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REPORT OF THE ICES WORKING GROUP ON PATHOLOGY AND DISEASES OF MARINE ORGANISMS

edited by

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I. INTRODUCTION

The 1986 meeting of the W.G. on Pathology and Disease of Marine Organisms chaired by E. Egidius was held in Dublin, Republic of Ireland, from April 23rd to April 26th. The terms of reference for the meeting are listed in Annex 3. The W.G. meeting was preceeded by a two day workshop on the use of pathology in studies of the effects of contaminants, chaired by J. Thulin, mainly with the same participants.

The Chairman welcomed the participants and drew their attention to the fact that it was the 10th meeting of the W.G. and that the emphasis of the group in these 10 years had changed from only considering molluscan disease at the first meeting to concentrating more on fin fish diseases both in wild populations and mariculture.

II. WORKING GROUP BUSINESS

The proposed Agenda was adopted and two rapporteurs were appointed for each session. The Chairman reported from the 73rd statutory meeting of ICES held in London in October 1985, emphasising the increased realisation of the need for disease work amongst other groups including the ACMP. Attention was also drawn to the new citation status of papers and the publication of abstracts. Relevant theme session topics for the 74th statutory meeting were reported and a call for papers for theme session 4 from C.J. Sindermann was noted. For the 75th statutory meeting the following theme sesions were proposed: Problems of disease control in mariculture, etology of tumour diseases of fish and imerging problems of medication in mariculture. Nomination of membership of the W.G. was discussed and it was again decided to urge ICES to request delegates from eastern European countries to appoint members to the group so that annual national reports could be obtained.

II . NATIONAL DISEASE REPORTS

1. Formats of Presentation of Findings on Diseases

Simple formats summarizing national disease reports were used in the 1985 report, the draft of which was presented. It was agreed to improve this draft. Concerning the wild fish population format, the following was added: location, number of fish examined, size range and month of sampling. Concerning the mariculture format time of the year and number of outbreaks were added. It was emphasised that these formats should not substitute the more extensive national reports giving detailed information on occurrences of special interest. It was decided to use the new format for the 1985 results. The chairman will again contact non-present W.G. members for information from their countries to be included in the report. Additional information was received from the Faroe Islands only.

The possibility of the use of a computer data system to store the data collected each year, was discussed as a topic for the next W.G. meeting.

2. Highlights of national reports

BELGIUM reported two disease surveys on the Belgian continental shelf. Fish of 5 species (all over 20 cms) length were examined for epidermal anomalies. Also special attention was paid to splenic nodules for acid fast bacteria. High percentages of herring were infected with Anisakis larvae. The protozoan parasite Henneg·· salmonicola was detected in 3 different consionments of wild coho salmon for smoking imported from Canada. Mytilicola intestinalis was found in a high percentage of blue mussel imported from Denmark.

CANADA presented a report on diseases in Atlantic waters, mainly on cultured fish and a short report on the disease status on cultured salmon on the Pacific coast.

On the Atlantic coast furunculosis is confined to the province of New Brunswick and losses are low due to vaccination, early diagnosis and oxolinic acid treatment. Clinical BKD was observed for the first time in mariculture of Atlantic salmon. An extensive control program is being evaluated.

ERM has been detected subclinically and in the carrier state throughout the maritime provinces. The widespread occurrence of vibriosis is effectively controlled through the use of vaccines and chemotherapeutics. The contagious lobster disease caused by a shell digesting bacterium which has been present in the maritime provinces at a low level for many years, rose to 30% levels in certain ponds in 1985.

Light to heavy infestations of the marine helminth, Stephanostomum laccatum (normally associated with the skin of flounder) was identified in the heart of dying sea farmed rainbow trout. The etiology has not yet been established.

In contrary to the experience on the Atlantic coast, vibriosis occurred at the Pacific coast despite the use of vaccines. BKD seems to be the most important problem on the Pacific side with up to 60% mortalities of fish in their first ocean year.

DENMARK: One disease survey on dab in March 1985 was reported. High prevalences, specially of Myxobolus and Stephanostomum, were recorded. In general the prevalence of abnormalities was higher in the North Sea than in the Skagerak and Kattegat.

In rainbow trout mariculture furunculosis still is the main problem. ERM has appeared in one marine farm but does not seem to be a problem in sea conditions. 5 marine farms were heavily affected by liver hepatoma. The condition was traced back to the use of feed during the freshwater stage containing cotton seed oil apparently containing aflatoxins.

THE FEDERAL REPUBLIC OF GERMANY (V. Dethlefsen) reported 2 disease surveys in the southern North Sea to examine external anomalies specially in dab. Disease prevalences were as expected from former surveys. Sampling for chemical residue studies was also included and stomach contents and condition of the dab was recorded as was the benthic fauna in water samples from the stations. Immonological studies on dab were initiated to gather information on regional differences in the immunocompetence of fish in relation to known pollution and disease "Hot Spots". A first survey on lysosymal activity indicated that a reduced immunocompetence occured in areas previously identified as disease "Hot Spots".

The second report from Germany (H. Moller) may be divided into three parts. The first included results on mass mortality of marine fish, human pathogens transferred by fish, aspects of fish disease epidemiology, and disease as indicator of pollution as a a contributary factor in natural mortality. The second part consists of investigations on parasites spoiling fish fillets, mainly nematodes. The third part consists of an intensive survey on fish stocks and diseases in the Elbe River estuary which shows three distinct "disease regions". Diseases that are proven or thought to be induced by viruses or microorganisms occur at highest prevalences in the central estuary where strong tidal fluctuations seem to prevent the establishment of large zoobenthic communities that might serve as fish food. Consequently, fish in this area show a distinctly reduced condition factor and thus are presumed to be more susceptible to pathogens than fish found upstream or downstream of this area.

FINLAND reported a continuing high prevalence of skin tumours in northern pike and experimental studies indicate that the tumour is not a lymphoma but a monocytic or histiocytic tumour. The spawning population of the same species also show a high prevalence (37%) of skin hyperplasia. Lymphocystis in herring shows a cyclical occurrence and this disease was found in high prevalence, up to 10%, during 1985. Two mycobacteria have been iden-

ti ied from cod liver, one of them being a human pathogen, M. asiaticum. In farmed fish, vibriosis is rapidly declining due to the increasing use of vaccines. Because of this the use of antibiotics has dropped to 1% of the amount used in 1983 and fish production has increased.

FRANCE reported surveys on viruses and bacteria in eels. A vesiculovirus has been found in eels kept in cages before sale. These eels were also found infected with Trichodina, causing symptoms similar to red disease. In farmed fish IPN was found for the first time in turbot. It caused mortalities, but it was stressed that environmental factors and nutritional aetiology accounts for a significant part of the pathological problems. BKD was found in coho-salmon in incidences up to 30% and sale of these fish was stopped. No report was received on molluscs.

IRELAND reported that a lot of queries are made to fisheries authorities about cod-worms, but as yet no surveys have been made. Significant losses due to sea-lice infestation on caged Atlantic salmon were recorded, as well as losses caused by furunculosis which is the most serious bacterial disease. Pancreas disease in Atlantic salmon has caused very significant affects on production, but mortality is low.

THE NETHERLANDS reported the rapid spread of a nematode (Anguillicola cassa) in the swim bladder of eels. This parasite is introduced with eels imported from Asia and has also been found in Germany and Italy. Most of the imported eels are used for smoking and the spread of the parasite has obviously been facilitated through parasite eggs which reach water during the process of cleaning the eels. Since heavy infestations can lower the condition of the eels the importance of keeping close attention to the occurrence and distribution of this parasite in in other countries was stressed. In molluscs Bonamia disease

was still present in the old oyster beds as well as in the new experimental beds.

