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International Council for the
Exploration of the Sea

C.M. 1983/F:23 (E.V.)
Marine Environmental Quality
Committee
Ref. Mariculture Committee

REPORT OF THE WORKING GROUP

"Pathology and Diseases in Marine Organisms"

Lisboa, Portugal
April 18-22, 1983

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

LISBON, PORTUGAL 18-22 APRIL 1983

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1. INTRODUCTION

The meeting convened at 10 am. The Director of the National Fisheries Institute, Lisbon Commandante J.C. de Ataide gave a brief address and welcomed the ICES delegates to Portugal and to the Institute. The Chairman Professor Maurin then welcomed all the participants and particularly the new participants from Spain and Sweden. A number of researchers from various institutes and universities in Portugal also attended the meeting as observers. Unfortunately a delegation from Poland was unable to attend the meeting but a written report was received and has been included in this report. A number of changes in the agenda were proposed and accepted and these were as follows: that the working group would give consideration to the setting up of a world wide fish and shellfish health and inspection programme under the auspices of ICES; that the working group would discuss standardization of methods in the study of disease in relation to environmental quality (to be considered as part of agenda item No. 5); that the working group would consider the use of Ammodytes as a target species in the study of disease in relation to environmental quality.

CURRENT STATUS OF DISEASE IN MARINE SPECIES

1. Viral Diseases of fish

Infectious Pancreatic Necrosis (IPN)

Although IPN has been isolated from wild salmon in Scotland the numbers of fish from which virus has been isolated has always been small and wild fish are not considered to be an important or natural reservoir for the virus. In Norway IPN virus is being isolated much more frequently than in the past however these isolations have not been associated with disease. The disease is being controlled there by prohibiting movements of fish from infected to uninfected farms. In the case of fish for direct consumption being moved from infected farms there is obviously no such restriction.

An IPN type virus was isolated from sea bass at a hatchery in Martinique where heavy mortalities were occurring (80-90%). The maximum mortalities were seen when temperatures reached 17-18^{o}C and raising the water temperature to 24^{o}C appeared to be useful in reducing losses. The pancreatic lesions were not as pronounced as those described in salmonids and it is not yet known whether the virus is pathogenic for salmonids. In Brittany virus was not isolated from an IPN-like disease of Sea bass.

Viral Haemorrhagic Septicaemia (VHS)

VHS of sea cage reared rainbow trout was recorded from Denmark and in France. Turbot have been shown to be susceptible to the disease. Experimental vaccination of sea reared trout using an inactivated vaccine has been found to be effective in France.

Lymphocystis:

Lymphocystis disease was reported from a number of countries in 1982. The disease was found frequently in common dabs from the North of Scotland but only rarely in long rough dabs and plaice in the northern North Sea. The prevalence of the disease varied but levels of over 10% were recorded from most areas sampled with an upper level of 23% being recorded. The disease was also reported from plaice from the east coast of Ireland but the prevalence was less than the previous year. German workers also reported high levels of lymphocystis during a cruise along the German, Danish and British coasts and from flounder in the Baltic. In America lymphocystis was most often observed in flatfish from waters less than 6m in depth and only in winter flounder and American plaice. Combined prevalence in both these species was 0.01%. A survey carried out in Liverpool Bay in England showed the disease to be most prevalent in flounder although the levels observed were less than the 14.2% levels recorded from the same area in 1972.

Papillomas:

Papillomas were found on common dabs only from the northern North Sea and north of Scotland. In most areas the levels were between 1-2% although occasionally higher levels were recorded . German workers have demonstrated the presence of virus like particles from papilloma lesions. From Holland a prevalence of 2% was recorded with evidence of seasonal variation from the south and central North Sea.

Cauliflower Disease:

A variety of transmission experiments carried out by German workers were unsuccessful in spreading the disease from diseased to healthy fish.

BACTERIAL DISEASES OF FISH:

Vibriosis

Problems due to vibriosis outbreaks were reported from several countries in farmed salmon, rainbow trout and cod. In Norway Hitra disease is now a serious problem and is not only seen in the colder months of the year as previously but at other times also. The Vibrio isolated from cases of the disease can reproduce the condition experimentally however the organism can not be isolated from all field cases. A pathogenic strain of Vibrio was isolated from eels in France which showed differences to the salmonid strains. Vaccines have or are being developed in Canada, USA, Denmark, UK and Norway. Oxalinic acid which has recently been licensed for use in fish the UK has been found to be effective in treating the disease.

Furunculosis:

This disease has been identified as one of the most serious disease threats to salmon farming in Scotland, both freshwater and marine. A small number of outbreaks occurred there in 1982 but were successfully treated using antibiotics. Although this disease has been a problem in salmon farming in Ireland no serious problems due to the disease were recorded in 1982. Achromogenic strains caused disease in Norwegian salmon and a strain resistant to sulphonamides was reported from Denmark. A vaccine against the disease is showing promise in Canada.

BACTERIAL KIDNEY DISEASE

Since 1980 over 1,000 wild salmon kelts from Scottish rivers have been tested for BKD with negative results. A farmed population with 60% prevalence of clinical disease suffered 20% mortality over a two month period after transfer to seawater. However following this initial mortality the disease rapidly regressed and the fish grew satisfactorily to market size. The causal organism could not be detected in survivors. In Canada the disease is widespread on the west coast but only causes clinical disease at one location on the east coast. In France only Coho salmon showed serious problems with BKD. Only one case of BKD was observed in Atlantic salmon and in this case a miliary form affecting the liver occurred. In Ireland BKD has never been recorded but an organism resembling Renibacterium salmoninus was isolated from asymptomatic salmon smolts in 1982. However bacteriological tests showed this organism to be probably a Lactobacillus sp

Mycobacteriosis

Mycobacteriosis had a prevalence of 100% in 5 ring and older mackerel in UK waters with lower levels of infection in younger fish. The southern North sea, western English channel, northern Bay of Biscay and S.W. Ireland showed higher levels of infection in mackerel than the southern Bay of Biscay, NW Scotland and northern North Sea. The disease may affect growth rates of mackerel as there was an indication within year classes of a relationship between smaller size and increasing intensity of infection. Approximately 5% of cod in the Little Belt area off Denmark were infected and about 6% in the English channel in the region of the German Bight. So far it has not been possible to culture the acid fast bacteria responsible

A high prevalence of nodules in black scabbard fish from Madeira was reported but no acid fast bacteria were observed. Caution was advised in diagnosing nodules as mycobacteriosis as many of the histological changes in such nodules are non specific and can be due to a variety of conditions.

Photobacterium sp.

This organism was isolated from a new condition which caused mortalities in cultured turbot in France but it was not possible to develop an effective vaccine.

Redmouth disease

This disease has been identified the first time in trout in freshwater (Yersinia Type II) in France. It has also been recognised as a disease in turbot. An effective vaccine has been developed. The finding of antibodies in fish to various fish pathogenic bacteria and human pathogenic bacteria was described from USA. These studies can indicate contact between fish and potentially pathogenic microorganisms which could affect their health, survival and their suitability for consumption.

Fungal diseases of fish

Icthyophonus:

Continuing high levels of infection were reported in plaice and haddock from Northern Scotland and although most of the northern North Sea had levels similar to that found since 1977, three statistical rectangles east of Shetland showed high levels for the first time >40%

The market quality of fish in the same area showed a simultaneous deterioration but it is not known whether a new epidemic focus has occurred.

