International Council for
the exploration of the Sea

C.M. 1987/F: 49
Ref.E,K

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

edited by

Emmy Egidius
Institute of marine research
Bergen - Norway

Secretary General of ICES
Palaegade 2-4
DK 1261 Copenhagen K
Denmark

I INTRODUCTION

The 1987 meeting of the W.G. on Pathology and Diseases of Marine Organisms chaired by Emmy Egidius was held in Brest, France, from April 22nd through April 25th. The terms of reference for the meeting are listed in Annex III.

The chairman welcomed the participants and especially the new W.G. members from Iceland and the FRG. A minute of silence was observed in memory of professor George Balouet, deceased W.G. member from France. The official welcome was given by dr. G. Tixerant, the director of the Laboratoire National de Pathologie des Animaux Aquatiques, which hosted the meeting.

II WORKING GROUP BUSINESS

The proposed agenda was adopted with 3 additions and two rapporteurs were appointed for each session. The chairman reported from the 74th statutory meeting of ICES held in Copenhagen in October 1986. Attention was drawn to Council Res. 4:17 concerning regular long-term surveys of fish diseases. The special meeting to be held three days prior to the 1988 statutory meeting recommended by the WG last year, was not approved by Council. The ICES Journal de Counseil will increase the number of annual issues from 2 to 4 and is inviting W.G. members to publish in the journal. A second Sea-going Workshop on Studies of Fish Diseases was approved by Council. Co-convenors of the workshop will be Drs. Thulin and Dethlefsen. The task of the workshop will be to discuss and calibrate improvements to methodology developed since the first Sea-going Workshop in 1984. The planning of the workshop will be carried out by the convenors and the chairmen of the WGPDMO and on Biological Effects of Contaminants. J. Thulin informed that the workshop will take place onboard the Swedish R/V "ARGOS" for about 7 days in April - May of 1988. The chairman reported the work presented by the ICES representative to the GEEP workshop held in Oslo in August 1986.

III NATIONAL DISEASE REPORTS

A. Formats for reporting disease findings

The usefulness of the adopted formats summarizing the national disease reports were again discussed. It was emphasized that locations should be given in the ICES grid system, and further the importance of also including negative findings was stressed. The usefulness of the formats for comparable data computerization was discussed and has to be further explored.

B. Highlights of national reports

In Denmark the coastal pollution situation is alarming and no more fish farms will be allowed. In surveys of both freeliving fish and shellfish, mortalities were reported in connection with oxygen deficiency. The eelbladder parasite Anguillicola has been reported in Denmark for the first time. In the discussion connected to these questions, the importance of studying how much mariculture adds to the coastal pollution situation in Denmark was stressed.

The swimbladder nematode of eel also was reported from FRG. In the western part of the country prevalences from 13 to 28% were reported, whereas the prevalence in the waters arround Berlin was as high as 60%. Live Anisakis were reported found in fillets of cod and saithe shock-frozen at - 60 C and stored at 2 month at - 30 C. Occasionally this nematode also was found alive in ready to eat, smoked, marinated and sour herring products. The problem of survival of Anisakis during freezing should be studied further promptly , due to the human health risks involved.

During a German survey of a total of 1339 dab in May 1986, 55% showed anomalies on their liver surface, 528 of the sample seemed to be pretumours and tumour conditiones having a positive linear length relation in fish longer than 16 cm. The liver symptoms appeared at lower rates in the Dogger bank area than in the German Bight.

Finland reported furunculosis in farmed salmonids for the first time, the

infection is believed to have been brought in with broodstock of Atlantic salmon.

France reported a significant phytoplancton bloom (*Distephonus speculum*), considered to be the first bloom of this species. The alge is harmful to mariculture resulting in iritation of the gill epithelium with subsequent secretion of mucus. Further France reported infections with the microsporidium *Kudoa sp* in farmed fish. In marketed brown troutthe infection lead to complete degradation of the fish flesh.

Iceland was represented at the WG meeting for the first time, and a detailed account was given on the disease situation in farmed Atlantic salmon in the country.

The Dutch work to collect baseline data on disease rates in freeliving fish stocks, was continued in 1986 with two surveys, one during early spring and the other during early autumn. The 1986 data showed an increasing prevalence of lymphocystis in dab compared with the 1985 data. The seasonal changes were found reverse of those found the foregoing year. These findings again emphazise the necessity of long term baseline surveys. Also epidermal papilloma showed a remarkable increased prevalence in the autumn period. Skin ulcers also increased in prevalence in both seasons compared to 1985. The report on the first 5 years of the Dutch disease surveys for baseline data have been published. In a Dutch pollution/disease study on dab and plaice, covering an area polluted by TiO_2 waste acid dumpings and different dredge spoil dumping areas, liver nodules/tumours were observed in both species and were found to be more prevalent in fish from severely contaminated areas than in those from reference areas. In the dredge spoil dumping areas higher rates of bacterial infections in the blood of flounder were found in contrast to none from the reference areas. In particular those fish with finrot and skin ulcers were found to have more bacteria in the blood.

Norway reported that farmed Atlantic salmon had suffered high mortalities due to coldwater vibriosis during autumn 86 and winter 87. BKD has been spreading and also occurs in sea water in Atlantic salmon.

The Swedish report for the first time included marine mammals as the occurrence of lessions in seals in relation to pollution has become a

serious problem in the Baltic. There also seems to be an increase in nematode prevalence in the Baltic seals. A control survey of cod, flounder and eel living outside the Ringhals nuclear power station at the Swedish west coast has been conducted over the period 1975 - 1985. The only exception from a normal disease and parasite fauna was the occurrence of a skin ulceration on the lawer jaw of young cod occasionally seen during 1982.

A Scottish survey of more than 13.000 dab concentrated on X-cell disease, its distribution,aetiologi and effect. High prevalence, 60%, was found in the Moray firth, in the southern North Sea the prevalence was low and off the Scottish west coast and in the Irish Sea the condition was absent. The epidemiology strongly suggests an infectious disease. Affected fish have reduced survival ability and the reproductive capacity of females is also reduced.

Two English surveys in the Irish Sea in April and November showed substancial differences in prevalence rates of epidermal diseases, no simple explanation can be given for this. Liver anomalies in dab were observed and characterized, but there was no evidence of neoplasia.

The chairman had received a report from Belgium which was presented at the meeting, and after the meeting she also received a short report from Poland on a disease survey in the Baltic (Annex VII a), a report from the Oxford Laboratory, Maryland and a report from Spain on the health status of different farmed mollusc species (Annex VII b).

IV LEGISLATION ON FISH DISEASES IN MEMBER COUNTRIES

At the WG meeting in 1986 B. Hill (UK) took upon him to collect laws and regulations on fish diseases from all member countries. The task has not yet been completed as it is far more complex than first assumed. Many countries are in the progress of preparing or revising their fish disease legislation and therefore have nothing to contribute. It was concluded that each WG member should report on the disease legislation situation to Dr. Hill who then finally will edit the reports. There was agreement that the collection of this material is necessary and also can be a step towards greater uniformity in such legislation.

V STATUS OF DISEASE LEAFLETS

10 new leaflets were published i 1986 and it is intended to procedd publishing 10 leaflets a year. 4 titles were still missing for the next series and this 4 will be provided by members of the WG. WG members were asked to consider further titles and authors. The chairman informed the WG members that professor Claude Maurin, France, has been appointed co-editor for the leaflets.

VI IMMUNOCOMPETENCE AND IMMUNSUPPRESION IN MARINE ORGANISMS

An overview on this topic had been prepared by Dr. A. E. Ellis of the Marine Laboratory in Aberdeen. The overview can be summarized as follows:

Alteration in the immune response by sublethal doses of toxic agents is well studied in birds and mammals but few studies have been specially designed to study this topic in fish. Available data are scattered throughout the litterature and often alterations on fish immune systems are only inferred.
It is essential to establish clear criteria for evidence of immune modulation from changes in the structure of tissues (lymphoid organs, leucocyte populations, serum proteins), the ability of fish to mount non specific and specific immune responses and evidence of changes in susceptibility or prevalence of tumours. Not all these changes may indicate change in immunocompetence. The indirect effects of stress and nutrition on the immune system could not be considered.
Of environmental contaminants particulate material, phenol, heavy metals (especially copper, zinc and lead) and pesticides (chlorinated hydrocarbons) have been implicated in direct effects on the immun system of fish to an extend of altering susceptibility to disease. Radiation is known to significantly damage lymphoid tissue but the significance in natural populations is uncertain. Generally there is only fragmentary evidence of suppresion of fish immune response by sublethal doses of toxicants leading to increased susceptibility to disease. In most reports it is difficult to differenciate stress effects from direct effects of toxic agents on the immunsystem. Specific experimental evidence linking toxicants, depression of immunity and formation of tumours is generally

lacking.