D. Vethaak reported on the disease/pollution surveys and the newly published report on these. The Dutch fish disease surveys over the same area, central North Sea and the part stretching away from the coastal waters of the Netherlands through the German Bight towards the north of Denmark, have now lasted for 5 years and seem to give a good baseline for the occurrence of diseases.

NORWAY reported that furunculosis was imported with a consignment of smolts from Scotland to the region of Trøndelag and that the disease has spread to affect most farms in that region. Gaffkemia was imported with live lobsters also from Scotland. For the first time the one lobster consignment was imported by trailer and as the bacterium also was found in lobsters dead during transport, the infection most probably was in the trailer. The affected lobster site has been cleaned out. In sea-farming of Atlantic salmon Ichtyobodo infection (costiasis) is an increasing problem. Another serious problem is the spread of BKD specially in two regions. Intestinal cestode infection in sea reared salmonids also is an increasing problem. Investigations on poor liver conditions in cod in the outer Oslofjord has been started.

SWEDEN reported that BKD has been found in rainbow trout for the first time and that high incidence outbreaks of infectious dermatitis caused by Aeromonas salmonicida subsp. have occurred among sea trout in a few rearing stations. The population of natural and farmed blue mussels along the west coast is still poisoned by DSP and the prohibition on harvesting and sale might be detrimental for this new young industry. It was pointed out that extremely high infestations with Cryptocotyle in cod may cause an abnormal deep greenish colouration instead of the common black-spotted appearance.

UNITED KINGDOM (England-Wales) reported that two cruises have been made: one a feasibility study to find out how a routine fish stock assessment team could handle the examination and sampling of certain fish species for diseases in six areas in the Irish Sea, and the other a more specialised fish disease cruise sampling 4 areas in the Irish Sea. No special trends were observed. Gaffkemia in lobsters was identified in one lobster holding facility. All stock were destroyed and the site completely disinfected. The greatest problem in mollusc mariculture is Bonamia which was found in some new areas: the situation is worrying.

UNITED KINGDOM, (Scotland) reported that pseudobranch lesions have been shown to have a variety of aetiologies and are, therefore, not useful for monitoring studies. Vertebral anomalies of haddock were found to be restricted to the northern North Sea and north of the Scottish mainland with a sharp line of demarcation of a population with very low levels of lesions to the west of the Hebrides. In discussing the gill x-cell lesions it was stressed that paraffin sections are totally useless in diagnosing this disease and that plastic sections or smearing techniques should be used.

A written report from the NOAA Disease Laboratory in Oxford, Maryland, U.S.A. (A. Rosenfield) was presented.

IV. PUBLICATIONS

1. Anton Dohrn report

The report of the sea-going workshop on board the RV "Anton Dohrn" from January 3rd to 12th 1984, entitled "Methodology of Fish Disease Surveys" is now ready. The report edited by A.H. McVicar, V. Dethlefsen and E. Egidius will be published as an ICES co-operative Research Report.

2 Status of diagnostic leaflets

A letter was received from the Editor of the Diagnostic Leaflets, Dr. C.J. Sindermann, stating that 30 leaflets have either been published or will appear in the near future. 10 further manuscripts have been received and edited, and will be sent to ICES before the end of May.

3. New titles for diagnostic leaflets

The Editor urged the W.G. members to submit additional manuscript or to request manuscripts from appropriate colleagues. Nearly 20 new titles were suggested. Manuscripts for the following 10 will be fininshed by June 1986.

Blood flukes of flat fish	J. Thulin
Gaffkemia in Lobsters	J.E. Stewart
Exophalia in salmonid culture	K. Engjom, F. Langvad
Granulomatous hypertyrosenemia in cultured turbot	F. Baudin Laurencin
Hysterothylasium aduncum	B. Berland
Cryptocotyle lingua	B. Berland
Black patch necrosis in sole	A.H. McVicar
Costiasis in seawater (Ichthyobodo sp.)	R. Wootten
Saltwater trichodiniasis	J. McArdle
Pleistophora erenbaumi in Annarchais sp.	E. Egidius

Manuscripts with the following titles will be ready by December 1986:

Lernaenicus sprattae	T. Schram
Lernaeocera branchialis	H. Moller
Skin tumours in Northern Pike	G. Bylund
Cold water vibriosis	E. Egidius
IPN in salmonids	B. Hjeltnes
Liver nodules in dab	D. Bucke
Diplectanum in sea bass	F. Baudin Laurencin
Epidermal hyperplasia in whiting	D. Bucke
Henneguya salmonicola in Pacific salmon	D. Declerk

W. G. members were asked to consider further titles for the next meeting in order to maintain a publishing rate of about 10 leaflets per annum. Broader subjects such as e.g. "Skin Parasites of Dab" should be considered. This most possibly will necissitate leaflets of more than 4 pages.

A discussion on the objectives of the diagnostic leaflets and an eventual revision of previously published leaflets will be discussed at the next W.G. meeting.

4. Definitions of terms

Last years work on definitions of terms to prevent misunderstandings, was discontinued but will be on the agenda again next year. The meeting decided however, that the term epidemic (epidemiology) should be used also when marine organisms are conserned instead of the term epizootic (epizootology). The latter term was proposed some 10-15 years ago for use when animals were concerned, but has not come into common use.

V. LEGISLATION ON AQUACULTURE AND FISH DISEASES

Reports giving details of national legislation on aquaculture and diseases were received from seven countries. A short summary of the details circulated at the meeting. This work will be continued and it is proposed to produce a document for the next meeting containing the legislation from all the member countries in the original language followed by an appraisal in English.

VI. FISH PARASITES AND POLLUTION

J. Thulin gave a short review of Carl Sindermann's paper "Fish Parasites and Pollution". The conclusion in this paper was that more work is necessary on this topic before eventual links between fish parasites and pollution are confirmed. H. Møller also

presented a paper on this topic and had a more optimistic view on the possibilities of using parasitology in pollution monitoring, contrary to Dr. Sindermann's conclusion.

It was the general opinion that more data on fish parasites had to be collected and evaluated for its possible use in showing the impact of pollution.

It was recommended that parasite data be collected during future fish disease surveys for later evaluation in this context.

VII. WORKSHOP

Details of disease conditions and problems encountered in 1985 were illustrated through slide material and transparencies.

DR. BYLUND: Salmon with yellow pigmentation.
Cod with "lateral line necrosis".

DR. MELEGAARD: Sequential development of myxobolus infection in plaice.
Diseases in Danish eel culture.

DR. MOLLER: Pharyngeal papillomas in smelt.
Spawning papillomatosis in smelt.
Tumours in different fish species.
"Bleaching syndrome" in flounder.
"Lateral line necrosis" in cod.

DR. BALOUET: Haematopoetic neoplasms in molluscs.

(presented by DR. BAUDIN LAURENCIN)

DR. VETHAAK: Papilloma in whiting.
Intestinal and splenic lymphocystis in flounder and dab.

D.. VAN BANNING:	Anguillicola cassa infections in Dutch eels.
DR. EGIDIUS:	Costiasis in salmon. Hitra disease in farmed salmon and experimentally infected fish.
DR. LINDESJOO:	Scar formation associated with the lateral line in cod. Ulcerations in herring.
DR. McVICAR:	Pancreas disease. Exophiala infection musculature, oi smoked salmon. X-cells in dab gills.
DR. McARDLE:	Furunculosis originating from gill infections (carriers).

