



EFFECTS OF HERBICIDE EXPOSURE ON DIATOM ASSEMBLAGES IN A STREAM MESOCOSM

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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 of three treatments each with two controls to experimentally study the potential chronic exposure effects that the common pesticide glyphosate (the main ingredient of RoundUp) may have on the diatom assemblage of the Colorado River at the Timberlake Biological Field Station near Goldthwaite, Texas. Eight artificial streams were stocked with river water from the Colorado River to create an environment that mimicked the actual river as closely as possible. Epilithic diatom communities were collected from the Bosque River and used to establish diatom communities in the artificial streams; periphyton had been scoured from the Colorado River by heavy rains, so a nearby river of similar diatom assemblage was used. Each treatment stream was exposed to glyphosate in chronic low concentrations that accumulated over time in the closed system from daily doses of the chemical. The low-dose treatment was of the currently recognized TMDL for glyphosate in the state of California; the high-dose treatment was twice the dose of the TMDL. A voucher flora was constructed using the diatoms present within the streams. Statistical comparisons among the control and treatments considered the long-term shifts in the assemblage, as well as if the presence of glyphosate caused a particular genus or species of diatom to dominate the streams. 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.

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