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## Potential effects of Asian clam (*Corbicula fluminea*) die-offs on native freshwater mussels (Unionidae) II: porewater ammonia

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**Abstract.** The Asian clam (*Corbicula fluminea*) occurs in most of the southeastern US, often sharing habitat with native unionid mussels. Clam populations can reach high densities and, under conditions of low water flow and warm summer temperatures, may experience rapid die-offs. Clams are infaunal, so the interstitial zone may be subject to elevated levels of ammonia and reductions in dissolved oxygen (DO) that could affect organisms such as native mussels that also use this habitat. We conducted laboratory experiments to characterize concentrations of total ammonia and unionized ammonia (NH<sub>3</sub>-N) produced in the sediment pore water and in overlying water as a result of clam die-offs. Sediment porewater NH<sub>3</sub>-N concentrations ranged between 0.013 and 5.56 mg/L, levels that were consistently higher than NH<sub>3</sub>-N concentrations in the overlying water. Levels of NH<sub>3</sub>-N in both pore water and overlying water were positively correlated with temperature and density of clams involved in the die-offs. NH<sub>3</sub>-N concentrations in chambers maintained at 28°C were 5.56 mg/L, ~ 20× levels in chambers maintained at 19°C. Increasing clam density from 200 to 1000 individuals/m<sup>2</sup> resulted in an increase in porewater NH<sub>3</sub>-N from 0.17 to 0.55 mg/L. NH<sub>3</sub>-N concentrations in some tests exceeded acutely toxic levels for some species of unionid mussels (0.022 to 5.56 mg/L). DO was always lower in pore water (2.01 to 6.74 mg/L) than in overlying water (5.02 to 8.67 mg/L) in chambers containing dead Asian clams, and low DO could have further exacerbated stress associated with exposure to NH<sub>3</sub>-N. Overall, our results indicate that NH<sub>3</sub>-N production and DO reductions associated with Asian clam die-offs could pose a risk to unionid mussels, particularly during warm low-flow summer months.

**Key words:** ammonia toxicity, pore water, Asian clam die-offs, unionids.

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