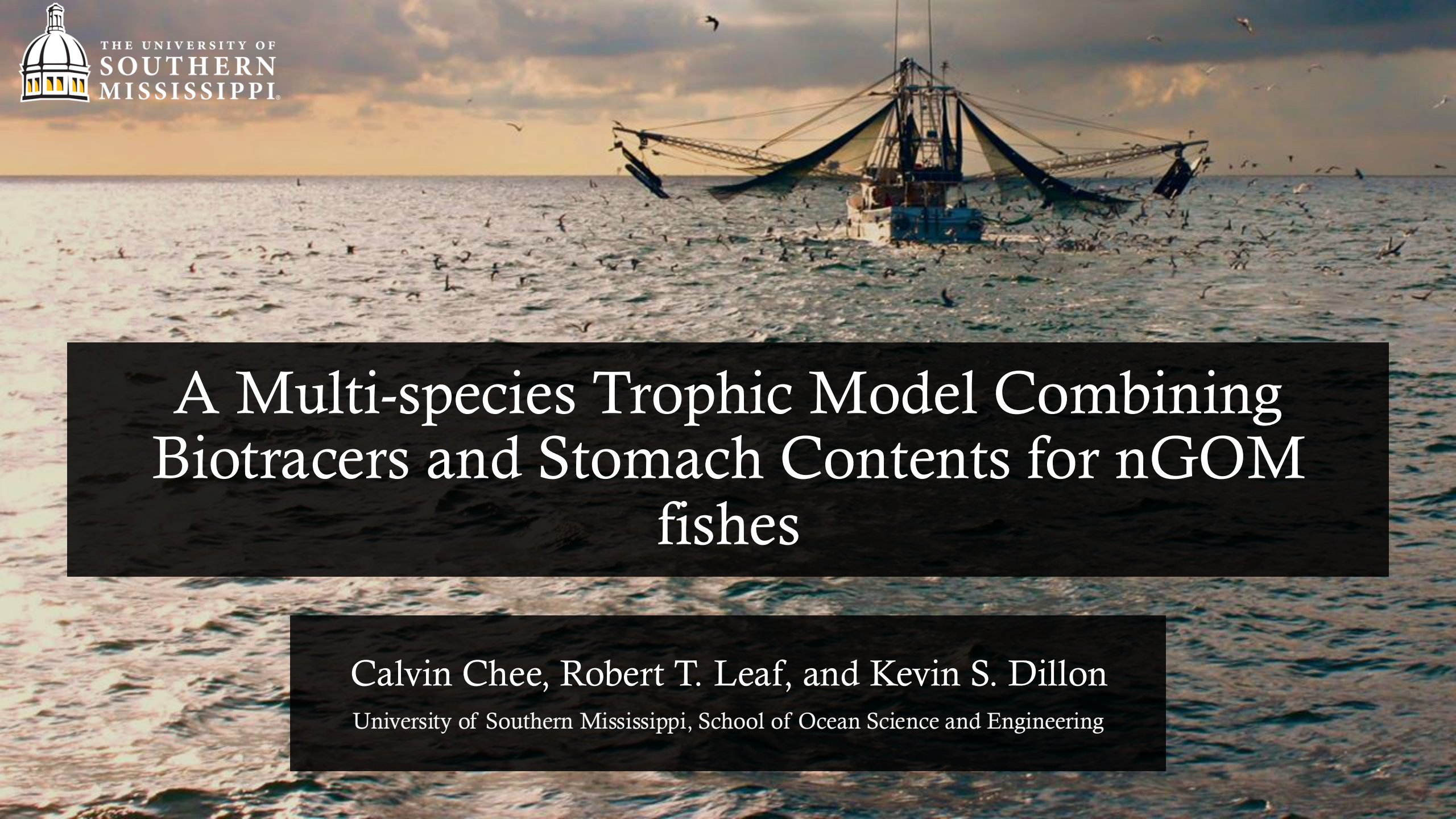




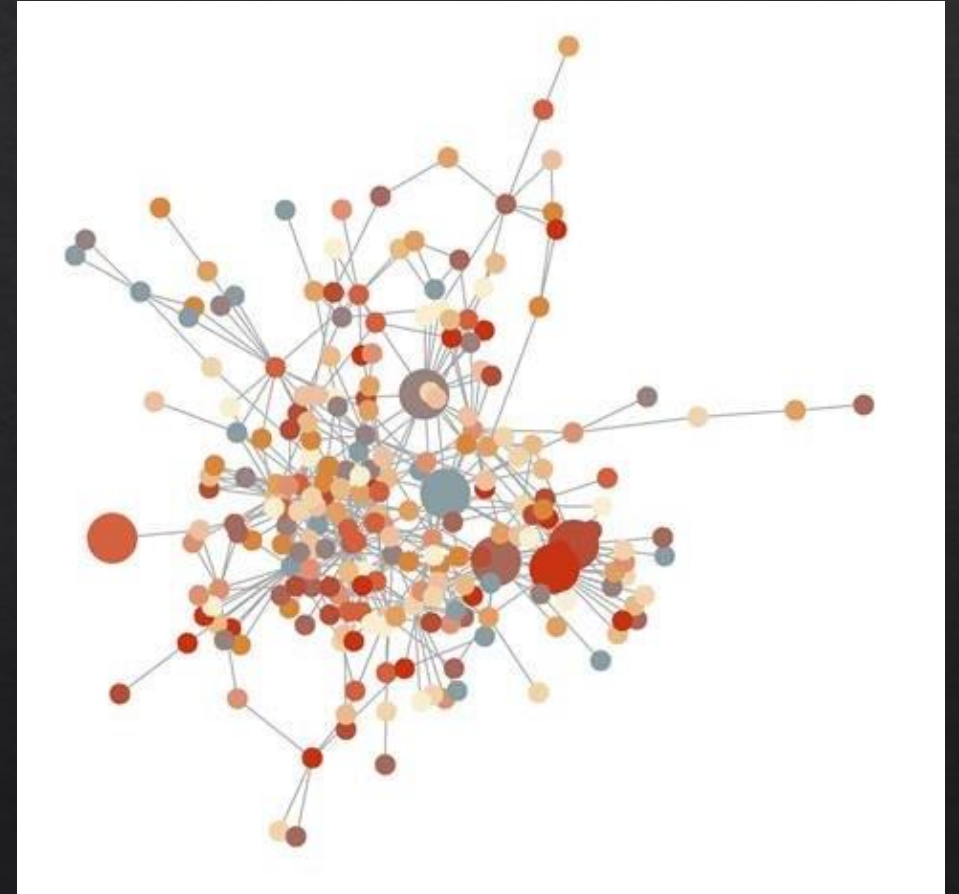
A Multi-species Trophic Model Combining Biotracers and Stomach Contents for nGOM fishes