A fungal condition of cod as revealed by the presence of black mycelial aggregations in the flesh was noted in Ireland. Similar isolated observations were made by other countries.

In very low salinity conditions Saprolegnia has caused disease problems in sea bass in France.

Parasitic diseases of fish

Proliferative Kidney Diseases (PKD) was reported from sea cage reared rainbow trou in Ireland and the disease was thought to be carried over from freshwater. Trichodina sp of the gills was also recognised as an important cause of mortalities in cage reared rainbow trout in Ireland.

In the USA quantitative studies are being performed on the mortality in winter flounder due to Glugea stephani (a blood parasite) Studies are also being carried out on the effects of Haemotractidium scombri in mackerel in which high prevalence levels in young fish, may be associated with a decline in the host population.

From Canada continued emphasis was placed on codworm which shows an increased infection with increasing host age. It is intended to use the infection in 35-40cms plaice as an indicator of the prevalence of the disease.

Lernaeocera branchialis in Sweden causes lesions similar to tumours on the innersurface of the operculum opposite the parasite. Consequently caution was advised when such lesions are being classified. Off Portugal 28.5% of pout were infected with Lernaeocera branchialis.

Parasitic copepods, occasionally common on cod in Sweden were reported to cause skin damage, which, following secondary infection could lead to the formation of ulcers and be possibly confused with other conditions.

In Germany high Lernaeocera infestations of cod and haddock have been found to be associated with high populations of flounder, the intermediate host. It has also been found that fat storage levels are reduced in infected fish and that infected fish are more susceptible to low oxygenlevels in aquaria than uninfected fish.

Diseases of crustaceans

Virus diseases: Both France and the USA reported the finding of virus diseases in penaeid shrimps from the Pacific and South America. One of the viruses, designated Infectious hypodermal and haemetopoietic necrosis virus (IHHNV) has been found in the blue shrimp P.stylirostris The other virus reported from P. Mondon, P. Stylirostris and P. Vannamei is known as Monodon baculovirus (MBV) and has been shown to be a serious disease agent of cultured shrimp. IHHN may be difficult to diagnose and EM studies are usually necessary. Two types of virus particles (one 27nm and the other 50nm) have recently been observed in connection with mortalities of P.Japonicus in France. Mortalities in larvae have been particularly serious and a study of these viruses is in progress in France.

These reports are of particular interest as they are the first documented cases of disease being transferred by movement of exotic species.

Because of these reports the importance of co-operation between the Pathology working group and the Working group on introductions and transfers was emphasised. Also the necessity for guidelines on health inspections prior to transfers of fish was emphasised. The possibility of viruses being spread from finfish to shellfish and vice versa was also discussed (See Rec. 1 & 2).

Bacterial diseases

Mortalities of Artemia due to chitinolytic bacteria were reported form Portugal. An outbreak of Gaffkaemiosis was reported from lobsters in the channel islands.

Fungal diseases

The most important fungal disease of crustaceans reported is Fusarium sp particularly in P. japonicus. In the Mediterranean region this fungus, which develops in the gills of the adult shrimp and spawners, causes necrosis and destruction and produces the characteristic symptom of black gills. Because the traditional fungicides used in aquaculture block the development of the ovaries they cannot be used as a treatment. Other substances are being tried in France.

Diseases of Molluscs

Viral diseases - the isolation of IPN like viruses from shellfish was again reported.

Bacterial diseases

Vibriosis was reported as causing mortalities in O.edulis larvae in hatcheries in the UK. The infections have been successfully controlled using oxolinic acid. A rickettsial infection of Ruditapes philippinarum in France was also decribed and illustrated.

Parasitic diseases

Bonamia

In Holland the disease is now considered to have virtually disappeared as a result of the eradication measures which were outlined at last year's meeting. Only one of the locations in which indicator oysters were laid down was still positive for the parasite and this was at a low level. All other sites were negative for the parasite.

In France the disease is still found on a regular basis except for some areas with natural settlement especially in the Bays of Cancale and St. Brieuc. The Mediteranean has also remained free of the disease. The production of flat oysters in France has fallen drastically as a result of the disease, being less than 10% of production prior to the to the start of the epidemic. A plan to combat the disease has been recently developed which involves elimination of oysters from infected areas exposed by the tide, seeding of new areas with clean oysters and controls on transfers of oysters.

In Spain the disease has been reported both in hatcheries and natural environment. Mortalities varied from 20-100% depending on the type of culture involved with a lower mortality occurring in hanging culture. Imports of O.edulis into Spain were found to be infected after about 15 days. The imports were reported as coming from Ireland but discussion showed the origin of these oysters was uncertain. In Ireland the disease has not been identified and no unusual mortalities were reported from there. Greek, Italian and Yugoslavian oysters (O.edulis) imported into Spain were found to be negative for the disease although they did become infected after 4-6 months in contaminated areas there.

In England the disease was diagnosed for the first time in September 1982 in Samples of oysters, O.edulis from two areas; the river Fal area of Cornwall and West Mersea in Essex. Oysters had been moved from the Fal area to West Mersea in Spring and Summer of 1982. The degree of infection varied from 2-26% depending on the area and mortalities were only reported from areas with a high level of infection. Oysters from the known infected areas and from other areas are currently being examined. The disease is being controlled by restriction on the movements of shellfish from infected areas.

Attempts to culture the parasite in tissue culture are in progress in France. The parasite multiplies extracellularly in cultures derived from gill tissue in Eagles medium after 48 hours at 20°C. With one infected culture it has been possible to further infect 8 other cultures. Transmission experiments carried out in France have shown that clean oysters when laid in contaminated areas first become infected in about three months and mortalities begin (15 days if infective parasite used)

about three months later. Infection with the parasite can occur at any time of the year. The use of Ozone and Paracetic acid to treat effluent water from infected oysters has been found effective in eliminating the parasite. The parasite has not been observed in C.gigas or eight other species of shellfish examined including cockles, clams and scallops.

In the USA 2 protozoan diseases are of concern at present. The microcell parasite of C.gigas is believed not to be the same parasite as Bonamia disease in Europe of O.edulis. Recently there have been major mortalities of C.virginica in Chesapeake Bay due to Minchinia nelsoni Interestingly, these mortalities are being seen in Upper Chesapeake Bay where mortalities had not been reported before.

Marteilia

Recently there has been an increase in the prevalence of Marteilia refringens in certain parts of Brittany particularly in the north of Brittany. In the Rade de Brest a disease prevalence of 80-90% has been noted.

Another Marteilia species has been observed in blue mussels (Mytilus galloprovencialis). The life cycle appears to be similar to M.refringens but the spores appear to be different. It is proposed to designate this new parasite Marteilia maurini. The importance of Marteilia as a group capable of affecting a variety of shellfish on a world wide basis was emphasised.

3. Workshop: study of microscopic slides and photographic transparencies

A variety of both photographic transparencies and microscopic slides of a number of pathological conditions were studied by members of the working group.

Photographic transparencies of nodular lesions from internal organs of fish caught in french waters were shown and a classification for such lesions was proposed. The non specific nature of the histological changes was emphasised.

Transparencies of Bonamia disease from the most recent outbreak of the disease in England were shown. Although the condition generally resembles the disease as described in other countries some minor differences were referred to. American and french workers seem generally agreed that Bonamia ostreae of O.edulis and microcell disease of C.gigas are not the same organism.

