Living Resources Committee **ICES CM 2001/G:08**
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REPORT OF THE

WORKING GROUP ON MACKEREL AND HORSE MACKEREL EGG SURVEYS

By correspondence

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1 INTRODUCTION

1.1 Participants

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Franco, Concha	Spain
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Molloy, John	Ireland
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Pissarra, Joaquim	Portugal
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1.2 Terms of Reference

a) coordinate the individual cruises of the 2001 mackerel and horse mackerel egg survey (January-July);

b) coordinate the distribution of plankton and ovary samples between the laboratories;

c) coordinate the collection of the survey data for the databases of the data coordinators;

d) prepare for a meeting in 2002 to analyse the data and report on the survey results.

2 MATERIALS AND METHODS

The working group performed its task in 2001 by correspondence.

3 RESULTS

During 2000 the Mackerel and Horse Mackerel Egg Survey Working Group planned and prepared the 2001 triennial mackerel and horse mackerel egg survey. In the centre of the attention in preparation was to meet the requests made by the working group in 1999 (Anon., 2000), *i.e.* to maintain an optimal coverage of the spawning area in each of the sampling periods (Task 1), and, in addition, to plan for a significant increase in the number of ovary samples for the determination of the fecundity of mackerel and horse mackerel (Task 2). Moreover, a workshop was to be held in Lowestoft to harmonise the egg identification and first of all the correct interpretation of the embryonic stages of mackerel and horse mackerel eggs (Task 3).

To be able to carry out a better coverage of the egg sampling throughout the periods, the sampling scheme as devised in Table 5.1 (Anon., 2000), was refined a number of times. This was due to changing conditions on the national level and the availability of research vessels, and due to intense negotiations for ship time on the institute's level in some cases. As a result, the initial plan of providing 37 ship weeks to the entire survey could be increased to about 49 ship weeks

(Table 1). This was a significant increase in ship time as compared to the 1998 survey during which a total of about 36 ship weeks were devoted to the survey.

To be able to provide such a high number of ship time to the mackerel and horse mackerel egg survey, an EU project for support of the egg survey was applied for by the chairman. This study project was granted and totalled about 2.5 Mill. € financial contribution from the European Commission. Partners were Portugal (IPIMAR), Spain (IEO), Spain (AZTI), France (CG), England & Wales (CEFAS), Ireland (MI), Scotland (MARLAB), The Netherlands (RIVO), Norway (IMR) (as subcontractor to Germany) and Germany (BFA) (Coordinator).

Portugal was able to perform three cruises in each of the first three sampling periods, Spain (IEO) one cruise, Spain (AZTI) one cruise, The Netherlands (RIVO) two cruises, Germany (BFA) two cruises (one of them with chartered vessel from CEFFAS), Ireland (MI) two cruises, Scotland (MARLAB) two cruises, England & Wales (CEFAS) one cruise and Norway (IMR) one cruise.

In addition to this sampling of fish was performed on Dutch and Spanish commercial vessels and on the English Goundfish Survey during the second sampling period in March.

Responding to the request to increase the sampling intensity first of all with respect to the sampling of ovaries for fecundity estimation, and as a result of the co-funding for the individual cruises and the costs for sample analysis, a significant increase in sampling effort (Task 2) could be achieved.

Due to the funding by the Commission it was possible for Germany to carry out a second cruise by chartering the CEFAS vessel “Corystes” for 18 days and to cover the costs of the scientists and the analysis of the samples at CEFAS. Moreover, due to the funding France could take part in the survey by contributing manpower and geostatistical expertise during the “Walther Herwig III” cruise in the third and fourth sampling period (Bez & Hammer, 2001). Based on this the sampling strategy on the second part of the German cruise could be adapted to the requirements of the determination of the random sampling variability during the egg survey. As a result, repetitive plankton hauls were made on stations which had been fished previously. In addition, 8 repetitive hauls were carried out consecutively in one rectangle, to determine the random variability of the plankton catches without time component.

3.1 Sampling for Fecundity Estimation

Analysing the results of the samples taken during the 1998-survey, WGMEGS came to the conclusion (Anon. 1999) that for the 2001 survey significantly more ovaries samples should be taken to better estimate the potential and realised fecundity of mackerel and horse mackerel. Based on this and the reinforcement of this by ACFM, great effort was taken in the preparation of the 2001 survey to increase the number of ovary samples in the 2001 survey.

Specific sampling schemes were designed for mackerel and horse mackerel by the species coordinators at RIVO (horse mackerel) and CEFAS (mackerel) shortly before the survey started. These sampling schemes are the result of an *ad hoc* discussion on the sampling during the Mackerel and Horse Mackerel Egg Staging Workshop in Lowestoft, in December 2000. The revision of the sampling became necessary since more specific information on the plan able ship time for the 2001 survey had become available. For this reason the opportunity of the workshop was taken to revise the sampling for the western stocks in the presence of most of the WGMEGS members, the chairman and the two sampling coordinators.

