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ULCERATIVE DERMAL NECROSIS (UDN) IN SWEDISH SALMON RIVERS

by

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INTRODUCTION

Ulcerative dermal necrosis (UDN) is a pathological condition of mature salmonids, characterized by progressive cytolytic necrosis of the epidermis at non-scaled areas of the body. Secondary bacterial and fungal (mainly Saprolegnia parasitica) infections of the lesions are frequent. Adult migratory Salmon (Salmon salar L.) and Sea trout (Salmo trutta L.) are described to be affected as they are entering fresh water (Roberts, 1971).

A recent outbreak of the disease was recognized in south-west of Ireland in 1964 (Brown, 1966; Went, 1967; Carbery, 1968). A rapid spread of the disease is reported, and by 1968 almost all salmon rivers at the British Isles were affected (Elson, 1968; Roberts, 1971). In 1968 it was observed in two French salmon rivers in Brittany (Kinkelin and Le Turdu, 1971), and in 1971 at the Atlantic coast of Spain (Murphy, 1973).

Thompson et al. (1973) have reported one suspected case of UDN in Poland. However, this record is unconfirmed, and to date it would seem that the first outbreaks of the disease in the Baltic Sea region occurred in Sweden in 1975. Salmon and Sea trout in three main salmonid rivers in northen Sweden were seriously affected that year, and by 1977 the disease has extended to at least nine salmon rivers.

EPIZOOTOLOGY

The first outbreaks of UDN were recognized almost at the same time in early August 1975 in two different areas of the Baltic coastal region - the River Lule (09) in the North of Sweden, and the Rivers Indalsälven (40) and Ljungan (42) (Table 1 and Figure 1). So far as is known no other waters were affected this year.

With the run of 1976, Salmon and Sea trout in the River Ångermanälven (38) were found to be affected as well as Sea trout in two rivers at the south coast; River Verkeån (87) and River Nybroån (89). This shows a "jumping" progress of the spread which is difficult to explain. However, a similar picture is described from the British Isles (Roberts, 1971). In 1976 the disease was recognized also in adult Brown trout in an inland fish farm situated about 250 kilometers from the coast (Figure 1). These fishes had until 1975 been fed on vendance (Coregonus albula L.) from the Baltic.

By August 1977 the disease has spread also to the River Torne älv (01) in the upper north, the River Ume älv (28) and the River Dalälven (53), the two last-mentioned being suspected already in early autumn 1976.

TABLE 1. Swedish rivers infected or suspected to be infected with UDN by Aug. 1977. Comp. Figure 1.

River Name	River Number (Comp. Fig. 1.)	Month and year of the first known occurrence of UDN	
Torne älv	01	Aug. 1977	
Lule älv	09	Aug. 1975	(initial area of infection)
Ume älv	28	Aug. 1977	(suspected in July 1976)
Ångermanälven	38	Aug. 1976	
Indalsälven	40	Aug. 1975	(initial area of infection)
Ljungan	42	Aug. 1975	
Dalälven	53	April 1977	(suspected in July 1976)
Mörrumsån	86	Aug. 1977	(suspected, under investigation)
Verkeån	87	Oct. 1976	
Nybroån	89	Aug. 1976	

SPECIES AFFECTED

By the present outbreak the disease has so far only been found in adult Salmon, Sea trout and Brown trout. There is, however, a remarkable increase in the frequency of infections with Saprolegnia parasitica in whitefish (Coregonus lavaretus L.) in areas where Salmon and Sea trout are infected by UDN. Similar observations are earlier reported from Scotland by Roberts et al. (1970).

TIME OF THE YEAR

Early observations on UDN indicated a temperature - dependent occurrence, the disease was reported to be most prevalent in the colder periods of the year from late autumn (Carbery, 1968). On the other hand, it is shown that

falling temperatures will increase the length of the incubation period (Strickland and Carbery, 1968). All outbreaks of UDN in Sweden have started at rather high (15 - 20° C) water temperatures a few veeks after the first salmon run and the desease seems to be most prevalent in early autumn.

This indicates that the seasonal fluctuations in the incidence of the disease are related not only to the water temperature but also to other factors, inter alia the time for and intensity of the run and the length of the period during which the fish have been staying in fresh water.

DISEASE FREQUENCY AND MAGNITUDE OF LOSSES

It is extremely difficult to determine the frequency of disease, and mortality due to the disease under natural conditions, and few data are available. A random sampling made by netting in the River Indalsälven in August 1975 (first year of infection) showed a disease frequency of 33 per cent (of 200 salmon examined, 66 showed clinical manifestations of UDN). This is in accordance with the findings in Scottland (Roberts, 1971). There are also observations indicating that the disease rates are dropping after one or two years of infection.

In stations where migratory salmon are caught and kept (during the period June - October) for stripping rather high losses are noted. Table 2 shows the rate of mortatlity in two of these stations during 1975 and 1976.

TABLE 2. Percentage of mortatlity due to UDN in salmon and Sea trout kept for stripping in two different rivers, years 1975 and 1976.

		Station A R. Indalsälven		Station B R. Lule älv	
		% of mortality		% of mortality	
		1975	1976	1975	1976
Salmon	♀	58,8	30.0	60.8	28.1
Salmon	♂	22.9	17.4	30.9	15.2
Sea trout	♀	52.3	29.6	52.7	28.6
Sea trout	♂	47.2	14.1		

In 1975 when the fish were untreated (or not adequate treated) the losses were about 60 % in female salmon and 20 - 30 % in male salmon. There are reasons to belive that this mortality rate is far more high than under natural conditions due to stress created by the environmental conditions in the stations. In 1976 adequate treatments were undertaken in both stations, reducing the mortality rates with about 50 per cent. It is also worth - while to note the remarkable differences between sexes. Female salmon show both year at both stations mortalit rates twice the male salmon.

MEASURES FOR CONTROL

Most reports on the aetiology of UDN indicate an infectious nature of the disease, although no pathogen has been described or isolated. Therefore full - scale attempts is made to eliminate the risks for spread of the disease, and the following measures are taken:

i. Information on the disease and on methods for hygienic precautions are given to all fishery - biologists and fisherman.

ii . A disease recording system is established

iii. Restrictions on transportation of fish from infected areas to not infected areas at the Baltic coast.

iiii. Restrictions on transportation of fish and fish eggs from the whole Baltic coastal region to inland waters and to the west-coast.

In pre-spawning Salmon and Sea trout kept in impoundments for stripping, treatments with formalin is used for the control of UDN-Saprolegniasis. Regular treatments by bathing (1:4000 for 50 minutes, three times a week) is found to be effective

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FIGURE 1. The present spread of UDN in Sweden. Figures within circles refer to river numbers in Table 1. ★ indicates the initial areas of disease outbreakes.