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Jon-Arne Snøli

THE DISTRIBUTION OF CAUDOFOVEATA, POLYPLACOPHORA, AND  
PROSOBRANCHIA IN BORGENTJORDEN, NORTH-TRØNDELAG, NORWAY

TRONDHEIM 1975



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Contribution No. 187. Biological Station, Trondheim, Norway

THE DISTRIBUTION OF CAUDOFOVEATA, POLYPLACOPHORA, AND  
PROSOBRANCHIA IN BORGENTJORDEN, NORTH-TRØNDELAG, NORWAY

by

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ISBN 82-7126-063-4

ABSTRACT

Sneli, Jon-Arne. 1975. The distribution of Caudofoveata, Polyplacophora, and Prosobranchia in Borgenfjorden, North-Trøndelag, Norway. *K. norske Vidensk. Selsk. Mus. Miscnea* (23): 1-26.

The species distribution was investigated by grab sampling with a 0.1 m<sup>2</sup> Petersen grab (1,039 samples) during the years 1967-1971. A total of 1,195 specimens, belonging to 29 species, were obtained. The most abundant species on soft bottom substrates in Borgenfjorden were *Turritella communis* and *Aporrhais pespelecani*, comprising altogether 92.5% of all the specimens collected. About 40% of the species sampled are typical epifaunal organisms. In all three groups lusitanian-boreal species dominated within both fjord basins. Local distribution maps are presented.

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CONTENTS

INTRODUCTION .....	7
AREA AND ENVIRONMENT .....	7
MATERIAL AND METHODS .....	10
RESULTS .....	11
Caudofoveata .....	12
Polyplacophora .....	12
Prosobranchia .....	14
DISCUSSION .....	21
ACKNOWLEDGEMENTS .....	24
REFERENCES .....	26
MAPS	





## INTRODUCTION

The first inventories of the algae, benthic invertebrates, fishes and mammals in Borgenfjorden were made about half a century ago (Nordgaard 1910, 1923). The fjord once harboured a large stock of plaice (*Pleuronectes platessa* L.), but the size of the stock decreased considerably after 1940-1945. An extensive biological survey, to study the ecological relationships in the fjord, and if possible, to find reasons for the decrease in the stock of plaice was therefore started in 1967 (see Borgenfjordundersökelsene 1969, 1970, 1971, 1973).

The Borgenfjord survey includes investigations of the bottom fauna (Gulliksen, 1971, 1972, 1974, Holthe 1973, E. Lande 1975, E. Lande & Gulliksen 1973, Skjæveland 1972, 1973), sediments (Strömngren 1974, Strömngren et al. 1971), hydrodynamics (McClimans 1973), food and feeding habits of cod (Denstadli 1972) and plaice (R. Lande 1972, 1973).

This paper deals with the Caudofoveata, Polyplacophora, and Prosobranchia sampled in Borgenfjorden during the period 1967-1971.

## AREA AND ENVIRONMENT

Borgenfjorden is located in the inner part of Trondheimsfjorden (Fig. 1). It is connected with Trondheimsfjorden proper by a narrow inlet, Strømmen, approximately 5-6 m deep and 150 m wide. The fjord itself is divided into two basins by a threshold, at a depth of 14 m. The maximum depth of the outer (southern) basin is nearly 40 m, of the inner (northern) about 30 m (cf. Fig. 3). The surface area of the fjord, at the high water mark, is estimated to be ca. 19.3 km<sup>2</sup>.

Based on SCUBA-diving forays and from the contents of dredges and grabs, Gulliksen (1971) has described the main types of bottom substrate; sediment analyses of subsamples from 85 grab samples have been published by Strömngren et al. (1971). The finest sediment types are found in the northern basin (Fig. 2). Coarser sediments occur where the tidal current has its greatest influence, i.e. near the entrance to the fjord, in areas situated on the west side

