Does subsurface interstitial space influence
general features and morphological traits of the
benthic macroinvertebrate community in streams?

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With 4 figures, 2 tables and 1 appendix

**Abstract:** The benthic macroinvertebrate community and substratum characteristics were assessed at 17 study sites differing in the amount of interstitial space in the subsurface interstitial zone (0–15 cm deep). The invertebrate community was described in terms of density, taxonomic richness, Shannon diversity and morphological traits (size, flexibility and body shape of the invertebrates). The amount of interstitial space in the subsurface zone that is described by porosity was significantly and negatively related to percentage of fine sediment, but not to stream slope, particle heterogeneity and particle size. Invertebrate density was significantly and positively related to the amount of interstitial space whereas taxonomic richness was slightly and negatively related to fine particulate organic matter content. Relative abundance of intermediate body size (5–10 mm), intermediate body flexibility (10–300°), and flattened or streamlined shape were significantly and positively related to the amount of interstitial space, contrasting with relative abundance of small body size (<5 mm), and cylindrical or spherical shape that were significantly and negatively related to this variable. These results highlight the importance of interstitial space, both as a factor partly controlling community structure and as an evolutionary factor acting on macroinvertebrate ability to penetrate the substratum. In addition to flow, the substratum selects the invertebrates through their different abilities to use the interstitial habitat.

**Key words:** substratum characteristics, taxonomic richness, Shannon diversity, substrate porosity.

**Introduction**

MINSHALL (1984) summarised the role played by the substratum for invertebrates when he wrote: “the substratum is the medium upon which aquatic in-