

i.) English summary (G.BRETSCHKO, P.SCHABER)

ii.) Research and teaching activities at the Division of Limnology

After a short description of the history of the division an outline of the teaching programme is given in relation to present changes in legal regulations. Both, the goals of current graduate student work and the titles of these finished in 1975 are listed. The entire research programme of the division is shortly described according to the six main chapters of the report, focussing mainly on organisation and financial support. Finally a short account is given to the divisions activities in applied limnology, mainly the surveying and rehabilitations of recreational lakes.

I.) Ecosystem study "Piburger See".

The introduction illustrates the history of the activities at Piburger See (1. PECHLANER). The following chapter (2.1. MAYRHOFER) presents the investigations of some physical (tab. 2.1.-8 stability, tab. 2.1.-9 heat budget) and chemical parameters (oxygen content, conductivity, pH, maior ions on tables 2.1.-1 to 2.1.-7). The iron cycle and iron-bacteria are discussed and given on 4 figures (2.2. GANTHALER). Three phosphorus fractions (2.3. BACHINGER) have been determined monthly: dissolved orthophosphate and total phosphorus in filtrated and unfiltrated water. Means for different water bodies and times are described (tables 2.3.-1 to 2.3.-5). The total phosphorus content of rainwater was weekly investigated for two summermonths. Three anorganic and two organic nitrogen compounds have been studied (tables 2.4.-1 to 2.4.-5, 2.4. SOSSAU).

The water economy (3. GATTERMAYR) was studied by registrating evaporation, inflow and outflow. Two formula are given to calculate the evaporation. The results are compared with direct measurements (tables 3.-1 to 3.-6).

The study on bacterio plankton (4.1. PSENNER) presents results of abundance and distribution of total bacteria (fig.4.1.-1), biomass (fig.4.1.-2) and the mean bacteriale volume (fig.4.1.-3). A relation between volume and number of bacteria is found (fig.4.1.-4 plate counts: tab. 4.1.-1, exact data: tables 4.1.-2 to 4.1.-4).

The qualitative and quantitative phytoplankton composition and the amount of phytoplankton biomass is shortly discussed (4.2. ROTT) covering the period of October, 1974, to August, 1975 (fig.4.2.-1 and 4.2.-2).

The primary production rates for the years 1973 and 1974 are set out in figure 4.2.-3. Figure 4.2.-4 shows the theoretical turnover time and the measured and estimated change of biomass. Radiation measurements are described and given in figures 4.2.-5 and 4.2.-6. A checklist of pelagic protozoans is given in the next chapter. The spatial and temporal distribution is presented on 2 figures and 10 tables (4.3.1.IDL).

Composition, development and distribution of pelagic rotifers and crustaceans are described for the years 1973 to 1975 (tab.4.3.2.-1 to 4.3.2.-4). The annual means of abundance and biomass is given in table 4.3.2.-5 (4.3.2. SCHABER).

The sedimentation rates (5.DÖRRSTEIN) are measured at 14-day intervals for the time November, 1974, to January, 1975. The phosphorus and nitrogen content (fig.5.-1, tab.5.-1 and 5.-2), the ratio P:N (tab.5.-3) and the dry weight are studied.

Weight/breadth-regressions of nematodes (6.1.PEHOFFER) are established (tab.6.1.-1). Abundance and biomass are described for Tobrilus gracilis (tab.6.1.-2) and for Monhystera paludicola (tab.6.1.-4). Data to the population dynamics of T.gracilis are given in tab. 6.1.-3.

Abundance of the ostracodes Cypria ophtalmica, Candona candida and Cypridopsis vidua are described and set out in figures 6.2.-1 to 6.2.-4 and tables 6.2.-1 to 6.2.-4 (6.2. THALER).

Abundance and biomass of chironomid larvae (6.3.SCHLOTT) are described and presented on 2 figures and 9 tables.