A request for information on pollution related fish immunosuppression studies in progress or planned, indicated involvement in England, the Netherlands, FRG, Sweden and Norway in addition to more specialist studies on basic aspects of immunology by various countries.

Haematopoetic tissue depressed by exposure to chlorine and other material associated with pulp mill effluents in experimental trials was not so obvious in field observations. The usefulness of bacterial levels in fish blood as an indicator of polluted areas was suggested by studies in the Netherlands.
Following discussion on differentiating stress related changes in immunological parameters in fish, reference was made to French studies on Stannius corpuscules which provide good indication on long-term stress effects. In response for the plea for information on mollusc immunosuppresion effects, current studies in England and France on oysters were noted and the suggestion was made that some data on this topic be assembled and made avaiable to the WG meeting in 1988.

VII DEFINITIONS

Concern was expressed that at least 3 groups within ICES were working on definitions of terms including topics of relevance to fish diseases and pathology, concequently with considerable overlap. It was proposed that such disease and pathology related terms be agreed by the WGPDMO before being finalized.

A. Definitions by WG

Cooperation of Drs. D. Bucke (Weymouth, UK) and F. Baudin-Laurencin as requested resulted in proposed definitions of ten further terms. After discussion resulting in some modification the following were agreed by the WG members:

Stress:
Sum of the non-specific reactions of an organism to an adverse stimulus, thus affecting the functional processes of that organism, possibly leading to pathological changes.

Stressor:
Any adverse stimulus of psychological, physical or chemical nature which leads to stress.

Epidemiology:
The study of diseases or health factors and their relations with the population and the environment.

a. Descriptive epidemiology: studies their charcterization and their evolution in time and space
b. Analytical epidemiology: studies the factors which are involved directly or not, in their occurrence
c. Operational epidemiology: takes the descriptive and analytical data into account with the object of improving the health of the population.

Endemia:
Disease occurring regularly in a population in a given area..

Endemic:
Is an adjective which means that a disease or health factors are usually present in a defined area.

Epidemia:
Disease appearing suddenly or with a high morbidity in a given area

Epidemic:
An adjective desribing a disease appearing suddenly or with a high morbidity in a given area

Morbidity:
The level of disease in a population commonly defined in terms of incidence or prevalence

Prevalence:
Total number of disease cases in a population. It can be presented as

a percentage of the population.

Cohort:
A group of individuals of the same population born over the same period of time.

The definitions will be translated to French, as has been done previously.

B. ICES gloassary of aquaculture terms

The ICES glossary of aquaculture terms (CM 86/F: 34) had been sent to the chairman for discussion in the WG. A high percentage of the defined terms are linked to disease and pathology in one way or another and could not be treated at the meeting at short notice. It was desided that the chairman send a letter to one of the authors (Dr. J. Stewart, Canada) that the WGPDMO will go through the relevant terms but that this exercise will need more time. The ICES Secreariat will be asked to send copies of the glossary to all WG members attending the meeting.

C Introductions manual - definition of terms

The chairman received the parts of the manual relevant to diseases (salmonids, eels and molluscs) last autumn and sent them to WG specialists for comments. It was recommended that when WGPDMO definitions of terms exixts, these should be used. The manual will be presented at the statutory meeting in October.

VIII IMPACT OF PARASITES IMPARING THE VALUE OF FISH PRODUCTS

The topic was introduced by H. Möller. As there is currently active research in progress on several important conditions (tissue nematodes, Kudoa infections), Heino Möller considered it inappropriate to produce a written statement of the topic at present. As a participant of the recent seal worm workshop organised by the Canadian Department of Fisheries and Oceans in Halifax, he gave a brief resume of the objectives, terms of reference and main results presented at this workshop. Evidence of significant increases in populations of grey and harbour seals and evidence of increased tissue nematode burdens, especially *Pseudoteranova decipiens,* in fish in the areas of seal colonies and in more general areas, was presented by several countries. Small fish species are probably major transport hosts for the nematode. It is intended that a follow-up meeting of this workshop will be held in late 1987.

Details of research by the FRG were presented in which it was indicated that the Wadden Sea seal populations which had remained stable from the 1940's to 1960's, had shown a considerable and steady increase from the 1970's. Food analysis showed flatfish to be major components of the seals diet and this was considered to be the main species for transmission of *P. decipiens* in the area. Data on worm burdens spatially and in different fish species were presented. Data on tissue nematode prevalence in gadoids from commercial catches showed stability in worm burdens between 1935 and 1982 but a massive increase from 1983.

There have been 8 reported clinical cases of anisakiasis in FRG in 1983 and 1984. Suggestions that fish tissue nematodes may survive shock freezing and subsequent thawing were presented. In the discussion it was indicated that this question should be further investigated and the results meanwhile be treated with caution until full data are avaiable in published form, first then the question can be evaluated also in connection to current commercial practices.

IX COMPUTERIZATION OF FISH DISEASE DATA

I. Dalsgard presented a description of the system used for computerization of fish disease data collected during Danish surveys. The Danish system is based upon an existing "fishery system" elaborated at the Danish Institute for Fishery and Marine Research for computerization of data collected during stock assessment surveys. The data accumulated in this system are then transformed to SAS data sets and all statistical treatment is carried out by using the SAS statistical system.

In the Dutch disease-pollution examinations all data recorded are computerized and analysis on correlation, patterns etc. can easily be conducted. The program used is speciaslly designed for this work and not part of stock assessment work. The Dutch disease baseline data sofar are recorded on paper as there is no space avaiable on the stock assessment programs. With the new ship however, direct computer recording also of disease data will be possible.

In France computerization of diagnostic laboratory data is used also for the characterization of bacterial isolates. England has developed and use a computer program for registration of diseases in aquaculture..

In the following discussion it was agreed that it is yet far from clear which way should be choosen for computerization of disease field-data. It would be useful to have a standarized sytem of storing data at least for specified diseases and it was proposed that a discussion of this should be on the program for the Second Sea-going Workshop in 1988. At the same time some consideration also should be given to the usefulness of the present summary formats for computerization. Colums for severity (numbered from 1 to 3 as described in the Anton Dohrn report), sex of fish and size clases of 5 cm should be added. B. Hill took upon him the task of designing a recordingsheet and send it to WG members for consideration before the 1988 meeting

X MEDICATION IN FISH MARICULTURE

Infectious diseases occur regularly in marine fish culture in far to many cases due to the fact that farming systems often pay little attention to optimal husbandary conditions. Infectious diseases are treated with antibiotics and chemotherapeutics adminstered through bath or mixed into the diet. In both cases parts of the medication is released to the environment without concern on consequenses.

The problem of medication in fish culture is manifold: accumulation of residues of antibiotics/chemotherapeutics in fish farm sediments and their impact on the bacterial ecology in the sediments, the direct impact on marine planctonic life especially by chemotherapeutics, medication residues in the farmed fish and eventually in scavenger fish arround the farms and resistance in strains of the infectious bacteria , resistance often being plasmid induced with the possibility of transferring it to other bacteria.

Actually little knowledge exists on several of this fields, especially on the impact of medication on bacterial life in sediments, and adequat analysing methods have to be developed. Investigations on the role of medication on sediments and changes in their bacterial flora are started in Norway and Denmark. An UK survey on antibiotics in rivers with and without fish farms gave no obvious pattern, but there seemed to be a seasonal fluctuation in antibiotic levels observed. In Finland with HPLC analysis high levels of antibiotics were found in sediments and also high concentrations were shown in freeliving fish. Finland also reported a study on immunosuppression in connection with the use of antibiotics: in fish where oxytetracycline was used prophylactically during the immunixation period, no immune response was found.
Effect on the planctonic and other fauna and flora is dependent on the toxicity of the chemical used, and again little knowledge is avaiable. The organophospfor-compound DDVP is toxic for planctonic stages of crustaceans and also for some adults, it actually is used to erradicate crustaceans from freshwater systems. It recently has been shown that rotenone has a retared mortality effect on oysters even at low temperatures. There also is some evidence of immunosuppresion in fish by toxicants and this could affect disease levels. At the 1988 Statutory meeting of ICES "Problems of Medication in Aquaculture" will be proposed for a special theme session.

