Effects of differing inter-disturbance intervals on the diversity of mayflies recolonizing disturbed sites in a tropical stream

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With 7 figures and 3 tables

Abstract: Field experiments to determine the effects of inter-disturbance intervals on the diversity of mayflies recolonizing disturbed subsites in the Naro Moru River, Kenya, were undertaken from June 1993 to January 1994. Stirring, shifting and relocation of streambed substrates by hand was used to delimit physical disturbance, which was also the act of sampling. Continuous disturbance had a distinct depressant effect on mayfly species diversity. No species diversity differences were observed between day and night (one-way ANOVA, \( p > 0.05 \)) at short inter-disturbance intervals of between 10 and 40 min. Medium/intermediate inter-disturbance intervals of between 1 and 10 h had significant effect on species diversity \( (F_{(5, 132)} = 5.25, p < 0.001) \), with the species diversity of the 6-h inter-disturbance interval being significantly higher than the species diversity of the 1-h inter-disturbance interval (Tukey's honestly significance difference test, \( \alpha = 0.05 \)). Species diversity in the subsites exposed to the long inter-disturbance intervals of between 33 and 43 d did not differ from that of the subsites exposed to intervals of between 13 and 28 d \( (t\text{-test}, p > 0.05) \). The shorter the interval before the next disturbance, the greater was the species diversity decline. The short and long inter-disturbance intervals are important to stream ecosystems since they regulate species diversity in time and space. The increase and/or decrease in species diversity of the mayflies recolonizing the disturbed subsites, and the patterns thereof, may reflect mayfly mobility, especially in foraging for food and search for habitat and refuge.

Introduction

Species diversity is one of the parameters close to the concept of community organization (Sanvicentre-Añorve et al. 1996) and is an expression of com-