The growth and feeding behaviour of perch (Perca fluviatilis), roach (Rutilus rutilus), rainbow-trout (Salmo gairdneri), brook-trout (Salmo trutta), and char (Salvelinus alpinus) have been investigated. (7.1.GASSER). The results are given in detail in 1 figure and 7 tables. In a second contribution (7.2.AUER) the food composition of Scardinius erythrophthalmus is described (fig.7.2.-1 to 7.2.-3 and 2 tables). Amount and quality of sport fishing is discussed (tab. 7.2.-3 to 7.2.-6). The macrozoobenthos of the Piburger Bach is analysed by KOWNACKA (8.1.). The daily rhythm and the annual cycle of the organism-drift in the small brook, the only inflow of the lake have been studied (8.2. PREM, STEMBERGER). The methods are shortly discussed and results are given in table 8.2.-3 for Ephemeroptera, Plecoptera, Chironomidae, and Simuliidae. Figure 8.2.-2

illustrates the life-cycle and the annual drift of Protonemura montana.

II.) Ecosystem study "Vorderer Finstertaler See" (VFS):

VFS has been destroyed in April, 1975, in order to transform the basin into a hydroelectric impoundment. Until this time investigations have been carried on and afterwards samples and data previously collected are processed and specific experiments are made in the neighbouring HFS.

The results of the fertilizing experiment (2.WITT) clearly shows, that there is no light inhibition in phytoplankton production when a sufficient amount of phosphorus is provided.

The distribution of benthic bacteria (3.1.TAUTERMANN) is complicated and different for different size-classes of cells. The biomass distribution in time shows three peaks: in spring, in mid-summer, and in late autumn.

In a sediment depth of 15 cm *Daphnia ephippia* (3.2.BRETSCHKO) do occur which are not known from the present. Assuming that the daphnids have been extinct by the introduction of fish into the lake in the early 16th century an average sedimentation rate of 0,4 mm per year is calculated. Extrapolated to the total depth of lake sediments (6 m) the age of the lake is estimated at 15 000 years, which is in good agreement with geological data.

The behaviour of Cyclops abyssorum taticus stages living in close contact with the lake bottom has been studied by means of a grid-experiment in HFS (3.3.BRETSCHKO). The "cloud-theory", proposed in 1975, has been confirmed but on top of it a permanent distribution pattern is detected. In difference to former results a daily vertical migration pattern is found.

III.) MAB-Project "Finstertaler Speicher":

The limnological effects of the transformation of a high mountain lake into a hydroelectric impoundment are studied (1.BRETSCHKO). So far an underwater drilling was done and VFS was drained through the drill-hole. The remaining water body has a maximum depth of roughly two meters. Plankton and chemistry of the remaining waterbody is described (6.WITT). The drilling itself had a significant effect on

the benthic meiofauna (4. PEHOFFER): the density of juvenile nematodes (mainly Ironus tenuicaudatus) is positively correlated with the distance from the drilling site. Adults are not influenced. During the emptying phase of the lake chironomid larvae followed first the falling water-level but failed later to do so (5. BRETSCHKO). Beside this investigations the still untouched HFS is sampled regularly (2. WITT, 3. BRETSCHKO).

IV.) Project "Gossenköllesee" (Kühtai, 2413 m NN)

This lake is supposed to be the substitute for the lost VFS. The history of the construction of the new station is shortly described (1. BRETSCHKO). In difference to the rather large former VFS (15,7 ha) the small GKS (1,7 ha) should serve as a sort of a "natural experimental basin". Right from the start of the investigations all collected data are to be handled by electronic devices (2. FORSTNER).

V.) Running-water-studies (see I-8)

First results on the limnology of a small mountain brook (Niklbad, Upper-Austria) are presented (1. DIEM, WEICHSELBAUMER). The qualitative composition of the fauna of a glacier brook (Obergurgl, Tyrol) is described in detail (2. KOWNACKA).

VI.) Fish (see I-7)

The investigations deal with the development of the char (Salvelinus alpinus) in natural habitats as well as under artificial condition. Covered is the period starting with the unfertilized egg and ending with the two years old fish. Main emphasize is given to the improvement of artificial hatching (1. STEINER).

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