

REPORT ON THE MARICULTURE COMMITTEE

Chairman: Prof. K. Tiews

1. The Committee met on 7 and 8 October 1981. The agenda was adopted and the Committee was informed that the papers C.M.1981/F:9, 21, 27, 29 and 31 should be transferred to the Anadromous and Catadromous Fish Committee, as they concern sea ranching aspects of salmonid fish.

At the end of the first session the Committee met together with the Statistics Committee to jointly discuss matters of aquaculture statistics. The report of the joint session will be given in the report of the Statistics Committee.

2. Seventeen of the 18 member countries of ICES have submitted Administrative Reports. Ten of these were able to supply mariculture statistics (C.M.1981/F:1).

The number of countries which have supplied a list of publications of interest to the Mariculture Committee has increased from 4 to 7 in comparison with last year. The members were urged to supply the desired information in the future (F:2).

3. Dr Rosenthal gave a report on the results of the World Conference on Aquaculture which took place 21-25 September 1981 in Venice and which was organized by the European Mariculture Society and the World Mariculture Society and supported by the Mariculture Committee. The conference was attended by 1200 participants from 57 countries from all over the world. The documentation consisted of 25 review papers and 180 experience papers, the latter introduced in poster sessions. A trade show was connected to the conference in which 44 firms participated. The Committee noted that several members attended this extremely valuable conference and that it was considered the largest Aquaculture Conference so far held. The proceedings of the Conference will be published in due time.

4. The report of the Working Group on Introductions and Transfers of Marine Organisms (F:46) was given by its Chairman, Dr C.J. Sindermann. The discussion focused on the recommendations proposed by the Working Group to its parent Committee. The Committee agreed on the following:

- (1) Concerning the Norwegian proposal to introduce Coho salmon for studies on their suitability for mariculture, it is recommended that the following advice be offered:

It is considered that this request would not pose a risk to the environment or to native salmonids, provided the Norwegian government representative endorsed the desk study statement (Appendix IV of the Working Group report) supporting the proposal that escape of fish and any non-indigenous pathogens introduced with them could not occur from whatever facilities were used to contain the fish. With such an endorsement, it is recommended that the Council accede to the request.

It is assumed that the Norwegian authorities will ensure that the net pens or tanks holding the smolts will be maintained in conditions offering the best prospect for protection from the weather and that the authorities are satisfied that the chances of escape are negligible during the lifetime of the original import and of the  $F_1$  stock. Under such conditions, no reason is seen why the trial should not be conducted. If started with eggs in 1981, it will take 3 years to produce the  $F_1$  stock and a further 3 years to evaluate the performance of the  $F_1$  stock in seawater cages, making 6 years in all (a short period will be required if U.K. salmon are used as brood stock).

However, if the proposed experiment resulted in a recommendation for commercial aquaculture of coho salmon, the Norwegian authorities must recognize that a new situation might arise with some risk potential. Commercial development could not take place under the stringent "no escape" conditions of this proposal, and the virtual certainty of escapes raised the question of whether they posed a threat to native fish.

The desk study acknowledged that such a threat might exist, yet made no reference to initiating research to settle this question. It was therefore strongly recommended that the Council points this out to the Norwegian authorities and advises them to use some of the  $F_1$  stock

to establish if interactions between Coho and native fish were significant and to the latter's detriment. All progress on the Coho introduction should be reported to the Council.

- (2) Concerning the CNEXO proposal for the study of the interactions between Coho salmon and native migratory salmonids in France, the following is recommended:
  - a) that CNEXO scientists prepare a detailed revision of their experiment in accordance with discussions at the 1981 Working Group Meeting, and that advice of a Panel of Experts under Dr Munro of Scotland be sought.
  - b) that CNEXO proceed with a modified experiment involving study of fresh-water interactions, and a single release of Coho salmon, after a carefully designed experiment is developed.
  - c) that the status of the experiment be reviewed again at the 1982 meeting of the Introductions Working Group.
- (3) Since the new information concerning introductions of non-indigenous species is now in the final manuscript stage, the Council should publish the information as a Cooperative Research Report (see Rec.).
- (4) National regulations concerning introductions of non-native species are still inadequate in some member countries. Every effort should be made by ICES to encourage development of adequate safeguards, since actions in one country may affect adjacent countries.
- (5) An important book on introduced species "Theory and practice of acclimatization of aquatic organisms" has been published in the USSR by Dr A.F. Karpevich. ICES should encourage translation of the work into other languages.
- (6) Because of current interest in the status of a number of introduced species (Pacific salmon, oysters, exotic seaweeds, eels, etc.), ICES should convene a mini-symposium on the subject as part of its 1983 Statutory Meeting, supported jointly by the Mariculture and Marine

