

QCMI: A method for quantifying putative biotic associations of microbes at the community level

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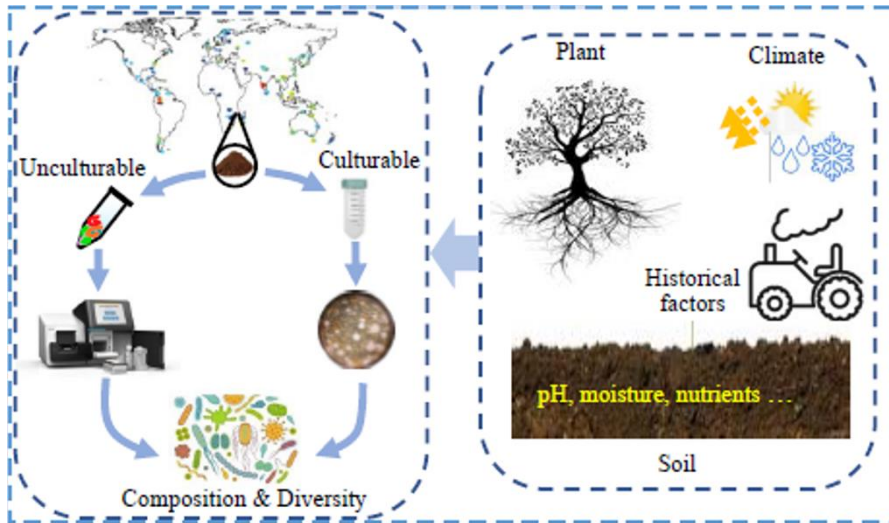
³ State Key Laboratory of Crop Stress Adaptation and Improvement, School of Life Sciences, Henan University



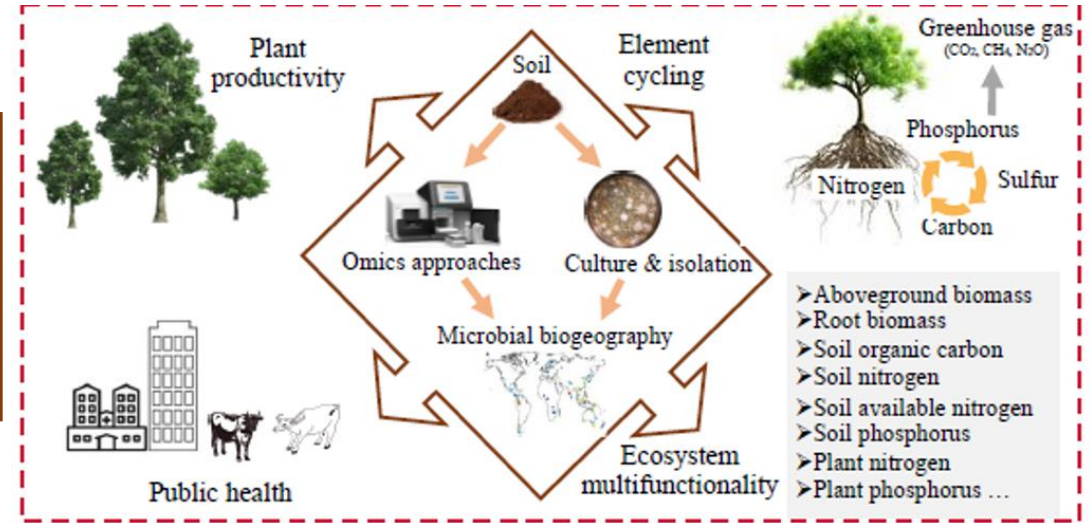
Xu Liu, Yu Shi, Teng Yang, Gui-Feng Gao, Haiyan Chu. 2023. *QCMI*: A method for quantifying putative biotic associations of microbes at the community level. *iMeta*: e92. <https://doi.org/10.1002/imt2.92>