VIII. HOST-PARASITE INTERACTIONS

A review paper entitled "Aspects on host-parasite interactions in fish infection" was presented by G. Bylund. The definition of a parasite by Piekarski in 1954 was given, followed by a classification into 4 categories of parasitism as used by Lom in 1984. The review paper discussed injurious effects of parasites and defence mechanisms of host fish. Injurious effects can be due to mechanical action and secretion of toxic substances. It can result in functional disturbances which can be severe enough to be observed as symptoms of disease. Defence mechanisms of host fish are protective reactions, i.e. by tissue reactions and/or immunity. In the first case there is an inflammatory reaction which can lead to an encapsulation. Immunity responses are limited by the fact that the antigenic composition of parasites is more complex than in bacteria and viruses and because the reactions of fish are weaker than in higher vertebrates.

However, antibodies have been demonstrated in fish serum against many parasites, sometimes sufficient to prevent reinfection. A discussion followed concerning other observations or studies carried out. Aspects of therapy, vaccination, specificity of parasites, role of genetics and phylogeny, and the infective stages were also discussed. It was considered that studies on host-parasite interaction need further attention.

IX. ICES COOPERATION WITH OTHER INTERNATIONAL BODIES REGARDING DISEASE WORK

The W.G. member Stig Mellergaard (Denmark) attended the GESAMP Working Group on the Review of Potentially Harmful Substances (Copenhagen, 22-23 January, 1986). Data were presented on presence of tumours in fish and shellfish at many sites.

The members of the W.G. were informed about the invitation of the IOC (Intergovermental Oceanographic Commission) to ICES to co-sponsor the group of Experts on Effects of Pollutants (GEEP). The chairman of the WGPDMO will serve as the ICES liaison with GEEP. For the inclusion of ICES input on pathobiological studies in the GEEP Workshop program (C.Res. 1985/3:3).

Heino Moller (Germany) informed the W.G. about the arrangement by the Council of Europe of a research programme on "Management of Water Resources" which was held in March 1986 in Lyon. During this meeting a sub-group was formed to plan a meeting on "Fish and their environment in large European river ecosystems" from November 21st to 22nd 1986 in Liege, France. A part of the programme concerns diseases and parasites.

X. PROTOCOLS FOR INTRODUCTIONS AND TRANSFERS OF MARINE ORGANISMS

The Working Group on Introductions and Transfers of Marine Organisms is finalising the disease protocols in connection with the Code of Practice.

The draft protocols were discussed and it was agreed that it would have been preferable if the WGPDMO had discussed the matter and given advice on the disease protocols at a much earlier stage. It was emphasized that the spesific disease protcols (salmonids, eels, molluscs etc.) were examples of miniumum requirements.

XI. EXPERIMENTAL STUDIES ON JUVENILE STAGES OF MARINE FISH

A review on "Disease studies on early stages of marine fish: relationships between levels of aetiological agents and pathogenicity with reference to wild fish populations" was presented by A. McVicar. Although disease studies of juvenile fish are of importance in fish cultivation and pollution related programmes, the paper was restricted to the relevance of disease in natural populations. It is accepted that disease probably contributes to natural mortalities in wild fish populations, but this is an aspect which is usually calculated retrospectively. Commonly up to 99% of initial stock is lost during egg, larval and juvenile stages. Although some causative factors are known, it is possible disease may play a part, so that even relatively minor changes in the effect of diseases on survival could significantly influence the final size of the fish population.

Field assessment of disease in juvenile fish is difficult for practical and technical reasons and consequently data must be complemented by experimental studies. Little information is

a ilable on pathology from fish resource (feeding, growth, behaviour) type studies and toxicity testing studies. There is considerable potential to incorporate disease studies into enclosed ecosystem research programmes. Although much information is available from marine fish cultivation studies, the relevance of this data to natural populations should be taken with caution because of the highly artificial nature of the cultivation conditions. For studies on disease to be relevant, it is essential that their experimental design is firmly based on field data. Examples in which disease patterns observed in natural populations of fish were experimentally tested were taken from studies in Aberdeen, and the role of disease in causing mortality assessed.

Attention was drawn to comparative studies in pathology of cultivated fish larvae that might be useful for evaluation of disease conditions of free-living stages. A number of different disease signs (atrophy, muscular degeneration, gas-gland and glomerular dystrophy), partly considered to be related to nutrition, was encountered in larval turbot during a histopathological and histochemical study in Brest. A very high survival rate was found in Norwegian aquaculture experiments when naturally spawned eggs of cod were hatched in artificial environment and the fry was rised under the exclusion of predators in a fjord enclosure. The only mortality observed was due to cannibalism. The role of infestations by cercarie of Cryptocotyle lingua could as yet not be determined. Serious signs of infectious disease (vibriosis) only occurred following the handling and transfer of the fish.

A German survey is dealing with the potential effects of pollutants on reproduction success and malformation on embryonic stages of seven fish species in the western Baltic Sea and the southern North Sea. It includes studies on chromosomal abnormalities and residues in gonads in relation to viability of hatching. Preliminary results indicate that high levels of certain toxicants may interfer with the reproductive success of fish.

During the discussion it was pointed out that the effects of diseases of early stages of fish still cannot be quantified.

XII. EFFECTS OF USE OF MEDICATION IN AQUACULTURE

The chairman expressed the growing concern in Norway regarding the use of medicamentation in marine fish culture. Because of inadequate attention to good husbandry practices, too many salmonid farms experience frequent disease outbreaks which leads to extensive use of medicamentation for their control. A review has been prepared on all medicines used in fish culture in Norway including a bibliography of the published information on the effects on the environment. This bibliography reveals that there is an inadequate amount of information on the main problems and questions viz:

- the effects the different drugs used have on the environment in general
- the development of drug resistance in bacteria on the farm and in the local environment
- the transfer of drug resistance to aquatic bacteria of human health significance
- the accumulation of drugs in sediments under fish farms and the effect on its normal bacterial flora
- the presence of drug residues in farmed fish on the market.

Several research projects in this topics are planned in Norway.

It has also been recognised that with incorrect use of medicated feeds, large amounts of antibiotics can be lost into the aquatic environment, but modification of the dosages of the food for different temperatures, has greatly reduced this problem. As for the tissue residues problem, it is likely that a regulation will be introduced soon to impose a statutary withdraval period of 90 days for all antibiotic treatments in salmonids. It is believed that a general improvement of husbandry standards to

r uce the need for drug treatments, and extensive use of vaccines is the best long term strategy for dealing with the problems.

From Great Britain it was reported that a close examination is being made of the use of medicines for fish and of the licensing arrangements permitting their availability. Also, a general regulation will be introduced soon to control the preparation, sale and usage of medicated feeds for all animals including fish. The regulation will impose a standard withdrawal period which takes into account the influence of water temperature on excretion rates by using the degree-day concept.

A research project is underway at the Weymouth Laboratory to monitor the development of antibiotic resistance in bacterial pathogens of fish and other selected aquatic species on rivers with and without fish farms using drug treatments. Sampling is being done throughout the year to account for different drug usage at different times of the year. Widely fluctuatory levels of resistance have been observed, but no clear picture has yet emerged. Indeed, it was reported from Scotland that some recent isolates of the bacterium causing furunculosis in Atlantic salmon, have an increased resistance to oxolinic acid, the most widely used antimicrobial compound for this disease. Also it is planned to start a project at Weymouth to determine more precisely the optimal protocols of the most commonly used antibiotics in fish farming in Britain at different water temperatures from the point of view of economy of use without loss of efficacey.

