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Tor Strømngren

ZOOPLANKTON AND HYDROGRAPHY IN TRONDHEIMSFJORDEN

ON THE WEST COAST OF NORWAY

TRONDHEIM 1974

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ZOOPLANKTON AND HYDROGRAPHY IN TRONDHEIMSFJORDEN

ON THE WEST COAST OF NORWAY

by

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ABSTRACT

Strömngren, Tor. 1974. Zooplankton and hydrography in Trondheimsfjorden on the west coast of Norway. *K. norske Vidensk. Selsk. Mus. Miscellanea* (17): 1-35.

An analysis of the relationship between hydrography and the zooplankton in Trondheimsfjorden is presented on a basis of zooplankton samples and hydrographic data collected during 1963-1966 and 1968-1972.

A highly significant correlation was found between the size of the spring generation of the most important copepod species present, *Calanus finmarchicus*, and the discharge of riverine freshwater into the fjord prior to the main spring flood. The brackish water run-off is assumed to transport the juvenile stages of *C. finmarchicus* out of the fjord.

During the late summer and autumn, a highly significant correlation was found between the numbers of *C. finmarchicus*, copepodite stage V, and the salinity below threshold levels. The increased salinity at this season is assumed to indicate an inflow of deep water, which carries with it fresh stocks of *C. finmarchicus*, thus compensating for the vernal loss of the juvenile stages.

Several autochthonous temperate species show a decrease in abundance from the mouth to the inner parts of the fjord during summer and autumn, which is correlated with warm water influxes. The immigrants carried in by these influxes contribute significantly to the local stocks.

A number of allochthonous species are indicators of surface or deep-water inflows in the autumn.

The close relationship found between zooplankton and hydrography, demonstrates that establishment of the stocks of the various species is affected by the complex interaction of several independent biological and physical factors. This probably explains the large temporal and spatial variations of the zooplankton found in Trondheimsfjorden.

A comparison with data from Hardangerfjorden indicates similar relationships between zooplankton and hydrography.

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CONTENTS

	Page
INTRODUCTION	7
THE INFLUENCE OF BRACKISH WATER RUN-OFF IN SPRING	8
THE INFLUENCE OF DEEP INFLOWS IN SUMMER AND AUTUMN	14
TEMPERATE AUTOCHTHONOUS SPECIES AND THE HYDROGRAPHY IN SUMMER AND AUTUMN	21
IMMIGRATION OF ALLOCHTHONOUS SPECIES IN AUTUMN	27
ASPECTS OF THE DYNAMICS OF THE ZOOPLANKTON IN TRONDHEIMSFJORDEN	30
ACKNOWLEDGEMENTS	32
REFERENCES	33

INTRODUCTION

In Trondheimsfjorden marked annual variations occur in the composition of the zooplankton and the abundance of the different species. The cause or causes of these variations are not yet fully understood. Several events may determine success or failure, such as food supplies, predation, the reproductive dynamics of the various species and certain abiotic factors, e.g. currents. The long-term investigations made in Trondheimsfjorden, permit an analysis of the relationship between hydrography and the occurrence and abundance of many zooplankton species.

This paper is a discussion of the results of previous investigations in Trondheimsfjorden made during 1963-1966 and 1968-1972 (Strömngren 1973a, b, c; Wendelbo 1970). Comparisons are made with similar investigations in Hardangerfjorden in 1950-1951 (Gundersen 1953) and 1955-1956 (Lie 1967, Saelen 1962). The sampling stations for Trondheimsfjorden are shown in Fig. 1, and the sampling dates during the investigation period are shown in Table 1.

The methods used in sampling the zooplankton, together with their limitations, have been discussed previously (Strömngren 1973a).

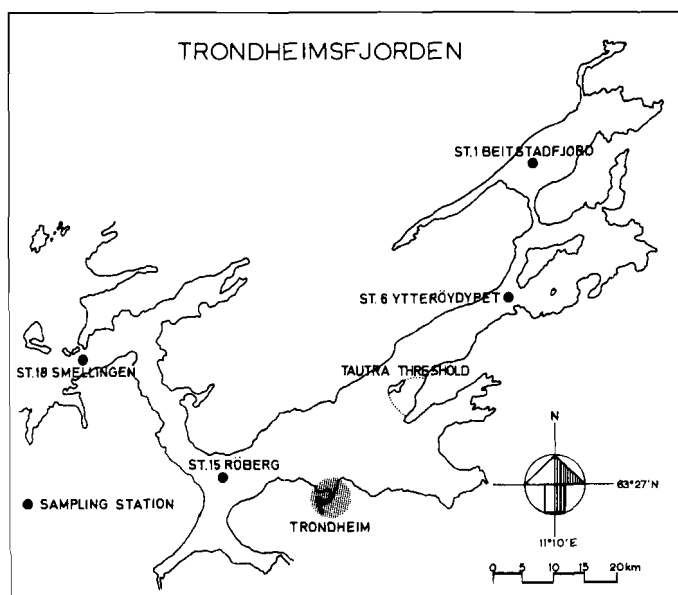


Fig. 1. The positions of the four sampling stations in Trondheimsfjorden.