Introduction

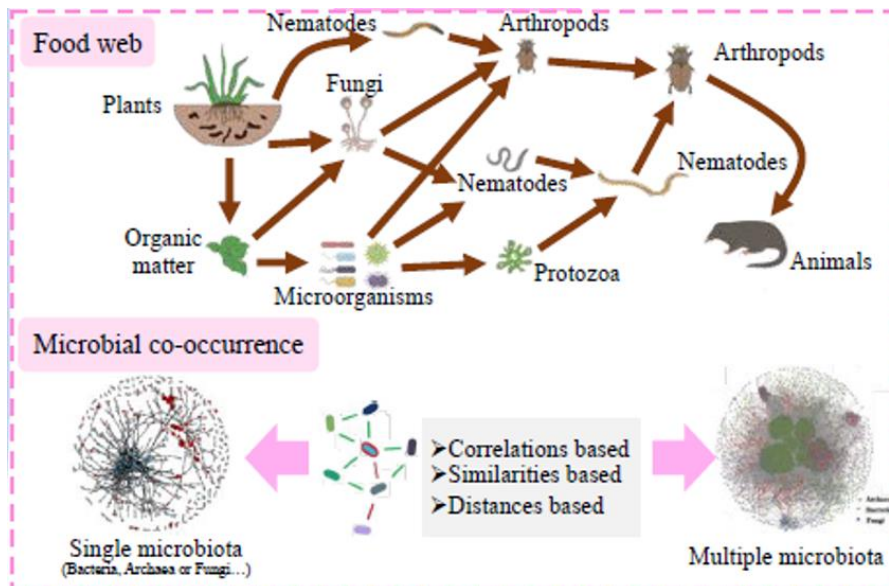
Distribution



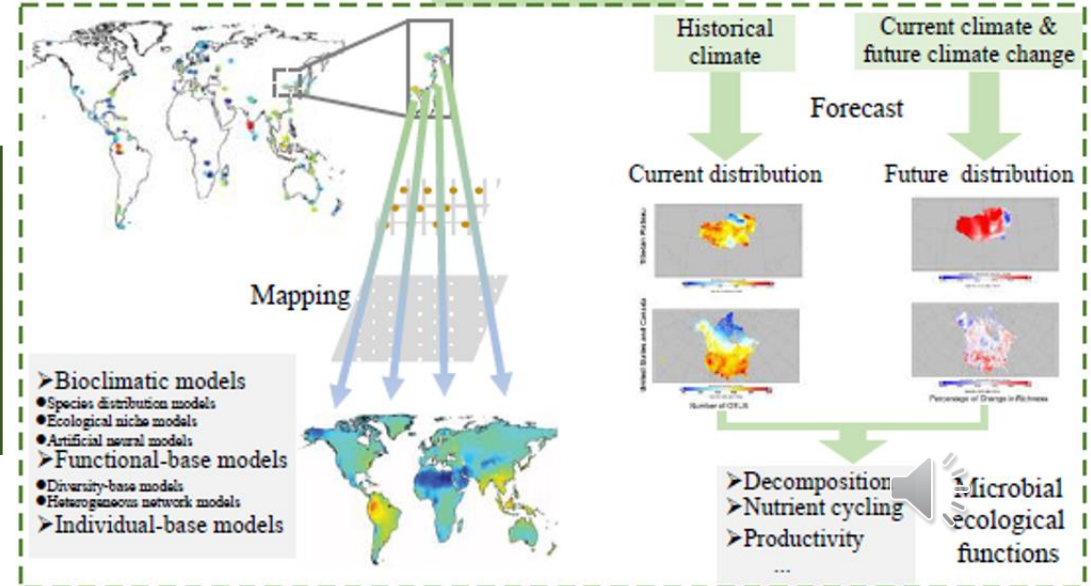
Function



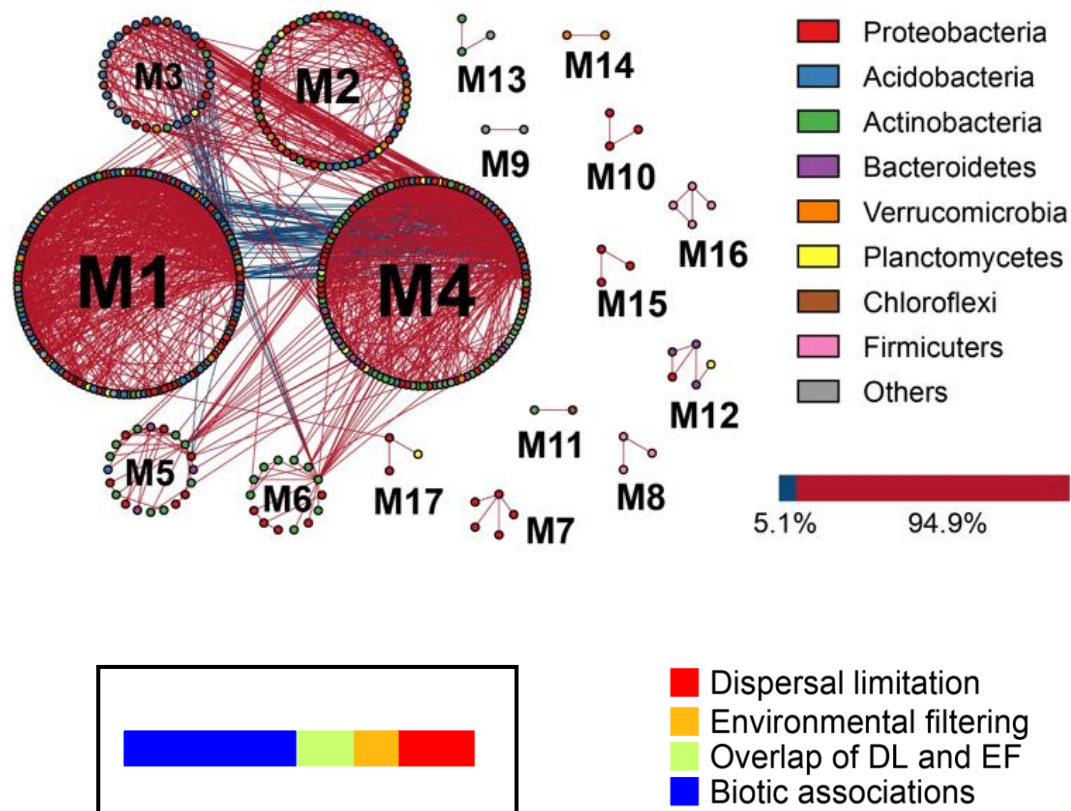
Interaction



Prediction