Sections of a number of different types of nodular lesions from the livers of dabs from the Irish Sea were also shown and discussed.

The sequential pathology of a pancreatic condition of sea reared Atlantic salmon in Scotland was described and research on the cause of the condition is continuing. The condition differs from IPN in that a more generalised destruction of pancreatic cells occurs than in IPN. The condition which is often seen about 6-8 weeks after transfer of smolts to seawater causes low level mortalities but a severe retardation of growth occurs for several months until regeneration of the pancreas occurs.

Vibriosis disease of cod farming in Norway is becoming a serious problem and slides illustrating the condition were presented. Grossly the condition is characterised by haemorrhages which are particularly prominent around the head and eyes. Severe infestation of cod with Cryptocotyle, leading to "Black Spot" was also illustrated.

Eye lesions of herring in Finland were demonstrated from fish caught in the area of T_1O_2 dumping grounds. The lesions were mainly seen in the corneas and in some cases colonization of the cornea with flexibacter - type bacteria occurred.

A number of other conditions such as unusual ulcers in plaice from Denmark and ulcers in eels from Portugal were also presented and discussed. A list of some of the slide material studied is contained in Appendix I of this report.

4. IMPACTS OF DISEASE ON COMMERCIALLY IMPORTANT FISH STOCKS

Although there was little new information presented at the meeting the working group felt it would be useful to gather all the available quantitative information on the diseases of commercially important species of wild fish and also in aquaculture. It was decided that this information would be sent to the chairman of the working group on an area basis by the working group members in July 1983. The working group were informed that a special mini-symposium would be held at the 1983 Statutory meeting of ICES on the quantitative assessments of disease impacts on natural stocks of commercially important fish species. This session is being organised by Dr. P rce, Chairman of MEQC.

It is likely that some members of the working group would prepare presentations for the session. Both Prof. Mavrin and Dr. Rosenfield were contacted in view to cochair this minisymposium.

5. RELATIONSHIP BETWEEN POLLUTION & DISEASE

Federal Republic of Germany

A presentation was made which emphasised that great care must be used in interpretation of data on disease rates. Based on examination of data on cauliflower disease in the River Elbe over a long time it was apparent that disease rates had remained unchanged for many years. From further studies carried out in the River Elbe the most significant finding was that maximum disease rates occurred in brackish waters. It was felt that the most important factor in explaining the disease rates observed was the changing salinity which may act as a stress on fish. Also fish in the brackish water areas where disease rates were highest showed a lower condition factor than fish in the outer estuary where disease rates were lower, indicating the importance of nutrition in determing disease rates.

Finland:

Studies carried out in the Baltic, in connection with T_1O_2 dumping areas, were reported. Eye lesions in herring were the predominant lesions recorded. It is possible that the high iron levels (Fe^{+++}) in the water in these areas may be a significant factor in the development of these lesions and further studies are being carried out.

France:

Because Brittany is a relatively unpolluted area the Amoco Cadiz oil spill in 1978 offered a good opportunity to study the relationship between pollution and disease. Mullet showed quite deep necrosis and flatfish such as flounder and sole showed skin ulcers and fin erosion. The abers were the worst affected areas although other areas were affected to a lesser extent. The lesions

observed were found for 18 months after the spill had occurred. The effects on shellfish were particularly important and significant levels of hydrocarbons could be found in oysters even after 3 years although histologically they appeared normal.

Details of a five year french study which has now been completed were presented. The work was carried out by a number of laboratories and consisted of two parts; the first part involved epidemiological studies and the second laboratory studies. Most of the diseased fish examined came from commercial catches and from surveys. In total 1216 diseased fish were examined out of catch of 117 tonnes. A variety of lesions were identified including ulcers, fin rot, lymphocystis and internal nodules. The various stages observed on histological examination of skin ulcers was described. Four distinct stages could be recognised which consisted of spongiosis and vascularization, leucocytic infiltration and fibrin deposition, fibrosis and repair. These changes are largely non specific and typical of an inflammatory response. Attempts to experimentally reproduce lesions in trout using "phosphogips" have been largely unsuccessful.

The results of a french study on the role of the Corpuscles of Stannius was also presented. The study showed that environmental changes could result in hyperstimulation and ultimately degeneration of the gland and thus the gland could be a useful indicator of environmental changes.

Sweden:

A major project using disease in fish as a possible pollution indicator was outlined. The first part of the project involves a base-line study of the major diseases and the second involves looking for "hotspots". Also the effects of warm water effluent from nuclear power stations are being studied.

Poland: (Communicated by written report)

High morbidity rates of disease were observed in cod, flatfish and eels in the Baltic in 1981 and 1982. The disease lesions observed were predominantly ulcers. In eels high mortalities were mainly observed in the Spring. The disease rate in cod was estimated at between 2-3%. Because a variety of bacteria could be isolated from these lesions including Aeromonas, Pseudomonas and Vibrios it is thought that these may be secondary invaders. The conditions observed are thought to be related to pollution of bottom sediments or possibly excess hydrogen sulphide in the water resulting from prolonged stagnation.

The Working Group considered the two closely related questions 1) does pollution cause diseases among aquatic life forms and 2) can fish pathology be used to monitor the biological effects of marine pollution. The Working Group believes that the questions cast in these terms lead to a dangerously misleading over-simplification of highly complex interactions.

It should be clearly understood that diseases, defined broadly or narrowly, are multifactorial in origin and/or development. Furthermore clinical signs are often not specific to one disease. Similarly pollution is also a collective term which by its use however tends to suggest a single entity equivalent to salinity, oxygen or ambient temperatures. In reality, pollution covers a complex range of agents or events which includes among others, such diverse elements as waste heat, a lengthy list of both organic and inorganic chemicals, microbial agents, turbidity, increased sediment burdens etc. in highly

scientists; the massive reduction or elimination of important species will not remain undetected.

The Working Group also wishes to make the observation that pollution is not studied for its own sake but rather because it has or may have an impact on the biological entities or a reduction in the aesthetic value of an area. These biological effects include a reduction or elimination of stocks of aquatic life forms of commercial or recreational value or an interference with various elements of the food web. An answer to those concerned with environmental quality is that until the underlying causes of disease are clearly understood we should use diseases as an indicator of pollution with the greatest degree of caution. We should select, on the basis of first principles, those features which serve best the studies of man induced changes as well as those studies concerned with the more fundamental aspects of diseases and their impacts on populations.

Footnote: The term fish is used here interchangeably with the term, aquatic life forms, and includes all life forms mammals invertebrates, finned fish, marine plants etc.

6. Professor Carvalho Varela of the Lisbon Veterinary university presented a paper on the host parasite relationship which provoked an interesting discussion.

7. Methodology in Pathological research (inoculations, vaccination etc).

A number of participants emphasised the need to standardize techniques in the study of fish diseases. The suggestion was put forward that Ammomodytes should be the prime target species in the study of disease in relation to

pollution. However for a variety of reasons, such as low availability of this species in some areas it was felt that this would be impractical. Consequently most people were of the opinion the best approach is to focus attention on fish species appropriate to a particular area.

The need for standardization of parasitological methods was also suggested and a scoring system or necrotic index for quantitative assessing of disease severity in molluscan shellfish was proposed.

