CHAPTER 1

DIURNAL RHYTHMS OF GAPING BEHAVIOR IN SEVEN SPECIES OF FRESHWATER MUSSELS (BIVALVIA: UNIONIDAE)

by

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(ABSTRACT)

Seven species of freshwater mussels from different habitats were monitored for 96 hr for valve gaping behavior under 12 light:12 dark photoperiod in the laboratory. A reservoir species, giant floater (*Pyganodon grandis*), tended to gape during the night, whereas the riverine species, pimpleback (*Quadrula pustulosa*), tended to gape during the day. The remaining five riverine species; threeridge (*Amblema p. plicata*), Ohio pigtoe (*Pleurobema cordatum*), ebonyshell (*Fusconaia ebena*), rainbow mussel (*Villosa iris*), and eastern elliptio (*Elliptio complanata*) did not exhibit a diurnal pattern of gaping behavior. The heart rates of four specimens of *P. grandis*, recorded simultaneously along with gaping behavior, slowed after closure of the valve and increased several fold just before the onset of gaping. Causes for gaping behavior are reviewed and correlated to the lotic and lentic habitats, food availability, and energy expenditure of feeding in both habitats. The rhythmic gaping behavior of *P. grandis* suggests an adaptation for energy

efficiency in lentic habitats, whereas the variable pattern of gaping behaviors of riverine species suggests different strategies of adaptation to their habitats.