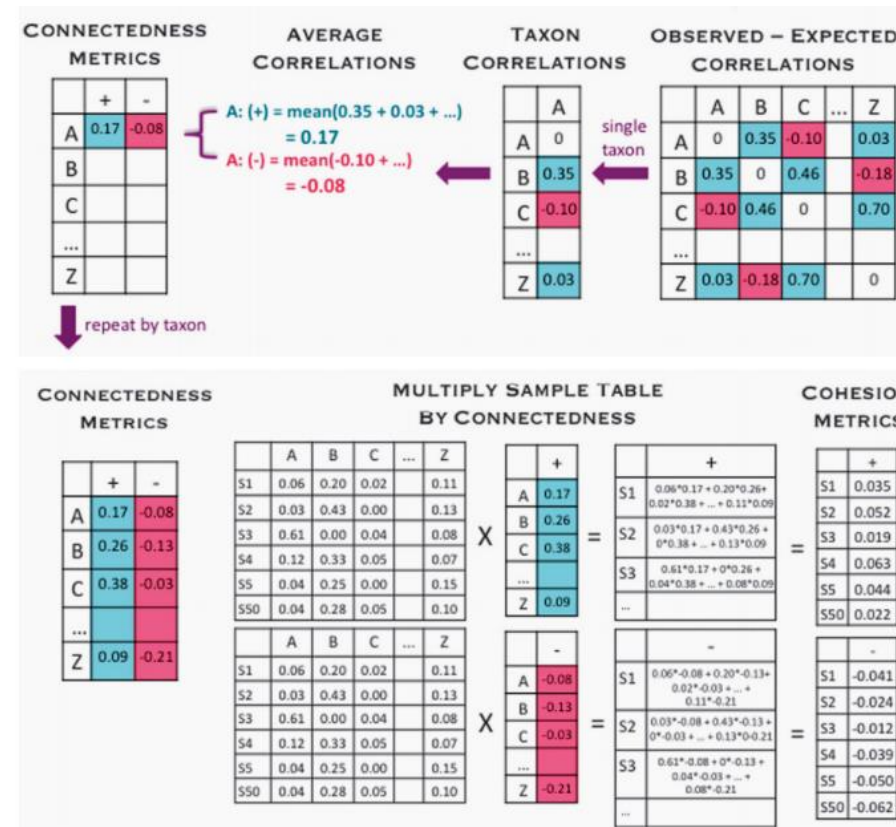


Introduction



Goberna, 2019. *Mol. Eco. Res.*

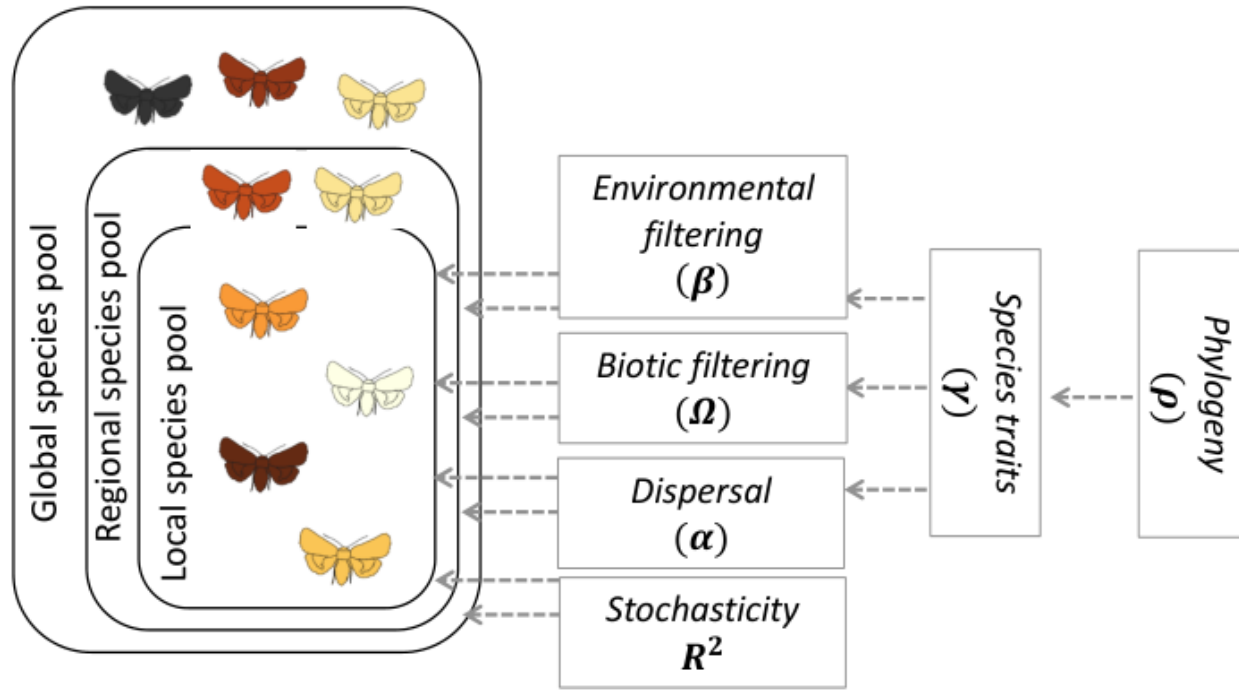
Coexistence network relationships include complex biotic and abiotic associations



