**The Selective Feeding Behaviours of Adult and Juvenile Freshwater Mussels Under Flowing Conditions**

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Freshwater unionid mussels play a vital role in aquatic ecosystems, in particular, clarification of lakes and rivers, nutrient cycling and benthic-pelagic coupling. It remains to be determined as to whether and how selective feeding in unionids occurs under ecologically relevant flow conditions. Flow chamber experiments using adult Fatmuckets (*Lampsilis siliquoidea*; shell length = 9 - 12 cm) indicate that seston flux using river water affects their clearance rates. Clearance rate (CR) increased with chamber velocity (0-18 cm s-1) and CR at the highest flux were 5 time larger than under low or static flow conditions (i.e., 0.21 L h-1). Preliminary data on juvenile Wavyrayed lampmussel (*Lampsilis fasciola*; shell length 430 - 580 μm) using a newly developed paddle-wheel flow chamber indicate that high seston flux reduce CR from 1.39 mL hr-1 at 0 cm s-1 to 0.39 mL hr-1 at 8 cm s-1). Data, obtained using flow cytometry techniques (FlowCam) are being analyzed to determine whether there is selectivity based on particle size and/or food quality. Results will provide information on habitat requirements of unionid mussels, their role in the great Lakes Ecosystem, and insight into their conservation.