

Progress Report

NCER Assistance Agreement Annual Report Summary

Period Covered by the Report: 2003

Date of Report: October 2003

EPA Agreement Number: R82941091-01

Title: Developmental Stability in Amphibians as a Biological Indicator of Chemical Contamination and Other Environmental Stressors

Investigators: Whiteman, Howard H., Loganathan, Bommanna G.

Institution: Murray State University

Research Category: EPA EPSCoR

Project Period: October, 2001 through September 30, 2004

In Year 2 of this grant, our research continued in earnest with the recruitment of a quality graduate student (Ms. Beth Kobylarz) concentrating on asymmetry analysis and a postdoctoral student working on contaminant analysis. Specifically, we processed two species of amphibians, bullfrogs and spotted salamanders for developmental stability; contaminant analysis is currently being conducted on these animals. We completed statistical analyses of our earlier asymmetry results and should have a manuscript submitted during Spring 2004 (see below). Three other graduate students have become involved in this project: Ms. Christy Meredith has conducted experiments on the effects of nitrate on amphibian development, completed her M.S. during Fall 2003, and will be submitting her work to Ecological Applications during Spring 2004. Ms. Jessica Boynton joined our group in Fall 2003, and with funding from the Kentucky Space Grant Consortium has been analyzing our developmental stability results from a GIS perspective. Most recently, Mr. I-Lun Chien has joined the project to complete the remaining contaminant analysis.

Expenditures to date are in line with expectations at this point in the research. Less salary was paid to undergraduates because volunteers and students paid through other grants became available. However, much of this salary will be used in the final months of this project to hire several new undergraduates. The project is approximately on schedule; the asymmetry analysis is almost complete, and while the contaminant analysis is on schedule. In addition, all quality assurance requirements are being met through use of a onsite QA/QC manager.

We are currently collecting larger numbers of bullfrog adults in an effort to correlate asymmetry with age, contamination level, and the presence of corticosterone, a known stress hormone. We are also currently collecting tissue samples of other species for contaminant processing, and completing the contaminant analysis.

Publications:

Manuscript in preparation:

1. Loganathan, B.G. and H. H. Whiteman. PCB congeners and chlorinated pesticide concentrations in amphibians collected from western Kentucky. In preparation for Int. J. Anal. Chem.
2. Benson, A. R., Whiteman, H. H., J. B. Boynton, M. Dotson, and R. Cates. Developmental stability as an indicator of amphibian population health. In preparation for Conservation Biology.
3. Meredith, C. S. and H. H. Whiteman. Lethal and sublethal effects of nitrate on amphibian embryos and larvae. In preparation for Ecological Applications.