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In Situ Survival and Performance of Juvenile Mussels in Streams and Correlations with Water and Sediment Quality Factors

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Abstract

Freshwater mussels have disappeared or declined greatly in many streams. In some cases, mussel declines appear linked to specific factors such as coal mining, but mussels also have declined in many streams that have no obvious human impacts. We directly examined survival and growth of juvenile mussels in 23 streams across Kentucky. These streams represent a range in conditions from streams that support largely intact mussel assemblages to those that have lost their mussels almost entirely; seven streams fell into this latter category. In each stream, we placed captively propagated juvenile pocketbooks (*Lampsilis cardium*, 6 months old, mean length = 6.4 mm) in silos and sediment cages in late May and early June and retrieved them in September. We also collected water and sediment samples monthly during the study and monitored stream temperature continuously. Mussels showed high survival in nearly all streams, regardless of the condition of the resident mussel assemblage. However, juveniles grew little in all seven streams that have lost their mussel fauna. These mussels appeared to be starving and likely would have died shortly. Mussels grew in all other streams, but growth varied widely probably in large part according to natural variation in basin geology and water chemistry (e.g., temperature, productivity, water hardness). We currently are investigating the potential role of other water and sediment chemistry variables in explaining the lack of growth we observed at some sites; these results will be discussed as available. This study suggests that disruption of mussel feeding or a change in mussel food resources in streams may be a major factor in mussel declines.