In France antibiograms are obtained for most bacteria causing disease outbreaks to check if susceptible to the usual drug of choice. It has been found that the resistance of Aeromonas salmonicida fluctuates widely throughout the year which is consistent with the findings of the Weymouth Laboratory for aquatic bacteria in general. Using a suspension of diseased tissue a result from the antibiogram is obtained by 24 hours which is considered a short enough period to wait before deciding which antibiotic treatment to use.

In Denmark the use of medicated feed is not allowed officially under the present regulations. A new regulation is being introduced which will allow the use but under close scrutinity of the Department of Fisheries and regulated such that the particular drugs being used and the amounts will be known to the authorities.

A research project is planned on the residues and excretion rates of different antibiotics in salmonids in freshwater and seawater.

In the discussion on the use of medication in fish culture, it seems appropiate to point to the national report from Finland. Vibriosis that was so far the main threat to fish farming, is reported to be in rapid regress due to the increased use of vaccines. The consequence of this is that the use of oxytetracycline in the main fish farming area dropped to about 1% compared to 1983, although the fish production in the area was doubled.

In general discussion it was agreed that the problems associated with the use of drugs in aquaculture are common to all countries and should be given fuller consideration and attention by the working group. Consequently it was agreed that a review should be prepared and the subject be given fuller attention at the next W.G. meeting.

XIII. RECOMMENDATIONS

1. In view of the increased use of medication in mariculture it is recommended that member countries should give careful consideration to the use of antibiotics and other medicines in marine aquaculture and in particular to the following problems:

- regulation of use
- development of antibiotic resistance
- accumulation in sediments and other environmental
- impacts
- residues in fish products.

2. Arising from the present state of knowledge on parasites in fish it is recommended that the potential for the use of ectoparasites as indicators of environmental changes including pollution effects, should be explored as a promising new approach. Because of the influence of natural phenomena on fish disease levels it is recommended that studies to establish the relationships between pollution and disease should concentrate on estuarine and coastal waters, areas of pollution "Hot Spots" and areas of changing pollution status.

3. Recognising that the interest in and effort put into research on fish diseases has increased considerably in recent years it is recommended that a special meeting entitled "Recent advances in pathology and disease of marine species of commercial and biological interest" be held over three days in conjunction with the 1988 Statutory Meeting in Bergen, Norway. A planning group should be set up under the convenership of Dr. Emmy Egidius.

4. The Working Group should meet again for 4 days in Brest, France, from April 22nd, through 25th, 1987, under the chairmanship of Dr. E. Egidius, to:

   (a) discuss implications of information on the current disease status in member countries and on new disease problems of wild and cultivated marine organisms.

   (b) review and discuss the immunology of marine organisms, including immuno-competence, immunosupression and the potential for increasing resistance through use of vaccines.

(c) discuss the comprehensive review and implications of the use and abuse of antibiotics and chemotherapeutants in mariculture

(d) examine available information on national laws governing fish health

(e) continue work on definitions and preparation of a glossary on fish health terms

(f) review and discuss a proposal for computerisation of fish disease and pathology information now reported annually to ICES

(g) assemble and review information on existing national fish diseases and pathology computer systems for the purpose of devising or agreeing on a common or compatible system to permit ready exchange of data among member nations

(h) discuss a review of the impact of parasites impairing the value of fisheries products.

ANNEXES

ANNEX 1

CONTENTS

ANNEX 2

AGENDA

April 23rd 9.30.	Opening of meeting Rapporteurs Adoption of Agenda ICES Statutory Meeting 1985. Formats for National Reports National Reports Tour.
April 24th 9.30.	Continue National Reports Disease Leaflets: Status and New Titles. National Laws on Mariculture and Disease Control. Possible Relationship of Fish Parasites and Pollution.
April 25th 9.30.	Host-Parasite Interactions ICES Co-operation with other International Bodies regarding Disease Work Protocols for Introductions Definitions Experimental studies on Juvenile Stages of Marine Fish Pathology Registries Data base on Disease Recording Provisional Discussion on: Recommendations Terms of reference next meeting
April 26th 9.30.	Effects of Use of Drugs in Aquaculture Recommendations (contd.) Any Other Business
16.00.	END OF MEETING

ANNEX 3

TERMS OF REFERENCE (C.RES.1985/2:32)

a) Discuss implications of information on the current disease status in member countries and on new disease problems of wild and cultivated marine organisms;

b) Discuss experimental studies on juvenile stages of marine fish in order to determine relationships between levels of aetological agents and pathogenicity in wild fish populations;

c) Examine available information on drugresistance from different countries both from marine aquaculture and experimental studies;

d) Study the review being prepared on possible relation between parasites and pollution and host-parasite interactions;

e) Review and discuss methods to determine the resistance and immunostatus of marine organisms considering that a variety of pollutants and physical environmental factors can lower the resistance;

f) Continue work on definitions and start preparing a glossary on fish health terms.

ANNEX 4

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ANNEX 5a

INTERNATIONAL COUNCIL FOR THE EXPLORATION OF THE SEA (ICES)

FISH AND SHELLFISH DISEASE: ANNUAL REPORT

(A) WILD POPULATIONS COUNTRY: BELGIUM YEAR: 1985

DISEASE/PARASITE	HOST SPECIES	LOCATION (ICES GRID)	NUMBER OF FISH/SHELLFISH EXAMINED	SIZE RANGE (cm)	PREVALENCE (%)	MONTH OF SAMPLING	REMARKS
1. Lymphocystis	Dab	102	318 - 280	> 15	2.7 -	March-Sept	
	Plaice	102	182 - 172	> 20	2 - 1	March-Sept	
	Flounder	102	290 - 176	> 20	6.2 - 8	March-Sept	Higehest observed prevalence in single fish sample was 22%
2. Epidermal papilloma	Dab	102	588	> 15	-	Spring and autumn	No observations
	Plaice	102	354	> 20	-		
	Flounder	102	466	> 20	-		
3. Gill x-cell	Dab	102	588	> 15	-	Spring and autumn	No observations
4. Ulcers	Plaice	102	182 - 172	> 20	- 1.2	March-Sept	
	Flounder	102	290 - 176	> 20	1.7 - 2.2	March-Sept	
5. Skeletal deformities	Plaice	102	182 - 172	> 20	- 2.3	March-Sept.	
	Whiting	102	172	> 20	0.8	January	
	Cod	102 - 101	76 - 107	> 20	5.3 - 1	March-Dec.	
6. Fin erosion	Dab	102	318 - 280	> 15	3.8 - 1.4	March-Sept	
	Plaice	102	182 - 172	> 20	4.4 -	March-Sept	
	Whiting	102	172 - 152	> 20	2.6 - 1.4	March-Sept	
		101 - 829	254	> 20	-	January	
	Flounder	102	290 - 176	> 20	0.7 - 2.3	March-Sept	
7. Pigment anomalies	Flounder	102	290 - 176	> 20	5.5 - 6.5	March-Sept	
	Plaice	102	182 - 172	> 20	2.2 - 3.5	March-Sept	
8. Lernaeocera branchialis	Whiting	102	172 - 152	> 20	18 - 25	Jan-March	
		101	254	> 20	5.5	Sept	
9. Mycobacterium	Cod	101	107	> 20	3.7	Dec.	
	Whiting	102	172	> 20	1.2	Jan.	
10. Ichtyophonus	Cod	101	107	> 20	-	Dec.	First observation in Belgian continental shelf.
	Whiting	102	172	> 20	2.3	Jan.	
11. Glugea stephani	Dab	102	318 - 280	> 15	13.3 - 7.1	March-Sept	Observations of acute phase only
12. Cryptocotyle	Whiting	102	172-152-254	> 20	5.3-5.6-9	March-Sept-Jan.	
13. Anisakis simplex	Herring	102 - 829	5700	>20-28<	78 - 97	Oct-Des.	Sandettie stock. Related with age composition of the catch.