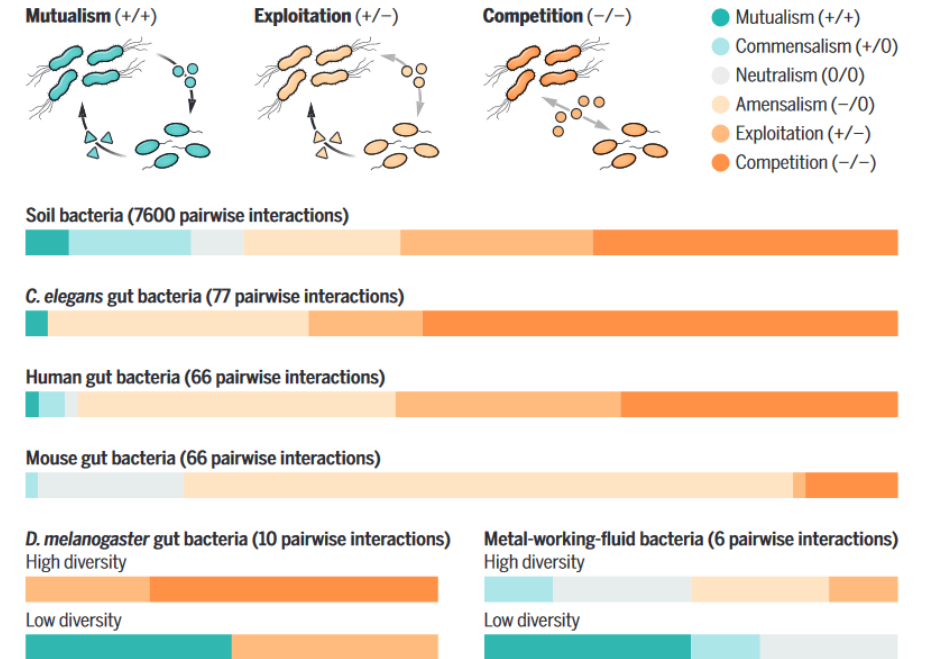
Herren, 2017. *ISME J*

Network cohesion represents the complexity of the community associated with networks

Introduction



Tikhonov, 2020. *Methods in Ecology and Evolution*

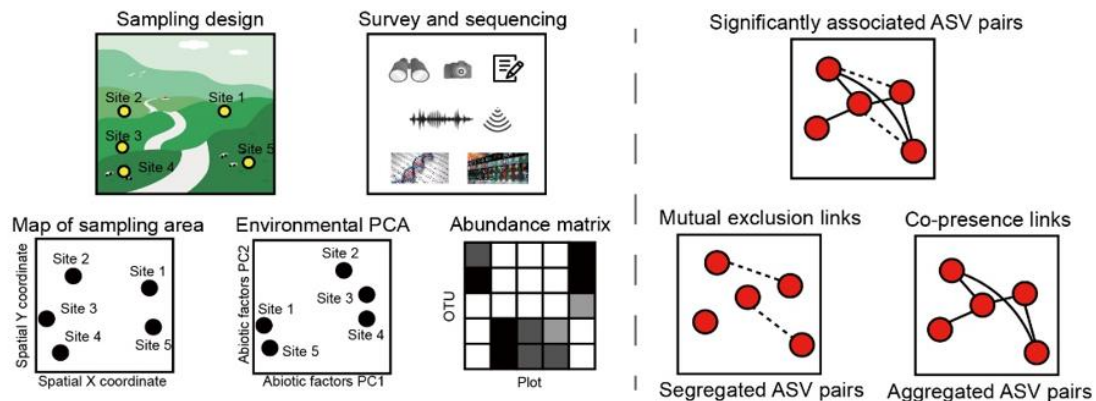


Palmer, 2022. *Science*

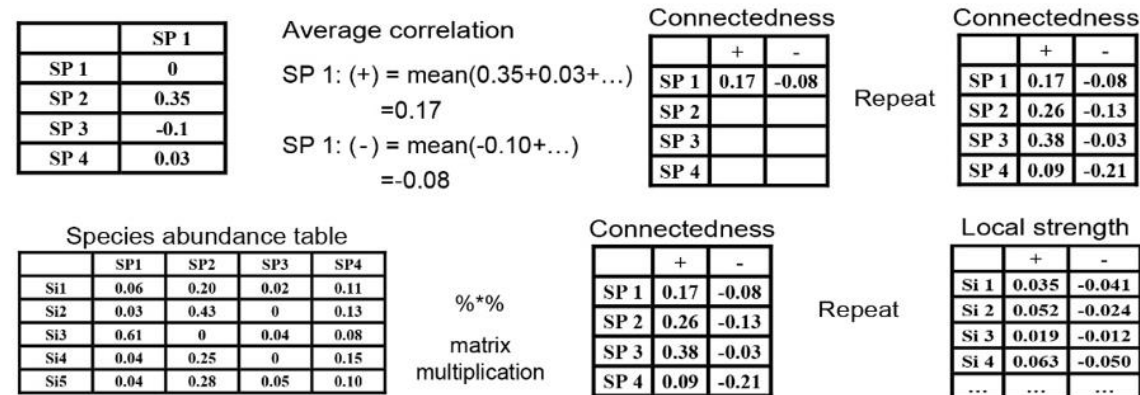
The Vellend's theory indicates that the community assembly process is not only influenced by neutral processes, but also driven by environmental selection and biotic filtering

Pipeline

★ Step1. Construct ecological networks



★ Step3. Quantify the strength of biotic associations



★ Step2. Assign assembly processes

1. Are spatial distance significantly different between sites with different ASV states?

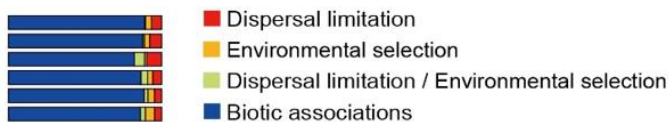


2. Are environmental factors significantly different between sites with different ASV states?

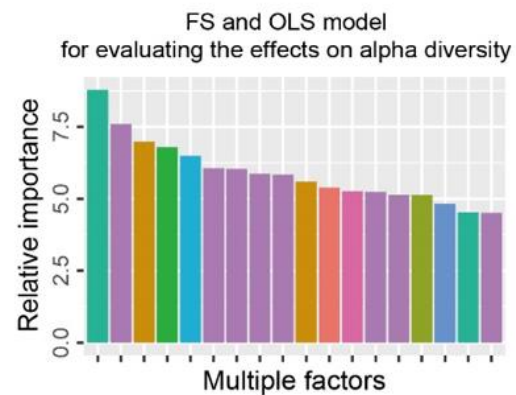


Putative biotic associations

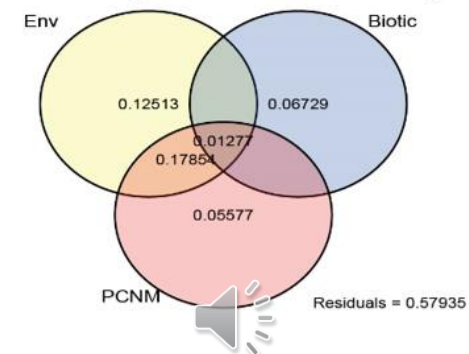
- Positive associations (Aggregated pairs)
- Negative associations (Segregated pairs)