In the UK the use of smears and conventional histological techniques in the diagnosis of Bonamia disease of oysters was compared. Although both techniques appeared to be equally sensitive in detecting the disease there were advantages and disadvantages in both techniques.

Besides the more conventional techniques in studying disease it was proposed that other ways should be considered in assessing health and disease such as serum enzyme levels. However one of the problems associated with the use of such methods was the lack of available information on the normal parameters in fish.

It was pointed out that disease reports seldom give information on the intensity or severity of the condition in individual specimens. Disease conditions may be regarded as minimal, moderate or marked. Because of this the Working group suggests that a more uniform approach be given to recording the quantative and qualitative relativities of disease and propose to produce a series of examples on the common diseases. These would be put forward for discussion at the next working group meeting.

8. Surveys and research at sea

The working group were informed of a proposal to hold a sea going workshop for those involved in carrying out disease surveys in either May 1983 or January 1984. The working group strongly support the idea of holding a sea going workshop on board the research vessel Anton Dohrn in January 1984. The objectives would be to bring together scientists actively involved in the field of marine fish disease surveys to discuss relevant problems. The final aim of the workshop would be to produce proposals for standardized methodologies which could be followed in disease work incorporated into routine stock assessment surveys and also special disease surveys.

9. Publications

Fiches The first 10 fiches on specific disease conditions will be published shortly and a further 10 will be published later this year. Ten more fiches are also in preparation and it is hoped to publish these in 1984. As these fiches are a very concrete example of the value of the working group some disappointment was expressed that the fiches did not state clearly that they were prepared under the auspices of ICES working group. Therefore it was proposed that this should be clearly stated in future fiches.

Index:

Because the fiches had dealt with many of the areas to be covered in the index some members of the working group felt that production of the index

was no longer necessary. However others felt that the index would still have a value and should be produced. Following the discussion it was decided that the index should be produced as a considerable amount of work had been already put into this project. However a number of inaccuracies in the geographical distribution of a number of diseases in the index require correction before publication.

10. Co-operation with MPBM W.G.

Dr. Egidius reported on the meeting of the MPBM WG which she and Dr. Nounou attended this year. Because of attending this meeting she felt that the fears expressed by the Pathology Working Group at last years meeting about possible overlap between the two groups were unwarranted. The MPBM working group recognised the prime responsibility of the Pathology and Disease WG in the collection and interpretation of data on fish diseases but were obviously interested in receiving results of these cruises and the views and comments of the pathologists on such results.

11. Miscellaneous: Registry

The value of national registries of slides and other information on pathological conditions was recognised by the Working Group. The use of computors in the storing of relevant pathological data was discussed and details of a number of different systems used in different countries were presented to the group. Some of the different systems used are contained in appendix II of this report. It was decided that any new information on computerised systems of storing pathological information should be sent to Dr. Egidius who would report back on this to the Working Group at next year's meeting.

12. Recommendations:

Arising out of the meeting the working group made a number of recommendations:

1. In spite of the ICES code of practice on introductions and transfers both the Working group on Pathology and diseases of Marine organisms and the working group on Introductions and transfers are seriously concerned about the possible spreading of disease agents.

Whilst acknowledging the early work of the FAO/OIE government consultation on the control of the spread of major communicable Fish Diseases, the establishment of an EIFAC code of practice last year for fresh water organisms and the FAO involvement in establishing similar codes in other regions the working groups still feel it is of the greatest importance for ICES to urge their delegates, the government members of ICES, to take all possible steps to avoid the spread of disease agents among all marine organisms.

2. Following the discovery of viruses closely related to known fish pathogens and crustaceans e.g. IPN-like viruses from oysters and crabs, the working group recommend the implementation of studies to investigate the pathogenic potential of these agents against fish. This potential of pathogens to spread from fish to invertebrates should be studied carefully especially where they are farmed in close proximity.

3. The Working Group on Pathology and Diseases in Marine organisms will meet in Halifax, Nova Scotia, Canada from 14th to 18th May 1984 with Professor C. Maurin as Chairman. To continue their work they should: collect new information on disease status in natural stocks and aquaculture, consider experimental studies (Inoculation, vaccination etc.), hold a workshop on the

preparation and identification of disease agents (photographic slides, table etc.) consider the effects of pollution on disease; the qualitative effects of disease on fish health; the quantitative effects of disease on fish stocks and results of new surveys.

13. Acknowledgements:

The working group chairman thanked the Director of the National Fisheries Institute, Commander Ataide for hosting the meeting and for the warm hospitality extended to the working group members. Professor Maurin also thanked Dr. Menezes for all his work and effort in ensuring the success of the meeting.

APPENDIX I

Slide intercalibration workshop - slides and transparencies examined

Slides and transparencies of Bonamia disease relating to the disease situation in England.

Slides and transparencies of fish from Liverpool Bay, England (Dab, plaice, whiting, cod, sole etc.)

Slides relating to research in Dab livers

Mycobacteriosis of fish.

Slides of Bonamia for comparison with slides form other European countries. Slides show haemolcyticinfiltration and intracellular parasite

Marteilia refringens in cockles and mussels
Parasitic multicellular forms in digestive tract identical to those observed in ostrea edulis.

Skin nodules from dab (Limanda limanda). Slides show histocytic nodules with presence of fungi (82-100 19).

Nodules in liver, heart and digestive tract of Mackerel (Scomber scombrus). Slides show helminth infection with granulomatous reaction to eggs?

Skin tumour of the skin of cheek in a cod (gadus morhua). Slides show infiltrative sarcomatoid lesions. Probably on achromic melanotic tumour

Liver tumour from flounder (Platichthys flesus). Slides show vascular proliferation. Haemangiopericytoma? (82-100 25).

Eye tumour from flounder (Platichthys flesus). Angioma of the choroid? (82-100 42).

Pseudobranch tumour from Cod. German Bight. July 1979. Bilateral swellings from the region of the pseudobranch.

Epidermal papilloma from Dab (Limanda limanda). German Bight July 1980. Macroscopic examination showed white opaque swellings of the epidermis from 1-20mm in diameter. Associated with dumping of T_1O_2 waste.

Whitish swellings on the fins of dab (Limanda limanda) Dogger Bank 1979 Slide shows inflammation of connective tissue. Possibly protozoan infection.

Kudoa infestation of mackerel (Scomber scombrus). Slide shows presence of spores in muscle. Muscle shows extensive liquifaction.

Fungal infection of muscle of cod (Gadus morhua). Macroscopically dark brown - black areas seen throughout muscle. Slides shown presence of fungal hyphae, muscle necrosis and granulomatous reaction.

Trichodina infestation of gills of rainbow trout. Slides shows hyperplasia of gill lamellae and presence of parasite between adjacent gill secondary lamellae.

Unidentified amoeboid parasite of the gills of rainbow trout. Slide shows hyperplasia and fusion of secondary gill lamella

Sections of nodules obtained during the Thalassa cruise

Sections of nodules from a natural case of BKD in rainbow trout

Sections of nodules obtained from experimental antigen inoculation

Photographs and sections of papules from the summer disease of rainbow trout in Brittany

Sections of Pansteatis and pancreatic necrosis in rainbow trout

Slides and photographs of the indirect fluorescent antibody test for detection of Aerococcus viridens

Slides demonstrating use of the indirect fluorescent antibody technique for detection of Aerococcus viridens var Homeri.