INTERNATIONAL COUNCIL FOR THE EXPLORATION OF THE SEAS (ICES)

FISH AND SHELLFISH DISEASE: ANNUAL REPORT

WILD POPULATIONS — COUNTRY: CANADA — YEAR: 1985

Disease/Parasite	Host Species	Location (ICES Grid)	Number of Fish/Shellfish Examined	Size Range (cm)	Prevalence	Month of Sampling	Remarks
Lobster Shell Disease	Lobster Homarus americanus	S.W. Nova Scotia	—	—	Normally <1% up to 30% in winter 1985.	Dec.	Higher than normal prevalence reported by fishermen in December. No specimens examined.
Pleistophora hippoglossoides	American plaice Hippoglossoides platesoides	2J to 5ZE	4,000-5,000	31-40	0-60	Apr. - Dec.	
Pseudoterranova incipiens	American plaice Hippoglossoides platesoides	2J to 5ZE	4,000-5,000	31-40	0-60	Apr. - Dec.	

INTERNATIONAL COUNCIL FOR THE EXPLORATION OF THE SEA (ICES)

FISH AND SHELLFISH DISEASE: ANNUAL REPORT

(A) WILD POPULATIONS — COUNTRY: Denmark — YEAR: 1985

DISEASE/PARASITE	HOST SPECIES	LOCATION (ICES GRID)	NUMBER OF FISH/SHELLFISH EXAMINED	SIZE RANGE (cm)	PREVALENCE (%)	MONTH OF SAMPLING	REMARKS
Myxobolus aeglefini	Dab	North Sea(N) lat:54°00'-56°45' long:6°30'-8°-20.' Skagerak (S) lat:56°45'-57°45' long:6°30'-10°20' Kattegat(K) lat.56°00'-long:10°20'-12° 30'	North Sea n=6234 Skagerak n=1768 Kattegat n=8967	7-40cm	N 24% S 38% K 27%	May	
Stephanostomum baccatum					N 15% S 13% K 9%		
Lymphocystis					N 10% S 4% K 2%		
Epidermal hyperplasia/papilloma					N 4.3% S 0.1% K 0.8%		
Ulcers					N 0.8% S 0.2% K 0.2%		
Skeletal deformities					N 0.07% S 0.05% K 0.00%		
Myxobolus aeglefini	Plaice	Same locations as scheme 1	North Sea n= 4451 Skagerak n= 1108 Kattegat n= 645	10-55 cm	N 21% S 58% K 57%	May	
Lymphocystis					N 1.3% S 1.2% K 0.2%		
Epidermal hyperplasia/papilloma					N 0.03% S 0.00% K 0.00%		One specimen in one haul
Ulcers					N 0.00% S 0.00% K 2.1%		One specimen in one haul

INTERNATIONAL COUNCIL FOR THE EXPLORATION OF THE SEA (ICES)

FISH AND SHELLFISH DISEASE: ANNUAL REPORT

(A) WILD POPULATIONS

COUNTRY: FEDREAL REPUBLIC OF GERMANY YEAR: 1985

DISEASE/PARASITE	HOST SPECIES	LOCATION (ICES GRID)	NUMBER OF FISH/SHELLFISH EXAMINED	SIZE RANGE (cm)	PREVALENCE (%)	MONTH OF SAMPLING	REMARKS
	Dab (Limanda limanda)	Southern North Sea 36 stations	7034	9 - 38		May 1985	Percentages related to to averages
Epidermal papilloma/ Hyperplasia					6.38		
Lymphocystis					13.82		All stages of intensity
Ulcerations					3.84		Includes acute healing an healed stages

INTERNATIONAL COUNCIL FOR THE EXPLORATION OF THE SEA (ICES)

FISH AND SHELLFISH DISEASE: ANNUAL REPORT

(A) WILD POPULATIONS

COUNTRY: FINLAND YEAR: 1985

DISEASE/PARASITE	HOST SPECIES	LOCATION (ICES GRID)	NUMBER OF FISH/SHELLFISH EXAMINED	SIZE RANGE (cm)	PREVALENCE (%)	MONTH OF SAMPLING	REMARKS
Skin ulcers	Platichthys flesus	49/G9-H2	994	17-41	2,7	May - July	Commersial catches
Skin tumours	Esox lucius	49/H0-H2	1532	35-105	1.6	April - May	Commersial catches; brackish water; spawning population
Skin hyper-plasia	Esox lucius	49/H0-H2	1532	35-105	3,7	April - May	- " -
Lymphocystis	Clupea harengus	48/H3-H4	2000	15-25	7.5	April	Commersial catches

INTERNATIONAL COUNCIL FOR THE EXPLORATION OF THE SEA (ICES)

FISH AND SHELLFISH DISEASE: ANNUAL REPORT

(A) WILD POPULATIONS

COUNTRY: FRANCE

YEAR: 1985

DISEASE/PARASITE	HOST SPECIES	LOCATION (ICES GRID)	NUMBER OF FISH/SHELLFISH EXAMINED	SIZE RANGE (cm)	PREVALENCE (%)	MONTH OF SAMPLING	REMARKS
Vesiculovirus	Eel	Estuaries of Loire and Vilaine, other estuaries	7 samples		Carriage in 2 cases of 7	Autumn	Virus pathogenic for rainbow trout fry
Vesiculovirus	Eel	Estuarie of Loire	4 samples	adult	carriage in 1 sample	Autumn	
Birnavirus	Eel	"	4 samples		Carriage - 2 samples		
Ciliates (Trichodina)	Eel	"	4 samples		2 samples	Autumn	Congestiv hemorrhagic lesions of abdomen
Yersiniosis	Atlantic salmon	Florin river	1 fish	70	1/1	Autumn	Septicemic bacteria found upon a returning salmon with external lesions with Saprolegnia.

