



Identification of Keystone Species in Ecological Communities in the East China Sea

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SUMMARY

- Based on food web structures, we construct a topological ecological network with the aim to reveal critical species within the eastern aquatic ecosystem of China, and further quantify their ecological functions.
- We identified *Muraenesox cinereus*, *Leptochela gracilis*, and *Trichiurus lepturus* as keystone species in the region based on the results of principal component analysis of ten network indices.
- The removal analysis performed suggested that the loss of keystone species might have a negative impact on the complexity and stability of the food web in the East China Sea

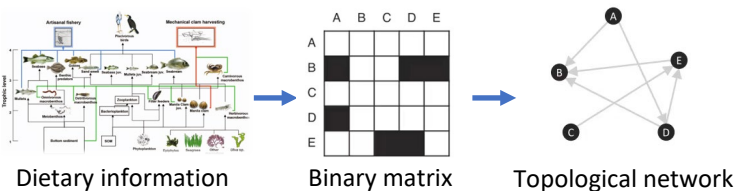
MATERIALS & METHODS

1. Area

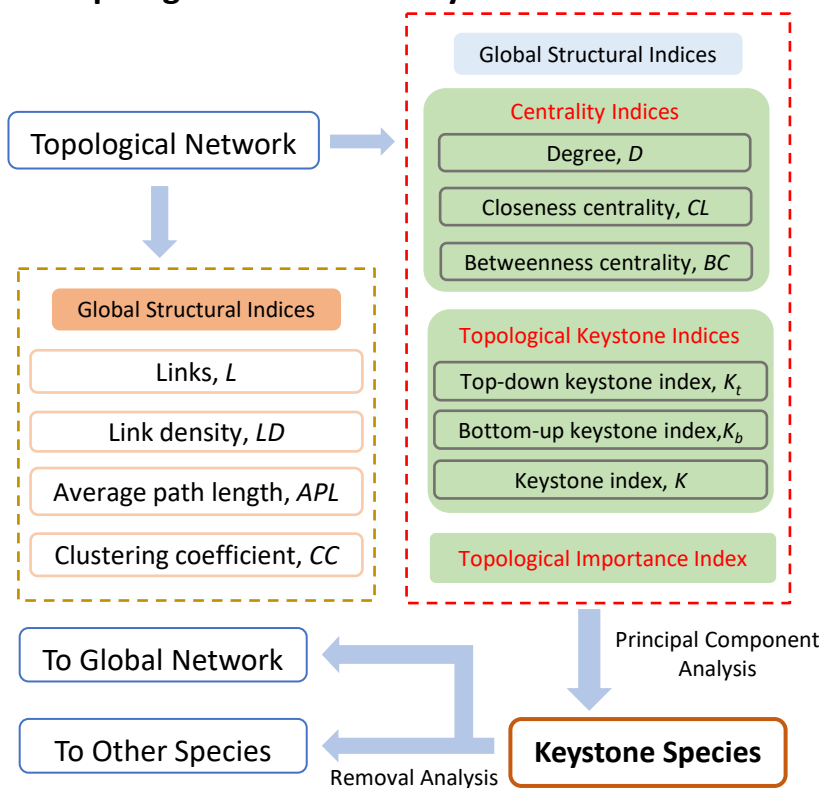


The East China Sea

1. Construct food web



2. Topological network analysis



RESULTS

1. Food web & Keystone species

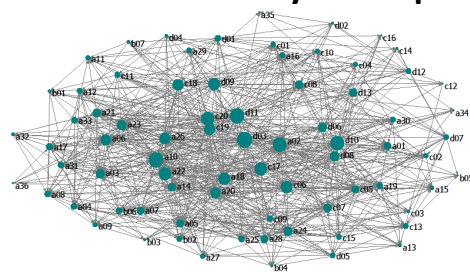


Fig.1. A food web diagram for the East China Sea

Species importance ranking:

1. *Muraenesox cinereus*
2. *Leptochela gracilis*
3. *Trichiurus lepturus*
4. *Oratosquilla oratoria*
5. *Apogonichthys lineatus*

2. Removal analysis

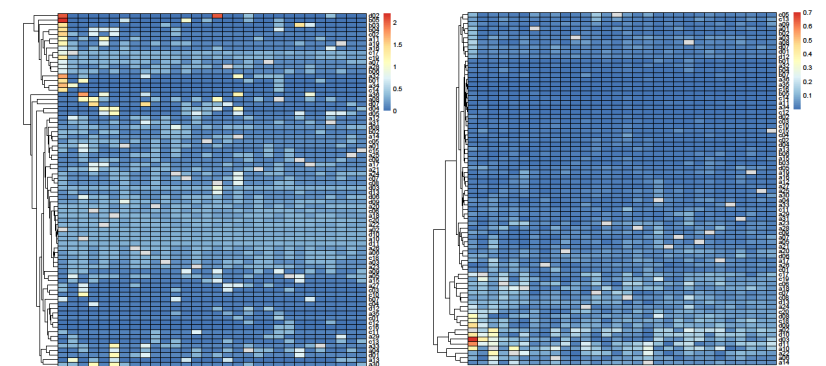


Fig.2. Variations in CL and BC after species removal in the food web of the East China Sea

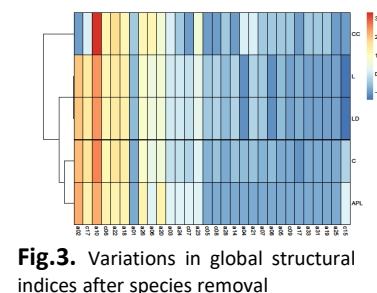


Fig.3. Variations in global structural indices after species removal

- The higher the species was ranked, the greater the impact on the global structural indices after removal.
- The removal of *T. lepturus* had the greatest influence on the global structure.
- *S. laticaudus* with its high rank had little effect on the global structure.

3. Accumulative removal

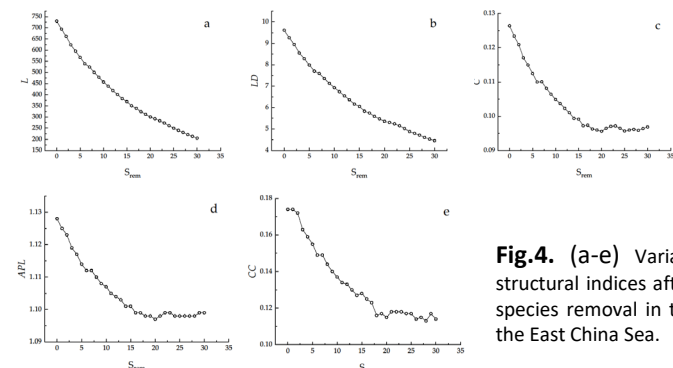


Fig.4. (a-e) Variations in global structural indices after accumulative species removal in the food web of the East China Sea.

CONCLUSIONS

- The LD, C, and CC values of the food web were high, which indicated that the food web had strong robustness and resistance. The lower APL value meant that negative effects spread rapidly and widely throughout the food web.
- *M. cinereus*, *L. gracilis*, and *T. lepturus* were identified as the keystone species in this area according to 10 topological indices. *L. gracilis*, as a key food organism, plays an important upward effect in the community.

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MORE INFORMATION

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