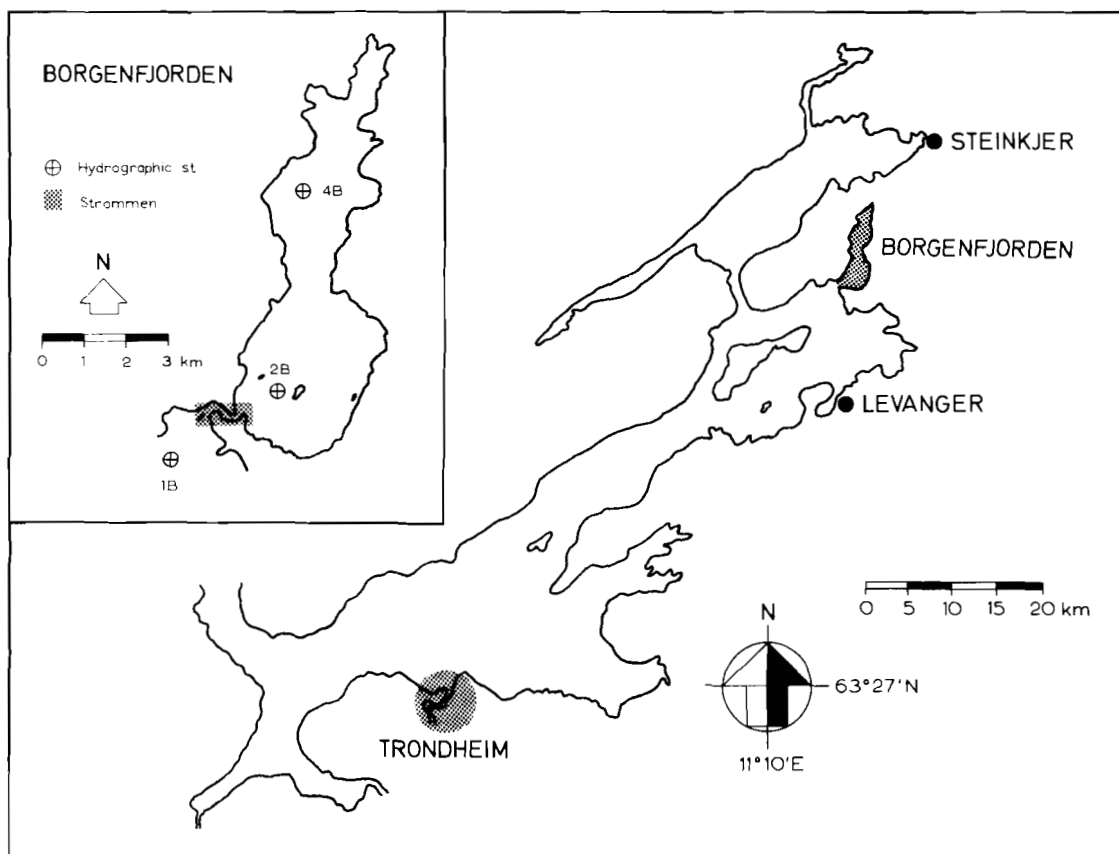


Fig. 1. Map of Trondheimsfjorden showing the location of the landlocked basin Borgenfjorden (after E. Lande & Gulliksen 1973).

of Rolsøy, and on the threshold between the two basins. Medium types of sediment are mainly found in the southern basin. The soft bottom material has a high content of organic matter (Strömngren et al. 1971).

The water masses of Borgenfjorden originate from the surface layers of Trondheimsfjorden proper, and 50% of the water masses are renewed over a period of 11-14 days (McClimans 1973). The tidal current through Strømmen, which may reach a speed of 5 m/sec near the surface (McClimans 1973), produces strong turbulence in the water masses of the southern basin, which are therefore practically homogeneous throughout the whole water column.

In the northern basin, however, a pycnocline is formed at about 15-20 m depth during the summer. Decomposition of trapped

