Freshwater ecosystems will likely become sinks for future silver loadings as a result of increased nanosilver (n-Ag) use in industrial and commercial applications. A series of bioassays was performed to assess how n-Ag toxicity may be influenced by abiotic factors associated with natural freshwater ecosystems. Additionally, these bioassays provide insight into how environmentally relevant concentrations of n-Ag may sublethally affect the freshwater benthic gastropod, *Physa acuta*, that plays pivotal roles in maintaining the structure and function of freshwater ecosystems. In sediment with no benthic organic carbon (BOC), gastropod vital rates decreased in treatments containing any n-Ag, gastropods in sediment with relatively low BOC appeared to trade off growth for reproduction at high n-Ag treatments, while gastropod vital rates in high BOC sediment remained unaffected at all nanosilver treatments. Sediment type may abate nanosilver toxicity as a result of organic carbon content. Effects of n-Ag on gastropod vital rates were not dependant on pH, suggesting aqueous pH does not directly influence n-Ag toxicity. Nanosilver (0.2 µg/L) stressed gastropods, altering their growth and reproduction tradeoff dynamics. Nanosilver concentrations modeled to exist in natural freshwaters, disrupted gastropod ability to detect and respond to a natural predator, while greater n-Ag concentrations stimulated gastropods to exhibit contaminant avoidance behavior and thereby attempted to flee their habitat. This study provides direction in understanding how adverse n-Ag effects may be influenced by abiotic parameters, while assessing sublethal effects of n-Ag on freshwater ecosystems.
gastropods that are likely to occur in natural freshwater ecosystems, given current estimates of environmental n-Ag concentrations.