

EFFECTS OF HERBICIDE EXPOSURE ON DIATOM ASSEMBLAGES IN A STREAM MESOCOSM

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Do pesticides have an effect on the diatom assemblages found in freshwater rivers that come into contact with the runoff of land purposed for agricultural use? Various pesticides are utilized year-long to combat the everchanging population of biotic organisms that jeopardize the viability of agricultural yields. Texas is currently one of the largest pesticide users and sources of agricultural non-point pollution in North America. The presence, concentration, and ecological effects of pesticides in Texas streams are not well understood. Diatoms are considered with high regard in terms of their use as bioindicators in determining the overall health of aquatic systems. Diatoms, while able to live in nearly any place with a bit of moisture and light exposure, have limitations and environmental optima that can be discerned based off of multiple factors, reasonably including tolerance towards toxic compounds. This research project utilized eight artificial streams in a paired replicate study with controls to experimentally study the potential chronic exposure effects that the common pesticides glyphosate (the main ingredient of RoundUp) and Terbacil may have on the diatom assemblage of the Colorado River at the Timberlake Biological Field Station near Goldthwaite, Texas. These two herbicides are of particular interest at this site because Terbacil is a commonly used herbicide at pecan plantations just upstream of the field station, and a long-term project to remediate a field of Bermuda grass near the river at the field station is considering the use of herbicide. Epilithic and epipelic diatom communities were collected from a site within the Colorado River along with river water to ensure more accurate comparisons among stream mesocosms. The artificial streams created an environment that mimicked the actual river as closely as possible. Each treatment stream was exposed to one of the pesticides in chronic low concentrations that accumulated over time in the closed system. Diatom communities were subsampled weekly and enumerated; comparisons between the control and the treatment were assessed. While such experiments can elucidate chronic exposure effects on community assemblage, more research is needed to understand the interactions that herbicides have with the individual species of diatoms.