

International Council for the
Exploration of the Sea

C.M.1980/F:35
Mariculture Committee

Ref: Anacat Committee
Shellfish Committee
Marine Environmental
Quality Committee

Heine Ergebnisse

*fr. 29.11.82
dabei nicht
relevant.*

REPORT
on

SPECIAL MEETING ON DISEASES OF COMMERCIALY
IMPORTANT MARINE FISH AND SHELLFISH

1-3 October 1980

held at

the Royal Veterinary and Agricultural University
Bülowsvej 13, 1870 Copenhagen V, Denmark

prepared
by

Convener: J.E. Stewart

and the Members of the Planning and Organizing Group

N.O. Christensen, E. Egidius, C. Maurin, H. Möller,
A.L.S. Munro and C.J. Sindermann

The Special Meeting on Diseases of Commercially Important Marine Fish and Shellfish was held from 1-3 October 1980 at the Royal Veterinary and Agricultural University, Bülowsvej 13, DK-1870 Copenhagen. The objectives of the meeting were to bring together from as many parts of the world as possible disease experts to exchange information and ideas and through personal contacts to encourage and foster international cooperation in advancing studies on aquatic diseases and in developing principles from data available.

The Planning and Organising Group believes that the meeting was very successful in fulfilling these objectives and that the meeting was quite productive. Eighty-seven participants from 19 countries attended the meeting. Fifty papers were presented excluding two read by title only, 6 posters were displayed, an evening panel discussion on the quantitative impacts of disease on marine resources was followed by a working microscopy session in which materials brought by the participants were examined and discussed.

The participants at the Special Meeting wish to express their gratitude for the generous hospitality extended to them by the Royal Veterinary and Agricultural University and the Town Council of Frederiksberg, and for the dedicated and effective support provided by the ICES Secretariat.

The Meeting was opened by Prof. C. Maurin, Vice-President of ICES, representing the President of ICES. The Vice-Rector of the University, Dr F. Pasmussen welcomed the participants and extended to them the hospitality of the University. The distinguished scientist, Professor Syuzo Egusa of Tokyo had accepted our invitation to deliver the opening lecture and gave an address entitled : Disease problems in Japanes Yellowtail, Seriola quinqueradiata culture:A review". This address was rewarding and informative covering approximately two decades of work in culture of yellowtail during which this mariculture operation has grown enormously. In the course of this growth most disease problems in mariculture have been experienced and thus the Japanese experience with yellowtail culture offered many object lessons for others engaged in similar culture ventures.

The business of the first morning session was completed with an address by Dr. R.A. Murchelano of the United States entitled "An international registry of marine pathology." In this address Dr Murchelano described the Registry on Marine Pathology (ROMP) operated at his laboratory and the advantages to be gained by having central respositories for reference material such as microscopic slides of typical histological sections and an index of material at other centres. The value of this and other similar national centres to others could be extended substantially by the existence of an international registry for the systematic exchange of reference materials.

An important topic which was discussed in depth during the meeting was the quantitative aspects of disease and its impact on marine resources. Although epizootics of disease in wild populations are frequently recorded and in certain instances have been shown to have imposed dramatic reductions on populations in highly non-uniform ways, the effects of these diseases on natural mortality are not taken into account in stock assessment work. The reasons for this are that first, most work on disease is of a qualitative nature and lacks the quantitative data required to be useful in stock assessments and secondly, the information lacks predictive qualities. A series of conclusions were drawn from these discussions

leading to recommendations for courses of action to rectify these problems. Because of the complexity of the problems it was felt that continuing leadership and coordination was required and that the Working Group on the Pathology of Marine Organisms should undertake this role.

A number of papers presented descriptions of new diseases and amplified the information on diseases and syndromes which have been described previously. The status of the various diseases and syndromes has become much clearer and the definition of other diseases and syndromes has been improved making progress more possible; in general, the information base and methodology is improving all the time. There are, however, certain gaps which are posing real problems. These gaps include the lack of tissue culture lines for molluscan and crustacean virus work; the problem with the development of these tissue cultures lines is denying research workers the tools required to properly describe these viruses or to grow them to determine the characteristics of the disease and the impacts of the viruses upon the invertebrate species.

Progress in the area of humoral and cell mediated defense mechanisms has been steady and encouraging. Work leading to the development of vaccines for their inherent value and to supplant the uncontrolled and wide-spread use of chemotherapeutants is accelerating and considered to be all important.

Concern was expressed regarding the introduction of new diseases through mariculture operations and the impact that mariculture diseases have on wild populations and vice versa. Most diseases in the mariculture of finned fish in ICES countries appear to involve salmonids chiefly because these are the species most often cultured. *Vibrio* infections in mariculture and in wild populations of many fish species are extensive and possibly increasing.

The extensive discussions and papers presented on pollution and disease clearly indicated a requirement for more work in this area. There is a particular need to improve the data base to prove or reject the suspected link between pollution and disease; at present the information base on this all-important question is insufficient to reach a conclusion through statistical analysis.

A series of conclusions was drawn from the deliberations and is listed below; a set of recommendations stemming from the Special Meeting and consistent with the conclusions was prepared for presentation to the Mariculture Committee.

