuel. Finally, the recover of the biomass allow in long term improve the quantity cached by fuel consumed.
Costs per landing if	Increase	Decrease	The initial reduction of the catch supposes increasing the

biomass recover			cost per landing.
Added value	Decrease	Increase	The initial reduction of catches supposes the reduction of the added value, net profit and wages.
Net Profit	Decrease	Increase	Idem
Wages	Decrease	Increase	Idem
Social effect (employment)	Decrease	Stable	Initial reduction of the revenue supposes the increase of wages and a decrease of employment. In the long term, it could be observed an attraction to the metier as there is an increase of the wages and a net profit.
Acceptability by the fishing sector	Rejected	Accepted	Initial cost of the transition produces a resistance to change. When the biomass is recovered, the fishermen improve their profits and so they support the new regulation.

Table 1: List of potential economic indicators to valuate the consequences of square codend application to Mediterranean trawl fisheries

33. To apply these socioeconomic indicators in the selectivity analysis, it was judged relevant to define each gear to be analyzed, and identify gears to be considered as reference. For each gear, it is needed to define:

- Name;
- Technical characteristics;
- A definition of an unit of effort (number of hooks, meters of net, etc.) and a unit of time (one day or one year).

34. To contribute to the analysis of a gear, the use of economic indicators can improve the decision criteria to the managers and fishers. The following socioeconomic indicators were endorsed:

A. Short-Term Indicators. The short-term indicators measure the immediate effect of the use of each fishing gear. Five short term indicators were considered:

- **Physical Productivity (S-PP)**: Catch per unit of effort by gear type. Expressed as catch (kg) for each fishing ground by species.
- **Economic Productivity (S-EP)**: Average production value per unit of effort by gear type. In addition of the information (1), we need to know the average price per kg of each species caught by gear type.
- **Intensity of work (IW)**: Average number of hours per worker needed to produce one unit of effort of a given gear type.
- **Man Physical Production (S-MPP)**: Average production in terms of catch weight (kg) per man-year equivalent for each gear type (= S-PP/IW).
- **Man Productivity (S-MP)**: Average productivity value by man-year equivalent (=S-EP/IW).

B. Long-Term Indicators. The long-term indicators measure the effect of the use of each fishing gear, when the stocks improve (or go down). They take into consideration the effect of the implementation of a different system of production over the fish stocks. Their estimation needs the use of bio-economic models (as MEFISTO), and are a statistical prevision. It is proposed 4 short-term indicators, given that the intensity of work (IW), will not change between the short- and long-term by effort unit:

- **Physical Productivity (L-PP)**: Estimation of the long-term catch as by unit of effort that each gear type can produce; expressed as the catch in a given area (fishing ground) (kg).

- **Economic Productivity (L-EP)**: Estimated long-term average value produced in a fishing ground by unit of effort for each gear type considered. In addition of the information, we need to assume an average price per kg of each species caught by each gear type.
- **Man Physical Production (MPP)**: Long-term estimation of catch (kg) per man-year equivalent by each gear type; calculated from the data of L-PP and IW.
- **Man Productivity (MP)**: Long-term average value per each man-year equivalent; calculated from the data of L-EP and IW.

4. PROGRESS ON THE IMPLEMENTATION OF THE 40 MM SQUARE MESH CODEND

35. The meeting reviewed 3 documents on the implementation of the 40 mm square mesh codend. The related presentations and discussions are summarized hereafter:

A summary of size selectivity of diamond and square mesh codends for eight commercially important species in the Aegean Sea (by Adnan Toka, Z.Tosunoglu, C.Aydin, H. Kaykaç, H.Özbilgin)