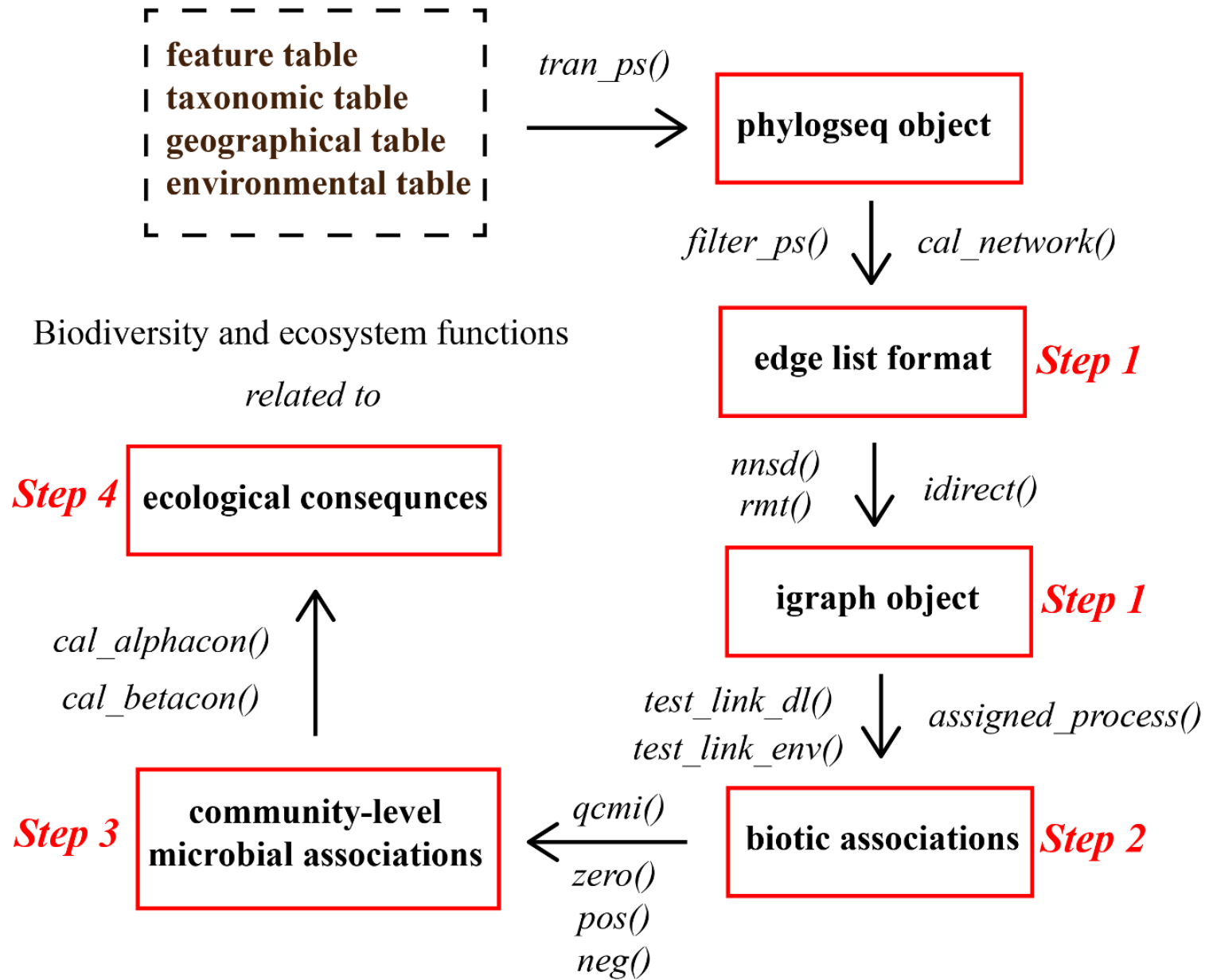
★ Step4. Calculate the effects of biotic associations