XI IRISH SEA REPORT

The ACMP requested the WD to review the disease parts of the Irish sea report and the relevant pages were discussed. The report received was prepared based on Uk data only, it was recommended that also Irish disease data be included. The discussion further stressed the necessity of gathering knowledge on the biology of the fish species survyed in the region, specially with regard to their migration patterns. The C. Res. 1986:4:17.1 on longterm (5 years) studies on regular basis were stressed.

XII WORKSHOP

As usual at the WG meetings one afternoon was spent at presenting and discussing newly discovered or otherwise interesting disease conditions. The main topic of the discussion became the reported liver anomalies in flat fish and their possible usefulness as indicators of contaminants. Liver anomalies in different flat fish species were found during an English survey in the Irish Sea, , FRG surveys in the German Bight and on the Dogger bank and during the special disease /pollution study surveys along the Dutch coast.

The UK surveys do not mention any prevalence of the reported condition, the FRG survey reports 39.4 %prevalence of tumours and pre-tumours and 15 to 16 % discolouration of livers of dab. Most affected areas found in the German studies were the German bight, off the Dutch coast and off the mid-east coast of the UK.The Dutch surveys reported a prevalence of 2.8% in areas contaminated with harbour dredge sludge, against zero in the control area.. The diagnosis of the liver nodules was somewhat contradictory, the UK findings were defenitely said not to be neoplastic, whereas the Dutch findings which had been sent to an US specialist, were diagnosed as true tumours

Another topic discussed at the workshop was the progressing prevalence of the eel bladder parasite Anguillicola crassa in many European countries. In the Netherlands preliminary observations on anemia and mortality probably due to secondary bacterial infections, were made. Concern was expressed regarding a possible serious negative impact of the parasite on eel culture.

Further presentations were made on sceletal anomalies of cod found during Danish surveys, yellow patches in the fin muscles of dab during German surveys, occurence of large superficial inflammatory areas in large cod west off northern England reported by fishermen and reports on cutaneous swelling of turbot and on muscle liquefaction of marketed cultured salmonids due to the protozooan parasite Kudoa in France.

XIII RECOMMANDATIONS

In view of the importance of having a complete account of fish and shellfish disease development in the ICES area it is recommended that the

council encourages all member countries and peticularely those bordering the Baltic, to send representatives to the WGPDMO or, when non attending, to submit a written report.

With reference to CR 86 4:17.2 it is further recommended that member countries pay particular attention to liver anomalies including nodules in flat fish

In view of the increasing problem of expanding seal populations in the ICES area, it is recommended that member countries focus attention on the related problem of seal-worms (cod-worm) in fish and take note of the discussions and conclussions of the workshops on seal-worm in progress in Halifax, Canada

The Working Group should meet again for 4 days in Helsinki, Finland , from March 23rd through 26th, under the chairmanship of Dr. E. Egidius to:

discuss information on current disease status in member countries and on new disease problems in free-living and cultivated marine organisms

continue recording and comparision of national legislation concerning fish health

further discuss collected data on the impact of medication in fish farms on the environment and to collect information ruling the use of antibiotics and chemotherapeutics in fish farms in member countries

review and discuss presentations on the existence of immunosystems in molluscs and crustaceans

review the discussions and conclussions of the Seal-Worm Workshops in Halifax, Canada and continue discussion on data on impact of parasites imparing the value of fisheries products

discuss available information on the use of neoplastic liver lessions for environmental monitoring purposes.

continue work on definitions and the preparation of a glossary of fish health terms.

ANNEXES

1 CONTENTS

2 AGENDA

April 22nd:
Opening of meeting
Rapporteurs
Adoption of Agenda
ICES's statutory meeting 1986
Formats for national reports
National reports
Excursion to aquaculture facilities

April 23rd:
Continue national reports
Legislation on fish diseases in member countries
Disease leaflets: status en new titles
Definisions
Definisions in introductions manual
ICES's glossary of aquaculture terms

April 24th:
Immunocompetence and immunsupression in marine organisms - an overview
Impact of parasites imparing the value of fish products
Irish Sea report
Provisional discussion on terms of reference and recommandations
Workshop

April 25th:
Computerization of fish disease and pathology information
Medication in aquaculture
Terms of reference for next meeting
Recommendations
Other business
End of meeting 16.00

3 TERMS OF REFERENCE:

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

b) review and discuss the immunoly of marine organisms including immunocompetence, immunsupression and the potential for increasing resistance through use of vaccines

c) prepare and discuss the comprehensive review and implications of the use and misuse of antibiotics an chemotherapeutics in mariculture

d) examine avaiable 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 computerization of fish disease and pathology information now reported annualy to ICES

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

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

j) review information on background levels of disease in fish and shellfish resulting from studies referred to in C. Res. 1986/4:17

4 PARTICIPANTS

I. Dalsgaard , Fiskepatologisk lab., Danmarks Fiskeri og havsundersogelser, Bulowsvej 13, 1870 Fredriksberg C, Denmark

G. Bylund, Abo Akademi, Porthansgatan 3, 20720 Abo, Finland

F. Baudin-Laurencin, Laboratoire National de Pathologie des Animaux Aquatiques, B.p. 337, 29273 Brest Cedex , france

H. Grizel, IFREMER, B.P. 133, 17390 La Tremblade, France

G. Tixerant, Laboratoire National de Pathologie des animaux Aquatiques, B.P. 337, 29273 Brest cedex, france

H.H. Krantz, Zool. Inst. & Zool. Museum Universitat Hamburg, Martin Luther King Platz 3, 2000 Hamburg 13, Federal Republic of Germany

T. Lang, Bundesforschungsabstalt fur Fischerei, Cuxhaven, Bei der Alten Liebe 1, 2190 Cuxhaven, federal Republic of Germany

H. Moller, institut fur meereskunde, 2300 Kiel, Federal Republic of germany

S. Helgason, Institute for experimental pathology, University of iceland, Box 8540, 128 Reykjavik, Iceland

P. van banning, RIVO, P,O,Box 68, Ijmuiden, The Netherlands

D. Vethaak, RIVO, P.O.Box 68, Ijmuiden, The Netherlands

E. Egidius, Institute of Masrine research, C, Sundtsgate 37, 5004 Bergen, Norway

J. Thulin, The National Swedish Envireonmental protextion board, marine section, Box 584, 74071 Oregrund, Sweden

B, Hill, MAFF, Fish Disease Laboratory, The nothe, Weymouth, Dorset, England

A. McVicar, DAFS Marine Laboratory, P.O.B. 101 Victoria Road, Averdeen, Scotland

5 TASKLIST FOR 1988:

H. Grizel and J.E. Stewart:

Immunocompetence in molluscs and crustaceans

B. Hill:

Legislation on fish diseases in member countries

E. Egidius:

Medication in aquaculture in relation to environment

D. Bucke and F. Baudin Laurencin:

Definitions and fish health glossary

INTERNATIONAL COUNCIL FOR THE EXPLORATION OF THE SEA (ICES)