3.1.1 Western Horse Mackerel Fecundity and Atresia Sampling in 2001

Fecundity

A sampling strategy for the collection of horse mackerel ovaries is proposed for 2001.

Fecundity should be estimated over the period January – July 2001 from the main spawning area southwest of Ireland. During this period every two weeks fecundity samples should be collected only for the most relevant weight class (150-249g) either from the commercial fleet or from research vessels in order to follow over time the production of vitellogenic oocytes, the increase in fecundity, the residual fecundity, and the atresia. In addition the fecundity should be estimated extensively for all weight classes during the first half of April, which was traditionally the period for taking fecundity samples. At the same time in the first half of April 2001 the fecundity samples should be collected in such way that they are area distributed in order to detect changes is fecundity in a north-south and a east-west direction.

It is recommended to measure the egg diameter frequency distributions from the formalin ovaries directly and not from the slides, because the oocytes are not sliced through the middle in the slides!

The coordinator for fecundity sampling of western horse mackerel is Guus Eltink.

The text table below shows the sampling for horse mackerel fecundity:

	WEIGHT CLASSES for Horse Mackerel Fecundity Sampling		
PERIOD	**150 - 249 g** (approx. 26 - 32 cm)	**250 - 349 g** (approx. 32 - 35 cm)	**350 - 449 g** (approx. 35 - 38 cm)
1-15 Jan 2001	30		
16-31 Jan 2001	30		
1-14 Feb 2001	30		
15-28 Feb 2001	30		
1-15 Mar 2001	30		
16-31 Mar 2001	30		
1-15 Apr 2001	30 + 240 extra ##	30	30
16-30 Apr 2001	30		
1-15 May 2001	30		
16-31 May 2001	30		
1-15 Jun 2001	30		
16-30 Jun 2001	30		
1-15 July 2001	30		
16-31 Jul 2001	30		
TOTAL	660	30	30

8 samples of 30 fish (240 extra fish) should be collected in a north-south and east-west direction in order to enable the detection of changes in fecundity due to geografical area.

Atresia

A separate sampling scheme for the research vessels during the egg survey is not needed for horse mackerel atresia estimation during all coverages of the egg survey in 2001, because during earlier egg surveys atresia has been estimated to be very low compared to fecundity (approx. 1%) and because atresia will be estimated anyway in the long time series of fecundity sampling from January - July 2001. It is more useful to spend all effort on horse mackerel fecundity!

3.1.2 Western Mackerel Fecundity and Atresia Sampling in 2001

The sampling for mackerel fecundity and atresia is given in Table 2. As compared to the original sampling scheme as given in Anon. (2000) (Chapter 5.4.2-5.4.4) the number of samples which theoretically could be collected had increased greatly.

4 MACKEREL AND HORSE MACKEREL EGG STAGING AND HISTOLOGY WORKSHOP

During the 1999 WGMEGS meeting (Anon. 1999) it was agreed to conduct a workshop in Lowestoft in 2000 to solve problems in staging of mackerel and horse mackerel eggs and therefore to obtain a better identification of the particular embryonic stages of mackerel and horse mackerel in the analysis of the 2001 survey samples. In addition, WGMEGS recommended (Anon. 2000) also to connect a training course for identification of atresia and fecundity from prepared slides to the egg identification and staging workshop in Lowestoft in November 2000. The chair of the working group was requested to apply for funds at the EU, together with the application for support for the egg staging workshop.

Moreover, the working group had requested (Anon. 1999) that mixed plankton samples should be circulated amongst the potential participants of the 2001 survey. These samples were supposed to contain the eggs of mackerel, horse

mackerel and those of species with similar eggs. The results were planned to be analysed to compare the accuracy of sorting and identification of mackerel and horse mackerel eggs.

This exchange was initiated and started in November 2000. Three plankton samples were prepared by CEFAS and sent to one other institute, from where it was further forwarded. The results were analysed during the Mackerel and Horse Mackerel Egg Staging Workshop in 2001 and were taken as a starting point of the work during the workshop. Results are given in the respective workshop report (Anon. 2001).

Based on these requests the chairman applied for financial support at the EU in the frame of a call for accompanying measures. This application was fully granted and covered the entire costs of the workshop, which was held, not as originally planned in November 2000, but instead in early December (4-13/12/00). Both parts of the workshop were a great success, as judged by all participants and were regarded as an excellent preparation for the upcoming 2001 egg survey. The results clearly underpin the necessity to conduct such a workshop. A full account of the results is given in Anon. (2001).

5 REFERENCES

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