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REPORT ON AN EPIZOOTIC OF VIBRIOSIS IN THE YOUNG SAITHE POPULATION  
ALONG THE NORWEGIAN COAST.

by

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ABSTRACT

From July to November 1974 an epizootic of vibriosis occurred in the young saithe population along the western Norwegian coast. Diseased fish showed external lesions. Vibriosis is the economically most important disease in sea-rearing of salmonids. The disease in the saithe population did not seem to affect the farm fish, indicating host species pathogenity in the bacterial strains.

INTRODUCTION

During the summer of 1974 several outbreaks of a disease producing skin and muscular lesions in young saithe were reported from shallow coastal waters in western Norway. In September the same was reported in seine catches from the south coast and from then on the number of reports increased from all along the west coast. The epizootic culminated in October and seemed to vanish in late November - December. Laboratory examinations confirmed the disease to be vibriosis.

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## THE DISEASE

Vibriosis is a well-known marine fish disease caused by a bacterium, Vibrio anguillarum, or closely related species, and has been described from a variety of free-living fish such as eel, cod, saithe, different flatfish species and Pacific herring. The disease has been known since 1909 when Bergmann described the bacterium causing it, but it did not catch serious attention before it became a real menace in sea-rearing of salmonids. Most of the knowledge of the disease therefore, refers to salmonids.

In salmonids the disease can be acute with high mortality and without the fish showing external symptoms. In its more protracted form disease signs are necrotic lesions of the skin and musculature, erythema of the paired fin bases and intestinal hemorrhages. It is not known if the course of the disease in saithe is the same as in salmonids. Very probably an acute disease attack with high initial mortality without external symptoms can appear unnoticed in a free-living fish population. Most of the diseased saithe observed had necrotic skin lesions, and laboratory examined fish also showed intestinal hemorrhages. In diseased fish the bacterium can be isolated from the blood and from spleen, kidney and lesions.

In salmonids the young fish are more susceptible to the disease than are the older ones and disease attacks mostly can be related to stress (transfer from fresh to sea water, overcrowding and rough handling). In the saithe epizootic the one-year old fish were most seriously hit, only a few diseased yearlings and two-year old fish were reported.

## DEVELOPMENT OF THE EPIZOOTIC

The rearing of salmonids in floating pens in the sea attracts smaller fish, especially saithe. The yearlings frequently are small enough to enter the pens and very soon grow to large to get out again.

In the beginning of July 1974 a fish farm in the Florø region reported diseased saithe inside and outside the rearing pens. Most of the diseased saithe showed skin lesions, and within ten days all saithe inside the pens were dead. The laboratory diagnosis was vibriosis.

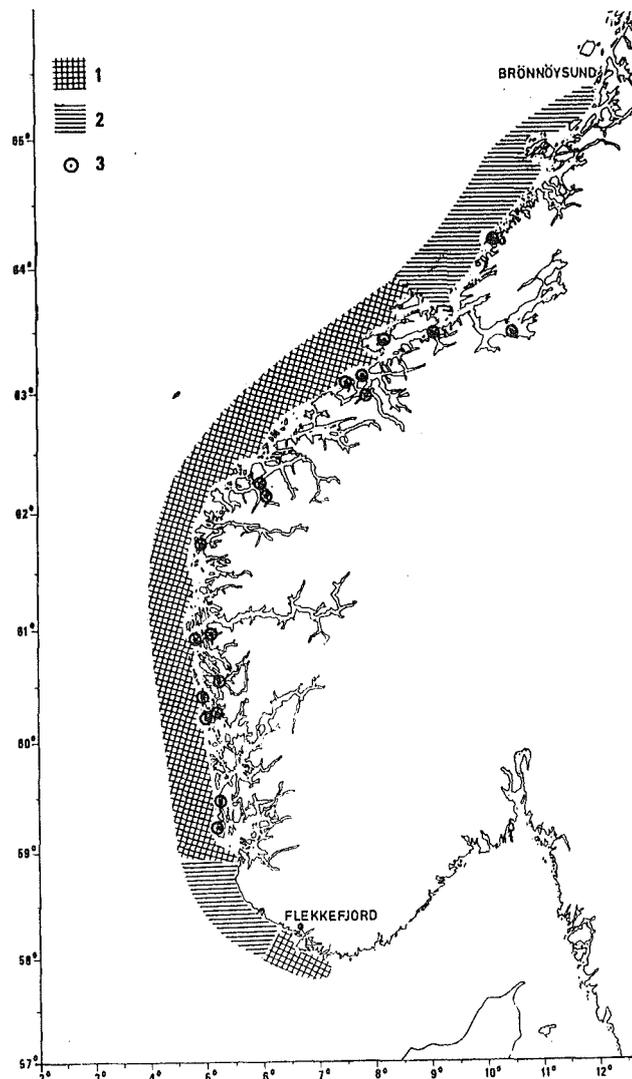


Fig. 1 Spread of the 1974 vibriosis epizootic  
1) Heavy attacks 2) Sporadic occurrence  
3) Bacterial isolates for further study

In the middle of August diseased saithe inside another salmonid farm was reported, this time in the Bergen area. The laboratory diagnosis again was vibriosis. Here the mortality of saithe was estimated to about 75 %.