Abstract: Recent studies have shown that the selectivity of the 40 or 44 mm diamond mesh codends used commercially by Turkish bottom trawlers is rather poor. The study comprised two demersal trawl fisheries; one more shallow water fishery for fish and another deep water fishery where the dominant income was from deepwater shrimp. Four different codends were tested: 40mm-, 44mm- and 50mm diamond mesh codends and 40mm square mesh codend. The main findings were backed by state of the art statistical methodology and demonstrated a better selectivity for the majority of species in the 40mm square mesh codend than in a 40mm diamond mesh codend except for the four spotted megrim (a flatfish). The 50mm diamond mesh codend gave the best selectivity for most species except for hake where the highest selectivity was found in the 40mm full square mesh codend. This might indicate a special issue for the Mediterranean and could be explained by the fact that the fish is so small that it does not have power to escape through a partly closed diamond mesh. The study also compared the new, modern and more efficient trawl design derived from the Atlantic demersal trawls with the standard Mediterranean trawl. Unfortunately, the new trawl design did not show a better selectivity with the same codends as tested for the old design. The shift to more modern and efficient trawls has been expected for many years and will most likely soon spread to the whole region.

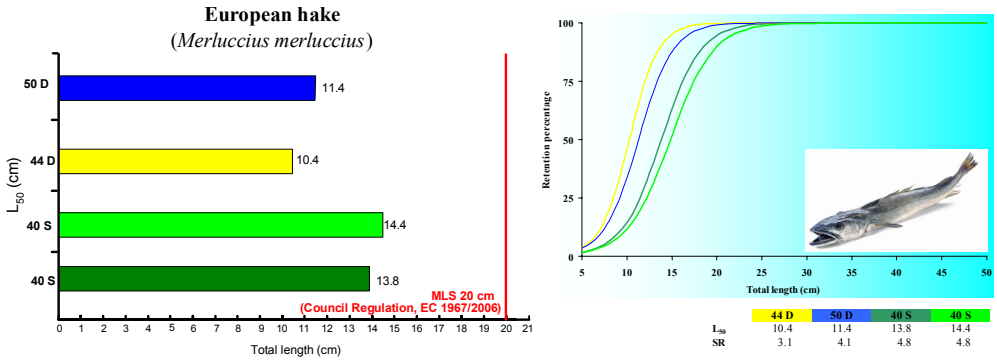

Figure 6**: For *Merluccius merluccius* as for the other species with the exception of flatfish the 40 mm square mesh provide generally the best improvement of the trawl selectivity but without allowing to reach the MLS (from Tokaç et al.)**

36. The Working Group expressed expectation that the shift to the more modern trawl may increase the general fishing pressure considerably on the already exhausted demersal fish stocks of the

Mediterranean. It called for quick and robust action introducing and enforcing more selective technical measures. It was noted that the exploitation of the resources is further increased by the introduction of newly built, highly efficient trawlers to replace the often hundred years old trawlers of the Turkish fishing fleet.

Science versus fishers decisions: a real experience. A document for reflexion (By F. Sarda and J.B Company)

Abstract: In relation to the new EC rules on implementation of the 40 mm square mesh in the trawl cod-ends in the Mediterranean, a series of selectivity experiments in the Catalanian multi-species fishery were conducted by members of ICM (CSIC). Experiments were performed applying strict scientific and statistical criteria. The results were disseminated in specialized journals, at scientific workshops, to fishermen's associations and directly to the sector. Reacting on this and the new regulation, the fishing industry arranged on their own, a one day experiment with three vessels testing a 40mm diamond-, a 50mm diamond- and a 40mm square mesh codend. It seemed that this (non-scientific) experiment had implication for the decision processes related to the implementation of the new EU regulations in the country and the presentation described the frustrations the fisheries management advice was facing on the issue.

Size selection by diamond- and square-mesh codends in multi-species Mediterranean demersal trawl fisheries (by A. Sala, A.Sal, A. Lucchetti, C. Piccinetti, M. Ferretti)

Abstract: The comprehensive study investigated by means of the covered codend method, the selectivity for eight common species in the Mediterranean demersal trawl fishery. A 38mm full square mesh codend was tested against a traditional Italian 38mm (40mm nominal) diamond mesh codend. Improved selectivity was demonstrated in the square mesh codend for all species except for scaldfish (*A. laterna*). Good overall catches allowed for estimation of between haul variations which does not underestimate the variation normally obtained when pooling haul-data. The use of square 38mm (40 nominal) mesh codend as technical measure was strongly supported although it does not give sufficient increase in selectivity for multi-species fishery. Hake was one of the species who showed the largest improvement in selectivity using the square mesh configuration despite the improvement was not sufficient in relation to the minimum landing size.