Slides of Deniman island disease in oysters from the USA

" " crustacean viral diseases from the USA

" " various fish diseases from the USA

APPENDIX II

France

PROPOSITIONS CONCERNANT L'ELABORATION D'UNE BANQUE DE DONNEES SUR LA PATHOLOGIE DES ANIMAUX AQUATIQUES

OBJECTIF :

Il s'agit de centraliser, pour en assurer la disponibilité, des informations et matériels concernant des cas pathologiques observés chez les Animaux Aquatiques.

Un effort particulier serait fait pour réunir autour de chaque cas des précisions concernant l'animal examiné (biométrie, hématologie, symptômes, lésions, etc...) et par ailleurs les données concernant le groupe dont l'individu est issu (épidémiologie, résultats thérapeutiques, etc...).

Reposant sur une observation concrète assez précise, chaque cas présenté apporterait plus que le seul matériel histopathologique habituellement proposé dans les registres. Il ne se substituerait pas à une description même sommaire, d'une maladie déjà référenciée (type index ou fiches CIEM), n'en illustrant au mieux qu'un aspect particulier. Il pourrait, par contre, apporter les éléments d'une situation pathologique non encore publiée.

PRATIQUE DU FONCTIONNEMENT

- Chaque chercheur désirant apporter les éléments d'un cas pathologique, remplit le formulaire ad hoc pour y consigner le maximum de renseignements concernant le cas, et préciser le matériel disponible. Le formulaire est adressé au Laboratoire centralisateur, ainsi, éventuellement, que le matériel "d'illustration" (photos, lames histo-pathologiques, souches microbiennes, parasites, etc...), si le laboratoire d'origine le souhaite.

- Le laboratoire centralisateur établit un catalogue à plusieurs entrées :

. cas numérotés arbitrairement, avec description succinte :

Espèce, environnement
Importance dans la population
Géographie
Diagnostic
Matériel disponible.

. Espèce

. Type de pathologie (infectieuse, nutritionnelle, etc...).

- Les demandes d'information et de prêt de matériel sont à adresser au laboratoire centralisateur qui dégage la fiche de renseignements correspondante.

. Si le matériel complémentaire est conservé par le laboratoire centralisateur, l'ensemble fiche et matériel est directement expédié au demandeur.

. Dans le cas contraire, la fiche est adressée au laboratoire d'origine, avec le double de la demande. Le laboratoire d'origine expédie au demandeur l'ensemble fiche et matériel complémentaire.

Le L.N.P.A.A., qui dispose de moyens informatisés, propose de servir au départ de laboratoire centralisateur.

BANQUE DE DONNEES SUR LA PATHOLOGIE DES ANIMAUX AQUATIQUES

CATALOGUE N° "de présentation"

1 - CLASSEMENT PAR NUMERO D'ORDRE

90 001 - *Salmo gairdneri* - Elevage marin
Dix pour cent de la population atteinte pendant l'été.
Rade de Brest
Panstéatite (?)
Section de caeca pyloriques, avec pancréas et graisse péripancréatique (1 lame)

90 002 - *Salmo gairdneri* - Elevage marin
50% de la population estivale
Brest, sortie de rade (Camaret)
Papules cutanées
Macroscopie : 1 photo
Microscopie : 1 section de la lésion cutanée

90 003 - *Ostrea edulis* -
Impact dans la population : inconnu
Rade de Brest
Parasitose à *Minchinia armoricana*
1 lame : infiltration par plasmodes multinucléés + 20 photos (microscopie)

90 004 - *Ostrea edulis*
150 cas collectés en 7 ans
Bretagne Nord
Hémocytosarcome de type hyalin
Prolifération de cellules hémocytaires atypiques : 3 lames + matériel d'inclusion + photos

2 - REPERTOIRE PAR ESPECE

Ostrea edulis : 90 003, 90 004

Salmo gairdneri : 90 001, 90 002

3 - REPERTOIRE PAR TYPE DE MALADIE

- Maladies d'origine virale
- Maladies d'origine bactérienne
- Maladies parasitaires

  90 003
- Maladies tumorales

  90 004
- Maladies d'origine indéterminée

  90 001, 90 002

BANQUE DE DONNEES SUR LA PATHOLOGIE DES ANIMAUX AQUATIQUES

FICHE DE RENSEIGNEMENTS

1 - IDENTITE - BIOMETRIE

N° définitif : 9 0 0 0 1 Date examen (jour mois année) 0 8 0 8 8 2

Groupe : mammifère, reptile, poisson, crustacé, mollusque, autre ** [ ] *

Laboratoire d'origine* (en clair) : *E.N.P.A.A.* [ ] *

N° du cas au laboratoire d'origine : 11 8 7 9

Genre : *SALMO* Espèce : *GAIRDNERI* [ ] [ ] *

Animal prélevé vivant** : agonique - non agonique

Animal prélevé mort* : état de conservation : bon - moyen - mauvais

Origine** : sauvage - d'élevage

Lieu géographique (en clair) : *Rade de Brest*

Poids (en g) : [ ] 1 5 1 *

Longueur :(à la fourche pour poissons) (en mm) : 2 7 3 *

Poids du foie ou hépatopancréas (en cg) : [ ] [ ] 1 8 0 *

Poids de la rate (en cg) : [ ] [ ] 4 0 *

Poids des gonades (en cg) : [ ] [ ] [ ] [ ] [ ] *

Indice de condition (pour les Mollusques, selon WALNE) : [ ] [ ] *

Sexe : *Mâle* Maturité : *1*

Parr ou smolt** (pour les Salmonidés) :

Age** : moins de 2 mois (en jours)
de 2 mois à 1 an (en mois)
d'1 an et plus (en années): *1 an +*

2 - ENVIRONNEMENT - EPIDEMIOLOGIE - SYMPTOMATOLOGIE

Qualité de l'eau : Dureté: [ ] [ ] Salinité: (pour mille) 3 5

Oxygène (dixième de ppm): [ ] [ ] pH (en dixième): 8 0

Ammoniaque (en 1/100 ppm d'N): [ ] [ ] [ ] [ ]

Nitrite (en 1/100 ppm d'N) : [ ] [ ] [ ] [ ]

Température (au dixième de degré): 1 9 4

Existence d'une pollution (en clair) :

Evaluation du nombre d'animaux concernés : lot malade *294*

Mortalité journalière (en nombre) : *4*

Mortalité depuis : (en jours) *60*

Mortalité cumulée : *556*

Manipulations effectuées, en relation avec la pathologie observée transport, tri, traitement, etc... : (en clair). Préciser le temps par rapport aux premiers symptômes observés.