INTERNATIONAL COUNCIL FOR THE EXPLORATION OF THE SEA (ICES)

FISH AND SHELLFISH DISEASE: ANNUAL REPORT

(A) WILD POPULATIONS

COUNTRY: Norway

YEAR: 1986

DISEASE/PARASITE	HOST SPECIES	LOCATION (ICES GRID)	NUMBER OF FISH/SHELLFISH EXAMINED	SIZE RANGE (cm)	PREVALENCE (%)	MONTH OF SAMPLING	REMARKS
Vibriosis	Pollachius virens	Local outbreaks along west coast		1-2 years		autumn	
" "	Salmo salar	Os river near Bergen	Several	spawners		August	Low water level in river may have delayed migratio
Poor liver conditions	Gadus morrhua	Outer Oslofjord	31	40 - 60		Nov.,Dec.	Cause unknown

INTERNATIONAL COUNCIL FOR THE EXPLORATION OF THE SEA (ICES)

FISH AND SHELLFISH DISEASE: ANNUAL REPORT

(A) WILD POPULATIONS

COUNTRY: THE NETHERLANDS YEAR: 1985

DISEASE/PARASITE	HOST SPECIES	LOCATION (ICES GRID)	NUMBER OF FISH/SHELLFISH EXAMINED	SIZE RANGE (cm)	PREVALENCE (%)	MONTH OF SAMPLING	REMARKS
Glugea stephani	Flounder	Coast of the province of South Holland (33 F4)	725	20-31-45	1.8	September	Heavily polluted area
" "	"	Eastern Sheldt (32 F3)	362	20-31-45	1.1	"	Relatively unpolluted area
Neoplastic liver nodules	"	33 F4	725	20-31-35	1.5	"	Heavily pollueted area
" "	"	(32 F3)	362	20-31-45	0.0	"	Relatively unpolluted area
Lymphocystis		(32 F3)	362	20-26-45	5.5	"	Realatvely unpolluted area
		33F4	725	20-31-45	21.9	September	Heavily polluted area
Ulcers	"	(33 F 4)	725	20-31-45	4.3	"	Heavily polluted area
	"	(32 F4)	362	20-26-45	0.6	"	Realtively unpolluted area
Finrot	"	(32 F3)	725	30-31-45	2.3	"	Heavily polluted area
	"	(33 F4)	362	20-26-45	0.6	"	Relatively unpolluted area
Skeletal deformities	"	(32 F3)	725	20-31-45	0.3	"	Heavily polluted area
	"	(33 F 4)	362	20-26-45	0.0	"	Realatvely unpolluted area
Lymphocystis	Dab	33F3-34F3	833	15-21-35	0.5	"	Vicinity of TiO_2 dumping ar
Epid.hyperplasia/ papillomas	"	" "	"	" "	0.2	"	" " "
Ulcers	"	" "	"	"	1.1	"	" " "
Fin rot	"	" "	"	"	0.2	"	" " "
Skeletal deformities	"	" "	"	"	0.6	"	" " "
Glugea stephani	"	" "	"	"	7.7	"	" " "

INTERNATIONAL COUNCIL FOR THE EXPLORATION OF THE SEA (ICES)

FISH AND SHELLFISH DISEASE: ANNUAL REPORT

(A) WILD POPULATIONS

COUNTRY: THE NETHERLANDS YEAR: 1985

DISEASE/PARASITE	HOST SPECIES	LOCATION (ICES GRID)	NUMBER OF FISH/SHELLFISH EXAMINED	SIZE RANGE (cm)	PREVALENCE (%)	MONTH OF SAMPLING	REMARKS
Lyphocystis	Dab	South east North Sea framed by ICES grid lines Fz and 44	4859	15 - 20	Mean - Max 1.8 - 8.2	April and September	General Fish Disease recor (stock assessment)
Hyperplasia/ Papilloma	"	"	"	" "	1.4 - 3.8	"	" "
Ulcers	"	"	"	" "	1.0 - 2.4	"	" "
Glugea stphani	"	"	"	" "	5.7 - 13.0	"	" "
Myobolus	"	"	"	" "	4.1 - 11.9	"	" "
Lymphocystis	Plaice	"	4626	15 - 35	1.3 - 1.8	"	" "
Ulcers	"	"	"	" "	0.4 - 0.5	"	" "
Glugea stephani	"	"	"	" "	1.7 - 3.5	"	" "
Myxobolus ~~s~~gelefini	"	"	"	" "	14.8 - 38.6	"	" "
Mycobacteriosis	Cod	"	768	15 - 80	<1 - 1.7	"	" "

INTERNATIONAL COUNCIL FOR THE EXPLORATION OF THE SEA (ICES)

FISH AND SHELLFISH DISEASE: ANNUAL REPORT

(A) WILD POPULATIONS

COUNTRY: England and Wales YEAR: 1985

DISEASE/PARASITE	HOST SPECIES	LOCATION (ICES GRID) (see Fig.1)	NUMBER OF FISH/SHELLFISH EXAMINED	SIZE RANGE (cm)	PREVALENCE (%)	MONTH OF SAMPLING	REMARKS
Lymphocystis	*Pleuronectes platessa*	Irish Sea	1129	16-42	1.6 mean	November	Joint fish stock assessment and fish disease cruise
	Limanda limanda		713	10-32	1.9 "		
Ulcers	*P. platessa*	Irish Sea	1129	16-42	1.0 mean	November	-
	L. limanda	" "	713	10-32	3.1 "		Up to 8.5% in control area
	Merlangus merlangus	" "	1460	10-50	0.05 "		-
Epidermal hyperplasia	*L. limanda*	Irish Sea	713	10-32	0.1 mean	November	Up to 8.5% from "control" area only
Skeletal deformities	*P. platessa*	Irish Sea	1129	16-42	0.7 mean	November	Fin ray distortion - probably old trawl damage
	L. limanda	" "	713	10-32	0.4 "		Caudal peduncle deformities
Tumours	*L. limanda*	Irish Sea	713	10-32	0.01 mean	November	Liver

INTERNATIONAL COUNCIL FOR THE EXPLORATION OF THE SEA (ICES)

FISH AND SHELLFISH DISEASE: ANNUAL REPORT

(A) WILD POPULATIONS

COUNTRY: U.K., SCOTLAND YEAR: 1985

DISEASE/PARASITE	HOST SPECIES	LOCATION (ICES GRID)	NUMBER OF FISH/SHELLFISH EXAMINED	SIZE RANGE (cm)	PREVALENCE (%)	MONTH OF SAMPLING	REMARKS
Vertebral anomalies	Haddock		5119		1		
Pseudobranch-lesions	"		5119		1.3		
Ichthyophonus	"		1829				
	Plaice		319		2.5		
Lernaeocera branchialis	Haddock		1700		14 - 42		
	Lemon sole		170		100		
Lymphocystis	Dab		1703		5.8		
Skin ulcerations	Dab		1703		1.4		
	Plaice		319		0		
Skin papilloma/ hyperplasia	Dab	1703			1.1		
Gill x-cell lesions (gross)	Dab	1703			1.5		
Psendobranch tumours	Cod	753			0.9		
"Mycobacteriosis"	Mackerel	95			48.4		
		>20.000 (1979 -86)			(up to 100)		

ICES DISEASE REPORT 1985 WILD POPULATIONS AND OTHERS

COUNTRY: United States EFFORT:

DISEASE/PARASITE	SPECIES	SIGNIFICANCE
Ulcer Disease (primary fungal etiology)	Menhaden (Brevoortia tyrannus) and other estuarine species	Prevalence >50% in YOY fish in same estuaries in 1984 widespread - New Jersey to Florida. Prevalence lower 1985.
Cytopathology of liver disease	Winter flounder (Pseudopleuronectes americanus)	Study of nonneoplastic liver disease observed in 68% of specimens collected in Boston Harbor (Deer Island), and believed to result from pollution by PCB's and other hepatotoxins.
Haematractidium scombri	Atlantic mackerel (Scomber scombrus)	Prevalences during 1982-1984 from 25% to >50%. Predominantly disease of age 2 & 3 mackerel (~45%); older fish with very low prevalences. Young-of-year uninfected. Widespread, New Jersey to Canada.
Intraleukocytic hemogregarine	Atlantic mackerel (Scomber scombrus)	Prevalence during 1984 about 25%. Widespread, New Jersey to Canada. Appears dominant in age 2 fish.
Kuhnia scombri (monogenetic trematode)	Atlantic mackerel (Scomber scombrus)	Prevalances approximately 30% in age 2 fish and >50% in older fish. Intensity of infestation on gills increases with age. Widespread, New Jersey to Canada.
Viral disease (Reolike and Rhabdolike viruses)	Blue crab (Callinectes sapidus)	Cooperative project with University of Maryland. ≅ 75% of crabs maintained more than 7 days in a recirculating system died of this combined virus infection in summer of 1985.
Infectious sarcoma	Mya arenaria	New occurrence in Chesapeake Bay - prevalences and mortalities of at least 60%.
"MSX" Haplosporidium nelsoni	Oysters (Crassostrea virginica)	Associated mortalities with increased prevalance in mid-Atlantic states and New England. Range extended to Georgia.
"Dermo" Perkinsus marinus	Oysters (Crassostrea virginica)	Extensive mortalities (70%) in Georgia.

