



Effect of Nutrient Concentration and Turbidity on the Microhabitats of *S. haematobium* Hosts

Does the concentration of nutrients and turbidity of rivers and lakes affect the type of microhabitat that is used by *S. haematobium* hosts?

Introduction

- Urogenital Schistosomiasis is a life-altering condition that affects millions of lives caused by the parasitic *Schistosoma haematobium*
- *S. haematobium* rates are positively correlated with the percent of nonemergent vegetation coverage of sites where humans and livestock come into contact with water, because of habitat use of nonemergent vegetation by the *Bulinus* hosts.
- As development increases in areas where *S. haematobium* proliferates, the amount of nutrients in rivers, lakes, and ponds increases.
- This study tests the correlation between nutrient indicators (concentration of nitrate, nitrite, phosphate, and secchi disc depth) and the percent coverage of microhabitats in water contact sites to see if the increase in nutrients would cause an increase in parasitic host habitat.
- This study predicted that samples with higher nutrients and turbidity would be correlated with higher percentage of nonemergent vegetation.

Methods

- Wood et al. (2019) created a dataset sourced from 32 sample water contact sites near 16 rural villages in northern Senegal from 2016 to 2018.
- Google Earth was used to randomly select the boundaries of sampling locations to determine the percent coverage of three different microhabitat types: mud, emergent vegetation, and non-emergent vegetation
- Each sample also tested for four nutrient indicators (concentration of nitrates (mg/L), nitrites (mg/L), phosphates (mg/L), and secchi disc depth (cm)).
- Each of the nutrient indicators were compared to each of the three microhabitat types to determine if there is a correlation between habitat and nutrient levels.

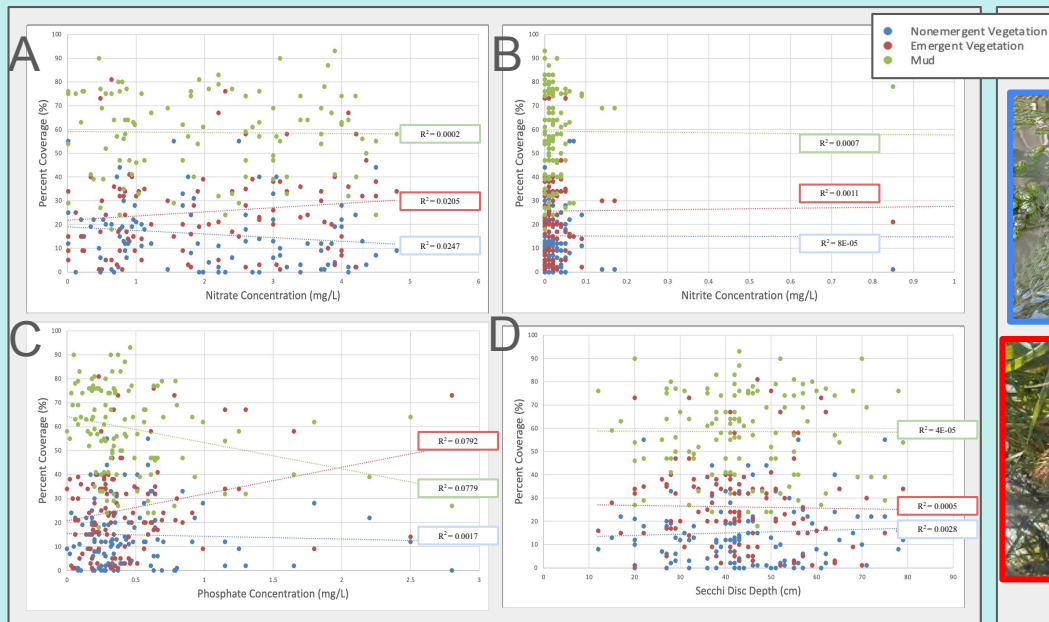


Fig. 1 Linear regression model of (a)nitrate, (b)nitrite, (c)phosphate, and (d)secchi disc depth compared to the percent coverage of each microhabitat (mud, emergent, and nonemergent vegetation)

Findings

- No significant correlation was found between any of the nutrient factors and nonemergent vegetation.
- This suggests that an increase in nutrients associated with an increase of development does not increase the habitat of the intermediate hosts of *S. haematobium*
- However studies show that other factors that are associated with development do have the potential to affect the population of *Bulinus* host, thus increasing schistosomiasis rates, including the creation of dams and use of irrigated agriculture. (2)

References

- El-Chay, M. G., et al. (2015). Analysis of Schistosoma haematobium infection prevalence and intensity in children, Sudan: an application of a new point model. *PLoS neglected tropical diseases*, 9(1), 2015.
- El-Chay, M. G., et al. (2016). The effect of irrigation practices on the transmission of schistosomiasis in the Middle and Upper Valley of the Senegal River Basin. *Journal of Tropical Medicine & Hygiene*, 9(1), 2016.
- El-Chay, M. G., et al. (2017). Prevalence of Schistosoma haematobium and S. haematobium in small reservoirs in Senegal. A systematic review and meta-analysis. *Journal of Tropical Medicine & Hygiene*, 9(1), 2017.
- El-Chay, M. G., et al. (2018). Nutrient and spatial variation in schistosomiasis: a systematic review and meta-analysis. *Journal of Tropical Medicine & Hygiene*, 9(1), 2018.
- El-Chay, M. G., et al. (2019). The effect of irrigation practices on the transmission of schistosomiasis in the Middle and Upper Valley of the Senegal River Basin. *Journal of Tropical Medicine & Hygiene*, 9(1), 2019.
- El-Chay, M. G., et al. (2020). The effect of irrigation practices on the transmission of schistosomiasis in the Middle and Upper Valley of the Senegal River Basin. *Journal of Tropical Medicine & Hygiene*, 9(1), 2020.
- El-Chay, M. G., et al. (2021). The effect of irrigation practices on the transmission of schistosomiasis in the Middle and Upper Valley of the Senegal River Basin. *Journal of Tropical Medicine & Hygiene*, 9(1), 2021.
- El-Chay, M. G., et al. (2022). The effect of irrigation practices on the transmission of schistosomiasis in the Middle and Upper Valley of the Senegal River Basin. *Journal of Tropical Medicine & Hygiene*, 9(1), 2022.
- El-Chay, M. G., et al. (2023). The effect of irrigation practices on the transmission of schistosomiasis in the Middle and Upper Valley of the Senegal River Basin. *Journal of Tropical Medicine & Hygiene*, 9(1), 2023.
- El-Chay, M. G., et al. (2024). The effect of irrigation practices on the transmission of schistosomiasis in the Middle and Upper Valley of the Senegal River Basin. *Journal of Tropical Medicine & Hygiene*, 9(1), 2024.
- El-Chay, M. G., et al. (2025). The effect of irrigation practices on the transmission of schistosomiasis in the Middle and Upper Valley of the Senegal River Basin. *Journal of Tropical Medicine & Hygiene*, 9(1), 2025.