FISH AND SHELLFISH DISEASES: ANNUAL REPORT

(A) WILD POPULATIONS: COUNTRY: BELGIUM YEAR: 1986

DISEASE/PARASITE	HOST SPECIES	LOCATION (ICES GRID)	NUMBER EXAMINED	SIZE RANGE (cm)	PREVALENCE (%)	MONTH OF SAMPLING	REMARKS
1. Lymphocystis	Dab	102	368-241	> 15	1.1 -	Mai-Oct.	
	Plaice	102	236-520	> 20	0.8-1.1	Mai-Oct.	
	Flounder	102	236-204	> 20	17-14.8	Mai-Oct.	
2. Ulcers	Dab	102	368-242	> 15	0.5-	Mai-Oct.	
	Flounder	102	236-204	> 20	0.8-	Mai-Oct.	
	Cod	102	414-218	> 20	-0.9	Mai-Oct.	
3. Fin erosion	Plaice	102	236-520	> 20	2.5-1.9	Mai-Oct.	
	Flounder	102	236-204	> 20	6.8-2.7	Mai-Oct.	
4. Mycobacterium	Cod	102	414-218	> 20	-2.8	Mai-Oct.	
5. Epidermal papilloma	Sole	102	368-241	> 20	-	Mai-Oct	No observations
	Flounder	102	236-520	> 20	-	Mai-Oct.	
	Dab	102	236-204	> 15	-	Mai-Oct.	
6. Gill X-cell	Dab	102	236-204	> 15	-	Mai-Oct.	No observations
7. Liver tumors	Flounder	102	236-204	> 20	0,8-0,9	Mai-Oct.	
	Cod	102	414-218	> 20	-0,9	Mai-Oct.	
	Whiting	102	276-464	> 20	-1,3	Mai-Oct.	
8. Glugea stephani	Sole	102	192	> 20	0,5-	Mai	
	Dab	102	368-242	> 15	7,6-9	Mai-Oct.	
	Plaice	102	236-520	> 20	3,4-	Mai-Oct.	
	Flounder	102	236-204	> 20	6.8-0,1	Mai-Oct.	

INTERNATIONAL COUNCIL FOR THE EXPLORATION OF THE SEA (ICES)

FISH AND SHELLFISH DISEASES: ANNUAL REPORT

(A) WILD POPULATIONS: COUNTRY: BELGIUM YEAR: 1986

DISEASE/PARASITE	HOST SPECIES	LOCATION (ICES GRID)	NUMBER EXAMINED	SIZE RANGE (cm)	PREVALENCE (%)	MONTH OF SAMPLING	REMARKS
9. Lernaeocea branchialis	Whiting	102	276-464	> 20	44.2-8.2	Mai-Oct.	
	Cod	102	414-218	> 20	1.4-0.9	Mai-Oct.	
10. Cryptocotyle lingua	Whiting	102	276-464	> 20	13.8-13.4	Mai-Oct.	
	Cod	102	414-218	> 20	1.5-0.9	Mai-Oct.	
11. Stephamostomum	Dab	102	241	> 15	-30.6	October	
	Plaice	102	520	> 20	-77.3	October	
12. Anisakis marina	Herring	102-829	1200	> 20	75-95	Oct.-Dec.	

INTERNATIONAL COUNCIL FOR THE EXPLORATION OF THE SEA (ICES)

FISH AND SHELLFISH DISEASES: ANNUAL REPORT

(A) WILD POPULATIONS: COUNTRY: DENMARK YEAR: 1986

DISEASE/PARASITE	HOST SPECIES	LOCATION (ICES GRID)	NUMBER EXAMINED	SIZE RANGE (cm)	PREVALENCE (%)	MONTH OF SAMPLING	REMARKS
Lymphocystis	Dab	North Sea (N) lat: 54°00'-56°45' long: 6°30'-8°20'	North Sea n= 5332	7-40 cm	N: 6,3 S: 0,4 K: 2,6	May	
Epidermal hyperplasia/papilluma		Skagerak (S) lat: 56°45'-57°45' long: 6°30'-10°20'	Skagerak n= 1557		N: 4,4 S: 0,0 K: 1,1		
Ulcers		Kattegat (K) lat: 56°00'-57°00' long: 10°20'-12°30'	Kattegat n= 2539		N: 1,0 S: 0,6 K: 0,3		
Myxobolus aeglefini	Plaice		North Sea n= 3229	10-55 cm	N: 5,5 S: 34,1 K: 37,7		
Lymphocystis			Skagerak n= 1189		N: 0,3 S: 0,5 K: 0,4		
Ulcers			Kattegat n= 504		N: 0,0 S: 0,3 K: 0,2		

INTERNATIONAL COUNCIL FOR THE EXPLORATION OF THE SEA (ICES)

FISH AND SHELLFISH DISEASES: ANNUAL REPORT

(A) WILD POPULATIONS:

COUNTRY: FRANCE

YEAR: 1986

DISEASE/PARASITE	HOST SPECIES	LOCATION (ICES GRID)	NUMBER EXAMINED	SIZE RANGE (cm)	PREVALENCE (%)	MONTH OF SAMPLING	REMARKS
Hematodinium sp.	Macropipus puber	South Britany	300		0 - 63 % selon les lots	Winter	Important mortalities
Hematodinium sp..	Cancer pagurus	Britany Normandie	104		0 - 52 % selon	Winter	Mortalities
Haplospoïdie sp.	Macropipus puber	South Britany	300		40 %	Winter	
Rickettsie	Pecten maximus	Britany		no epidemiological role	studies winter gill's lesions unknown		

INTERNATIONAL COUNCIL FOR THE EXPLORATION OF THE SEA (ICES)

FISH AND SHELLFISH DISEASE: ANNUAL REPORT

(A) WILD POPULATIONS: Dab (Limanda limanda) COUNTRY: Federal Republic of Germany YEAR: 1986

DISEASE/PARASITE	HOST SPECIES	LOCATION (ICES GRID)	NUMBER OF FISH/SHELLFISH EXAMINED	SIZE RANG (cm)	PREVALENCE (%)	MONTH OF SAMPLING	REMARKS
Lymphocystis	Dab	38F6 - 38F7 37F6 - 37F7	2453	6-32 cm	5.71%	January '86	German Bight
Epidermal papilloma	"	"	"	"	1.88%	"	"
Ulcerations, accute and healed	"	"	"	"	0.49%	"	"
Ulcerations, healed	"	"	"	"	1.55%	"	"
X-cells, gills	"	"	"	"	0.04%	"	"
Lymphocystis	"	38F0 - 38F1 37F0 - 38F1	891	6-32 cm	13.80%	January '86	Dogger
Epidermal papilloma	"	"	"	"	3.37%	"	"
Ulcerations, accute and healed	"	"	"	"	1.12%	"	"
Ulcerations, healed	"	"	"	"	6.06%	"	"
X-cells, gills	"	"	"	"	0.00%	"	"

INTERNATIONAL COUNCIL FOR THE EXPLORATION OF THE SEA (ICES)

FISH AND SHELLFISH DISEASE: ANNUAL REPORT

(A) WILD POPULATIONS: Dab (Limanda limanda) COUNTRY: Federal Republic of Germany YEAR: 1986

DISEASE/PARASITE	HOST SPECIES	LOCATION (ICES GRID)	NUMBER OF FISH/SHELLFISH EXAMINED	SIZE RANG (cm)	PREVALENCE (%)	MONTH OF SAMPLING	REMARKS
Lymphocystis	Dab	38F6 - 38F7 37F6 - 37F7	3966	7 - 30 cm	9.25%	May '86	German Bight
Epidermal papilloma	"	"	"	"	5.52%	"	"
Ulcerations, accute and healed	"	"	"	"	0.28%	"	"
Ulcerations, healed	"	"	"	"	2.07%	"	"
X-cells, gills	"	"	"	"	0.83%	"	"
Lymphocystis	"	38F0 - 38F1 37F0 - 38F1	1716	7 - 31 cm	16.78%	May '86	Dogger
Epidermal papilloma	"	"	"	"	6.35%	"	"
Ulcerations, accute and healed	"	"	"	"	0.87%	"	"
Ulcerations, healed	"	"	"	"	4.49%	"	"
X-cells, gills	"	"	"	"	1.86%	"	"

INTERNATIONAL COUNCIL FOR THE EXPLORATION OF THE SEA (ICES)

FISH AND SHELLFISH DISEASES: ANNUAL REPORT

(A) WILD POPULATIONS: COUNTRY: ICELAND YEAR: 1986

DISEASE/PARASITE	HOST SPECIES	LOCATION (ICES GRID)	NUMBER EXAMINED	SIZE RANGE (cm)	PREVALENCE (%)	MONTH OF SAMPLING	REMARKS
Renibacterium salmoninarum	Atlantic salmon		3289	1-2 year old fish	17 fish (0.52%)	Oct-Dec	Brood fish
	(sea)trout		322		1 fish (0.31%)	Oct-Dec	Brood fish
	char		50		0	Oct-Dec	Brood fish

INTERNATIONAL COUNCIL FOR THE EXPLORATION OF THE SEA (ICES)

FISH AND SHELLFISH DISEASES: ANNUAL REPORT

(A) WILD POPULATIONS: a: average
m: observed maximum prevalence in one sample.