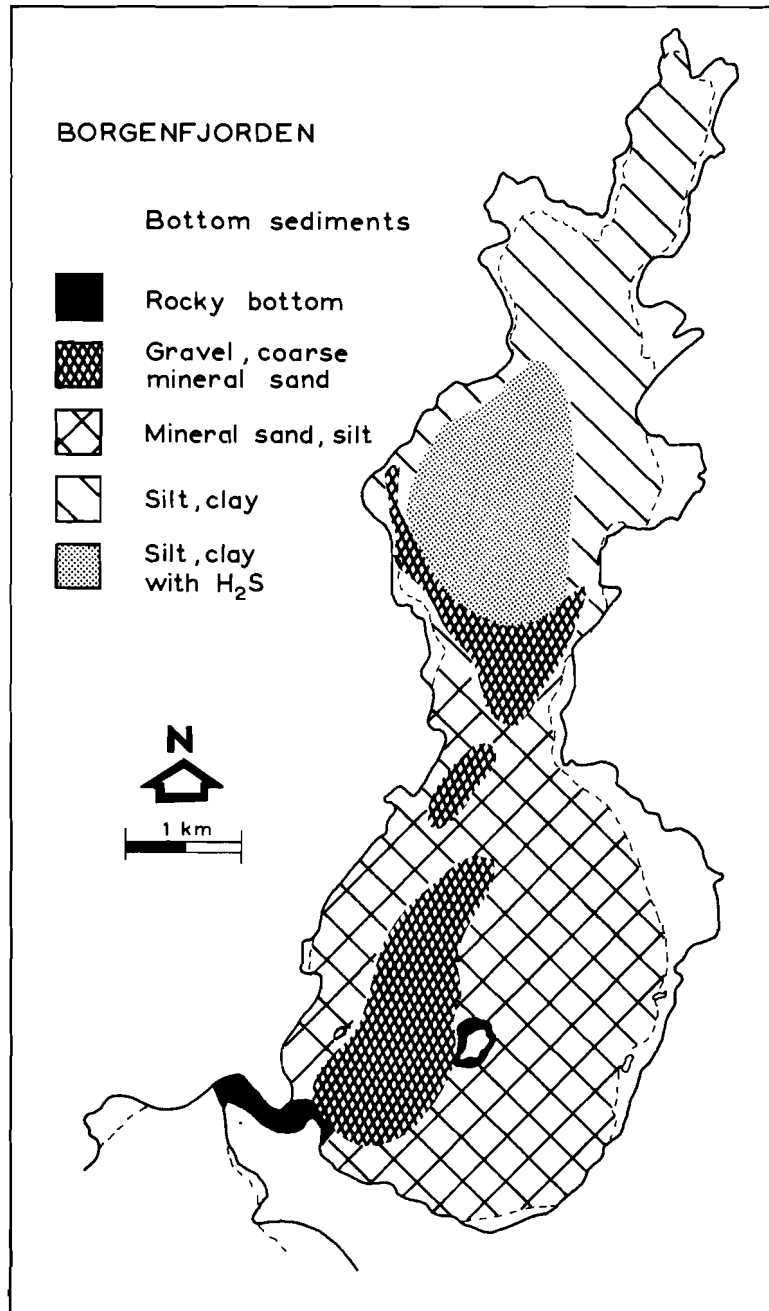


Fig. 2. Distribution of the main types of bottom sediments found in Borgenfjorden (after Gulliksen 1971).

organic matter below the pycnocline results in oxygen deficiency, and H<sub>2</sub>S is formed. An annual renewal of the stagnant bottom water starts in the autumn or early winter and continues throughout the winter.

The water temperature usually ranges annually from 1<sup>o</sup> to

20°C and the salinity from 20 to 30‰.

### MATERIAL AND METHODS

Between September 1967 and October 1971 a total of 1.039 samples were obtained by means of a 0.1 m<sup>2</sup> Petersen grab. The most valuable, because consecutive, period of observations is from

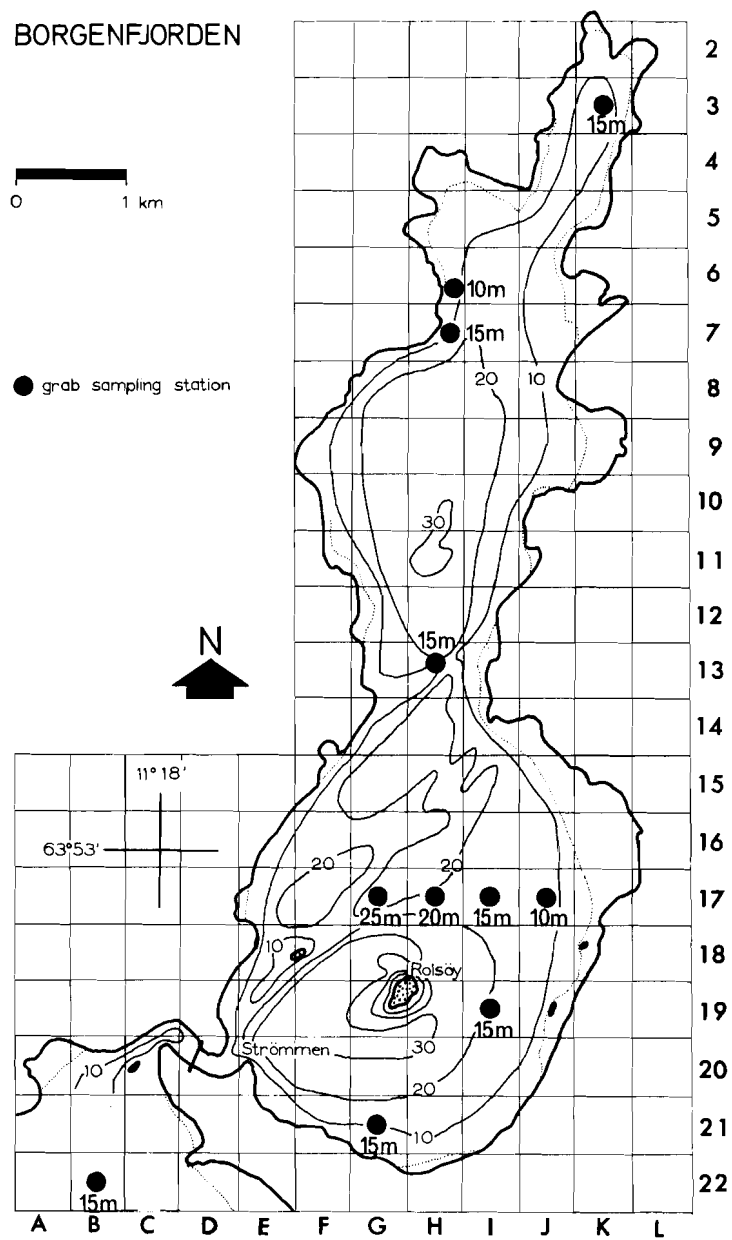


Fig. 3. Map of Borgenfjorden showing isobaths, coordinate grid, positions, and depths of all stations sampled between May 1970 and October 1971.



























































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