Epilithic Diatom flora in a contrasting river continuum

By
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Acknowledgement:
Laza, Julianna, Finaritra and Haja

BACKGROUND:

Epilithic diatom communities offer an integrated approach for assessing water quality and reflect an ecological state of a river: case study for Madagascar

STATISTIC QUESTION:

What environmental factors drive **diatom richness**?

MECHANISTIC QUESTION

How aquatic Insects affect diatom richness in a river continuum?

Statistical model

What environmental factors drive **diatom richness**?

HYPOTHESIS: Genera richness is influenced by combined phyisico-chemical propreties of water

Response Variable: Number of Identified genera

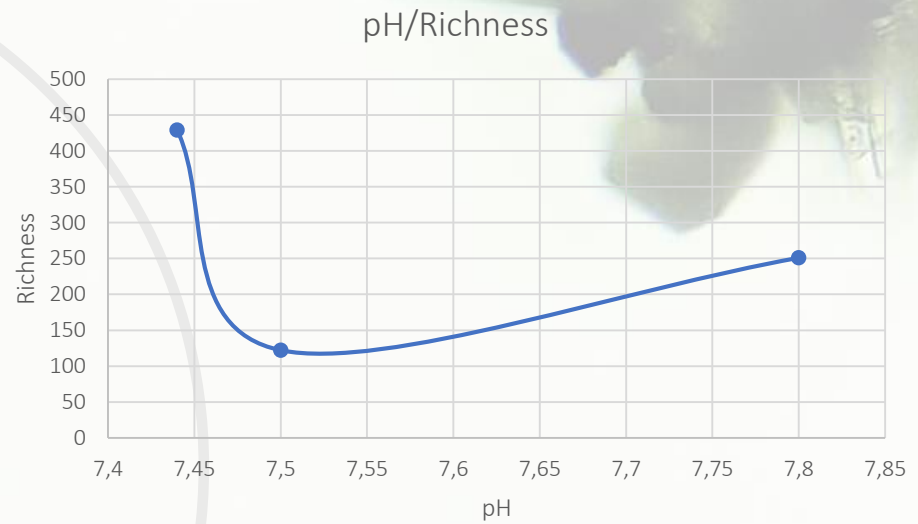
Explanatory variables: Temperature, pH, Organic Compound

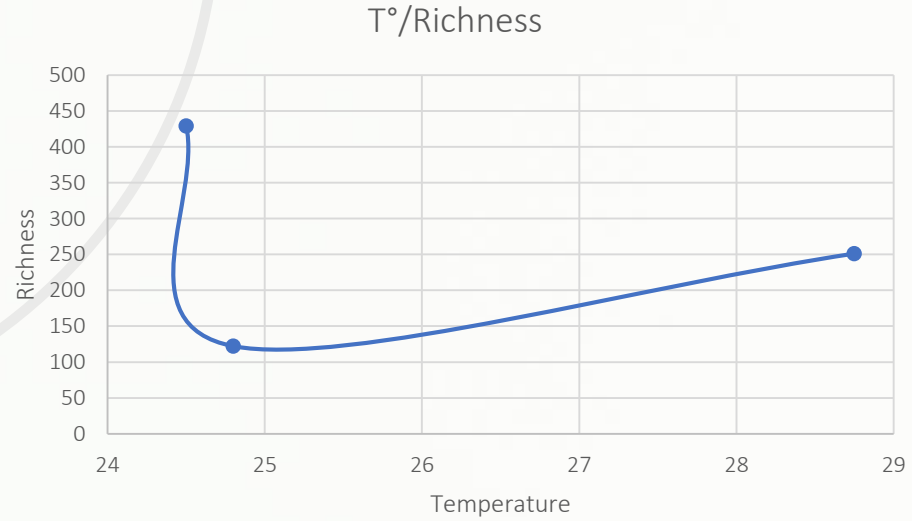
Family: Poisson

Link: Log

Hypothesis: An optimum Temperature coupled by a pH level increase genera richness on Diatoms.