COUNTRY: The Netherlands

YEAR: 1986 (1985)

Observers:
P.van Banning
M.J.M. Warmerdam

DISEASE/PARASITE	HOST SPECIES	LOCATION (ICES GRID)	NUMBER EXAMINED	SIZE RANGE (cm)	PREVALENCE (%)	MONTH OF SAMPLING	REMARKS
Lymphocystis	Plaice (Pleuronectes platessa)	area framed by F3 - F9 and 33 - 44.	3801	25.6 ± 5.3	a: 0.6 (0.6) m: 1.7 (1.5)	Febr.-April	Stages I II III 10% 50% 40%
			1987	21.9 ± 4.9	a: 1.6 (1.1) m: 3.4 (2.6)	Sept.-Oct.	46% 27% 27%
Skin ulcers	,,	,,	,,	,,	a: 0.5 (0.4) m: 0.5 (0.5)	,,	-
					a: 0 (0) m: - (-)		-
Glugea stephani	,,	,,	,,	,,	a: 1.3 (1.1) m: 2.3 (3.2)	,,	Stages I II III 45% 50% 5%
					a: 1.3 (2.3) m: 2.9 (3.5)		54% 23% 23%
Myxobolus aeglefini	,,	,,	,,	,,	a: 8.3 (26.4) m: 27.9 (50.5)	,,	Stages I II III 61% 31% 8%
					a: 18.4 (26.4) m: 42.1 (37.7)		51% 27% 22%
Mycobacteriosis	Cod (Gadus morhua)	,,	410	42.1 ± 29.3	a: 0 (2.1) m: - (2.1)	,,	-
			783	33.2 ± 8.5	a: 2.3 (-) m: 2.8 (-)		-

INTERNATIONAL COUNCIL FOR THE EXPLORATION OF THE SEA (ICES)

FISH AND SHELLFISH DISEASES: ANNUAL REPORT

(A) WILD POPULATIONS: a: average COUNTRY: The Netherlands YEAR: 1986 (1985)

m: observed maximum prevalence in one sample.

Observers:
P. van Banning
M.J.M. Warmerdam

DISEASE/PARASITE	HOST SPECIES	LOCATION (ICES GRID)	NUMBER EXAMINED	SIZE RANGE (cm)	PREVALENCE (%)	MONTH OF SAMPLING	REMARKS
Lymphocystis	Dab (Limanda limanda)	area framed by F3 - F9 and 33 - 44.	2756	19.1 ± 3.4	a: 3.2 (2.2) m:11.6 (8.2)	Febr.-April	Stages I II III 64% 34% 2%
			3572	19.8 ± 3.2	a: 4.7 (1.3) m:14.2 (2.0)	Sept.-Oct.	76% 23% 1%
Epidermal papilloma	,,	,,	,,	,,	a: 2.5 (2.6) m: 5.8 (11.8)	,,	-
					a: 3.3 (0) m: 8.4 (0)		-
Skin ulcers	,,	,,	,,	,,	a: 1.4 (0.4) m: 1.8 (0.5)	,,	-
					a: 2.9 (0) m:11.8 (0)		-
Glugea stephani	,,	,,	,,	,,	a: 4.7 (5.3) m:11.8 (10.8)	,,	Stages I II III
					a: 5.4 (6.2) m:15.0 (13.0)		57% 22% 21% 44% 24% 32%
Myxobolus aeglefini	,,	,,	,,	,,	a: 1.9 (3.2) m: 6.4 (12.1)	,,	Stages I II III
					a: 5.9 (4.1) m:27.1 (11.9)		25% 25% 50% 39% 29% 32%

Table 1.

INTERNATIONAL COUNCIL FOR THE EXPLORATION OF THE SEA (ICES)

FISH AND SHELLFISH DISEASES: ANNUAL REPORT

(A) WILD POPULATIONS: Special disease/ pollution study COUNTRY: Netherlands YEAR: 1986

DISEASE/PARASITE	HOST SPECIES	LOCATION (ICES GRID)	NUMBER EXAMINED	SIZE RANGE (cm)	PREVALENCE (%)	MONTH OF SAMPLING	REMARKS
Lymphocystis	dab (Limanda limanda)	30 nm West of Dutch coast (F3-33)	801	15-22-35	8,6	March-May	T_1O_2-waste dumping
		25 nm NW of Isle of Texel (F4-35)	835	15-21-35	5,4	March-May	controle area
Epid. hyperplasia/ papilloma		30 nm West of Dutch coast (F3-33)	801	15-22-35	7,2	March-May	T_1O_2-waste dumping
		25 nm NW of Isle of Texel (F4-35)	835	15-21-35	3,7	March-May	controle area
Ulcer		30 nm West of Dutch coast (F3-33)	801	15-22-35	0,6	March-May	T_1O_2- waste dumping
		25 nm NW of Isle of Texel (F4-35)	835	15-21-35	0,5	March-May	controle area
Fin rot		30 nw West of Dutch coast (F3-33)	801	15-22-35	0,1	March-May	T_1O_2-waste dumping
		25 nm NW of Isle of Texel (F4-35)	835	15-21-35	0,2	March-May	controle area

Table 1.
(continued)

INTERNATIONAL COUNCIL FOR THE EXPLORATION OF THE SEA (ICES)

FISH AND SHELLFISH DISEASES: ANNUAL REPORT

(A) WILD POPULATIONS: Special disease/ pollution study COUNTRY: Netherlands YEAR: 1986

DISEASE/PARASITE	HOST SPECIES	LOCATION (ICES GRID)	NUMBER EXAMINED	SIZE RANGE (cm)	PREVALENCE (%)	MONTH OF SAMPLING	REMARKS
Skeletal def.	dab (*Limanda limanda*)	30 nm West of Dutch coast (F3-33)	801	15-22-35	0	March-May	T_1O_2-waste dumping
		25 nm NW of Isle of Texel (F4-35)	835	15-21-35	0	March-May	controle area
Glugea stephani infection		30 nm West of Dutch coast (F3-33)	801	15-22-35	7,6	March-May	T_1O_2-waste dumping
		25 nm NW of Isle of Texel (F4-35)	835	15-21-35	5,7	March-May	controle area
Liver nodules/ tumours		30 nm West of Dutch coast (F3-33)	801	15-22-35	4,5	March-May	T_1O_2-waste dumping
		25 nm NW of Isle of Texel (F4-35)	835	15-21-35	1,0	March-May	controle area
Total diseased/ anomalies		30 nm West of Dutch coast (F3-33)	801	15-22-35	29,7	March-May	T_1O_2- waste dumping
		25 nm NW of Isle of Texel (F4-35)	835	15-21-35	19,0	March-May	controle area

Table 2.

