SESSION: You Can Teach an Old Dog New Tricks: Research Applications of Standard Toxicity Testing...

What Food and Feeding Rates Are Optimum for the *Chironomus dilutus* Sediment Toxicity Test Method?

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Laboratory tests with benthic macroinvertebrates are commonly used to assess the toxicity of both contaminated sediments and individual chemicals. Among the standard procedures for benthic macroinvertebrates are 10-d, 20-d, and life cycle exposures using the midge, *Chironomus dilutus*. This presentation describes a series of studies conducted to evaluate and optimize feeding regimes for midge toxicity testing. Current ASTM and USEPA test guidelines specify feeding a fine suspension of flake fish food (i.e., blended in water) at a rate of 6 mg dwt/day to each replicate chamber of 10 organisms. In 10-d exposures in which the initial stocking density varied from 6 to 12 organisms per replicate, the final weight of larvae increased markedly as stocking density decreased, suggesting that food quantity or accessibility does limit midge growth under standard test conditions. Additional experiments evaluating higher feeding rates confirmed higher midge growth is obtained if daily rations were increased. However, higher rations of the standard food preparation also result in the depression of dissolved oxygen, which in turn can limit midge survival and growth. Experiments examining several other diets and preparations did not identify an alternative food source that supports both strong larval growth and not create problematic oxygen demand. However, when presenting flake fish food as a suspension of fine flakes (passing through a No. 50 sieve) rather than the blended preparation we observed improved growth. The fine flake food may have allowed food particles to more readily settle to the sediment surface as these treatments yielded high growth rates with lower feeding rates. A series of 10-d toxicity tests were conducted and subsamples for growth measurements were taken at 4, 7, and 10 d of the testing exposure in an effort to optimize a progressively increasing ration design. We discuss the implications of these findings for midge toxicity tests and provide recommendations on improved feeding regimes. *Note: This abstract does not necessarily reflect USEPA policy.*