ANNEX 5b

INTERNATIONAL COUNCIL FOR THE EXPLORATION OF THE SEAS (ICES)

FISH AND SHELLFISH DISEASE: ANNUAL REPORT

MARICULTURE COUNTRY: CANADA YEAR: 1985

Disease/Parasite	Host Species	Number of outbreaks	Time of Year	Significance (e.g. % Mortalities)	Remarks
Furunculosis	Atlantic salmon	10	March - Sept.	Atlantic - Moderate mortality.	Control measures now becoming effective.
	Chinook salmon	6	April - Sept.	Pacific - low to moderate.	
	Chum salmon	3	June - Sept.		
	Coho salmon	20	May - Sept.		
	Steelhead trout	9	May - Aug.		
	Cutthroat trout	1	May		
Bacterial Kidney Disease	Atlantic salmon	6	April & Nov.	Significant on both Pacific and Atlantic coasts. Up to 60% losses reported.	Control by broodstock treatment.
	Chinook salmon	15	April - Nov.		
	Coho salmon	19	March - Oct.		
	Sockeye salmon	1	Nov.		
	Rainbow trout	3	March - Oct.		
Enteric redmouth	Atlantic salmon	nil	year round	Subclinical infection.	Atlantic area only.
Vibriosis	Rainbow trout	13	July - Sept.	Moderate mortality.	Vaccine and chemotherapy.
	Chinook salmon	34	May - Nov.		
	Coho salmon	19	March - Nov.		
	Sockeye salmon	1			
	Chum salmon	3			
Lepeophtheirus sp.	Atlantic salmon Salmo salar	1	November	Low to moderate.	Effective control
Stephanostomum baccatum	Rainbow trout Salmo gairdneri	4	August	Low.	First observation

INTERNATIONAL COUNCIL FOR THE EXPLORATION OF THE SEA (ICES)

FISH AND SHELLFISH DISEASE: ANNUAL REPORT.

(B) MARICULTURE COUNTRY: Denmark YEAR 1985

Disease/Parasite	Host Species	Number of outbreaks	Time of year	Significance (eg % Mortalities)	Remark
Vibriosis	Rainbow Trout in Cage Culture	-	April - November	Recurring Problem of Minor Significance	
Furunculosis	Rainbow Trout in Cage Culture	-		Important Problem	
Enteric Red Mouth	Rainbow Trout in Cage Culture	-		1 farm affected, no serious problem under marine conditions	
Hepatoma	Rainbow Trout in Cage Culture	-		5 farms affected Prevalence 15 - 100%	

INTERNATIONAL COUNCIL FOR THE EXPLORATION OF THE SEA (ICES)

FISH AND SHELLFISH DISEASE: ANNUAL REPORT.

(B) MARICULTURE COUNTRY: FAROE ISLANDS YEAR 1985

Disease/Parasite	Host Species	Number of outbreaks	Time of year	Significance (eg % Mortalities)	Remarks
Lepeophteirus salmois	Salmo salar Salmo gaidneri	All faroish fish farms	All year though especi ally antumn		Total numbers of fish farms is 50 (C. 500.000 m³ Treated with Neguvon
Dehydration in rainbow trout first winter in sea-water	Salmo gairdneri	5-10 fish	jan.- feb. farms in 1986	10 - 30% mortality / fish farm	

INTERNATIONAL COUNCIL FOR THE EXPLORATION OF THE SEA (ICES)

FISH AND SHELLFISH DISEASE: ANNUAL REPORT.

(B) MARICULTURE COUNTRY: FINLAND YEAR 1985

Disease/Parasite	Host Species	Number of outbreaks	Time of year	Significance (eg % Mortalities)	Remarks
Vibriosis	Salmo gairdneri	c. 10	June - Sept.	Low mortalities	In rapid regress du to vaccina program.
Vibriosis	S. trutta	c. 5	June - Sept.	Low mortalities	
Aeromonas salmonicida achr.	S. salar	3	July - August	No signif. losses	
Argulus & Caligus	S. gairdneri		July - August	No signif. losses	Persistant problem

INTERNATIONAL COUNCIL FOR THE EXPLORATION OF THE SEA (ICES)

FISH AND SHELLFISH DISEASE: ANNUAL REPORT.

(B) MARICULTURE COUNTRY: FRANCE YEAR 1985

Disease/Parasite	Host Species	Number of outbreaks	Time of year	Significance (eg % Mortalities)	Remarks
IPN - like virus	Turbot juveniles	1		60%	First recor mortality o such virus (AB serotyp in this spe
Vibrio parahaemolyticus	Sea bass	2	February	10% (after therapy)	18°c (hydro-elec plant
Vibrio vulnificus	Turbot	1	February	10% (after therapy)	
Vibrio anguillarum	Turbot, coho, sea bass	12	Spring	10% (after therapy)	
Furunculosis	Brown Trout	2	October	10% (after therapy)	
Corynebacteriosis	Coho	3 sites	March	10-30%	No therapy
Myxobacteriosis	Brown trout Atlantic salmon	2 2	Spring	5%	Bath treatme (furoxone)
Parasitism (Diplectanum)	Sea bass	2	Autumn	15%	Formaline
Parasitism (lice)	Turbot	1	Summer	0%	Trichlorfon
Granulomatous hypertyrosinemia	Turbot	3	All the year	15%	No treatment
Environmehtal pathology Nutritional pathology	All species	20	All the year	20%	Cataracts ulcerations
Larval mortality	Turbot		All the year	99%	Nutritional problem?

INTERNATIONAL COUNCIL FOR THE EXPLORATION OF THE SEA (ICES)

FISH AND SHELLFISH DISEASE: ANNUAL REPORT.

(B) MARICULTURE COUNTRY: IRELAND YEAR 1985

Disease/Parasite	Host Species	Number of outbreaks	Time of year	Significance (eg % Mortalities)	Remarks
Costia/Trichodina	Gills of Atlantic salmon in sea cages			Causes some losse if untreated	Usually successfully treated.
Sea Lice	Skin of Atlantic salmon in cages during summer and autumn.			Significant losses	
Furunculosis	Atlantic salmon in sea cages following transfer from infected hatcheries			Significant losse.	Responded we to Oxolinic Aci ; re-crudescence occurs
IPN	Atlantic Salmon at one sea cage site and 3 freshwater hatcheries			No losses observed.	
Pancreas Disease	Atlantic salmon in sea cages in late summer			Most serious problem observed in 1985.	Cause unknow

INTERNATIONAL COUNCIL FOR THE EXPLORATION OF THE SEA (ICES)

FISH AND SHELLFISH DISEASE: ANNUAL REPORT.

