The Role of Bioturbation of *Ellobium aurismidae* on Biogeochemical Characteristics of Carbon and Nitrogen in Mangrove Sediments

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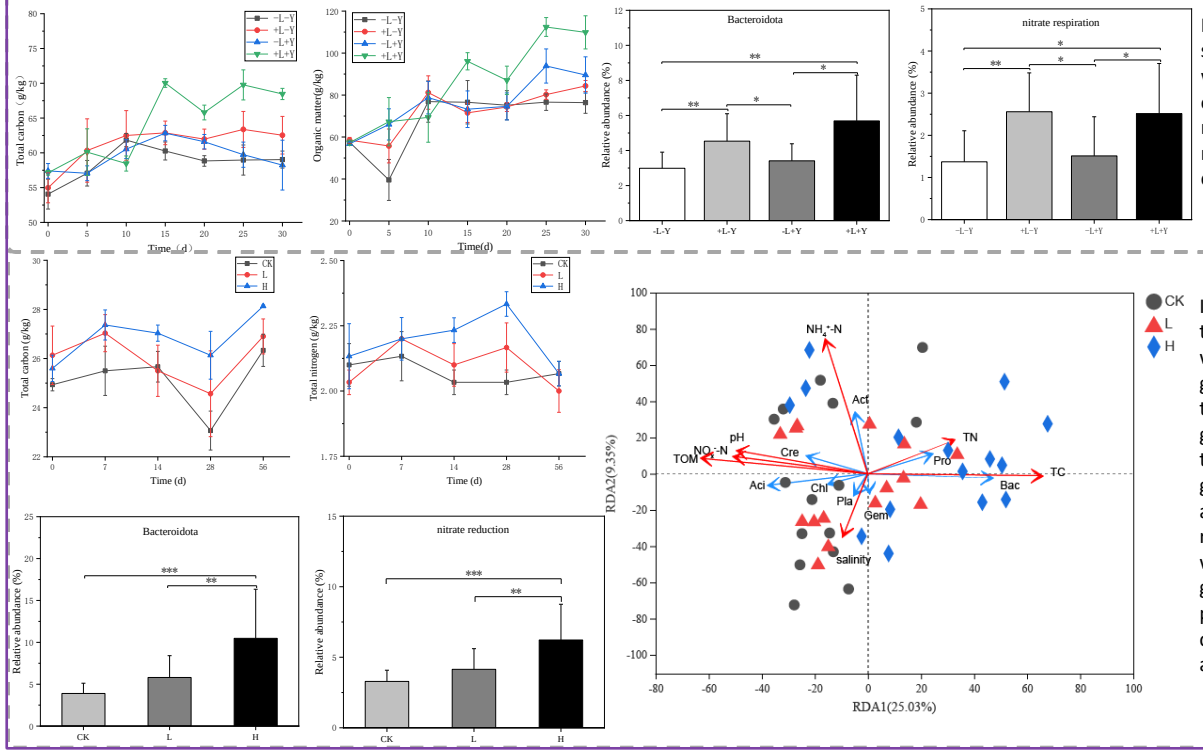
Introduction

The complex and diverse habitats of mangrove wetlands provide an ideal place for many organisms to feed, inhabit and reproduce. In the context of global change, the mechanisms affecting the carbon and nitrogen cycles of sediment systems as a result of cross-echelon interactions in the Earth system are the international frontier scientific issues of "blue carbon" in mangroves. Macrobenthos is one of the main biological drivers of energy flow and material cycling in mangrove wetland ecosystems. *E. aurismidae* is one of the major benthic species in the intertidal zone of mangroves, with large, hard shells and sediment scraping habits, but its ecological role is still in a blank stage. In-depth understanding of the mechanism of macrobenthos influence on the carbon and nitrogen cycle of mangrove sediments can help provide a theoretical basis for the conservation and restoration of mangrove wetland ecosystems and biodiversity.

Research content



In this indoor control experiment, the sediments in which both snails and leaves were placed had significantly higher contents of total carbon and organic matter, and the relative abundance of Bacteroidota and nitrate respiration function in the sediment microbial community was also significantly increased.

In the indoor density control experiment, the total carbon content of the high-density group was higher than that of the remaining two groups from day 14 onwards, and the mean total nitrogen content of the high-density group (2.19 g/kg) was significantly higher than that of the low-density and blank groups (2.10 g/kg and 2.07 g/kg). In addition, the relative abundance of Bacteroidota and nitrate reduction function in sediment microorganisms was significantly higher in the high-density group. The redundancy analysis revealed a positive correlation between the total carbon content in the sediment and the relative abundance of the Bacteroidota.

Conclusion

Bioturbation of *E. aurismidae* promotes the conversion of mangrove plant leaf litter into organic matter such as carbon and nitrogen in wetland sediments, while shaping the structural characteristics of sediment microbial communities and enhancing the functional abundance of nitrate respiration, potentially contributing to the denitrification process in mangrove sediments.