37. The Working Group discussed whether an increase in minimum mesh size immediately should comprise the whole trawl or only the codend. In this context, it was brought forward that the normal procedure was to first regulate only the codend and at the same time fix a transition period (a normal lifetime of a trawl) after which also the whole trawl should comply with the new minimum mesh size. In this way, the fishing industry would not need to discard new or usable trawl already made with the previous minimum mesh size, and as more than 90% of the selection happens in the codend, the conservation difference would not be significant anyway.

38. Regarding the socioeconomic impact of implementing the 40 mm square mesh, the Working Group noted the lack of studies conducted in the Mediterranean on these aspects and suggested to consider the outcome from studies on trawl selectivity conducted in other regions (such as the North Atlantic and Baltic demersal).

39. It was also acknowledged that the Mediterranean market might be less internationally oriented than the Atlantic fish market. A study was proposed to evaluate the resilience of the Mediterranean market to changes in delivery caused by changes in legal mesh-size including the likelihood for the fish prizes to increase with smaller landings and thus minimizing the loss for the fishing industry.

40. The Working Group finally acknowledged that the studies conducted so far demonstrate a clear improvement in selectivity for most species in the new 40mm square mesh codend compared to diamond mesh codends of same or smaller mesh sizes. Hake selectivity seems particularly to benefit from the square mesh configuration, noting that the 40mm square mesh codend is still far from meeting the demands for selectivity related to the legal minimum landing size. Many experiments also demonstrated that outside the region, flatfish get a reduced selectivity in square mesh configuration. Except for hake, a 50mm diamond mesh codend gives better selectivity for all species than 40mm square and diamond mesh codends.

5. DEVELOPMENT OF CASE STUDIES

41. The Moroccan participants presented an outline of a project proposal titled "Impact biologique et économique de l'utilisation du chalut à maille carrée de 40 mm sur l´écosystème marin et sur la communauté des pêcheurs". This project (case study) will study the effect of the 40mm square mesh trawl codend on the selectivity, on the catch, on the escapement of the juveniles target species, and on the discards. It will also analyze the socioeconomic impact of implementing this mesh size, on the resources and fisherman communities.

42. The Working Group appreciated the initiative and suggested that a final version of the project including relevant details on different operational phases should be presented during next SAC/ Sub-committee sessions (Antalya, October, 2008). The meeting pointed out the need for a technical support to develop the project structure.

43. The participant from Egypt stressed the interest that the project frame mentioned above be extended to other countries or regions.

6. GFCM-TECHNOMED TECHNOLOGY "WATCH"

6.1. Outline of the objectives of GFCM-TechnoMed network and methodology of work

44. The important role of the TechnoMed network for SAC, was evidenced underlining that the competence of this network in the field of fishery technology represents an essential tool in terms of either fishing effort, fishing capacity, fuel consumption, technical impact on the environment, security on board, technical issues within management plans, technical aspects of acoustic research, etc.

6.2. New FAO fishing gear classification

45. Mr MothPoulsen informed participants that the new FAO gear classifications has to be completed and it can be an hard work as many new gears appeared in the lat years and also because there are some problems between the old terms and the new ones. As the use of the same terminology is very important, the new manual will be completed for publication probably next year.

6.3. Web page of GFCM-TechnoMed

46. Mr Sacchi evidenced that the realization of the TechnoMed framework web page is still in progress having encountered some technical difficulties at the moment. It was showed a draft web page and communicated that the main idea is to combine English and French languages in the same page. The web page will include the objectives of research, the name and address of the TechnoMed members, the possibility of inserting pictures of the fishing activity, a forum for eventual discussion (this will depend on the possibility to have an interactive web page), other important information (photo, video, etc.), a glossary to facilitate the use of different languages and to facilitate translation of technical terms, a database of technical data (to be decided if in excel or access format). The general aim is to spread out the technical knowledge to the scientific community.