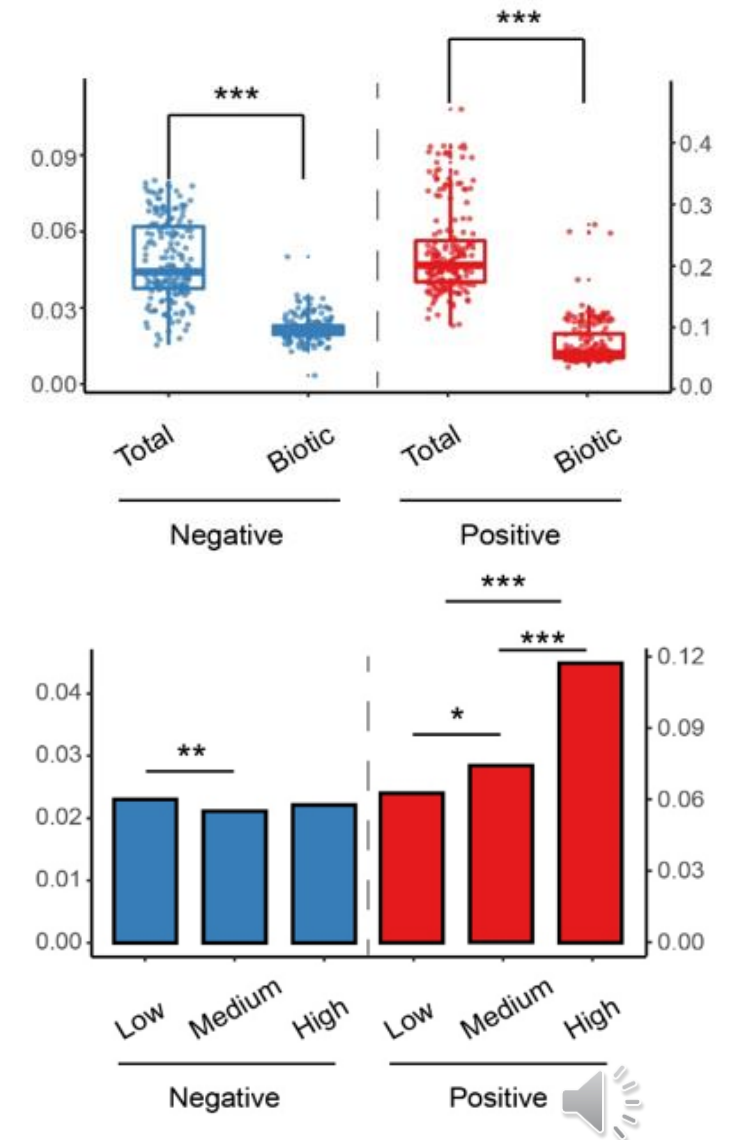
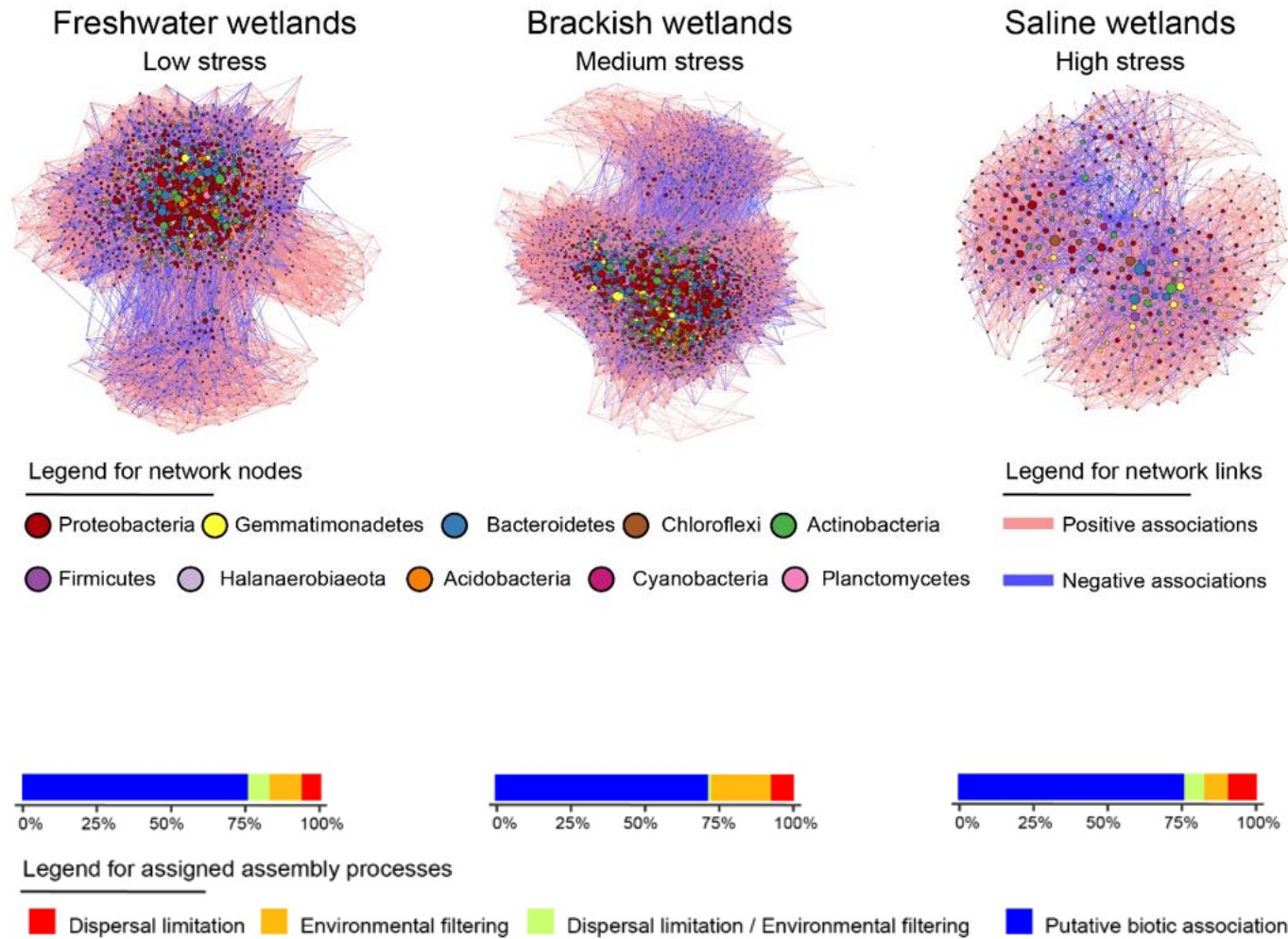
Multivariate regression analysis for evaluating the effects on beta diversity