RAS

Symptômes (sauf lésions) :(en clair) *RAS*

---

* Donné par le laboratoire centralisateur

** Rayer les mentions inutiles.

3 - EXAMEN - AUTOPSIE, ANATOMIE PATHOLOGIQUE

Estomac** : plein de matière - de liquide - mi-plein - vide
Intestin** : plein de matière - de liquide - mi-plein - vide
Couleur du foie (en clair) : de la bile (en clair) :
Graisse mésentérique** : énormément - beaucoup - moyennement - peu - pas du tout -
Aspect général (maigreur, etc...) : *Extrême maigreur*

Observations macroscopiques : ensemble des lésions observées :
(si photos, préciser ce qu'elles concernent et leur nombre)
(ex. : cavité abdominale congestivo-hémorragique : 2 ph)

Légère congestion intestinale
Opacité de la vessie natatoire

Observations microscopiques : ensemble des lésions observées
(si photos ou lames, préciser ce qu'elles concernent et leur nombre)
(ex. : Nécrose de l'épithélium branchial : 1 ph, 2 lames)

Pancréas : infiltrat à cellules mononucléées (1lame)
Absence de glycogène hépatique (PAS négatif)
Branchies très congestives : Nécrose de l'épithélium lamellaire (1 lame)

Observations ultra microscopiques :

Histochimie :

4 - HEMATOLOGIE - BIOCHIMIE SANGUINE ET TISSULAIRE : (tous résultats éventuels)
Valeurs plasmatiques : Pt : 16 ; Ch : 4 ; PO : 378 ; Cl⁻ : 187 ;
Al : 17 % ; "O2" : 25 %

5 - SEROLOGIE - PATHOGENES

SEROLOGIE : Méthode, antigène, résultat
(ex. : Séroagglutination, Vibrio type I - 128).
Séroagglutination. Vibrio type 1 : 16 (faible, 2 mois après vaccination).

PATHOGENES : Préciser l'organe - Donner une notion : beaucoup - peu -
Si la souche ou le parasite est disponible, indiquer M -
(ex. : Estomac - Ascaris sp. - beaucoup - M)

Aucun pathogène

Essai de transmission expérimentale et résultats :

6 - ESSAIS THERAPEUTIQUES - ET RESULTATS (en clair)

7 - DIAGNOSTIC RETENU OU HYPOTHESE (en clair)

Stéatite, maladie nutritionnelle ?

8 - REFERENCES ESSENTIELLES (2 ou 3 maximum)
ROBERTS R.J., RICHARDS R.H., BULLOCK A.M. - Panneatitis in Rainbow trout...
J. Fish Diseases, 2 (2) : 85-92 (1979).

** Rayer les mentions inutiles

BANQUE DE DONNEES SUR LA PATHOLOGIE DES ANIMAUX AQUATIQUES

FICHE DE RENSEIGNEMENTS

1 - IDENTITE - BIOMETRIE

N° définitif : 9 0 9 0 4 Date examen (jour mois année) 1 0 1 0 7 7 *

Groupe : mammifère, reptile, poisson, crustacé, mollusque, autre ** *

Laboratoire d'origine* (en clair) : *Faculté de Médecine - Anatomo/ Pathologie - BREST (France).* *

N° du cas au laboratoire d'origine : 77 10 8 4 1

Genre : *OSTREA* Espèce : *EDULIS* *

Animal prélevé vivant** : agonique - non agonique

Animal prélevé mort* : état de conservation : bon - moyen - mauvais

Origine** : sauvage - d'élevage

Lieu géographique (en clair) :
Carantec (Bretagne Nord)

Poids (en g) : *

Longueur :(à la fourche pour poissons) (en mm) : *

Poids du foie ou hépatopancréas (en cg) : *

Poids de la rate (en cg) : *

Poids des gonades (en cg) : *

Indice de condition (pour les Mollusques, selon WALNE) :

Sexe : Maturité :

Parr ou smolt** (pour les Salmonidés) :

Age** : moins de 2 mois (en jours)
de 2 mois à 1 an (en mois)
: d'1 an et plus (en années): *3 ans*

2 - ENVIRONNEMENT - EPIDEMIOLOGIE - SYMPTOMATOLOGIE

Qualité de l'eau: Dureté: Salinité:(pour mille)

Oxygène (dixième de ppm): pH (en dixième):

Ammoniaque (en 1/100 ppm d'N):

Nitrite (en 1/100 ppm d'N) :

Température (au dixième de degré):

Existence d'une pollution (en clair) :

Evaluation du nombre d'animaux concernés : lot malade

Mortalité journalière (en nombre) :

Mortalité depuis : (en jours)

Mortalité cumulée :

150 cas collectés en 7 ans par le laboratoire.
Incidence <1 %. Augmentation en automne

Manipulations effectuées, en relation avec la pathologie observée transport, tri, traitement, etc... : (en clair). Préciser le temps par rapport aux premiers symptômes observés.

Symptômes (sauf lésions) :(en clair)

* Donné par le laboratoire centralisateur
** Rayer les mentions inutiles.

3 - EXAMEN - AUTOPSIE, ANATOMIE PATHOLOGIQUE

Estomac** : plein de matière - de liquide - mi-plein, - vide
Intestin** : plein de matière - de liquide - mi-plein - vide
Couleur du foie (en clair) : de la bile (en clair) :
Graisse mésentérique** : énormément - beaucoup - moyennement - peu - - pas du tout -
Aspect général (maigreur, etc...) :

Observations macroscopiques : ensemble des lésions observées :
(si photos, préciser ce qu'elles concernent et leur nombre)
(ex. : cavité abdominale congestivo-hémorragique : 2 ph)

RAS

Observations microscopiques : ensemble des lésions observées
(si photos ou lames, préciser ce qu'elles concernent et leur nombre)
(ex. : Nécrose de l'épithélium branchial : 1 ph, 2 lames)

Prolifération de cellules hémocytaires atypiques de type hyalin avec infiltration interstitielle des vaisseaux, des branchies, des gonades. 3 lames + matériel d'inclusion + photographies.

Observations ultra microscopiques :

Identification des atypies nucléaires (membranes).

Histochimie :

4 - HEMATOLOGIE - BIOCHIMIE SANGUINE ET TISSULAIRE : (tous résultats éventuels)

5 - SEROLOGIE - PATHOGENES

SEROLOGIE : Méthode, antigène, résultat
(ex. : Séroagglutination, Vibrio type I - 128).

PATHOGENES : Préciser l'organe - Donner une notion : beaucoup - peu - Si la souche ou le parasite est disponible, indiquer M -
(ex. : Estomac - Ascaris sp. - beaucoup - M)

Pas de parasites visibles.

Essai de transmission expérimentale et résultats :

6 - ESSAIS THERAPEUTIQUES - ET RESULTATS (en clair)

7 - DIAGNOSTIC RETENU OU HYPOTHESE (en clair)

Hémocytosarcome

8 - REFERENCES ESSENTIELLES (2 ou 3 maximum)

Haliotis (1978) - 9 (1) : 99-102.

** Rayer les mentions inutiles

Canada

Fish Health Unit — Maritimes Region
Fisheries and Environmental Sciences Div.
Government of Canada
Dept. of Fisheries and Oceans
Box 550, Halifax, N.S. B3J 2S7

Please fill in available information. DO NOT USE SHADED AREAS. Please print clearly. Return completed form to above address.

Case Number [1] Reference Number [6] Date Collected [11] D M Y

Species* [17] Age* [22]

Wild or Culture* [24] General Area/Province* [25]

Specific Sampling Site* [27] [31]

Contributor* [55] [59]

Mailing Address Phone Number

Reason for Examination* [75]

Primary Diagnosis [76]

Water Supply* [79]

Water Data

Temperature [80] C Dissolved 0_2 [83] ppm pH [86]

Salinity [89] ppt Hardness [91] mg $CaCO_3$/litre

Feed Data

Diet* [94] Feed Application * [96]

Feeding Rate [97] % (percent of body weight per day)

Total Stock Size [99] Percent Mortality/Affected [107] %

Behavior (please provide information on behavior of 'healthy' and 'ailing' animals)

Remarks (please provide any additional information you feel is pertinent to this case — use reverse side if necessary).

