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PRELIMINARY RESULTS OF AN ATLANTIC SALMON POPULATION STUDY

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INTRODUCTION

For many reasons the Atlantic salmon represent a fascinating subject for population studies. Salmon from both sides of the Atlantic are believed to mix in the Greenland seas. Many people believe, however, that the European and American stocks segregate and, moreover, in each region an individual salmon river has its own population. The question also arises whether grilse and large salmon represent the same population, and whether the early and late spawning runs in American rivers are composed of genetically different groups of individuals.

The following represents a survey of salmon population studies executed at the Fisheries Research Board of Canada's Biological Station in St. Andrews, N.B., since November 1968.

IDENTIFICATION OF GENETIC CHARACTERS

Interest has been focussed on the presence of hereditary characters in blood. Careful blood sampling rarely hurts the fish, so that it is possible to use fish ladders and fences in rivers as sources of material. In addition, samples from both smolts and adults are easy to collect and handle in preparation for the subsequent various analyses.

Most of the material for the studies has been obtained by repeated bleeding of about 80 salmon of different ages and origins kept in tanks at the Station.

BLOOD TYPE STUDIES

The blood typing technique used has been described elsewhere (Møller, 1967).

A total of 36 rabbits have been immunized with blood cells from 18 different salmon. However, only one third of the rabbits have been investigated thoroughly up to now. The animals have reacted strongly to the cells; rabbit sera have reached titers of 1:712 to 1:11392. In spite of these high values, however, it has been impossible to detect specific antibodies even by titrations of absorbed sera against donor cells.

An injection course on 18 rabbits with the use of Freud complete adjuvant is now under way. Injection courses with salmon and cod as recipients have also been carried out. However, most of the cod have died, probably a direct result of the injections of salmon cells. Because of the long time needed to produce antibodies at low temperatures, the results of these courses of injections will not be available before late autumn.

ELECTROPHORETIC STUDIES

The electrophoretic technique used is described by Sick (1965) and Møller (1966).

The number of specimens investigated is not high. Samples from 40 to 50 different individuals have been analysed for the ten different systems investigated. These systems are, LDH and transaminase in sera, red cells, and muscle; esterase in sera and red cells; haptoglobin in sera; together with the common amidoblack staining of the "total" electrophoretic patterns of sera and red cells.

The patterns from one individual to another are very similar, each consisting, mostly, of one or two characteristic bands. Encouraging, however, are the different patterns of esterase in the red cells and the transferrin patterns detected by Naevdal (1969, pers. comm. See also Møller and Naevdal, 1967). These patterns represent a two-band system, and all three possible patterns have been observed in smolts, grilse, and large salmon. Freezing and thawing do not affect these patterns.

POPULATION STUDIES

Samples of salmon are available only from the end of May to the beginning of November. Good samples and high numbers of specimens have been, or will be, obtained from rivers in Labrador, Newfoundland, Quebec, and New Brunswick. The values of the frequencies will not be available, however, before later this autumn.

LITERATURE

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