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Horizontal patch-distribution in the gravel fauna of a second order alpine stream

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Zusammenfassung: Horizontale "patch"-Verteilung in der Schotterfauna eines alpinen Baches 2. Ordnung. Diplomarbeit, Universität Regensburg, 1992.

Summary:

- * The horizontal distribution of benthic invertebrates has been examined in the Oberer Seebach, a second order alpine gravel stream. As expected, faunal patches could be detected.
- * In this study patches were defined as clearly recognizable aggregations of individuals in a surrounding area with a lower density of individuals.
- * 30 samples were taken simultaneously ("snapshot") only with one occasion with a modified boxtype Surber-samplers ($r=9.5$ cm). They were arranged in a 1x1 m grid (3 rows of 10 samplers each) and covered a cross-section of approx. 30 m² of the stream bed.
- * The area of the stream where the samples were taken was situated upstream closer to the RITRODAT experimental study area (Biological Station Lunz). The area was largely homogeneous concerning morphometry, temperature, chemical characteristics and hydraulic stress.
- * A high water (=disturbance, 5 days before sampling) influenced the sediment in the sample-area in such a way that there were stones with no algal vegetation on their surface in the middle of the stream, whereas the stones nearer to the banks were still covered with algal vegetation.
- * 23 higher taxonomic categories (order, family) have been distinguished in the sampled area. The most dominant group were the *Harpacticoida* (31.7% of the total number of animals found), followed by *Chironomidae* (25.3%), *Ephemeroptera* (11.6%), *Nematoda* (10.9%), *Plecoptera* (10.7%), *Oligochaeta* (3.6%), *Ostracoda* (1.5%) and *Hydracarina* (1.3%). All other groups were represented with less than 1%.
- * The horizontal distribution of the invertebrates partly correlated with the distribution of the stones covered with algal vegetation. On a large scale the sample area could be

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divided into 3 sections respect to the distribution of the animals: section 1 (right bank), section 2 (middle of stream) and section 3 (left bank). Section 2 (middle of stream) showed the smallest number of individuals (Figure 1).

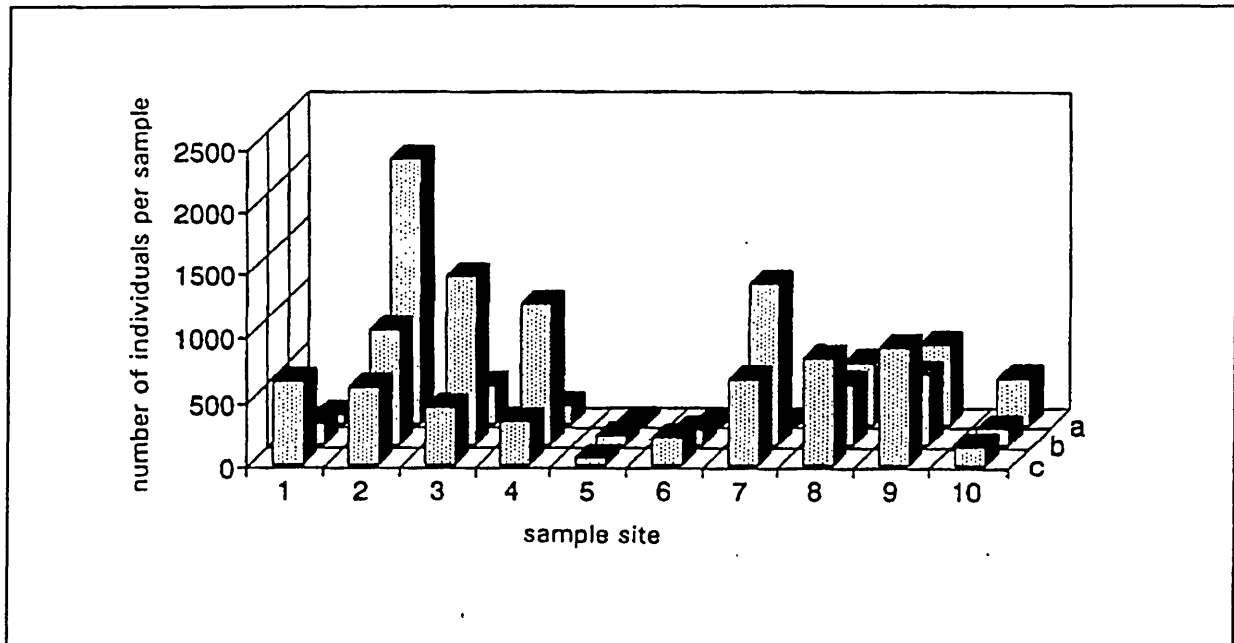


Fig. 1: Horizontal distribution of the number of individuals per sample for *Harpacticoida*, a-c and 1-10=coordinates of the sampling positions across the stream.