Case Number _____ Date Examined _____

Observations	Sub Sample #1	Sub Sample #2	Sub Sample #3
Health Status	* 110 _____	164 _____	218 _____
	Sample size * 111 _____	Sample size 165 _____	Sample Size 219 _____
Blood	Hematocrit 114 % _____	Hematocrit 168 % _____	Hematocrit 222 % _____
	R.B.C. 117 X 10^6 _____	R.B.C 171 X 10^6 _____	R.B.C. 225 X 10^6 _____
	Hemoglobin 120 g/100ml _____	Hemoglobin 174 g/100ml _____	Hemoglobin 228 g/100ml _____
Blood Smear	122 _____	176 _____	230 _____
	124 _____	178 _____	232 _____
	126 _____	180 _____	234 _____
External Disease Signs	Organ / Disease Sign	Organ / Disease Sign	Organ / Disease Sign
	128 _____ 129 _____	182 _____ 183 _____	236 _____ 237 _____
	131 _____ 132 _____	185 _____ 186 _____	239 _____ 240 _____
	134 _____ 135 _____	188 _____ 189 _____	242 _____ 243 _____
	137 _____ 138 _____	191 _____ 192 _____	245 _____ 246 _____
	140 _____ 141 _____	194 _____ 195 _____	248 _____ 249 _____
Internal Disease Signs	Organ / Disease Sign	Organ / Disease Sign	Organ / Disease Sign
	143 _____ 144 _____	197 _____ 198 _____	251 _____ 252 _____
	146 _____ 147 _____	200 _____ 201 _____	254 _____ 255 _____
	149 _____ 150 _____	203 _____ 204 _____	257 _____ 258 _____
	152 _____ 153 _____	206 _____ 207 _____	260 _____ 261 _____
	155 _____ 156 _____	209 _____ 210 _____	263 _____ 264 _____
Behavior	158 _____	212 _____	266 _____
	160 _____	214 _____	268 _____
	162 _____	216 _____	270 _____

DIAGNOSES

1.	272	275	% affected
2.	278	281	% "
3.	284	287	% "
4.	290	293	% "
5.	296	299	% "
6.	302		
7.	305		
8.	308		
9.	311		
10.	314		

TREATMENTS

	Treatments Route	Treatment	Success
1.	317	318	320
2.	321	322	324
3.	325	326	328

WORK DONE

Serology 329	Culture 330	Bacteriology 331	Virology 332
Parisitology 333	Histology 334	Hematology 335	E.M. 336
Vivo 337	Vitro 338	Agency 339	Microscopy 340
Photography 341	Biochemistry 342	Other 343	

REMARKS

Figure 1. Donor submission record used by the Registry of Marine Pathology.

Registry of Marine Pathology
Donor's Submission Record

Date: _____

Donor and Title: _____

Address: _____

Disease: _____

Pathogen or Parasite: _____

Host (Generic and Common): _____

Form of Submission: _____
Tissue: _____
Preparation Date: _____
Donor's Code: _____

Stain: _____

Description and Comments: _____

Principal Citation(s): _____

Figure 2. Format for entering information in catalogue of microslide accessions used by the Registry of Marine Pathology.

ROMP No.:

Animal: _____

Place/Date of Collection: _____

Disease: _____

Etiology: _____

Lesion: _____

_____

Donor: _____

Stain(s): _____

Accession Date: _____

Figure 3. Format of abstracts contained in the bibliography of North American marine fish and shellfish.

ACCESSION NUMBER 2356
AUTHOR :MC CAIN, B.B. M.S. MYERS W.D. GRONLUND
TITLE :THE FREQUENCY, DISTRIBUTION, AND PATHOLOGY OF THREE DISEASES OF DEMERSAL FISHES IN THE BERING SEA
JOURNAL :J FISH BIOL 12(4):267-276 (1978)
HOST SPECIES:LEPIDOPSETTA BILINEATA LIMANDA ASPERA GADUS MACROCEPHALUS
PATHOGEN :VIRUS UNKNOWN
PREVALENCE :DISCUSSED
PATHOLOGY :EPIDERMAL PAPILLOMAS AND TUMORS LYMPHOCYSTIS
HOST HABITAT:BERING SEA, AL
TYPE STUDY :FIELD
KEY WORDS :AL; NEOPLASM; LYMPHOCYSTIS; SOLE; PLEURONECTIFORMES; COD; OSTEICHTHYES; GADIFORMES; ULTRASTRUCTURE; CYTOLOGY; VIRUS

I

Norway

Prep.nr.: /198

HISTOLOGISK UNDERSØKELSE

Innsender:/SENDER
Sykdomslaboratoriet,
Havforskningsinstituttet,
C. Sundtsgate 37,
5000 Bergen

Skriv tydelig, bruk skrivemaskin

Species:

IDENTIFICATION
Ev. identifikasjon:

AGE
Alder:

SEX
Kjønn:

WEIGHT
Vekt:

LENGTH
Lengde:

CONDITION
Kondisjon:

CATCH PLACE TRAWL STATION
Fangststed/Trålstasjon:

CATCH DATE
Fangstdato:

WATER TEMP.
Vanntemperatur:

OTHER INFORM. ON WATER
Andre oppl. om vannet:

Kort sykehistorie, funn og evt. diagnose:
SHORT CASE HISTORY, FINDINGS AND EV. DIAGNOSIS

Materialet består av:

FARMING
Oppdrett □

FREE LIVING
Frittlevende □

SEA WATER
Saltvann □

FRESH WATER
Ferskvann □

PHOTO
Foto/Dia? □

TREATMENT BEFORE FIXATION
Behandl. før fiksering: ICED Iset □ FROZEN Frosset □ FRESH fersk □

FIXATION
Fiksert i:

DATE
Dato:

Kl.:
HOUR

DEAD (DATE)
Død (dato):

Kl.:
HOUR

(Utfylles FILLED IN BY LABORATORY:)

Preparat mottatt: RECEIVED

Svar:
ANSWER

		SNOP
Bone tissue		
Suprarenal gland cortex	N - 0032	T - 93
marrow	N - 0033	
Appendix	N - 0023	T - 66
Cartilage	N - 0034	T - 15
Pectoral fin	N - 0026	Y - 8
Abdominale fin	N - 0026	Y - 9
Anus/Cloacea	N - 0016	T - 69
Pharynx	N - 0004	T - 60
Anal fin		
Gall-bladder	N - 0020	T - 57
Gill-lamella	N - 0030	T - 22
Operculum		
Gonade (ovary, testes)	N - 0028	T - 87 ♀ / T - 78
Brain	N - 0035	
Heart	N - 0029	T - 32
Skin		
Cloacea/Anus	N - 0016	T - 69
Lips (+ teeth)	N - 0001	T - 52 (T - 54)
Liver	N - 0019	T - 56
Caudal fin		
Stomac cranial	N - 0006	T - 63
middle	N - 0007	
caudal	N - 0008	
Stomac (Entestine)	N - 0009	
Spleen	N - 0017	T - 07
Muscle	N - 0031	
Nose	N - 0003	T - 21
Kidney (Mesonephros)	N - 0022	T - 71
Oesophagus	N - 0005	T - 62
Pancreas	N - 0023	T - 59
Pronephros	N - 0018	T - 02
Pseudobranch		
Dorsal fin		
Lateral line	N - 0027	
Swimbladder	N - 0024	
Entestine 1	N - 0010	T - 64
2	N - 0011	
3	N - 0012	
4	N - 0013	
5	N - 0014	
6	N - 0015	
Teeth (+ lips)	N - 0001	T - 54 (T - 52)
Thymus	N - 0021	T - 98
Transversal septum	N - 0025	T - 29 (Pleura)
Tongue	N - 0002	T - 53
Section, whole animal	N - ∅	
Eye	N - 0036	

