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Title: Freshwater Bioturbators in Riverine Sediments as Enhancers of Contaminant Release Investigator(s): A. D. W. Acholonu¹, Collaborator(s) - L.J. Thibodeaux², K.T. Valsaraj²

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Objectives/Hypothesis

The purpose of this study was to collect, identify, and catalog the benthic (bottom-dwelling) invertebrates in the Yazoo River and Yazoo Lake, and to compare the fauna from the two freshwater bodies. It was also conducted to enable us to find and select relevant bioturbators and use them to conduct flux measurement experiments. The general objective of the project is to contribute to knowledge about hazardous substances and how to get rid of them; to measure the magnitude of bioturbation by tubificid worms and other appropriate bioturbators in the laboratory in order to advance modeling of contaminant flux and ultimately understand its ecological implications.

Approach

During the first year of this study, we surveyed the Yazoo River to find contaminated sediment sites; collect, identify, and catalog benthic fauna in the Yazoo River. Important bioturbators found were to be selected and transplanted into laboratory microcosm. Sediment contaminants were to be identified. Chemical analysis were to be performed and flux measurement experiments are expected to shed more light on physicochemical transport process. This study was directed toward quantifying the increased flux of hydrophobic organics from contaminated sediment due to bioturbation by freshwater oligochaetes found in the Yazoo River bed. The results of the flux measurement experiments are to shed more light on physicochemical transport process.

Results

The dipterans were the most numerous invertebrates recovered from both habitats but they were a little more in the river (9 genera) than in the lake (8 genera). That the dominant in fauna in both the lake and the river were chironomids (Diptera) and tubificid worms (oligochaeta). There were however, more varieties of genera and species from the Yazoo River than from the Yazoo Lake. This does not exist or cannot be found in the lake. The difference in the diversity between the Yazoo River and Lake Yazoo could be attributed to hydrologic conditions such as: Substrate type (slit, clay, sand) velocity of water, vegetation, organic detritus, and the overall water quality especially with respect to pollution.

PAHs are among the contaminants most frequently detected in sediments, and these were found in several parts of the lake and the river this showing that both bodies of water have some polluted parts. Some of the benthic organism found such as the oligochaetes: *Limnodrilus hoffmeisteri*, *Limnodrilus udekemianus*, and *Dero digitata*, may serve as bioturbators and enhance contaminant release. Chironomids, and *Lumbriculus* are suspected to have impact on contaminant migration intermediate between the amphipods and tubificids. The midge fly larvae borrow and grow until they emerge as adult flies (Reible et al. 1996). Our next step is to follow up on them and evaluate them as potential bioturbators. Attempts are being made to culture some of these for conducting flux measurement experiments. We also plan to collect sediments in the middle part or deeper parts of the river and lake and compare the fauna with those from the bank area as reported from this study.

Supplemental Keywords

PAHs, benthic invertebrates, and contaminant release

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