Data types

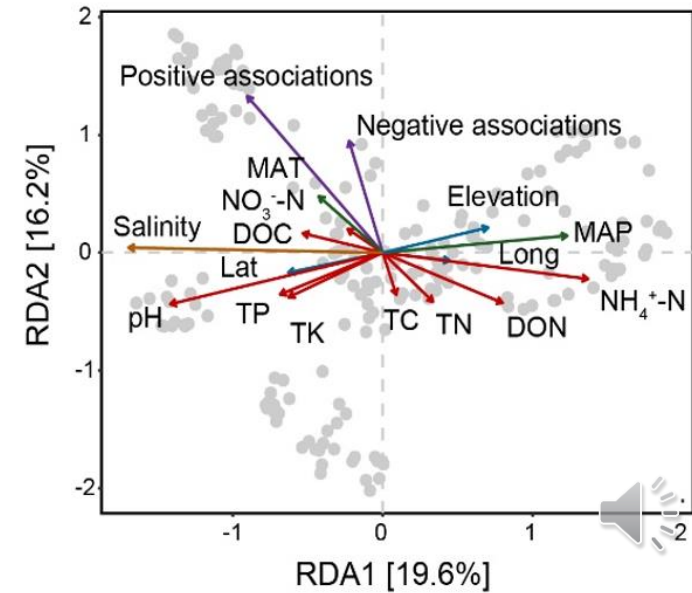
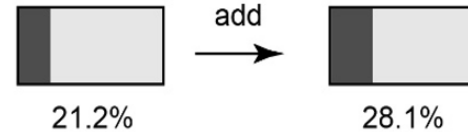
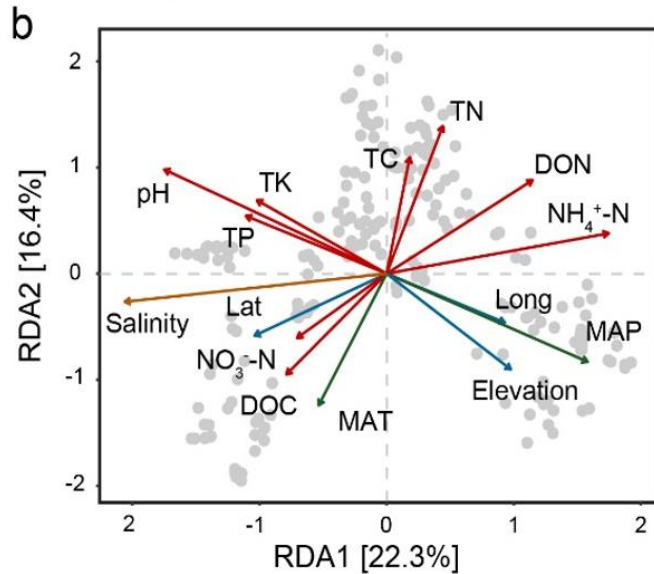
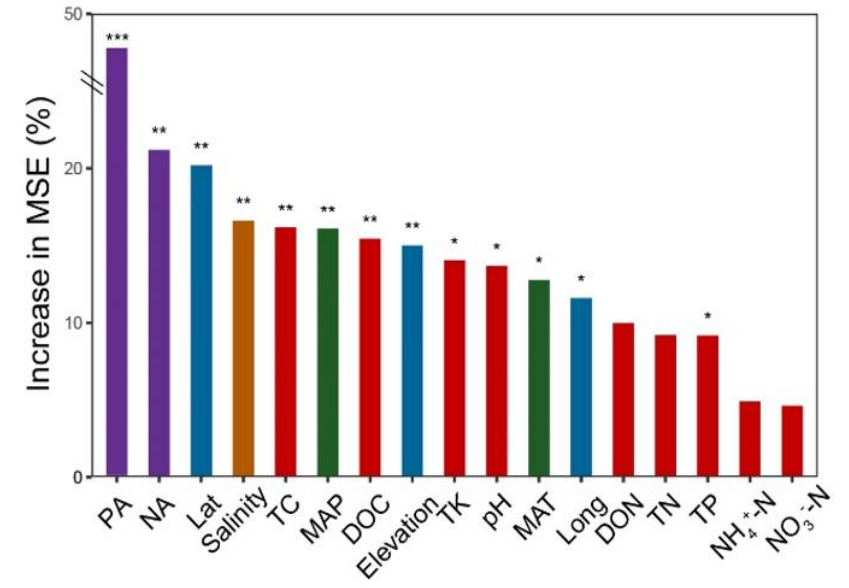
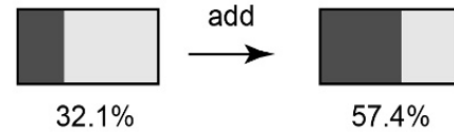
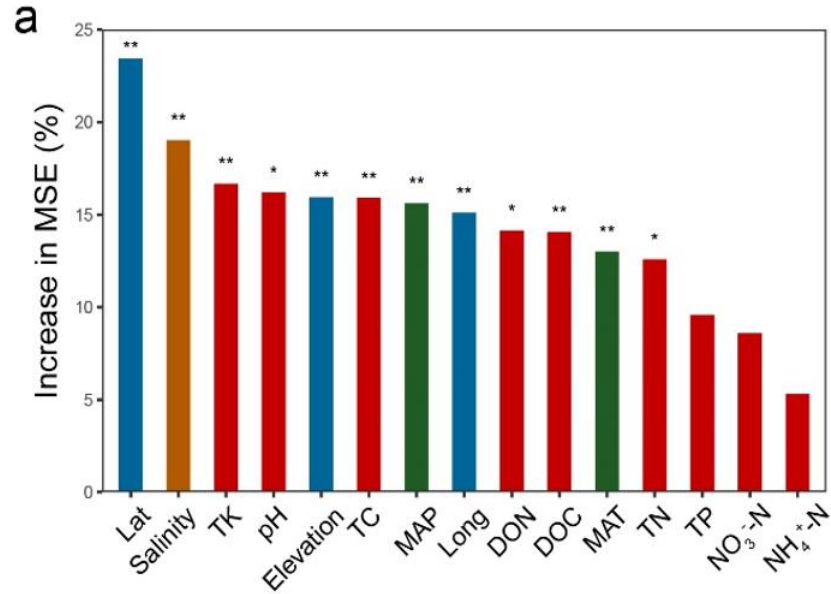


