

ZUSAMMENFASSUNGEN IN DRUCK BEFINDLICHER ARBEITEN:

XXIV. Congress of the International Association of Limnology, München 1989 *
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1) THE LIMNOLOGY OF A LOW ORDER ALPINE GRAVEL STREAM (RITRODAT-LUNZ STUDY AREA, AUSTRIA)

Bretschko, G.

In 1977 the project RITRODAT-LUNZ was started. A second order gravel stream, "Oberer Seebach", is the main study site and is used for the development of methods, for comparisons and for the definition and study of specific questions. Several aspects are highlighted in nine posters and one additional oral presentation. After a short summary of the present state of project, the importance of the bedsediments is discussed. Bedsediments are channel-forming sediments dominated by epigeic faunal elements and are described as "resource patches" (sensu NAIMAN). Consequently, the classical river benthos becomes a boundary community dependend on size and quality of the bedsediment biocoenosis. Discussed are important parameters influencing the bedsediments as a habitat, like grain size distributions, shape of sediment grains, throughflow of water, chemistry and interactions between surface- and groundwater.

2) INPUT OF ORGANIC MATTER (OM) IN A LOW ORDER STREAM (RITRODAT-LUNZ STUDY AREA, AUSTRIA)

Moser, H.

The allochthonous input of organic matter is the most important source of energy in low order streams. The main pathways are the bank-runoff and the input of airborne material from the airspace above the stream. Quantity and quality of these inputs are studied over three years (1986-88). Organic matter is measured as total organic carbon (TOC) and nitrogen (TON). The study site is a 100 m long stretch of "Oberer Seebach", 10 - 15 m in breadth. Total area is about 1600 m². Annual input of TOC is about 34 kg/a. 7 kg/a are measured from bank runoff with one peak in spring after snow thaw and another one in autumn during leaf litter fall. The input of TOC from airspace is 27 kg/a with an extreme maximum during litter fall. The influence of various parameters like rainfall, steepness of the bank, and riparian vegetation is discussed.

* These summaries were erroneously omitted from the Munich Abstract Volume.

3) DEBRIS DAMS AND RETENTION IN LOW ORDER STREAMS (PROJEKT RITRODAT LUNZ)

Winkler, G.

Debris dams are stable accumulations of organic matter in running waters. They serve as effective retention devices for smaller organic material, allowing time for microbial colonization, utilization and consumption by invertebrates. The structure and the invertebrate community of a debris dam in a first order mountain stream are described. An entire debris dam was dismantled according to its exposition to surface water. Periodically overflowed areas are separated from permanently flooded areas. The latter are further divided accordingly to surface water currents. The organic matter was divided into FPOM, leaves and CPOM of different sizes (1-10 mm, 10-50 mm, > 50 mm). It is determined as dry weight.

Debris dams form also transitional habitats between the terrestrial riparian and the aquatic biocoenosis. Therefore distinct differences in the invertebrate community are shown between the periodically and the permanently overflowed regions. In the first case, the invertebrate community contains elements of the riparian biocoenosis and in the second case it is a pure aquatic one. Within the permanently overflowed regions the composition of the invertebrate community depends on the exposition to water currents. The higher the flow of water through the debris dam, the higher is the abundance of Baetidae (Ephemeroptera) and Simuliidae (Diptera).

4) POM IN A GRAVEL STREAM (RITRODAT-LUNZ STUDY AREA, AUSTRIA, EUROPE)
DEBRIS DAMS AND RETENTION IN LOW ORDER STREAMS (PROJEKT RITRODAT LUNZ)

Leichtfried, M.

Amount, distribution and appearance of particulate organic matter (POM) are described for the bedsediments of a 100 m long stretch of a gravel stream. POM is measured as total organic carbon (TOC) and total organic nitrogen (TON). Bedsediments are the sediment layers dominated by epigeic faunal elements. At the study site (1600 m) bedsediments are approximately 60 cm deep, weighting about 18000 tons. This amount of sediments contains in the annual mean 3068 kg TOC + 10 % and 211 kg TON + 20 %. Largest concentrations are to be found between 20 and 40 cm sediment depth. Although grain sizes smaller than 1 mm contribute less than 10 % of total sediment (in weight), 80 % of TOC and up to 90 % of TON is to be found in this grain size class. In the area of highest water currents POM quantity is lowest but food quality (measured as C/N) is highest. Besides of macrozoobenthos (excluded here) POM appears in 3 forms:

- a) Animal tissue: probably quantitatively of lesser importance. The relation between total meiofaunal biomass expressed as TOC to measured TOC is roughly 1 : 250 000.
- b) Plant tissue: mostly parts of terrestrial vegetation. The frequency of occurrence of those particles does not correlate with TOC- and TON-concentrations.
- c) Biofilm: microorganisms plus their extracellular products associated with a substratum. By far most of the standing crop of POM in the bedsediments appears as biofilm. This may explain the fact that POM standing crop is not directly influenced by the discontinuous input of organic matter.