- * The middle of the stream, which had been disturbed greatly by the previous high water, was probably repopulated at a different speed, according to animal group. Probably due to their high drift rates, *Ephemeroptera*, *Plecoptera* and *Chironomidae* repopulated this section again, whereas the other animal groups were at lower densities here.
- * In 7 animal groups/species altogether 11 patches were found (Table 1). These patches were mostly found in those parts of the stream which had been largely undisturbed by the previous high water (sections near the banks).
- * Patches were not restricted to one sample only, but could also consist of several neighbouring samples.
- * Because of the selected sampling grid of 1x1 m mesh size no statement could be made about faunal densities between neighbouring samples. Despite this fact, a steady gradient of faunal densities between two neighbouring samples was assumed so that patches can be shown as isolines (Figure 2).
- * Assuming furthermore that one sample is representative for 1 m² of the streambed (determined by sampling grid), the patch size can be roughly estimated. Here, patch sizes were estimated ranging from ≤1 to ≤4 m² depending on the taxa.

Horizontal Patch-distribution

animal group/species	% of total number of individuals	number of patches	number of samples in one patch
Nematoda	10.9%	-	-
Oligochaeta	3.6%	1	3
Hydracarina	1.3%	-	-
Ostracoda	1.5%	-	-
Harpacticoida	31.7%	2	4/4
- <i>Limnocalanus echinatus</i>	26.2%	2	4/4
- <i>Bryocalanus zschokkei</i>	2.4%	2	4/1
- <i>Attheyella wierzejskii</i>	1.2%	1	4
Ephemeroptera	11.6%	-	-
- <i>Baetis</i> sp.	1.9%	-	-
Plecoptera	10.7%	-	-
- <i>Protonemura</i> sp.	*	2	2/1
- <i>Leuctra</i> sp.	0.7%	-	-
Chironomidae	25.3%	-	-
- <i>Corynoneura lobata</i>	7.2%	1	2
- <i>Nilotanytus dubius</i>	1.6%	-	-

Table 1: Patches - number of patches and number of samples within one patch for animal groups with more than 1% of the total number of individuals found and for selected species/genera.

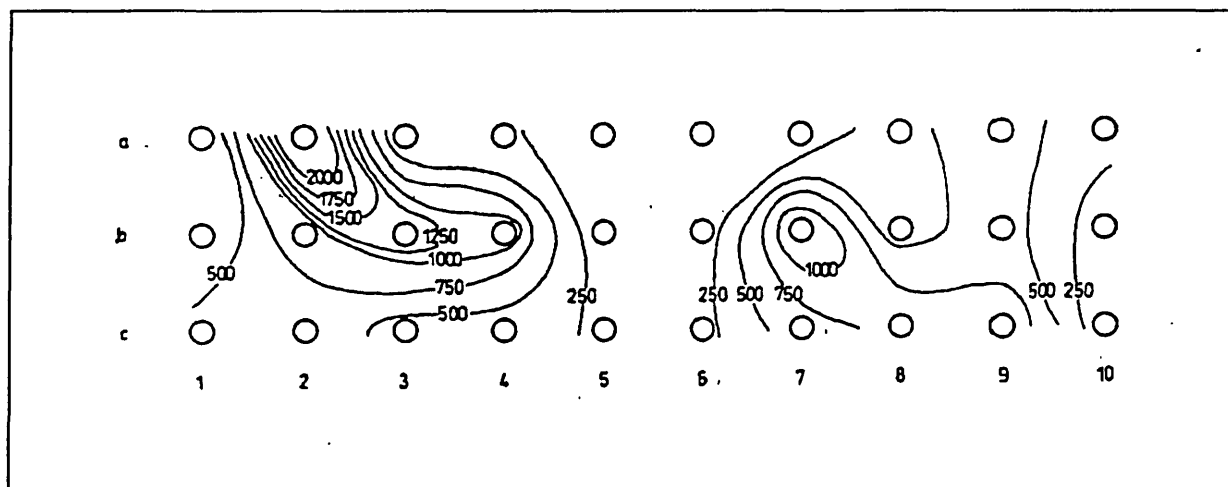


Fig. 2: Isolines of faunal densities for *Harpacticoida* (number of individuals per sample), a-c and 1-10=coordinates of the sampling positions across the stream.

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