

Highlights

- The coculture of *Sinonovacula constricta* in shrimp-crab ponds resulted in increased nitrogen cycling in water but decreased nitrogen cycling in sediment.
- The reduced nitrogen flux primarily originated within the sediments of the shrimp IMTA ponds, except for assimilatory nitrate reduction.
- pH and NH_4^+ played important roles influencing nitrogen cycling by the microbial community and overall nitrogen cycling in the shrimp IMTA ponds.