Emperical case



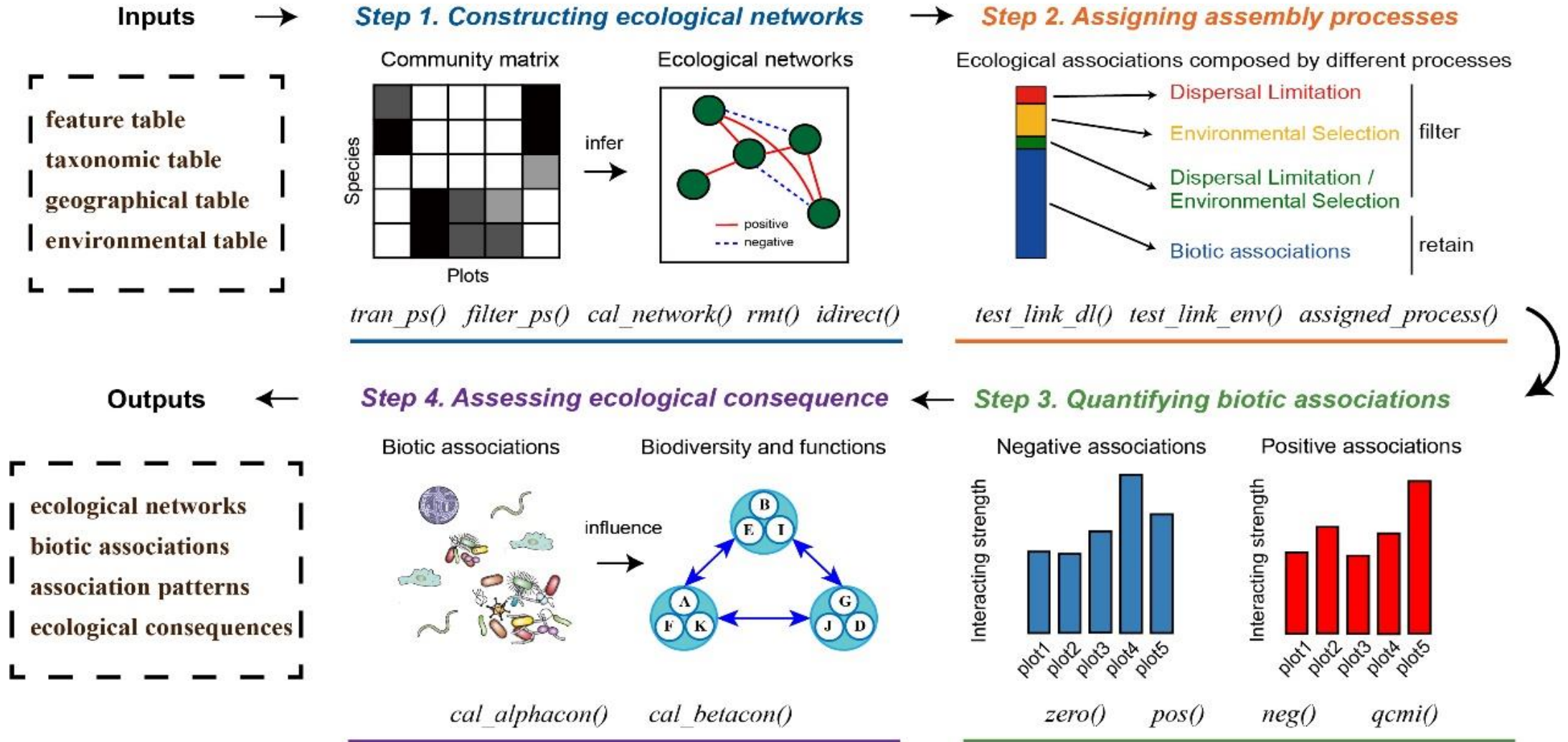
The result display, data comparison and ecological significance mining of case data

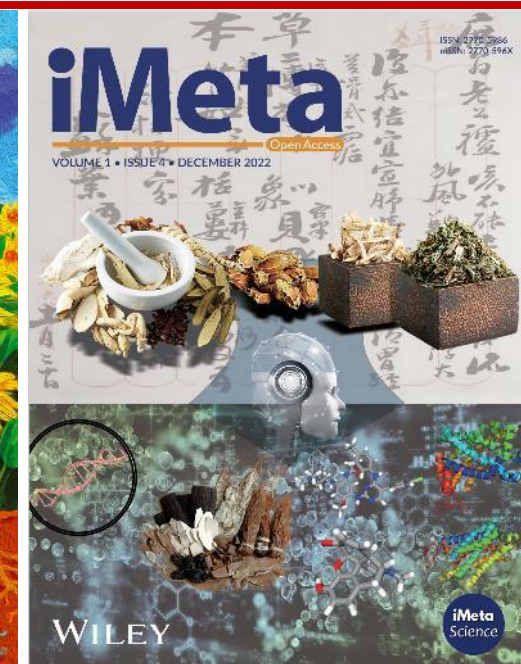
Emperical case



QCFI is essential for understanding the maintenance mechanisms of microbial diversity

Summary





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