In early September young saithe with skin lesions were reported in seine catches in the Flekkefjord region, and from then on saithe with skin lesions and mass-mortalities of young saithe were reported from all along the west coast. The northernmost report came from Brønnøysund, from Brønnøysund to Trondheim the disease occurred sporadically, between Trondheim and Stavanger the disease struck fully, and from Stavanger to Flekkefjord it again appeared sporadically (Fig. 1). The east coast did not seem to be affected.

In the middle of November fishermen in the Bergen region reported saithe with healing wounds, but how many of the fish with lesions can survive is not known. Reports from the various districts where the disease struck, indicate from 10 to 100 per cent of the fish in the area having lesions. The total mortalities due to the disease are also impossible to estimate.

#### PREVIOUS REPORTS OF VIBRIOSIS IN SAITHE

The 1974 epizootic of vibriosis in the young saithe population received a fair deal of publicity in Norway, but actually similar, if less wide-spread epizootics, have been reported earlier.

In 1962 there was disease and mass-mortality in young saithe around Lindesnes. The description of the disease points to vibriosis.

In 1965 diseased fish were seen from Batalden to Frøya, near Kristiansund N. catches were said to contain 100 % affected fish (Fig. 2). In 1967 the same happened from Stavanger to Rørvik north of Trondheim. Both years laboratory diagnosis confirmed vibriosis.

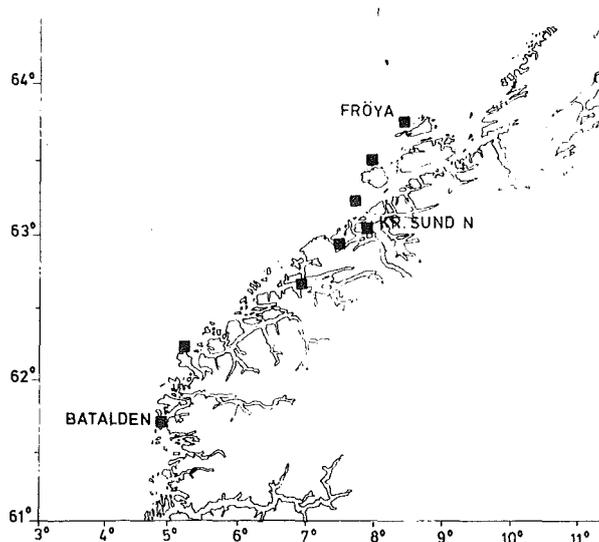


Fig. 2 Occurrence of vibriosis in young saithe 1965

In 1969 diseased saithe were reported in the Bergen region and in 1970 around Kristiansund N. Again laboratory diagnosis showed vibriosis.

In 1972 research on marine fish diseases and specially on vibriosis was started at this institute, and both in 1972 and 1973 vibriosis was found as cause of local mass-mortalities in saithe.

Experienced fishermen in the affected areas who have been asked, all state that skin lesions in young saithe occur more or less frequently every year and has been seen as long back as they can remember.

From other North-Sea countries references to what might have been vibriosis in saithe have been found from Foula in 1967 and from the Skaw ground in 1970 (Scottish Fisheries Bulletin nos. 28 and 35), but a laboratory diagnosis is not reported.

#### DISCUSSION

About the epizootology in the sea very little is known, but most probably it is not very different from the epizootology in land populations and there fluctuation of populations caused by disease is well known.

The vibriosis bacterium most probably is able to survive free-living in the sea for some time, but apparently some sort of infectious foci must exist, presumably as latent infection in fish. Saithe is a schooling fish and large schools often gather in restricted areas where current conditions make feeding abundant. The 1973 year class of saithe is very large, making it still easier for infections to spread.

North-Sea saithe were said to be in poor condition last summer. This could point to feed shortage and lowered resistance to infections. On the other hand, the saithe around the salmonid rearing pens are very well fed and in good condition - and were the first to be hit by the disease.

Another theory tries to connect the disease outbreak with pollution, i.e. the sort of pollution that augments the load of organic particles in the sea. At least it seems fairly sensible that the vibrios when free-living in the sea, are attached to minute organic particles. In this sence, a heavier load of such particles may also give a higher density of bacteria.

In salmonids the disease outbreaks mostly are related to water temperature, temperatures more than 10 °C favouring the disease. The water temperature could have been the reason why the disease did not go further north as Brønnøysund, but the records show only slightly lower temperatures further north. More important could be the possibility of different resistance to infections in saithe strains. If this is so, we have no means of proving today, but the saithe further north do not originate from the same spawning grounds as do the saithe in our south-western region.

The salmonid farms have been said to be the source of infection for the saithe, but there was not unusually much vibriosis among reared salmonids last year, and furthermore, where saithe in and around salmonid pens were hit, the salmonids were not affected. The same has earlier been observed the other way round: from all saithe in a sample taken outside a pen with rainbow-trout with vibriosis, the bacterium could be isolated, but the saithe seemed in perfectly good health.

The difference between Vibrio anguillarum strains isolated from trout and saithe is very slight, but laboratory experiments points to specific pathogenity in the strains. We have been able to induce experimental disease showing the usual symptoms by injecting a strain isolated from diseased rainbow trout into rainbow-trout, where as a saithe isolat in rainbow-trout does not affect the fish. Further experiments in this line are in progress.