

Title: Effects of Atrazine (1-Chloro-3ethylamino-5isopropylamino-2, 4, 6-triazine) on the Appalachian brook crayfish (*Cambarus bartonii*).

Program of Study: Zoo and Wildlife Biology

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Category: Experimental (Theoretical)

Abstract:

Crayfish are known as a keystone species in aquatic ecosystems. An increased use of herbicides (i.e. atrazine) could effect the role of crayfish as a regulator in local aquatic ecosystems. Understanding how atrazine may influence crayfish could support efforts to sustain optimal water quality. Observing how environmentally relevant concentrations of Atrazine effect crayfish will further the understanding of the impact that herbicides have on freshwater ecology. Atrazine is one of the most commonly used herbicides in the United States. Atrazine is introduced to streams by runoff and by rainfall and is commonly detected at levels around 20ug/L with concentrations in rural areas occasionally exceeding 500 ug/L (2013). The effects of Atrazine on a variety of different organisms including amphibians and fish have shown reduced reproduction rates in fathead minnows (2010) and the feminization of male African clawed frogs (2009). This study will examine the effects of Atrazine at realistic environmental concentrations on the reproduction of *Cambarus bartonii*. *C. bartonii* is readily available in local streams, should be relatively easy to breed, and it is a good candidate to provide insight into the possible effects of atrazine on freshwater organisms. To explore the effects of Atrazine on the reproduction of *C. bartonii*, several breeding pairs will be collected and established in tanks. The offspring of these crayfish will be moved to a separate tank, counted, and sexed. The total weight of the offspring will be measured weekly and recorded. Atrazine will then be diluted in reverse osmosis water and added to all of the breeding aquariums and the experiment will be repeated. The same pairs will be used throughout the experiment to eliminate variability. The number of offspring, their sex, and their weights will be compared. The diet, temperature, and maintenance routines will remain constant with the only manipulated variable being the presence of Atrazine. It is expected that Atrazine contamination will cause a decrease in the total number of offspring and lower weights over time due to exposure.

This research seeks to fill the mandate found in Genesis regarding the role of human beings as stewards of the earth. The projects goal is to further the body of scientific knowledge in a way that honors Biblical principles and protects the environment.