Environmental Quality Committees. The mini-symposium should consist of summary invited papers (see Rec.).

- (7) Protocol concerning inspection procedures, diagnostic procedures, and quarantine facilities and practices relating to introductions of non-indigenous species should be prepared and published by the Council as a further expansion of its Code of Practice.
  - (8) Summaries of national laws and regulations concerned with introduced species should be collated by the Working Group and published by the Council, with the complete national documents deposited and available at the ICES Secretariat.
  - (9) Because of the need to continue its oversight on salmon, oyster, and seaweed introductions, and its preparation of protocols and advisory documents, the Working Group on Introductions and Transfers of Marine Organisms should meet at La Coruña, Spain, 4-7 May, 1982 (see Rec.).
5. The report of the Working Group on Pathology and Diseases of Marine Organisms (C.M.1981/E:62), introduced by its Chairman, Prof. C. Maurin, was discussed. The Committee noted that:
- (1) Diseases have to be considered major obstacles to the successful development of mariculture. It is recommended that member nations should identify and study diseases predicted or expected to be problems or deterrents for mariculture of new species: turbot, penaeids, sea bass, etc., including genetic, nutritional, and environmentally-induced diseases.
  - (2) Because disease prevention is as significant as control, member countries should encourage the development of prophylactic measures against diseases important to mariculture.
  - (3) In view of their instructional value and their utility in archiving pathological data it is reiterated that ICES member nations establish registries to acquire and accession microscopic slides depicting representative lesions and microparasites of marine fishes, crustaceans and molluscs.

- (4) Because disease continues to be a significant factor in fisheries and mariculture in member nations, and because of the need to continue work on standard diagnostic methods, pathology registries, and disease summaries, the Working Group should meet in 1982. The time and place suggested is IJmuiden, Netherlands, 20-24 April, 1982 (see Rec.).
6. The report of the Working Group on Genetics was given by Dr A. Longwell (C.M.1981/F:5) and discussed. The Committee agreed that:
  - (1) selection programs need be continued at the pilot-hatchery scale over several breeding generations to exploit potential improvements and evaluate fully the results.
  - (2) Husbandry improvements should go hand-in-hand with breeding improvement programs.
  - (3) In order to make new breeding programs as significant as possible to aquaculturists generally, sources of foundation stock and/or prior artificial breeding history should be identified as completely as possible in initiating or reporting the work; appropriate control stock should be bred if the purpose is <sup>a</sup> meaningful elucidation of potential for genetic improvement.
  - (4) Strains of salmon particularly suited to pen culture and to ocean ranching, and oyster strains suited to the conditions of intense hatchery culture should be bred.
  - (5) Developments in the special areas of cytogenetics, biochemical genetics and gamete cryopreservation should be encouraged as supportive of breeding efforts.
7. Dr Dag Møller, Norway, was elected the new Chairman. The outgoing Chairman took the opportunity to evaluate the accomplishments of the Mariculture Committee during the first 4 years (1978-81) of its existence. The Committee can look back on a period of fruitful work which includes the holding of 3 large symposia, respectively, special meetings involving a total of some 250 papers

and some 160 paper contributions to the sessions of the Committee during the Statutory Meetings. At present, 3 Working Groups report to the Committee and a fourth one has successfully completed its work. The scientific work focused on the following subjects: Finfish nutrition, pathology and diseases of commercially important fish and shellfish, genetics, development of intensive aquaculture systems utilizing heated effluents and recirculation systems, methodology of rearing brood stocks and the mass rearing of juveniles of mariculture species as well as biology, physiology and ethiology of mariculture species and their controlled reproduction. One of the major accomplishments of the Committee is, that - together with other organizations - it has successfully started to develop formats for the reporting of research results in a standardized way to allow comparison of research results in the fields of finfish nutrition, of mariculture systems development and of selective breeding.