47. Mr Srour stressed that the GFCM Secretariat was in favor of examining the possibility to establish a specific TechnoMed web page in the GFCM website. He suggested that a prototype of this web page be submitted to the Secretariat to check the feasibility at technical level and compatibility with the GFCM website.

7. ANY OTHER MATTERS

48. The meeting was reminded of the request made to SAC by the Commission during the 32nd Session (Rome, February, 2008) inviting to proceed with the update of the GFCM glossary. The participants and the GFCM-TechnoMed network were invited to contribute to the process of updating the glossary.

8. CONCLUSIONS AND RECOMMENDATIONS

49. The Working Group reached the following main conclusions and recommendations:

- In line with static gear selectivity studies outside the Mediterranean, very few studies exist on other gear (longline, pots and traps) than gillnets in the region. A general problem for gillnet selectivity studies in the Mediterranean is the small catches giving weak statistical significance of the selectivity parameters. The group ***acknowledged the importance of Mediterranean selectivity results on longline; traps, trammels and gillnets for the Mediterranean fisheries and stressed the need for further research on these issues. In addition to the existing Mediterranean data, the meeting also invited to consider results from outside the region***;

- The Working Group stressed the importance to finalize the common framework for selectivity studies to support the implementation of the selectivity measures. This framework will include: i) the main technical parameters responsible of the selectivity of the gear, recalling that only one variable can be considered for each study; ii) considering the socioeconomic aspects, some proposals on the data collection framework are being developed and should be taken into account in selectivity studies, especially on: physical productivity, economic productivity; intensity of work; men physical production; men productivity. ***Once this framework is finalized and adopted by SAC, the scientists of member countries will be encouraged to test it for future studies on selectivity;***

- The studies conducted so far confirmed a clear improvement in selectivity for most species in the new 40mm square mesh codend compared to diamond mesh codends of same or smaller mesh sizes. Hake selectivity seems particularly to benefit from the square mesh configuration despite the 40mm square mesh codend is still far from meeting the demands for selectivity related to the legal minimum landing size. As also demonstrated in many experiments outside the region, flatfish get a reduced selectivity in square mesh configuration. As the Working Group foresees a rapid increase in demersal trawl catch efficiency and fishing pressure the next few years caused by new effective trawl designs and modern vessels entering the Mediterranean fisheries***. Consequently, the Working Group recommended to urgently implement and enforce the use of a square mesh of at least 40mm in the bottom trawl codend in accordance with GFCM regulation. The Working Group considered that only measures based on size selectivity are not enough and recommended that additional measures (closed seasons-areas) be also implemented***;

- The Working Group acknowledged the importance of the preliminary elements of the case study presented by the Moroccan participants. ***It was recommended that a project document be elaborated and submitted for consideration at next Sub-Committee meetings, including all relevant phases covering project formulation, gear survey, trial***

protocol, indicative budget as well as technical support needs for different phases of the project;

- The progress made by the TechnoMed network, in particular in the field of database on selectivity, was acknowledged. Another important tool to improve the TechnoMed network is the creation of a web page with the general aim of spreading out the technical knowledge among both TechnoMed members and inside the scientific community in the GFCM area. ***The Working Group encouraged the members of the network to continue the effort on their different tasks, notably the development of a GFCM database on gear selectivity and gear characteristics. In this context, the completion of the new FAO manual on fishing gear classification will be useful, as each single technical term plays a crucial role in fishery regulations. It was also recommended to test the TechnoMed web page (foreseen to be hosted in GFCM website) with the aim to improve its use as a tool of communication and exchange between the network and other scientists. The meeting recommended to the members of the network to develop a permanent "watch" on the fishing technical evolution of the fisheries in their countries***;

- The importance to contribute to the work to be launched by SAC and aimed to update the current GFCM glossary notably by introducing the best definitions regarding technical terminology and concepts used in fishing technology was stressed. ***The GFCM-TechnoMed was invited to coordinate and contribute to identify the list of main terms and concepts which needs to be defined and included in the updated glossary. This work will be done in accordance with the strategy defined by SAC.***

9. ADOPTION OF THE REPORT

50. The conclusions and recommendations were adopted on July 4, 2008. The whole report was adopted by e-mail on Friday 18 July 2008.

