



Is the water temperature a suitable predictor of longitudinal bio-zonation patterns in streams?

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The targeted audience are all colleagues who are engaged in the thermal characteristics of rivers and streams. The zonation of rivers based on their fish and benthic fauna has been customary practice in Europe for about 140 years. The theory behind founds on the observation that together with the continuously developing abiotic fluvial processes there is a shift of the biologic assemblages on a river's way from the spring to the mouth. Particularly the temperature and the current (hydraulic conditions) are regarded as the most important steering factors that determine a stream community. Although mean temperatures and temperature sums (degree days) are valuable tools to understand temperature driven biotic effects, the hypothesis of this paper is that it is primarily the temperature range or extreme values which largely determine the suitability of a site as habitat for a particular species. In aquatic communities where the environment mostly does not cool down below zero degrees the maximum temperature is considered as the limiting factor of several features of aquatic life. This study is based on long term temperature data and benthic invertebrate samples from about 200 investigation sites. It seems to be evident that the annual maximum morning water temperature at an investigation site is the best predictor of the benthic invertebrate community, expressed in terms of biocoenotic regions according to Illies & Botosaneanu (1963). As most of the benthic invertebrates live in the interstices of the river sediments they are exposed to thermal conditions that are only scarcely documented. Therefore the explanation for this correlation may be due to the fact that the early morning water temperatures in the free flowing channel are representative to characterize the average temperature conditions in the bed sediments.