In summary, the work of the Committee is developing satisfactorily and no reason can be seen for changing the direction the work has taken.

8. The following joint theme is proposed for the Joint Session with the Anadromous and Catadromous Committee, for which an extra half session should be set aside:

"Evaluation of the relative advantages (biological, economic and social) of sea farming and sea ranching of salmonids."

In the event that the Anadromous and Catadromous Committee does not agree to this proposal, the theme "Experiences with new candidate species for mariculture" is proposed.

9. Three invited papers dealt with the special theme "Biological and technological evaluation of mariculture projects" and only one paper was submitted to the second theme "Ecological impact of mariculture operations on the adjacent environment". The very poor response to submit scientific contributions to the invited themes demonstrates the difficulty which the Committee members have in getting the required experts to the Statutory Meetings. Because of the wide distribution of expertise in the member countries, they do not know each other very well, partly because mariculture is too young a field to have been able to establish such good links as many of the other disciplines within ICES have done.

- Another reason for the difficulty to bring required expertise together at Statutory Meetings is the wide scope of interest of the Committee reaching from ecological considerations when putting up mariculture enterprises to detail in the construction of a pump, for example. This is, on the other hand, one of the reasons that relatively many symposia were organized in such a short time.
10. Eight papers were dealing with genetics in aquaculture. Special interest aroused studies on breeding the American oyster for resistance to the m.s. x disease and on catfish breeding for improved food conversion efficiency (C.M.1981/F:36, F:35). Effects of in-breeding on field performance of rainbow trout were demonstrated in F:34.
  11. A further 8 papers were dealing with nutrition and feeding of mariculture species. The Committee noted the progress made in the development of micro encapsulated feeds for larval fish (F:22 and F:14) and stresses the need for more research in this important field. Three papers dealt with the development of alternative proteins as fish feeds (F:24, 6 and 3). New alternative feedstuff tested were swine bristle meal, dried domestic sewage sludge, whey protein and field bean meal. Bristle meal (7%), whey protein products (15%) and field bean meal (up to 45%) can replace fish meal in rainbow trout diets (F:3). Krill meal is an excellent replacement of fish meal in rainbow trout pellets despite its high fluoride content as fluoride accumulates mainly in the skeleton of the trout, but to a negligible amount in the muscle tissues only.
  12. Three papers were devoted to physiological aspects and two dealt with the mortality of rainbow trout kept in net pens in the southern Baltic as well as with bacterial diseases in bivalve larval cultures and their control. It was noted, that the control of such disease outbreaks is still a major constraint of mariculture practice.
  13. Four papers dealt with the rearing of larvae and fry. Special attention was attracted to the large-scale rearing of cod fry in an inlet which is very promising in view of the intended large-scale stocking experiments of cod in the Norwegian Sea (F:11 and 13).
  14. The introduction of the European flat oyster in the coastal waters of Maine has led to a new American culture fishery. The Committee noted this result as an excellent example for a successful introduction of a new species for the development of a new branch of mariculture (F:26). Similarly, in France a new form of mariculture was established with the Pacific clam, Ruditapes philippinarum (F:44).
  15. A full list of contributions will appear in Procès-Verbal 1981.

The Mariculture Committee recommends that:

- I(1) the Report of the Working Group on Introductions and Transfers of Marine Organisms edited by Dr C.J. Sindermann be published in the Cooperative Research Series



The Mariculture Committee recommends, that:

- II (1)           the Working Group on Introductions and Transfers of Marine Organisms (Chairman: C J Sindermann) should meet in La Coruña, Spain, from 4-7 May 1982 to continue its oversight on salmon, oysters and seaweed introductions and its preparation of protocols and advisory documents.
  
- II (2)           the Working Group on Genetics should meet immediately after the 1982 COST Symposium on Mariculture Genetics to take place in Galway, Ireland, in March 1982, in order to discuss factors influencing efficient selection for growth rate such as food conversion efficiencies, social interaction, stocking densities, feed and feeding techniques and schedules.

