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BENTHIC FAUNA OF A MEROMICTIC LAKE, LANGSEE, AUSTRIA

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ABSTRACT

Benthic fauna and the influence of meromictic characters of the lake, Langsee in Austria observed in May, 1976 are dealt with. Oxygen and temperature are found the most important parameters influencing the distribution of benthic fauna of Langsee. Number and variety of benthic forms are more in the mixing layer than in the monolimnion layer of the lake.

INTRODUCTION

Within the Austrian Alps, meromictic lakes are relatively abundant and concentrated chiefly to the federal province of Carinthia. Langsee, with an area around 1.5 km^2 was studied during May 1976 to assess the existing benthic fauna and the influence of the meromictic characters of the lake on their distribution. The maximum depth noted was 21 m. and generally during the period of investigation the weather was bright with sunshine. During 1972 Limnology excursion some benthic studies were made (Loffler, 1973).

MATERIAL AND METHODS

Two stations were selected for the study based on the depth contour of the lake. Station I was with gradual depth contour and station II was with steep depth contour. Through using an Ekman dredge of 100 cm^2 samples were collected at following depths namely 1, 3, 6, 11, 15 and 20 m. After washing, the bottom samples were filtered through the sieves of 500 μ, 200 μ and 100 μ and benthic fauna were separated for identification. The data pertaining to temparature, dissolved oxygen, conductivity and alkalinity were recorded for different depths.

RESULTS

The distribution of benthic fauna is influenced by various parameters like nature of sediment, temperature, Oxygen, pH and Oxidation-reduction potential. Among these Oxygen and temperature are the most important parameters. Considering the physico-chemical data (Table I) the temperature values tend to decrease gradually upto 3 m. and from here the decrease is rapid upto 11m. After this depth the temperature is almost the same. The dissolved oxygen values show a peak at 6 m. (12.9/mg/1) and suddenly drops down from 11 m. onwards. Alkalinity and conductivity values increase in accordance with the depth. But conductivity values increase rapidly from 11 m. onwards. Berger (Loffler *et al.* 1973) reported about the meromictic characters of this lake and about the monimolimnion layer.

Benthic fauna (Table II, III) of Langsee consists mainly of the following types namely Oligochaeta, Nematoda, Chironomid larvae, Chaoborus larvae and Ostracoda. Nematoda, Bdelloidea, Naidea, Tubificidae, Tardigrada, Ostracoda, Cladocera and Chironomid larvae were recorded from this lake by Schiemer (Loffler *et al.* 1973).

* Work carried out at Limnology Institute, Vienna, Austria.

TABLE 1.—Physico-Chemical Data

Depth m	Temperature C	Oxygen mg/l	Alkalinity	Conductivity mS 20
1	17·8	10·8	3·5	338
3	17·2	11·8	3·6	352
6	10·4	12·9	3·6	395
11	5·2	6·0	3·9	495
15	5·0	0·8	4·4	526
20	5·0	0	5·0	582

TABLE 2.—Benthic Fauna-Station I

Animal Types	Depth in m.						Total
	1	3	6	11	15	20	
Oligochaeta	5	1	—	—	2	—	8
Nematoda	4	20	—	3	2	4	33
Platyhelminthes	—	—	—	—	1	—	1
Chironomid larvae	5	25	—	5	2	2	39
Chaoborus larvae	—	—	—	5	64	2	71
Ceratopogonid	—	—	—	—	—	—	—
Corixidae	—	—	—	—	—	—	—
Tardigrada	—	1	—	—	—	—	1
Halacaridae	1	—	—	—	—	—	1
Macrothricidae	—	22	—	2	1	2	27
Chydoridae	—	55	—	12	20	7	94
Cyclops	—	12	—	9	—	2	23
Calanoids	—	—	—	—	—	—	—
Ostracoda	—	65	—	25	—	—	90
Herpecticoidea	—	2	—	—	—	—	2
Nauplii	—	11	—	2	1	1	15
Total	15	214	—	63	93	20	405

TABLE 3.—Benthic Fauna—Station II

Auimal Types	Depth in m.						
	1	3	6	11	15	20	Total
Oligochaeta	—	2	—	—	—	—	2
Nematoda	3	13	1	—	—	1	18
Platyhelminthes	—	—	—	—	—	—	—
Chironomid larvae	12	1	4	—	—	—	17
Chaoborus larvae	—	—	—	2	—	—	2
Ceratopogonid	3	—	1	—	—	—	4
Corixidae	—	—	—	1	—	—	1
Tardigrada	—	1	—	1	—	—	2
Halacaridae	1	—	—	—	—	—	1
Macrothricidae	18	8	1	—	—	—	27
Chydoridae	—	11	—	—	1	—	12
Cyclops	5	4	3	1	—	—	13
Calanoids	3	—	—	—	—	—	3
Ostracoda	8	37	10	—	18	3	76
Herpecticoidea	—	—	1	—	—	—	1
Nauplii	—	2	1	—	—	—	3
Total	53	79	22	5	19	4	182

DISCUSSION

The distribution pattern of benthic animals clearly indicate different zonations in accordance with the meromictic characters. For instance, though Oligochaeta, Chironomid larvae, Nematoda and Ostracoda are distributed upto 6 m. depth, maximum number is noted, at 3m. depth. The mixing layer of the lake is having more percentage of benthic forms both in number and in variety than the monomolimnion layer. Chaoborus larvae are present in large numbers in monimolimnion layer besides the occasional forms. They exhibit a peculiar phenomena of migrating to deeper waters during day time and coming up during night (Loffler *et al.* 1973). Also, the role of the depth contour in the distribution of benthic fauna is evidenced by the differences in number in between two stations namely 405 in Station I and 182 in Station II.

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