APPENDIX 1

Agenda

1. Opening and adoption of the agenda

2. Review of recent studies on static gears selectivity in the Mediterranean

   2.1 Advances on statistic gear selectivity in the Mediterranean;

   2.2 Revue on main technical parameters of static gears selectivity and selectivity database.

3. Development of a framework for collection of technical, ecosystemic and socioeconomic data relevant to the implementation of selectivity measures

4. Progress on the implementation of the 40 mm square mesh codend

5. Development of case studies

6. GFCM-TechnoMed technology "watch"

   6.1 Outline of the objectives of GFCM-TechnoMed network and methodology of work;
   6.2 New FAO fishing gear classification;
   6.3. Page Web GFCM–TechnoMed.

7. Others matters

   - Update of the GFCM/SAC glossary

8. Conclusion and recommendations

9. Adoption of the report

APPENDIX 2

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APPENDIX 3

Table for gillnet size selectivity database

Species	Area	Selectivity study	Data collecting method	Gear type	Twine type	Twine diam. (mm)
M. surmuletus	Gulf of Lions	size selectivity	mesh size comparison	Gillnet	Mono	0,2
M. surmuletus	Gulf of Lions	size selectivity	mesh size comparison	Gillnet	Mono	0,2
M. merluccius	Gulf of Lions		mesh size comparison	Gillnet	Mono	0,37
M. merluccius	Gulf of Lions	size selectivity	mesh size comparison	Gillnet	Mono	0,37
D.annularis	Aegean Sea	size selectivity	mesh size comparison	Gillnet	Multif	
M. surmuletus	Aegean Sea	size selectivity	mesh size comparison	Gillnet	Multif	
M. barbatus	Aegean Sea	size selectivity	mesh size comparison	Gillnet	Multif	

Species	Area	Stretched mesh range (mm)	Stretch. Height (m)	Net length (m)	Hanging ratio	Nb of net/mesh size	Nb of sets	Nb, ind, /mesh size	Length type
M. surmuletus	Gulf of Lions	38, 42, 46, 50	1,2 to 1,5	25	0,5	4	12x2000 m	370, 109, 27, 12	Total
M. surmuletus	Gulf of Lions	38, 42, 46, 51	2 to 2,5	25	0,5	4	12x2000 m	521, 192, 249, 66	Total
M. merluccius	Gulf of Lions	70, 76, 80, 85, 90	3,5 to 4,5	50	0,5	4	13x2000 m	141, 55, 145, 109, 66	Total
M. merluccius	Gulf of Lions	70, 76, 80, 85, 90	5,6 to 7,2	50	0,5	4	13x2000 m	207, 173, 159, 114, 137	Total
D.annularis	Aegean Sea	34, 38, 42, 46			0,6			126, 123, 352, 121	FORK
M. surmuletus	Aegean Sea	34, 38, 42, 46			0,6			352, 116, 73, 102	FORK
M. barbatus	Aegean Sea	34, 38, 42, 46			0,6			268, 556, 173, 137	FORK

Species	Area	Modal class	SF L/mesh size	dev/d,f	Authors
M. surmuletus	Gulf of Lions	17.31, 19.13, 20.96, 22.78	4,6	1.21	Sacchi J., 2001
M. surmuletus	Gulf of Lions	17.33, 19.15, 20.97, 22.8	4,6	3.346	Sacchi J., 2001
M. merluccius	Gulf of Lions	44.5, 47.5, 50.5, 53.5, 56.5	6,25	1,055	Sacchi J., 2001
M. merluccius	Gulf of Lions	43.5, 47;5, 50, 53.5, 56	6,25	0,83	Sacchi J., 2001
M. surmuletus					
M. surmuletus					
M. merluccius					
M. merluccius					
D. annularis	Aegean Sea	87.9, 98.2, 108.6, 118.9			Petrakis G., Stergiou K.I.
M. surmuletus	Aegean Sea	121.6, 135.9, 150.2, 164.5			Petrakis G., Stergiou K.I.
M. barbatus	Aegean Sea	132.6, 148.2, 163.8, 179.4			Petrakis G., Stergiou K.I.