

Annual dynamics of nutrients in a temporary stream in Southern Portugal: contributions of the primary producers and the drainage basin

Ana Pedro¹, Manuela Morais¹; Joana Rosado¹ & Rita Fonseca¹

¹Laboratório da Água, Universidade de Évora, CGE. Parque Industrial e Tecnológico, Rua da Barba Rala nº 1, P-7005–345 Évora, Portugal

email address of the corresponding: anacastpedro@yahoo.com

Abstract

Under the Mediterranean climatic conditions, the annual precipitation distribution determines that many streams are temporary with surface flow interruption during the summer dry period in contrast to the high discharges during floods, observed from late autumn to early spring. As water flows through the drainage basin it can pick up nutrients, sediments and pollutions. These can affect the ecological processes causing eutrophication where primary producers' growth is accelerated. In this study, the nutrient (N and P) concentrations were determined in water and river sediments, over a 3 years period in a 3rd order temporary stream reach of 500 m (Pardiela stream in Guadiana basin). The nutrients concentration in the water and in the sediment shows a decrease during the flood events due to the high discharge, followed by a rapid increase, although the nutrients concentrations in the sediments were smaller than in the water. The primary producers were studied during the same 3 years period, in terms of biomass of macrophytes, periphyton, and leaves fall in order to describe the annual patterns. Complementary, a rapid assessment of N, P and C concentration in macrophytes was analyzed with the objective to determine their nutrients contribution to the system in summer (1047.35 g/m²) although with low contents of P, N and C. Periphyton represents a basal contribution of biomass to the system, with high levels along the year, decreasing immediately after flood events and increasing subsequently. Contrary to what is described for the north hemisphere, in this study the leaves start to fall at the end of spring as surface flow decreases. The maximum leaves fall coincides with the maximum stream contraction at the end of summer, contributing to a high stream bed detritus biomass accumulation (143 g/m²). The highest nutrient input to the system comes from the drainage basin, especially after the flood events which also lead 3 weeks later to an increase in macrophyte biomass. The global results obtained in this study give a contribution to understanding the underlying processes in a temporary Mediterranean system which is a key issue to determine flexible and adaptive ecological management, promoting the conservation of natural ecosystems under global changes conditions.

Oral presentation on TEMPRIP 2012 – International Conference on Temporary Rivers;

12/14 September | University of Évora | Portugal