INTERNATIONAL COUNCIL FOR THE EXPLORATION OF THE SEA (ICES)

FISH AND SHELLFISH DISEASES: ANNUAL REPORT

(A) WILD POPULATIONS: Special disease/ pollution study COUNTRY: Netherlands YEAR: 1986

DISEASE/PARASITE	HOST SPECIES	LOCATION (ICES GRID)	NUMBER EXAMINED	SIZE RANGE (cm)	PREVALENCE (%)	MONTH OF SAMPLING	REMARKS
Lymphocystis	flounder (Platichtys flesus)	Dutch coast (F4-33)	1329	20-32-45	25,7	September	polluted
		Eastern Scheldt (F4-32)	239	20-29-45	10,0	September	rel. unpolluted
		Belgian coast (F3/F4-31)	259	20-32-45	32,4	September	polluted
Ulcers		Dutch coast (F4-33)	1329	20-32-45	2,3	September	polluted
		Eastern Scheldt (F4-32)	239	20-29-45	0,8	September	rel. unpolluted
		Belgian coast ((F3/4-31)	259	20-32-45	0,8	September	polluted
Fin rot		Dutch coast (F4-33)	1329	20-32-45	1,2	September	polluted
		Eastern Scheldt (F4-32)	239	20-29-45	0	September	rel. unpolluted
		Belgian coast (F3/4-31)	259	20-32-45	0,8	September	polluted
Skeletal def.		Dutch coast (F4-33)	1329	20-32-45	0,1	September	polluted
		Eastern Scheldt (F4-32)	239	20-29-45	0	September	rel. unpolluted
		Belgian coast (F3/4-31)	259	20-32-45	3,1	September	polluted

Table 2.
(continued)

INTERNATIONAL COUNCIL FOR THE EXPLORATION OF THE SEA (ICES)

FISH AND SHELLFISH DISEASES: ANNUAL REPORT

(A) WILD POPULATIONS: Special disease/ pollution study COUNTRY: Netherlands YEAR: 1986

DISEASE/PARASITE	HOST SPECIES	LOCATION (ICES GRID)	NUMBER EXAMINED	SIZE RANGE (cm)	PREVALENCE (%)	MONTH OF SAMPLING	REMARKS
Glugea stephani infection	flounder (*Platichtys flesus*)	Dutch coast (F4-33)	1329	20-32-45	1,7	September	polluted
		Eastern Scheldt (F4-32)	239	20-29-45	1,3	September	rel. unpolluted
		Belgian coast (F3/4-31)	259	20-32-45	3,5	September	polluted
Liver nodules/ tumours		Dutch coast (F4-33)	1329	20-32-45	1,6	September	polluted
		Eastern Scheldt (F4-32)	239	20-29-45	0	September	rel. unpolluted
		Belgian coast (F3/4-31)	259	20-32-45	1,5	September	polluted
Total diseased/ anomalies		Dutch coast (F4-33)	1329	20-32-45	32,6	September	polluted
		Eastern Scheldt (F4-32)	239	20-29-45	12,6	September	rel. unpolluted
		Belgian coast (F3/4-31)	259	20-32-45	40,2	September	polluted

Types, number and percentage index of pathological changes in sea fish from the Polish fishery zone in the Baltic in 1986.

Fish species	No. of inv. fish	Total 01 - 05	Pigment anomalie mel/alb.	Dwarfness deformaties of vertebral column	Hyperaemias, damage and necrosis of fins	Lymphocystosis	Parasites
cod	5187	75 /1,45/		36 /0,69/	80 /1,54/		a/ 11 /56/
herring	9461	19 /0,20/		5 /0,05/	6 /0,06/		b/ 756 /7,8/
sprat	1494	10 /0,67/		16 /1,07/	4 /0,27/		
flatfishes	934	7 /0,75/	34 /3,64/		52 /5,57/	22 /2,36/	c/ 10 /100/

Symbols used:

a/ Echinorhynchus gadi

b/ Anisakis sp.

c/ Pomphorhynchus sp.

01 - ruffled scales, loss of scales, palenness or hyperaemia of skin sections, oedema /of skin/

02 - necrosis of epidermis, skin damage

03 - general necrosis and damage penetrating into muscles

04 - cicatrizing ulcers

05 - scars after ulcers

Percentage of diseased fish given in brackets

INTERNATIONAL COUNCIL FOR THE EXPLORATION OF THE SEA (ICES)

FISH AND SHELLFISH DISEASES: ANNUAL REPORT

(A) WILD POPULATIONS: COUNTRY: Scotland YEAR: 1986

DISEASE/PARASITE	HOST SPECIES	LOCATION (ICES GRID)	NUMBER EXAMINED	SIZE RANGE (cm)	PREVALENCE (%)	MONTH OF SAMPLING	REMARKS
Lymphocystis	Limanda limanda	44E6	3068	8-38	1.79	May	
	" "	44E7	53	8-25	1.89	"	
Skin Ulcers	" "	44E6	3068	8-38	0.29	"	
		44E7	53	8-25	0	"	
	Pleuronectes platessa	44E6	602	3-50	0.67	"	
				16-48	0	"	
Skin hyperplasia/ papilloma	Limanda limanda	44E6	3068	8-38	1.34	"	
	" "	44E7	53	8-25	0	"	
Gill x-cell lesions	" "	44E6	3068	8-38	9.55	"	
	" "	44E7	53	8-25	3.77	"	
	" "	43E8	82	11-33	0	January	
	" "	42E8	5	12-34	0	"	
	" "	42E7	50	9-34	0	"	
	" "	41E7	380	5-34	0	"	
	" "	42F3	446	9-29	0.2	"	
	" "	42F2	1102	9-29	0	"	
	" "	43F2	1023	9-21	0	"	
	" "	43F3	1312	6-25	0	"	
	" "	41F4	409	6-23	0	"	
	" "	40F4	592	6-25	0	"	
	" "	40F3	732	9-27	0.3	"	
	" "	39F6	3264	6-27	0.2	"	
	" "	Irish Sea (see English report)	751	6-32	0	"	
IPN virus	" "	44E6	2	14-20	-	May	Similar to IPN Te virus
Pseudobranch swelling	Gadus morhua	44E7	22	19-53	0	"	

INTERNATIONAL COUNCIL FOR THE EXPLORATION OF THE SEA (ICES)

FISH AND SHELLFISH DISEASES: ANNUAL REPORT

(A) WILD POPULATIONS:

COUNTRY: Scotland

YEAR: 1986

DISEASE/PARASITE	HOST SPECIES	LOCATION (ICES GRID)	NUMBER EXAMINED	SIZE RANGE (cm)	PREVALENCE (%)	MONTH OF SAMPLING	REMARKS
Lernaeocera branchialis F. obtusa	HADDOCK Melanogrammus aeglefinus	44E7	1100	13-37	11-40%	Jan-Dec	Prevalence highest in winter months
	LEMON SOLE Microstomus kitt	44E7	40	19-30	100%	Jan-Feb	Typically 100% prevalence
	HADDOCK M. aeglefinus	Various N.N Sea & North Scottish Coast	1700	7-59	0-64%	Aug	Prevalence highest W of Greenwich meridian
Pseudoterranova decipiens L3 (sealworm)	LONG ROUGH DAB Hippoglossoides platessoides	45E6	115	11-18	11.3%)	Aug	Characteristically prevalence highest at inshore localities
		46E9	14	10-24	7.1%)		
		47E9	40	18-32	0%)		
		48E9	91	11-28	0%)		
		49E7	9	13-23	0%)		
		48F0	11	10-22	0%)		

INTERNATIONAL COUNCIL FOR THE EXPLORATION OF THE SEA (ICES)

FISH AND SHELLFISH DISEASES: ANNUAL REPORT

(A) WILD POPULATIONS: COUNTRY: England and Wales YEAR: 1986

DISEASE/PARASITE	HOST SPECIES	LOCATION (ICES GRID)	NUMBER EXAMINED	SIZE RANGE (cm)	PREVALENCE (%)	MONTH OF SAMPLING	REMARKS
Epid. hyperplasia	Dab	37 E6	179	> 15	0.6	April	
Lymphocystis	"	"	"	"	5.0	"	Special fish diseases cruise.
Skin ulcers	"	"	"	"	1.7	"	
Skeletal deformities	"	"	"	"	0	"	
X cells in gills	"	"	"	"	0	"	
EH	"	37 E4	77	"	2.5	"	Livers, spleen kidneys and gills were examined from both plaice and dabs.
LY	"	"	"	"	9.0	"	
U	"	"	"	"	3.9	"	
SD	"	"	"	"	0	"	
X cells	"	"	"	"	0	"	
EH	"	3 E6	173	"	7.0	"	No evidence of neoplasia.
LY	"	"	"	"	6.3	"	
U	"	"	"	"	4.0	"	
SD	"	"	"	"	2.3	"	
X cells	"	"	"	"	0	"	
EH	"	34 E5	332	"	1.2	"	
LY	"	"	"	"	0.6	"	
U	"	"	"	"	2.7	"	
SD	"	"	"	"	0	"	
X cells	"	"	"	"	0	"	
LY	Plaice	37 E6	482	"	7.7	"	
U	"	"	"	"	3.1	"	
SD	"	"	"	"	0	"	
LY	"	37 E4	525	"	2.1	"	
U	"	"	"	"	0.2	"	
SD	"	"	"	"	0	"	

