

## Sandy rivers: an ecological comparison of tropical and temperate zones

Les fleuves sableux: une comparaison écologique des zones tropicales et tempérées

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### RÉSUMÉ

Le chenal principal des parties moyennes et inférieures (et partiellement aussi les supérieures), de la plupart des plus grands fleuves, présente très souvent des sédiments sableux. Plusieurs études sur les relations entre benthos et structures d'habitat du Paraguay-Paraná (Brésil, Paraguay, Argentine) ont permis de caractériser des modèles intéressants couplant peuplements benthiques et caractéristiques physiques et chimiques des habitats. Les peuplements observés présentent, en effet, de grandes différences entre le centre du chenal principal et ceux des rives (y compris sur la zone inondable du lit en crue). De plus on note une homogénéité remarquable de la distribution longitudinale des peuplements benthiques dans la partie centrale du chenal principal. Un exemple caractéristique est celui de la présence et de la persistance sur plus de 3500 kilomètres d'un peuplement essentiellement constitué par *Narapa bonettoi*, *Haplotaxis aedeochaeta*, *Myoretronectes paranaensis*. Une recherche bibliographique sur des fleuves en zone tempérée et des études plus anciennes sur le Rhin (Allemagne) ont confirmé cette relation dans d'autres contextes bioclimatiques. Ceci nous permet d'émettre l'hypothèse que le modèle décrit pourrait être commun pour les grands fleuves dans le monde entier. La structure sableuse et mobile du lit, soumis au déplacement des barres sédimentaires, imposerait aux invertébrés dans ces habitats potamiques des adaptations particulières qui limiteraient mais aussi stabiliseraient la diversité des chenaux des systèmes potamiques.

### ABSTRACT

The middle and lower (and partly also the upper) segments of the main channel of most large rivers have sandy bed sediments. During several studies on the benthos assemblages and habitat structures of the Paraguay-Paraná river system (Brazil, Paraguay, Argentina) we found interesting patterns between the benthic species assemblages and the physical and chemical habitat characteristics. At one hand these assemblages largely differed between the central strip of the main channel and the banks (including floodplain environments). On the other hand there was a remarkable homogeneity in the benthic assemblages in the longitudinal distribution in the main channel central strip. One example is the occurrence of the assemblage: *Narapa bonettoi*, *Haplotaxis aedeochaeta* and *Myoretronectes paranaensis* on 3500 km river length. A literature survey on temperate rivers and earlier studies on the river Rhine (Germany) confirmed this statement for other rivers. This finding made us develop the hypothesis that the described pattern is common for large rivers world-wide. The sandy mobile bed structure (with dunes and bars) of potamal habitats forces a set of adaptations by the invertebrates which limits but stabilizes the diversity of these important river segments.

### KEYWORDS

Ecohydraulics, faunal assemblages, Paraguay River, tropical-temperate comparison, underwater sand dunes.

## SANDY RIVERS: AN ECOLOGICAL COMPARISON OF TROPICAL AND TEMPERATE ZONES

This paper addresses two main goals: A) In a scientific approach, it provides a literature review to test the hypothesis that faunal assemblages of benthic invertebrates are similar in different large rivers (independent of their geographical position). B) In an applied approach, it analyzes the causes for faunal diversity decline in these habitats, and tries to offer feasible solutions for river management to improve the biodiversity of this important functional element of large rivers. For example, in the early descriptions of the Rhine fauna, large species of mayflies were described for the lower reaches, but they are extinct today in spite the fact that water quality has considerably improved.

By comparing ecohydraulic features of tropical and temperate rivers we want to address both goals. The contents of the review we are providing at the IS Rivers symposium are synthesized in figure 1.

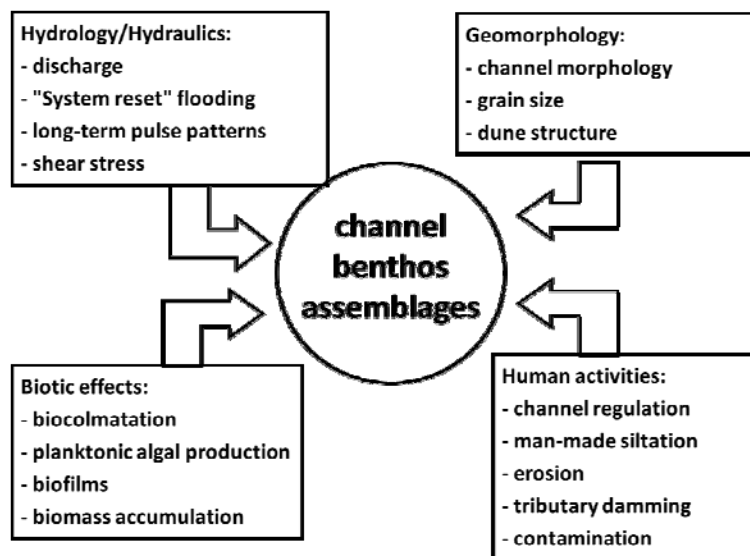


Figure 1: Environmental factors triggering the faunal composition of benthic assemblages in the central channel strip of large rivers (see list of references for further information)

### LIST OF REFERENCES

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