CONCLUSIONS

1. The discovery of new diseases and the investigation of disease aetiology is continuing at a significant and increasing pace. The possible effects of environmental quality on fish health has been an important and catalytic factor in increasing the efforts on disease studies.
2. Most of the disease work to date has been qualitative rather than quantitative in the sense that it has been concentrated mainly on descriptions of the diseases, the disease agents and the associated methodologies.
3. The epidemiological aspects, namely effects on population size and recruitment to fished stocks, areas of considerable interest to

fisheries are poorly developed, or not developed at all.

4. Before information on diseases in wild stocks can be incorporated in population models and used in stock assessments it must possess two characteristics currently lacking, quantitative data, in relation to the stock and a predictive aspect and capacity.
5. It has been shown in specific instances that disease outbreaks tend to increase the amplitude of fluctuations in stock size. An epizootic with accompanying increased opportunities for predation or mass mortalities could have both short and long term effects. In the short term, concern immediately centres on the assumed value for natural mortality which will be too low. In consequence, the yield per recruit versus fishing mortality curve will give erroneous values for stock assessment groups who are advising on the management of the fishery. In the longer term, the consequences of the resultant overfishing may imply a radical reduction in fishing effort and stringent management regimes to rebuild stocks.

No definite conclusions could be drawn as to whether fish pathologists should concentrate their efforts on specific portions of the life history of the various species under consideration. It was generally agreed that accurate data was needed to improve estimates of natural mortality now being used. It was also recognised that biologists cannot yet successfully link egg and larval data to recruitment; the normal depletion in population numbers at this stage of the life history makes the work difficult, but does not necessarily diminish its importance or possible relevance.

6. Studies which are to be useful in the assessment of stock sizes and the determination of permissible harvests must meet the following criteria :
 1. The disease state of the fish must be defined.
 2. A sampling regime must be followed which will permit detection of disease prevalence at low levels of infection.
 3. The capacity to predict the consequences of the disease is required.
 4. The capacity to evaluate the effect of intrinsic factors in the disease outbreak must exist.

The implication of these criteria for fish pathology are :

- a) collaboration with statisticians, epidemiologists, ecologists and fisheries population dynamicists,
- b) development of routine and rapid methodology to permit the collection of quantitative data on a meaningful scale,
- c) requirements for extended time series of data gained through monitoring of important diseases in important fish stocks to ensure that the predictive capacity is soundly based and well proven,
- d) a requirement to make use of the commercial fisheries as a unique and necessary sampling device,

- e) a requirement to develop realistic and efficient sampling protocols,
 - f) a requirement to define the disease adequately and evaluate the intrinsic and extrinsic factors on disease prevalence.
7. There is a very real need for adequate documentation of disease episodes on a continuing basis. At present, only major outbreaks of disease receive concerted epidemiological attention. In this regard it was concluded that an essential element of the documentation process were national and international repositories of information and reference material.
 8. There has been a resurgence in Europe of epizootics of diseases of flat oysters.
 9. Attempts to culture molluscan tissues to provide tissue culture cell lines necessary for the diagnosis of viral infections in molluscs have not been successful. The development and application of immunological diagnostic techniques for molluscan diseases is proving to be extremely difficult.
 10. Although it is often difficult and frequently impossible at present, every effort should be made to fulfill Koch's postulates to ensure that the condition or syndrome is defined and proven to be a real disease.
 11. The cultivation of crustacean tissues for diagnostic purposes appears to be advancing more rapidly than similar work on molluscs and there has been a limited degree of success in developing and applying diagnostic immunological techniques to crustacean diseases.
 12. The introduction or use of new candidates for mariculture must be expected to bring new diseases.
 13. Mariculture operations invariably will have an impact in the immediate vicinity and diseases in such operations may affect populations of wild species.
 14. Diseases previously assumed to occur solely in fresh water are being reported more frequently as occurring also in mariculture operations.
 15. The possibility of disease interactions between mariculture and wild populations should be emphasized since diseases previously reported only for mariculture operations are now being reported from wild fish.
 16. There is a remarkable and diverse collection of syndromes and cells which are referred to by the letter "X". This practice of labelling poorly understood cells or conditions is contributing to a considerable amount of confusion. The use of unique and more descriptive interim designations would relieve the confusion.
 17. New and improved immunoelectrophoretic techniques are available for the examination of serum proteins and appear to open a new path for the precise and quantitative studies of immune reactions in fish and other aquatic species.

18. A number of methods are now available for the mass vaccination of fish. They vary considerably in their requirement for labour. The efficiency of the delivery system, the stress imposed on the fish and the avoidance of stress are of prime concern. The spray method was described as promising.
19. The statistical data base required to determine if certain disease conditions in fish and shellfish are directly or indirectly associated with coastal/estuarine pollution is increasing, but the evidence is largely circumstantial and is not yet conclusive.
20. Skin ulcer disease is a condition found in several commercial species. It seems to be multifactorial in origin and in some instances appears to involve viruses and bacteria (which may be operating as facultative pathogens or coincident occupants of the lesions).
21. Detailed histopathological and histochemical examinations can be important ingredients in any study of pollution and disease; greater exploitation of these methods should be part of all national programs.
22. Exploration of the nature and consequences of pollution stress on marine fish and shellfish needs further emphasis. At present this term is used loosely and non-specifically, but the concept is amenable to being placed on a quantitative basis.
23. Stress, including that from natural factors and pollution can be an overriding influence on both cultured and natural marine populations.
24. Presentation of data by posters was found to be both informative and valuable; the value of this means of presentation could be improved by devoting sessions graphically to these rather than treating them in an incidental manner.