**Pimephales promelas** and Laboratory Bioassay Responses to Cadmium in Effluent Dominated Systems.

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**ABSTRACT**

While WET toxicity tests provide valuable information, they do not measure natural population or community responses. The study reported herein demonstrates the use of aquatic mesocosms, a recognized approach, to investigate levels of cadmium (Cd) in urban streams, a known contaminant of many southwestern U.S. streams. Chronic effects of Cd were assessed in laboratory mesocosms using a wide variety of endpoints. Stimulated production of vitellogenin (VTG), a critical step in egg development in aquatic species, was not affected by Cd. Endocrine endpoints (condition, hematocrit, GSI, HSI) were unaffected by Cd concentrations of up to 2.22 mM. Reproduction was unaffected by Cd. Analysis of multiple endpoints including aquatic invertebrates, periphyton and water chemistry demonstrated that Cd concentrations up to 2.22 mM do not reflect protection in "real-world" situations.

**EXPERIMENTAL OBJECTIVES**

- Evaluate effects of Cd on aquatic invertebrates and productivity.
- Investigate the effects of Cd on adult male fish endpoints.
- Evaluate Cd effects on aquatic invertebrates and community responses.
- Investigate the effects of Cd on adult male fish endpoints.
- Evaluate bioavailability and effects of Cd on aquatic biota in model systems dominated by a municipal effluent.

**EXPERIMENTAL APPROACH**

- Adult male fish were exposed to Cd concentrations of 0, 0.222, and 2.22 mM for 12 days. Fish were sampled for various endpoints including VTG, condition, hematocrit, GSI, HSI at 0600, 1400, and 2200 (Table 1).
- Aquatic invertebrates were assessed for responses to Cd concentrations of 0, 0.222, and 2.22 mM. Invertebrates were sampled for several endpoints including mortality, reproduction, and productivity.
- Water chemistry was monitored for pH, temperature, conductivity, dissolved oxygen, TDS, and hardness. Measurements were taken at 0600, 1400, and 2200 (Table 1).

**CONCLUSIONS**

- No observed effects of Cd on adult male P. promelas following a 12-day exposure. Condition, hematocrit, GSI and secondary sexual characteristics were unaffected by Cd effluent treatments.
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**ACKNOWLEDGMENTS**


**REFERENCES**

- Anderson J.L et al. 1999. Assessing the relationship between ambient toxicity and instream biological response. Texas Woman's University and the University of North Texas contribute approximately 40% of the City of Denton's effluent. Assays of treatment effects performed by Repeated Measures ANOVA using SPSS following arc sine (square root (y)) transformation.
- Allen et al. PH061, Hemming et al. PH064. No observed effects of Cd on adult male P. promelas following a 12-day exposure. Condition, hematocrit, GSI and secondary sexual characteristics were unaffected by Cd effluent treatments.