INTERNATIONAL COUNCIL FOR THE EXPLORATION OF THE SEA (ICES)

FISH AND SHELLFISH DISEASES: ANNUAL REPORT

(A) WILD POPULATIONS: COUNTRY: England and Wales YEAR: 1986

DISEASE/PARASITE	HOST SPECIES	LOCATION (ICES GRID)	NUMBER EXAMINED	SIZE RANGE (cm)	PREVALENCE (%)	MONTH OF SAMPLING	REMARKS
LY	Plaice	35 E6	146	> 15	1.4	April	
U	"	"	"	"	0.7	"	
SD	"	"	"	"	0	"	
LY	"	34 E5	171	"	0.6	"	
U	"	"	"	"	0	"	
SD	"	"	"	"	0	"	
EH	Dab	37 E6	278	> 15	0	November	
LY	"	"	"	"	0.72	"	OTHER included fin rot, skeletal deformities
U	"	"	"	"	3.96	"	
OTHER	"	"	"	"	0.72	"	
EH	Dab	37 E4	390	> 15	5.64	November	
LY	"	"	"	"	11.79	"	
U	"	"	"	"	8.72	"	
OTHER	"	"	"	"	3.08	"	
LY	Plaice	37 E6	370	> 15	3.51	November	
U	"	"	"	"	0.54	"	
OTHER	"	"	"	"	1.53	"	
LY	Plaice	37 E4	402	> 15	6.22	November	
U	"	"	"	"	0.25	"	
OTHER	"	"	"	"	6.72	"	

INTERNATIONAL COUNCIL FOR THE EXPLORATION OF THE SEA (ICES)

FISH AND SHELLFISH DISEASES: ANNUAL REPORT

(A) WILD POPULATIONS: COUNTRY: England and Wales YEAR: 1986

DISEASE/PARASITE	HOST SPECIES	LOCATION (ICES GRID)	NUMBER EXAMINED	SIZE RANGE (cm)	PREVALENCE (%)	MONTH OF SAMPLING	REMARKS.
Skin ulcers	Cod	41 F1 40 F2	Unknown	60 - 80	Unknown	Jan-March	Superficial ulce situated beneat the dorsal fin, extending often bilaterally.
" "	"	38 FO	100	60 - 80	5	June	- do -
" "	"	IVB-IVA	> 800	All sizes over 50	Insignificant	September	1 cod, 1 saithe as above.
							Original obser-vations from fi market and by fishermen.
Bonamia	*Ostrea edulis*	29 E4	300	Adult	6	December	Increase from 1% prevalence in 1985.
							No evidence of the disease in other natural stocks of oysters.

INTERNATIONAL COUNCIL FOR THE EXPLORATION OF THE SEA (ICES)

FISH AND SHELLFISH DISEASES: ANNUAL REPORT

(B) MARICULTURE COUNTRY: DENMARK YEAR : 1986

DISEASE/PARASITE	HOST SPECIES	LOCATION	NUMBER OF OUTBREAKS	TIME OF YEAR	SIGNIFICANCE (eg % MORTALITIES)	REMARKS
Vibriosis	Rainbow trout (Salmo gairdneri)	in all cage cultures	1 per fish farm	April-Nov.	Low mortalities	Usually succes-fully treated
Furunculosis	Rainbow trout (Salmo gairdneri)	in all cage cultures	1-2 per fish farm	June-Nov.	Serious problem	Recurring outbreaks despite treatment
VHS	Rainbow trout (Salmo gairdneri)	4 fish farms placed 2 and 2 close to-gether	4	May-June	Low mortalities	VHS-fish moved to saltwater not allowed!!!

INTERNATIONAL COUNCIL FOR THE EXPLORATION OF THE SEA (ICES)

FISH AND SHELLFISH DISEASES: ANNUAL REPORT

(B) MARICULTURE COUNTRY: FINLAND YEAR : 1986

DISEASE/PARASITE	HOST SPECIES	LOCATION	NUMBER OF OUTBREAKS	TIME OF YEAR	SIGNIFICANCE (eg % MORTALITIES)	REMARKS
Furunculosis	Salmo salar	58-59/H4-H5	8	June-Sept.	max. 50 %	
	S. gairdneri					isol.
	S. Trutta					isol.
	Salvelinus spp.					isol.
Vibriosis	S. gairdneri	49-50/H1-H2	> 20	June-Sept.	0 - 20	
	S. salar		> 5	June-Sept.	0 - 20	
Yersiniosis	S. gairdneri		1	-	-	
Pseudomonas angulliseptica	S. salar					
	S. gairdneri	49-50/H1-H2	6	July-Sept.	20 - 50	
	S. trutta					
	Coregonus lavar.					

INTERNATIONAL COUNCIL FOR THE EXPLORATION OF THE SEA (ICES)

FISH AND SHELLFISH DISEASES: ANNUAL REPORT

(B) MARICULTURE COUNTRY: FRANCE YEAR : 1986

DISEASE/PARASITE	HOST SPECIES	LOCATION	NUMBER OF OUTBREAKS	TIME OF YEAR	SIGNIFICANCE (eg % MORTALITIES)	REMARKS
BACTERIOSIS						
Vibriosis	Trout	Tréguier	4	Feb., March, December	50 % - 10 %	10 - 13° C
Furunculosis	Salar	Camaret	3	May	20 %	13° C - Fluméquine
Myxobacteriosis	Salar	Camaret	3	May,- June	5 %	
	Trout, coho	Camaret	3	July-January	5 %	Ulcérations
	Turbots	Brest	1	July		Occasional
Renibacterium	Coho	Camaret	enzootic	Winter-Spring	10 %	
	Salar	Camaret	2	May	Occasional	
PARASITISM						
Diplectatum	Sea bass	Brest	1	July	20 %	Experimental breed stock
Gyrodactylus	Elvers	Morbihan	1	Oct.	10 %	in gills
Sea lice	Trout	Brest	1		environ 10 %	few number of parasites per fish
GENERAL PATHOLOGY						
Cataracts	Salar	Camaret		summer	0 %	Prevalence nearly 100 %
	Trout	Brest		all time	0 %	Prevalence 10 %
	Sea bass	Brest		Occasional	0 %	Prevalence : 5 80 %
Pancreatic disease	Salar	Camaret		Jan March	2 %	No relationship with
	Fario	Camaret		Jan April	2 % - 5 %	IPN virus or antibodies

INTERNATIONAL COUNCIL FOR THE EXPLORATION OF THE SEA (ICES)

FISH AND SHELLFISH DISEASES: ANNUAL REPORT

(B) MARICULTURE COUNTRY: FRANCE YEAR : 1986

DISEASE/PARASITE	HOST SPECIES	LOCATION	NUMBER OF OUTBREAKS	TIME OF YEAR	SIGNIFICANCE (eg % MORTALITIES)	REMARKS
Bonamia ostreae	Ostrea edulis	Britany	8 000	all the year		
Martelia refringens	Ostrea edulis	"	8 000	Summer Autumn		Endemic parasite
Rickettsies	Different molluscs	All the coast				Unknown role
Mitilicola intestinalis	Mytilus edulis	Vivier/mer	699	all the year	Prevalence 80 %	
Trematodes	Mytilus edulis	Groix		Summer	Prevalence 60 %	Mortalities associated

INTERNATIONAL COUNCIL FOR THE EXPLORATION OF THE SEA (ICES)

FISH AND SHELLFISH DISEASES: ANNUAL REPORT

(B) MARICULTURE COUNTRY: F.R.G. YEAR : 1986

DISEASE/PARASITE	HOST SPECIES	LOCATION	NUMBER OF OUTBREAKS	TIME OF YEAR	SIGNIFICANCE (eg % MORTALITIES)	REMARKS
Furunculosis	Salmo gairdneri	Kiel-Fjord	1	summer	5 % mortality	
Ciliates (probably Cryptocaryon irritans)	Scophthalmus maximus, Larvae	Kiel-Fjord	1	April - August	high mortalities, up to 80 %	no effective treatment known

INTERNATIONAL COUNCIL FOR THE EXPLORATION OF THE SEA (ICES)