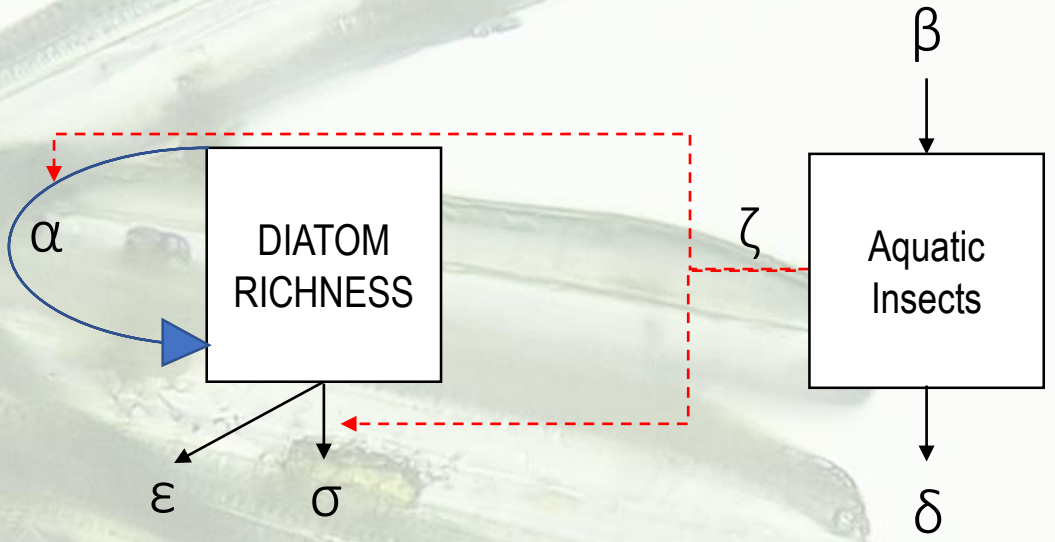
R Code: glmer(Num of taxons~ T°+pH+...+(1|site), family="Poisson", link="log",data = full.diatoms)





Dynamical Model

How Aquatic Insects affect diatom richness in a river continuum?



$$\frac{dD}{dt}=\frac{\varphi\rho}{\zeta}(\alpha-\sigma-\varepsilon)A \qquad \frac{dA}{dt}=(\beta-\delta)D$$

D: Diatom richness
ρ: Taxonomic Richness
φ: Global density
α: Diatom reproduction
ε: Community Erosion
σ: Cells Death
A: Aboundance of Aquatic Insects
ζ: Rate of Grazers Insect
β: Birth rate of aquatic insects
δ: Death rate of aquatic insects

NEXT STEPS:

COLLECT MORE DATA MORE RELATED TO DIFFERENT SITES

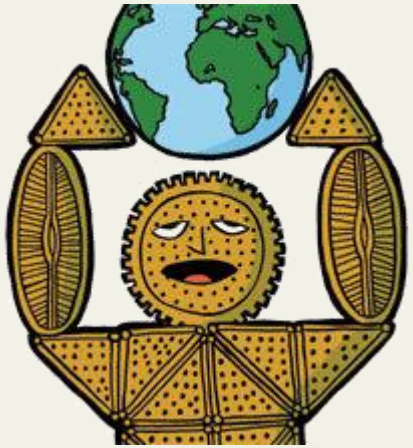
To highlight the diversity of Diatoms, more sites are needed to collect data and to have more comprehensive way how land uses can affect community composition of Diatoms.

ACCURATE SPECIES IDENTIFICATION AND PERFORMING INDICES BY THE METABARCODING

To highlight the diversity of Diatoms in flowing water, high accuracy of species level Identification is needed. And in the case of Madagascar, the specific richness leads to considerate the high diversity in species level.

INFERRING THE GLOBAL RIVER ECOSYSTEM HEALTH

By comparing diatom index and sensitivity with other aquatic indicators (Insects, Macrophytes, Fishes) can we generate an insight of the quality of the River considering the ecological integrity and the capacity of auto epuration.



Thank you