



WATER RESOURCES RESEARCH GRANT PROPOSAL

Project ID: 2005KY52B

Title: Development and Immunity in Dragonfly (Odonata: Anisoptera): Indicators of Water Quality

Project Type: Research

Focus Categories: Ecology, Non Point Pollution, Water Quality

Keywords: dragonflies, fluctuating asymmetry, immunity

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Abstract

Historically, one of the most widely-used indicators of water quality has been the presence or absence of certain organisms, particularly fish and aquatic insects. Such assays have proven very useful for monitoring, yet may fail if the environmental perturbation reducing diversity in these systems cannot be removed by natural or anthropogenic restoration, thus allowing natural recolonization. Scientists thus need an early-warning system that could identify environmentally-stressed animals before the stressor causes population and/or regional harm, i.e, one which is more sensitive than presence-absence data. Such an indicator should be able to measure stress-induced effects before drastic changes take place that would subsequently decrease the organism's survival and reproductive abilities. We propose to correlate biological indicators (development and immunity) with important water chemistry and habitat variables known or hypothesized to cause negative consequences in an anisopteran odonate (dragonfly), *Libellula lydia*. Developmental anomalies may indicate exposure to stress in the past; immunity may indicate the likelihood that organisms can withstand future stress. We will relate water chemistry variables and our bioindicators across forested, agricultural, and

industrial landscapes to understand how current land-use practices are influencing odonate populations. The results of this study will provide the data necessary to evaluate the use of odonates as an early-warning indicator of water quality and environmental degradation. Development of these methods will provide researchers with a sensitive biological indicator of environmental health, which can potentially be used to monitor areas that are susceptible to ecological disturbance or where there are human health concerns. The proposed research will thus be important to both species conservation and environmental monitoring.