FISH AND SHELLFISH DISEASES: ANNUAL REPORT

(B) MARICULTURE COUNTRY: ICELAND YEAR : 1986

DISEASE/PARASITE	HOST SPECIES	LOCATION	NUMBER OF OUTBREAKS	TIME OF YEAR	SIGNIFICANCE (eg % MORTALITIES)	REMARKS
Caligus elongatus	Atlantic salmon Rainbow trout	SW-Iceland	3 sites	persistent through summer and autumn	some mortality	bath treatment: Nuvan and Neguvon
Myxobolus cerebralis (Myxosoma cerebralis)	Rainbow trout fingerlings	SW-Iceland	1 site		carrier state (no mortality; no pathol. changes)	from earth ponds
Aeromonas salmonicida subsp. achromogenes	Atlantic salmon	NE-Iceland	1 site; cages	early summer with incr. temp.	some mort., esp. among smolts	treatm. with oxytet and oxolinic acid
——— " ———	——— " ———	SW-Iceland	3 sites; shore based tanks	different times of year	signific. mort., esp. smolts	treatm. with oxytet and oxolinic acid; rearing in 10°C, 10‰ or full salini
Renibact. salmoninarum	Atlantic salmon	SW-Iceland	2 sea ranch. sites	summer and autumn	carrier rate at time of return: 5-6% ? ; and at time of stripping: up to ca. 40-60%	brood fishes are selected from the searanching operations
——— " ———	——— " ———	SW-and W-Iceland	2 searanch. sites	autumn	carrier rate at time of stripping: < 1%	——— " ———
Sunburn	Halibut (Hippoglossus vulgaris)	SW-Iceland	1 experimental site	summer	signific. mortality	in shore based tanks; back to normal when tanks were covered.

INTERNATIONAL COUNCIL FOR THE EXPLORATION OF THE SEA (ICES)

FISH AND SHELLFISH DISEASES: ANNUAL REPORT

(B) MARICULTURE COUNTRY: The Netherlands YEAR : 1986 Observer: P. van Banning

DISEASE/PARASITE	HOST SPECIES	LOCATION	NUMBER OF OUTBREAKS	TIME OF YEAR	SIGNIFICANCE (eg % MORTALITIES)	REMARKS
Bonamia ostreae	European flat oyster (Ostrea edulis)	Easter-scheldt	1 specimen	May	Disease still present but in very low level	Challenge tests wer carried out to stuc the effects of the control measures.

INTERNATIONAL COUNCIL FOR THE EXPLORATION OF THE SEA (ICES)

FISH AND SHELLFISH DISEASES: ANNUAL REPORT

(B) MARICULTURE

COUNTRY: NORWAY

YEAR : 1986

DISEASE/PARASITE	HOST SPECIES	LOCATION	NUMBER OF OUTBREAKS	TIME OF YEAR	SIGNIFICANCE (eg % MORTALITIES)	REMARKS
IPN (clinical)	Atlantic salmon		4			
IPN (carrier state)	Atlantic salmon Rainbow trout					High prevalence
Furunculosis	Atlantic salmon Sea trout		3			
BKD	Atlantic salmon Sea trout		8			
Cold-water vibriosis	Atlantic salmon					High prevalence with high mortalities
ERM	Atlantic salmon Rainbow trout		12			
Exophiala sp.	Atlantic salmon		7			
Ichthyophonus	Atlantic salmon		1			
PKD	Rainbow trout Trout		1			
Whirling disease	Atlantic salmon Rainbow trout Trout		6			
Eubothrium crassum	Atlantic salmon Rainbow trout		83			

INTERNATIONAL COUNCIL FOR THE EXPLORATION OF THE SEA (ICES)

FISH AND SHELLFISH DISEASES: ANNUAL REPORT

(B) MARICULTURE COUNTRY: SPAIN YEAR : 1986

DISEASE/PARASITE	HOST SPECIES	LOCATION	NUMBER OF OUTBREAKS	TIME OF YEAR	SIGNIFICANCE (eg % MORTALITIES)	REMARKS
Chlamydia sp	Mytilus edulis M. galloprovencialis				50% prevalence	no histopathological effects
Marteilla sp					max. prevalence 35%	
Mytilicola intestinalis					in some place 90 - 100 % prevalence	
Haemocytic neoplasia					preval. 1%	
Marteilla refringens	Ostrea edulis				Spainish oyster culture crushed after French did, Little oyster cult. left	
Bonamia ostre	"				mortalities most important after second year, highest prev. at end of summer	
Vibriosis	different mollusc spesies	hatcheries				
	turbot coho salmon rainbow trout				juveniles especially susceptible	

INTERNATIONAL COUNCIL FOR THE EXPLORATION OF THE SEA (ICES)

FISH AND SHELLFISH DISEASES: ANNUAL REPORT

(B) MARICULTURE COUNTRY: SWEDEN YEAR : 1986

DISEASE/PARASITE	HOST SPECIES	LOCATION	NUMBER OF OUTBREAKS	TIME OF YEAR	SIGNIFICANCE (eg % MORTALITIES)	REMARKS
IPN	Salmo gairdneri	Swedish coasts	2			
BKD	" "		10			
vibriosis	" "		current problems			
furunculosis	" "		1			
DSP	Mytilus edulis	west coast	current problems			

INTERNATIONAL COUNCIL FOR THE EXPLORATION OF THE SEA (ICES)

FISH AND SHELLFISH DISEASES: ANNUAL REPORT

(B) MARICULTURE COUNTRY: England and Wales YEAR : 1986

DISEASE/PARASITE	HOST SPECIES	LOCATION	NUMBER OF OUTBREAKS	TIME OF YEAR	SIGNIFICANCE (eg % MORTALITIES)	REMARKS
Myxobacteriosis	Rainbow trout (*Salmo gairdneri*) Salmon (*Salmo salar*)	N.E. England pumped tank site	1 1	Continuing through winter months	≏ 30% > 10%	Fish stressed and then handled at low temperatures (5-7°C), not responding to treatment.
Bacterial kidney disease (*Renibacterium salmoninarum*)	Rainbow trout (*Salmo gairdneri*)	Cornwall south coast	1	Continuing through early spring-early summer	No significant losses attributed	First identified on site in 1985.
Gaffkaemia (*Aerococcus viridans*)	*Homarus gammarus*	Essex coast lobster holding tanks	1	Late autumn	10%	Native lobsters infected on site licenced to import Canadian stocks (*Homarus americanus*).
Bonamia (*Bonamia ostreae*)	*Ostrea edulis*	The Fal, Helford and Beaulieu estuaries, Poole and Emsworth Harbours, and the Essex coast	Continuing outbreaks but also in 4 new sites in 1986: Beaulieu, Poole, Emsworth and south Essex	All year	Varies from 10-90% depending on husbandry, relaying practise and environmental conditions	Disease first recognised in 1982.

INTERNATIONAL COUNCIL FOR THE EXPLORATION OF THE SEA (ICES)

FISH AND SHELLFISH DISEASES: ANNUAL REPORT

(B) MARICULTURE

COUNTRY: Scotland

YEAR : 1986

DISEASE/PARASITE	HOST SPECIES	LOCATION	NUMBER OF OUTBREAKS	TIME OF YEAR	SIGNIFICANCE (eg % MORTALITIES)	REMARKS
IPN virus	Atlantic salmon	-	No new occurrence	-	-	
Furunculosis	Atlantic salmon	W Coast, W Isles, N Isles	ca 50% sea sites affected	Mostly May-Nov	10% max	Cost of treatment major penalty
Sea lice	Atlantic salmon	As above	Most sites affected	Mostly May-Nov	No morts. Cost of treatment major problem	
Pancreas disease	Atlantic salmon	As above	11 new outbreaks	March-Nov	Low morts, associated with primary disease	Inappetance leading to problems treating secondary or concomitant disease
BKD	Atlantic salmon	W Coast	4	All year	Low morts	
Vibrio	Atlantic salmon	W Coast, W Isles, N Isles	10-20	All year	Low morts	Always associated with physical damage
Exophiala	Atlantic salmon	W Coast, W Isles	3	All year	No morts	
Jellyfish	Atlantic salmon	N Isles	3	Summer	Low morts	
Hitra	Atlantic salmon	-	0	-	-	
"Winter sores"	Atlantic salmon	All	Widespread	Dec-April	Low morts	Primary probably physical damage Secondary myxobacterial