5) QUANTITATIVE SAMPLING OF BEDSEDIMENTS (RITRODAT-LUNZ STUDY AREA, AUSTRIA)

Klemens, W.E.

The limnology of gravel streams is based on processes located in the topmost sediment layers (bedsediments, defined by the dominance of epigeic faunal elements). Quantitative sampling of gravel sediments is therefore obligatory, but methodically difficult. A combination of the well known "freezing-core" method with in situ electro-positioning gives satisfying results. The latter is necessary to avoid fast and strong escape reactions of the sedimentfauna. The combined method achieves good estimates of abundance and distribution of the entire biocoenoses (micro, meio and macro) but also from abiotic parameters, like grain size distributions, pore volume or organic matter. Set backs are the high costs and the great and relatively long lasting disturbances on the spot of sampling.

Permanently installed stand-pipe traps sample without any disturbance and monitor the vagil fauna but do not achieve abundance estimates. A modified cage-pipe trap allows simultaneous sampling in different sediment layers on the same spot and the measurement of the horizontal migratory behaviour of the sedimentfauna. The methodology is shown as well as their possibilities and limitations in the study of the limnology of gravel streams.

6) DISTRIBUTION OF HARPACTICOIDS IN A SECOND ORDER MOUNTAIN STREAM (RITRODAT-LUNZ study area, Austria)

Kowarc Verena Anna

Most studies dealing with benthic invertebrates of running waters describe only macrozoobenthos. Only few data exist about the meiobentic part of running water animals although especially harpacticoid copepods and nematods occur in high abundances in such water bodies. As a part of the long term project Ritrodat-Lunz the temporal and spatial distribution of harpacticoid copepods is investigated. The study area (Ritrodat area) is a 100m long part of the unpolluted second order stream "Oberer Seebach" about 500m upstream its inflow into Lunzer Unter See. This mountain stream is dominated by chiromomids but harpacticoid copepods form 11% of the whole river fauna. All data base on freezing core samples with electrostationing collected during an annual cycle. As possible abiotic parameter influencing and causing distribution temperature, surface current acting down to 20cm into bed sediments and gouch are taken into account. In this connection distribution of a pool and a riffle zone and a gravel bank, wich falls periodically dry, is compared.

7) TEMPORAL AND SPATIAL DYNAMICS OF CHIRONOMIDAE IN A MOUNTAIN BROOK

Schmid, P.E.

The dynamics of Chironomidae in the experimental area Ritrodat (Seebach, Lunz, Austria) is examined by means of freeze-core sampling with in situ electro-positioning. Interrelations and coexistence of larval species and their instars are considered where significant microhabitat preferences are indicated. Four questions are examined within this paper: (i) under what density-dependent or -independent conditions a population indicates significant spatial transitions of its density maxima. (ii) How does species dispersion pattern of larval instars differ temporally and spatially. (iii) How does the intraspecific timing of instars affect the dynamics of other larval chironomid populations with regard to resource utilization. (iv) How do habitat preferences among different populations inable relatively stable species associations in time.

Conclusions are drawn from the numerically most abundant species: (a) Dispersion patterns on the surface layer of the sediment and within the bedsediments vary among and between populations in time, clearly interconnected with fluctuations of hydrophysical variables. (b) Possible interspecific relationships can be expanded to include, in addition, density-dependent indications of dispersions within different depth layers of the bedsediments. (c) The four instar larvae and the pupal stage of the abundant species partition partly the resource habitat on a seasonal basis. Mostly in autumn a tendency of a transition of high densities within the surface layer into deeper strata of bedsediments is verified. (d) Horizontal dispersion patterns in time increase the general dynamics and are partly associated with changes of the utilization of species-specific microhabitats within the mosaic of resource-patches.

8) A FOOD SCHEDULE FOR COTTUS GOBIO L. (PISCES) IN THE UPPER SEEBACH (RITRODAT-LUNZ STUDY AREA, AUSTRIA)

Adamicka, P.

Cottus gobio is quantitatively by far the most important predator in the Seebach, a second order alpine gravel-bed stream. I present the food interrelationships in the gravel biocenosis, centered at the life history of this fish. *Cottus* starts to feed weighing approx. 2,0 mg. After three months, its weight is about forty times greater, and after the winter again four times. At the beginning, the food consists almost entirely of chironomids. Similar in size and subdominant, harpacticoids were nevertheless never found as stomach content - for reasons unknown. From the fish' length of approx. 2,4 cm onwards, plecopteran and ephemeropteran nymphs become quantitatively prevailing as food. Wet food weight conversion into fish biomass averages 18 % but is higher in the young, fast-growing fish. As *Cottus* grows older, it can less and less hide itself in the gravel interstices and is therefore more vulnerable to predation by salmonids. Only few individuals may outlast this period and, now becoming too dangerous for the trouts to be eaten, will grow to 13 - 14 cm in Seebach. Fish and fish eggs never play any role as food worth mentioning.

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Zoologisch-Botanische Datenbank/Zoological-Botanical Database

Digitale Literatur/Digital Literature

Zeitschrift/Journal: [Jahresbericht der Biologischen Station Lunz](#)

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