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REGISTRATION OF DISEASES DURING TRADITIONAL BIOLOGICAL SURVEYS

by

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ICES Council resolution 1982/4:5 reads: It was decided that when possible, surveys of pathological conditions in fish should be included in fish survey cruise plans, thereby making it possible to relate such data directly to populations already being estimated by standard methods, and the results should be reported to the Council. The aim of this presentation is to discuss how this can be achieved in practice.

INTRODUCTION

During the last few years attention has been increasingly focused on diseases in marine populations. The reasons for this interest are many. Of primary importance are the great economic consequences of diseases suffered in all sorts of marine aquaculture. In addition, the discussion of the impact of pollution on marine organisms and its eventual relation to diseases has gathered great interest. Thirdly the decline in many of the commercially important marine populations has drawn attention to all possible causes for the same. And lately, the general public attention

has become much more focused on all sort of abnormalities in living organisms including those in the sea. There is no reason why disease should be less significant in marine populations than in their terrestrial counterparts. Only the conditions of observation are different: fish live at depth in water, diseases are most likely unseen, the dead fish disappear and even high mortalities can pass unnoticed.

Nor is disease in the marine environment an entirely new phenomenon. Many fish parasites were discovered and described early and the first descriptions of some of the most well-known infectious diseases date back 100 (furunculosis) and 250 (vibriosis) years. Recently also the existence of a small early century collection of diseased fish specimens containing mostly tumours of various origins complete with slides etc. was brought to the attention of fish pathologists.

In general, the collection of disease data has been rare, and although some preserved material exists from cruises, these are not usually mentioned in cruise journals. However, when older fishermen were interviewed during the 1974 vibriosis epidemic in saithe along the Norwegian west coast, they all claimed to be familiar with the disease and to have seen it locally throughout the years as far back as they could remember. Nonetheless, the first laboratory record of vibriosis from Norwegian saithe populations dates from 1965. Another disease complex equally well known to fishermen is ichtyophonasis, a widespread fungal disease of marine fish.

DISEASE CRUISES

In the last few years special disease cruises have been conducted by several of the ICES member countries, occasionally with international participation. The purpose for several of those cruises was to prove that specific pollution conditions in restricted areas could be the cause of fish diseases, as has been the case in the English Channel off the French coast and in the German Bight (Le Baut and Maggi, 1982, Dethlefsen 1978 and 1980).

Initially too little attention was paid to observations in control areas and unaffected stocks, but now there is agreement that the picture in entirety is very complex. Scottish research vessels, on the other hand, have more regularly investigated the prevalance of one certain disease, ichtyophonasis, in the haddock and plaice populations in the North Sea (Wotten et al. 1982). The U.S. research vessels are, to the authors belief the only ones to include disease records on a regular basis in the routine fish cruises (Depres-Patanjo et al. 1982).

Special disease cruises are very costly and few, if any, of the ICES member countries will be able to fund such expeditions on a regular all season basis to gather the essential background information. If countries therefore want to follow up the aforementioned ICES recommendation, recording of diseases in fish must be integrated into the routine biological surveys.

BIOLOGICAL SAMPLING AND DISEASE DATA

In biological surveys two methods are used for sampling. Either the catch of each species is roughly estimated and a random sample of up to 100 specimens is measured, weighed (or related to an existing length/weight key) and examined, or a certain number of fish of defined length-groups of each species are examined.

To include disease records in these surveys will demand some changes in the routines and will necessitate longer hours. The routines can be divided into external and internal examination.

Traditional external examination including measurement of length and weight could be supplemented by registration of: skeletal deformities, fin erosion, parasitism (including gills), tumours and ulcers/lesions. Skeletal abnormalities are generally easy to record, consisting curvature of the spine, shortened opercula, fin deformities and shortened snout. Fin erosion may be confused with catch damage, as can be the case with ulcers/lesion. Parasitism is fairly emphatic-the gill worm Lernaeocera branchialis f.ex. is easily recognized and so is the ensuing damage.

Pseudobranchial tumours are also easy to recognize.

Internal examination traditionally includes determination of age, sex and maturation, stomach content and its degradation and possibly nematode parasites. Additional examination for disease could comprise kidney infections, infections in the liver and spleen and eventual tumours. Most of these have gross symptoms which are easily recognisable.

These lists may give the impression that the work on each catch would rise considerably. This is not necessarily true, as probably only certain conditions in each species would have to be searched for. When a new disease condition is suspected in a species, the first survey with special sampling should be done by a trained pathologist. Thereafter the recording of the condition with only occasional samples for laboratory verification should be incorporated in the biological work to establish the prevalence in different yearclasses and seasons for eventual evaluation of its significance. The follow up recording would of course need some training of staff.

With samples of about 100 specimens of each fish species being examined for each trawl haul, it is evident that the lower the occurrence of a certain disease condition, the longer it will take to gather adequate information. Disease prevalence in marine fish populations are also influenced by a multitude of natural factors such as migration patterns, spawning habits, population density, nutritional conditions, competition and predation and environmental factors the diversity of which makes it clear that longterm monitoring programs will be necessary. Our work on the prevalence of pseudobranchial tumours in blue whiting can be used as an example of the work to be included for disease registration and also demonstrates the danger of conclusions based on a single cruise.

In March 1982 all blue whiting caught during a cruise at the Egga off the coast of northern Norway were examined for pseudobranchial tumours (Egidius and Monstad 1982). Nineteen trawl hauls resulted in 1171 blue whiting specimens of which 118 or

10.7% had pseudobranchial tumours. Recalculation of the data from random samples of 100 specimens, found in the cruise journals, produced a rate of occurrence of 10.0% indicating no real difference. Average length and weight of tumour-bearing fish were lower than for healthy fish, and no significant difference could be found in age distribution. The tumours did not seem to affect the development of the gonads and both sexes were equally present.

Blue whiting was scarce in the catches and only few were mature, indicating that the main stock had left on their spawning migration. During the major spawning period the stock congregates over a relatively small narrow area west of the British Isles but unfortunately we have no data of tumours during this period. During the feeding season in the summer months, the blue whiting is distributed over a large part of the Norwegian sea. An international acoustic survey on blue whiting in August 1982 in this area had 7 vessels covering nearly 150 trawl stations and only 3 tumour-bearing fish were recorded (Anon. 1982). Photographs of tumours had been distributed and 6 of the 7 vessels included the recording of tumours in their routines. This indicates that the prevalence found in March was exceptionally high for reasons as yet unknown. The significance of the condition is also unclear.

CONCLUSIONS

From marine aquaculture we know that the fry and juvenile stages of fish can be particularly susceptible to diseases and that this can lead to high mortalities (up to 80-90%). We also know that older fish are usually susceptible to the same diseases. As the mortality in early life stages of the wild fish populations is extremely high it is plausible that diseases may account for some of this, but for the time being we have no means of investigating this.

For the older fish, however, studies of disease conditions are possible. Considering the report from the Working Group on Pathology where high prevalences (up to 100%) of specific diseases are reported in commercially important stocks, routine recording

seems absolutely necessary. The methodology for disease registrations at sea surely can be improved and during a sea-going workshop on such methodology in January 1984, improvement of routines will be the main issue. Hopefully, therefore, at the next statutory meeting easily applicable and reliable routine survey methods for diseases in fish can be reported.

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