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SCIENTIFIC COUNCIL MEETING – JUNE 2001

REPORT OF THE WORKING GROUP ON REPRODUCTIVE POTENTIAL MEETING

NAFO Scientific Council Working Group on Reproductive Potential

Hosted by AZTI, San Sebastian, Spain



OPENING

The 1st meeting of the NAFO Scientific Council Working Group on Reproductive Potential was held during 10-13 October 2000 at the Aquarium, San Sebastian, Spain. There were 14 participants from Canada, Denmark, Germany, Norway, Russia, Spain and United States of America.

The Meeting was opened by E. Trippel (Canada), Chairman of the Working Group, who on behalf of the Scientific Council welcomed participants to San Sebastian, and presented an overview of the Working Group's Terms of Reference (TOR), activities completed, and those tasks remaining. The Aquarium Director V. Zaragueta and L. Motos (AZTI, Spain) also welcomed WG members and a tour of the aquarium was provided by the Director. Local arrangements in preparation and during the meeting were well coordinated by H. Murua (AZTI, Spain).

INTRODUCTION

The establishment of the Working Group on Reproductive Potential followed a recommendation of the *Symposium on Variations in Maturation, Growth, Condition and Spawning Stock Biomass Production in Groundfish* hosted by the NAFO Scientific Council from 9-11 September 1998, Lisbon, Portugal. In June 2000, E. Trippel (Canada) presented to NAFO Scientific Council the work activities achieved on the four Terms of References. This progress and proposed future activities were approved by Scientific Council.

The meeting in San Sebastian was organized into three parts. TOR Co-Leaders first presented their achievements to date and received feedback. The second part was more informal, during which four TOR groups were formed to discuss future work activities and identify potential lead authors for respective manuscripts specific to a TOR goal. The third part provided a synthesis of the TOR group discussions and the directions and responsibilities of its participants. At the conclusion of the meeting, it was apparent to all that the achievements of the Working Group will form an important contribution to the methodology and application of reproductive biology to fish stock assessment.

The following is a summary of progress made and subsequent plans.

TOR 1 Co-Leaders: J. Tomkiewicz (Denmark) and J. Burnett (USA)

Explore and review availability of information and existing data on reproductive potential by areas and species.

Co-Leaders presented a preliminary version of four tables designed for the inventory of data on reproductive potential for marine fish stocks. The four tables comprised (i) available data for a specific stock, (ii) information on data format and quality, (iii) studies of reproductive potential, and (iv) data sources. As a trial, the templates were completed using data on Baltic Sea cod and discussion focussed on possible changes to table format as required. These tables, when completed, will provide an authoritative inventory of time series data and studies on reproductive potential for fish stocks in the North Atlantic and Baltic Sea. They will highlight which stocks are data

rich, moderate and poor, thereby identifying future stock-specific avenues for data collection and scientific research. Some of the reproductive parameters include sex ratio, maturity ogives, skipped spawning, first-time vs. repeat spawners, fecundity, atresia, condition, egg/larval quality, spawning time/period and gonad contamination.

The Co-Leaders were advised to proceed with slight modifications to original table format. Following this, it was suggested the data templates should be finalized and transmitted to WG members for completion and returned to Co-Leaders for collation and organization. It was proposed that the entire set of tables completed for selected fish stocks be published in the *NAFO Scientific Council Studies*, as well as listed on the NAFO website.

TOR 2 Co-Leaders: H. Murua (Spain) and A. Thorsen (Norway)

Explore possibilities to develop standard internationally coordinated research protocols to estimate egg and larval production.

