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Long-term sediment bioassay of lead (Pb) toxicity in two generations of the marine amphipod 'elasmopus laevis'

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Sediments toxicity evaluated by measuring mortality in a single cohort of amphipods in either acute (10-d) or chronic (28-d) bioassays. This novel investigation differed from conventional bioassays in three ways: Sublethal effects (fecundity) were estimated; a longer test period of 60+ d was used; and two successive generations of amphipod (Elasmopus laevis -Smith, 1873) were examined. Four test sediments were created between 58 ppm, and 424 ppm of lead using the 30 ppm whole-sediment as the control. Bioaccumulated lead at 60 d varied as a linear function of lead concentration in the sediments. Fecundity as estimated by offspring-per-chamber, and/or percent reproductive success was reduced as sediment lead concentrations increased and reproduction was delayed compared with the control. The reduction in offspring production per test chamber varied significantly as an inverse function of lead sediment concentration, best described by a curvilinear exponential equation. It was concluded that *Elasmopus laevis* exposed to 118 ppm and higher could not maintain a population as large as that in control. Although the current sediment quality guideline (SQG) for lead stipulates that adverse biological effects will likely occur above 218 ppm, this study revealed a statistically significant negative reproductive response at 118 ppm lead, and suggests that the current regulatory guideline for lead should be reconsidered.