(B) MARICULTURE COUNTRY: THE NETHERLANDS YEAR 1985

Disease/Parasite	Host Species	Number of outbreaks	Time of year	Significance (eg % Mortalities)	Remark
Bonamiasis - Bonamia	Ostrea edulis	Only few cases as result of control measures and ceasing of new planting	Peak in August and September	Serious commercial loss Oyster culture ceased in the infected area for some years.	Only experimental chal-enge tests ar carried out the infected area

INTERNATIONAL COUNCIL FOR THE EXPLORATION OF THE SEA (ICES)

FISH AND SHELLFISH DISEASE: ANNUAL REPORT.

(B) MARICULTURE COUNTRY: NORWAY YEAR 1985

Disease/Parasite	Host Species	Number of outbreaks	Time of year	Significance (eg % Mortalities)	Remarks
IPN	Atlantic salmon, Rainbow trout			Carrieres very frequent, 1 possible outbreak	
Cold-water vibriosis	Atlantic salmon (Salmo salar) Rainbow trout (Salmo gairdeneri)			Many sites affected, but less servere than year before	
Vibriosis	Atlantic salmon, Rainbow trout Cod (Gadus morrhua)			Pesisting, but not severe in 1985 Young cod serverely affected when transported from enclosure, vaccination ssems effectiv	
Furunculosis (Aeromonas salmonicida var. salmonicida)	Atlantic salmon Sea trout			Disease imported with salmon smolts from Scotland, 16 farms affected	
BKD	Atlantic salmon Sea trout (Salmo trutta)			Spread in two regions 26 farms affected	
Exophiala infection	Atlantic salmon			Found in 6 farms	
Salmon lice (Lepeoptheirus salmonis)	Salmonids			Important problem	
Cestodes (most often Eubotrium crassum)	Salmonids			Increasing problem	
PKD	Rainbow trout			Found in one farm	

INTERNATIONAL COUNCIL FOR THE EXPLORATION OF THE SEA (ICES)

FISH AND SHELLFISH DISEASE: ANNUAL REPORT.

(B) MARICULTURE COUNTRY: SWEDEN YEAR 1985

Disease/Parasite	Host Species	Number of outbreaks	Time of year	Significance (eg % Mortalities)	Remarks
Vibriosis	Salmonids	Dominant problem in farms all along coast			
IPN	Atlantic salmon	one outbreak			First recor for several years
BKD	Atlantic salmon				First occur in Swedden
Infectious dermatitis caused by Aeromonas salmonisida subsp. achromogenes	Sea trout				
DSP poisoning	Mytilus edulis	Whole west coast	Most part of year		

INTERNATIONAL COUNCIL FOR THE EXPLORATION OF THE SEA (ICES)

FISH AND SHELLFISH DISEASE: ANNUAL REPORT.

(B) MARICULTURE COUNTRY: England and Wales YEAR 1985

Disease/Parasite	Host Species	Number of outbreaks	Time of year	Significance (eg % Mortalities)	Remarks
Bonamia (*Bonamia ostreae*)	*Ostrea edulis*	Continuing disease in south-west and south-east England	All year	Severe	Disease first recognised i 1982
Gaffkaemia (*Aerococcus viridans*)	*Homarus gammarus*	1	October	Small number of mortalities in holding tanks	Site cleared of stock and disinfected

INTERNATIONAL COUNCIL FOR THE EXPLORATION OF THE SEA (ICES)

FISH AND SHELLFISH DISEASE: ANNUAL REPORT.

(B) MARICULTURE COUNTRY: U.K., SCOTLAND YEAR 1986

Disease/Parasite	Host Species	Number of outbreaks	Time of year	Significance (eg % Mortalities)	Remarks
Furunculosis	Atlantic salmon			Serious problem	
Vibriosis	" "			No serious problem	
Pancreas disease	" "	26 sites (19%) affected		Loss of growth	
BKD	" "			No serious problem	
Salmon lice: Lepeophtheirus	" "	Persisting problem in some farms			
Caligus	" "			Problem in some farms	
Kidney protozoans	" "			Kidney swelling, no mortalites	
IPN	" "	Persisting infection		No mortalities	

ANNEX 6

TASK LIST FOR 1987

B. Hill : Legislation on fish diseases in member countries

A. McVicar/E. Ellis: Immunocompetence and immunosupression in marine organisms - overview

D. Bucke/F. Baudin Laurencin: Definitions of fish health terms

E. Egidius : Medicamentation in aquaculture

H. Møller : Impact of parasites impairing the value of fish products

S. Mellergaard/I. Dalgsgaard: Computerisation of fish disease and pathology information

ANNEX 7

REPORT OF THE ICES WORKSHOP ON THE USE OF PATHOLOGY IN STUDIES OF THE EFFECTS OF CONTAMINANTS

Conclusions

(1) The links between pollution and disease, although tenuous, are considered to be more evident now than previously.

(2) There is a growing recognition that the problem of linking pollution with disease is much more complex that hitherto considered.

(3) There is a growing appreciation that even if the link is proved disease events (abnormalities) probably cannot be used as direct indices of pollution, but rather as the basis for general statements on th quality of the environment.

(4) There is a need for extensive data bases i.e. readily observable conditions measured annually (two seasons) over a 5 year period and plotted on 30 minute squares (ICES statistical grid).

(5) Once baselines have been built for the broad areas statistically designed plans of a lesser mignitude must be devised to monitor the situation.

(6) Specific pollution related disease studies should be encouraged in contaminated areas with suitable indicator species for the area(s) concerned.

(7) The main aim should be the use of change in disease prevalence rates as an indicator of the health of the environment.

(8) The interpretation should be based on stocks rather than solely on geographical areas.

(9) Internationally agreed and calibrated standard methods should be applied.

(10) Work should be concentrated on juveniles and adults since studies on larval forms in general are unlikely to yield useful results.

(11) Certain results could be followed-up in experimental studies.

(12) Dedicated cruises for disease studies using trained observers are best, followed by combined cruises also using trained observers.

(13) It was noted that with one exception all participants of the Workshop were drawn from the disease field. It must be emphasized that if fish studies are to be designed to gauge the link between pollution and disease then pollution must form a major part of the considerations. Thus pollution and population experts must be involved in the planning and any subsequent evaluations and interpretations.

Based upon the foregoing it was considered profitable to continue work on disease studies in relation to pollution, but with a changed perspective to capitalise on and exploit the knowledge gained in recent studies and the new concepts developed as a result. The following recommendations are put forward to reflect the conclusions arrived at by the Workshop.

Recommendations

It is recommended that:

(1)A. Knowledge of background levels of disease should be obtained from long term (e.g. 5 + years) baseline studies on a regular basis over broad areas using dedicated or combined cruises staffed by trained observers using internationally agreed approaches and methodology.

a) The interpretation of results should be besed upon stocks rather than solely on geographic areas.

b) Target organs should include skin, gills, fins and liver.

B. Specific investigations on diseases in relation to pollution should be carried out in hot spot and reference areas.

(2) A Second Sea-Going Workshop should be convened under the auspices of the WGPDMO in 1987 or 1988 to discuss and calibrate improvements to methodology developed since the First Sea-Going Workshop, 1984, and member countries are requested to provide ship-time.

(3) Arising from the present stage of knowledge of fish parasites the potential for the use of ectoparasites as indicators of environmental changes, including pollution effects, should be explored as a promising new approach.