Co-Leaders updated WG members on the necessary procedures used to estimate egg and larval production of fish stocks. H. Murua (Spain) provided the establishment of categories of reproductive biology of the species selected and indicated that different fecundity techniques may be required for each type. A. Thorsen (Norway) discussed a simple method for assessing fecundity using egg diameter and ovary weight. This rapid method could provide greater opportunities to gather annual fecundity estimates for a given stock. G. Kraus (Germany) and P. Witthames (United Kingdom) submitted notes on methods of estimating fecundity in their laboratories based on ovaries collected of wild specimens. A. Thorsen (Norway) provided an overview of techniques used to estimate egg production of captive fish, primarily cod, as well as of egg and larval quality. In identification of manuscript leads, it was recommended that H. Murua (Spain) outline and describe different spawner types, S. Junquera (Spain) lead the methodology description on fecundity estimation from ovaries, and A. Thorsen (Norway) lead the methodology description for captive fish studies. E. Trippel (Canada) would provide information on estimation of male reproductive potential.

TOR3 Co-Leaders: Y. Lambert (Canada) and N. Yaragina (Russia)

Explore and evaluate alternative methods to estimate reproductive potential annually or part of routine in monitoring and sampling schemes (such as HSI).

An appraisal was made of a variety of methods used to measure fecundity to gain annual estimates of a stock's reproductive potential. Several body metrics that showed promise included condition factor (e.g., Fulton's CF) and liver index (e.g., hepatosomatic index, HSI). These could be used to build long time series of reproductive potential, even for years for which no ovary collections were made for fecundity. It was recommended that these body metrics, and others, be explored and a select few be prioritized and recommended for standard practices in estimating a stock's reproductive potential. It was evident that a universal metric may not exist, and that one proxy of reproductive potential for a stock may not be the best predictor for another stock. Y. Lambert (Canada) was recommended to lead the preparation of manuscripts for this TOR.

TOR 4 Co-Leaders T. Marshall (Norway) and G. Marteinsdottir (Iceland)

Review possibilities to develop methods and opportunities to estimate stock reproductive potential for assessment and management.

T. Marshall (Norway) provided an update of efforts to date and indicated that a case study approach would be used to describe ways to improve on advice to fisheries management. Improvements would include having authors of stock survey reports/assessments provide current estimates of a stock's reproductive potential (e.g., in addition to maturity, weight or SSB). New biological reference points may then be developed if the reconstructed stock-recruitment relationship explains more of the variation in recruitment. The stocks proposed for case studies include those in NAFO and ICES jurisdictions. To account for wide variability in available data on reproductive potential among fish stocks, it was recommended that case studies be developed for data rich, data moderate and data poor stocks. A comparison of the relative merit of using different proxies to estimate reproductive potential was recommended, especially as some data requirements are less tedious yet produce important predictive power. The

latter point is similar to a goal of TOR 3 and discussion between the Co-Leaders will likely be required before finalizing this initiative.

CONCLUSION

It was recommended that TOR Co-Leaders arrange with their participants the preparation of material for primary publication as a special issue of the *NAFO Journal of Northwest Atlantic Fishery Science*. Co-Leaders of TOR 1 will also publish the comprehensive set of tables in the *NAFO Scientific Council Studies*. A 2nd Working Group Meeting to review and edit the resulting 10-15 manuscripts is scheduled for autumn 2001 (date and location to be decided). In the mean time, the Working Group will work by correspondence with an update of progress by TOR Co-Leaders to the Chairman set for March 1, 2001.

E. Trippel (Canada) closed the meeting by thanking the Co-Leaders and participants for their excellent contributions and energy shown in their activities to date. All members of the Working Group expressed their appreciation for the great hospitality shown by AZTI and the San Sebastian Aquarium during the meeting, which created an enjoyable and productive experience.



Participants present at the 1st Meeting of the Working Group on Reproductive Potential, Aquarium, San Sebastian, Spain:

(Left to Right): L. Motos (Spain), J. Tomkiewicz (Denmark), N. Yaragina (Russia), J. Morgan (Canada), H. Murua (Spain), Y. Lambert (Canada), S. Junquera (Spain), T. Marshall (Norway), F. Saborido-Rey (Spain), J. Burnett (U.S.A.), E. Trippel, Chairman (Canada), A. Thorsen (Norway), L. O'Brien (U.S.A.), and G. Lilly (Canada).

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