INSTITUTT FOR MEDISINSK BIOLOGI
UNIVERSITETET I TROMSØ
MORFOLOGISK SEKSJON E/S
Pb. 977, 9001 Tromsø

H 63

Prep.nr.: P 024/19W 31

HISTOLOGISK UNDERSØKELSE

Innsender:

Emmy Egidius
Fiskerdirektoratets Havforskn.inst.
C. Sundtsgt. 37
5011 BERGEN-NORDNES

Skriv tydelig, bruk skrivemaskin

Species: Makrell

Ev. identifikasjon: E 492 (22)

Alder: Kjønn:

Vekt: Lengde

Kondisjon:

Fangsted/Trålstasjon:

Fangstdato:

Vanntemperatur:

Andre oppl. om vannet:

Kort sykehistorie, funn og evt. diagnose:

Oppdrett ☐
Frittlevende ☒
Saltvann ☒
Ferskvann ☐
Foto/Dia? ☐

Behandl. før fiksering: Iset ☐
Frosset ☐
Fersk ☐

Fiksert i: Nøytral formalin

Dato:
Kl.:

Døde (dato):
Kl.:

Materialet består av:

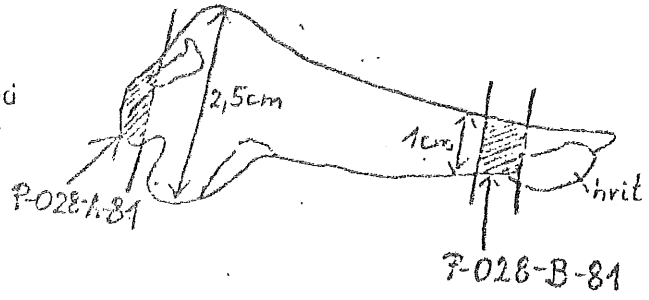
P 024/81 - P 026/81 ble mottatt sammen.
Nyre med hvite klumper.

(Utfylles av Inst. for med. biologi)

Preparat mottatt: 30.07.81

Svar:

Makroskopisk beskrivelse:
Det ble mottatt en vevsbit, 6 cm lang, med 5 hvitaktige områder på hele biten. Disse er ikke klart avgrenset mot det ellers morkbrun-svarte vev.



Mikroskopisk beskrivelse:

Det ses nyrevev med meget grove patologiske forandringer.

Hele organet er tett gjennomvokst av granulomatøse dannelser. Det som er igjen av nyrevevet er mest lymfoid vev. Melaninpigment er helt forsvunnet fra nyrevevet og ligger kun inne i noen av granulomene. Disse finnes i alle storrelser og stadier, ennå fyllt med celler, til fullstendig nekrotisert. Til dels med kalkavleiringer. Ved en del (de mindre sterkt nekrotiserte) finnes epiteloide celler. Kjempeceller kan heller ikke her påvises. Ziehl-Nielsen farging viste tallrike syrefaste staver.

Diagnose:

Granulomatos inflammasjon forårsaket av mykobakterier.

T-7100 / M-4400 / E-1750

Tromsø, 23. september 1981

RS.

Rosemarie Nesje

Rosemarie Braun-Nesje

168 - Streptococcus

1680 Streptococcus, NOS

1681 Streptococcus pyogenes
Streptococcus, beta hemolytic
Streptococcus Group A

1682 Streptococcus viridans

1683 Streptococcus faecalis
Enterococcus
Streptococcus Group D

1684 Streptococcus lactis
Streptococcus Group N

1685 Streptococcus MG

1686 Streptococcus, anaerobic
Microaerophilic streptococcus
Peptostreptococcus

169 - Lactobacillus

1690 Lactobacillus

1691 Lactobacillus acidophilus
Doderlein's bacillus
Boas-Oppler bacillus

170 - Corynebacterium

1700 Corynebacterium

1701 Corynebacterium diphtheriae
Diphtheria bacillus
Klebs-Loeffler bacillus

1702 Diphtheroids, NOS

1703 Diphtheroids, anaerobic

1704 Diphtheroids, aerobic

171 - Listeria

1710 Listeria

1711 Listeria monocytogenes
Bacteria monocytogenes

172 - Erysipelothrix

1720 Erysipelothrix, NOS

1721 Erysipelothrix insidiosa
Erysipelothrix rhusiopathiae

173 - Bacillus

1730 Bacillus, NOS

1731 Bacillus anthracis
Anthrax bacillus

1732 Bacillus subtilis

174 - Clostridium

1740 Clostridium, NOS

1741 Clostridium septicum
Vibrion septique

1742 Clostridium botulinum
Bacillus botulinus

1743 Clostridium perfringens
Clostridium welchii
Welch bacillus

1744 Clostridium tetani
Tetanus bacillus

175 - Mycobacterium

1750 Mycobacterium, NOS
Acid-fast bacillus

1751 Mycobacterium tuberculosis
Tubercle bacillus, human
Koch's bacillus

1752 Mycobacterium bovis
Tubercle bacillus, bovine

1753 Mycobacterium avium
Tubercle bacillus, avian

1754 Mycobacterium paratuberculosis
Johne's bacillus
Mycobacterium johnei

1755 Mycobacterium leprae
Hansen's bacillus
Leprosy bacillus

176 - Mycobacterium, Atypical

1760 Mycobacterium, atypical
Anonymous mycobacterium

1761 Mycobacterium, photochromogenic

1762 Mycobacterium luciflavum

1763 Mycobacterium kansasii

1764 Mycobacterium, scotochromogenic

1765 Mycobacterium, nonphotochromogenic

1766 Mycobacterium, Battey type

1767 Mycobacterium, rapid growers

1768 Mycobacterium fortuitum

177 - Nocardia

1770 Nocardia, NOS

1771 Nocardia asteroides

1772 Nocardia madurae

1773 Nocardia pelletieri
Streptomyces pelletieri

1774 Nocardia brasiliensis

1775 Nocardia tenuis

1776 Nocardia minutissima

178 – Actinomyces

1780 Actinomyces, NOS
1781 Actinomyces bovis
1782 Actinomyces israelii

179 Myxobacteria

1790 Flexibacter (Cytophaga)
1791 Cytophaga prychrophilia

18 – SPIROCHETALES

181 – Borrelia

1810 Borrelia, NOS
1811 Borrelia recurrentis
1812 Borrelia vincentii

182 – Treponema

1820 Treponema, NOS
1821 Treponema pallidum
Spirochaeta pallida
1822 Treponema pertenue
1823 Treponema carateum

183 – Leptospira

1830 Leptospira
1831 Leptospira icterohaemorrhagiae

19 – MYCOPLASMATALES

194 – Mycoplasma

1940 Mycoplasma
Pleuropneumonia-like organism

GROUPE DE TRAVAIL "PATHOLOGIE et MALADIES DES ORGANISMES MARINS
"PATHOLOGY AND DISEASES IN MARINES ORGANISMS"
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