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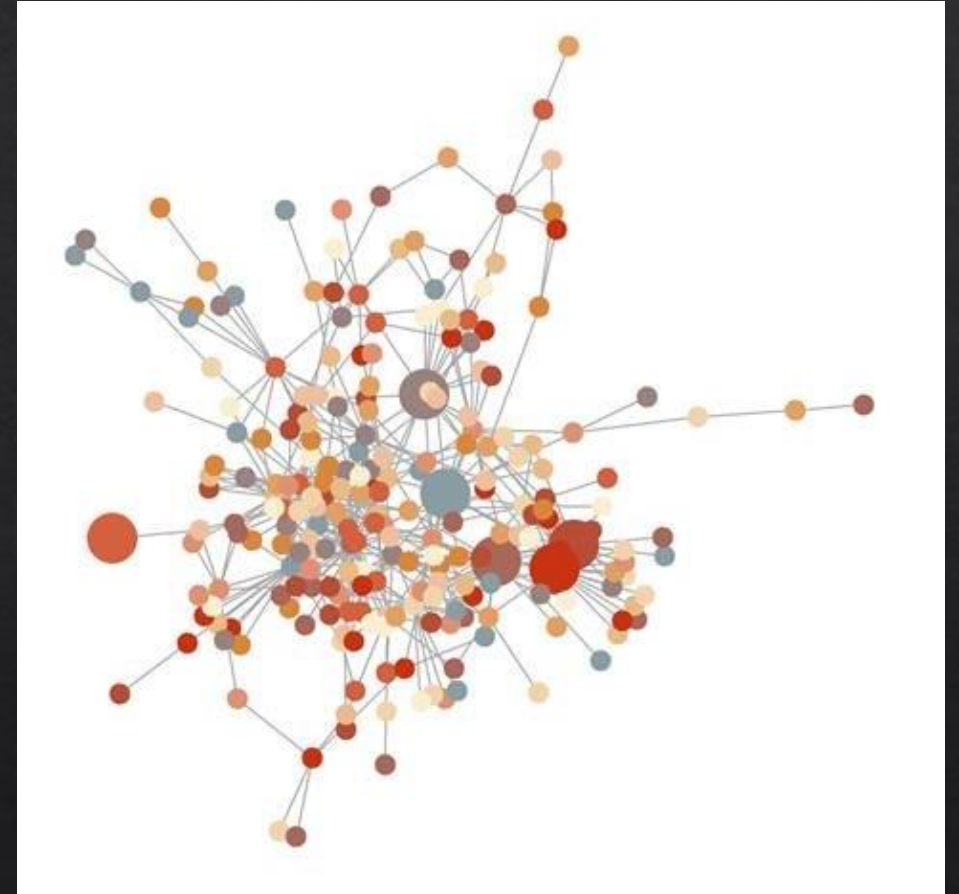
Northern Gulf of Mexico Trophic Dynamics

- ◆ The northern Gulf of Mexico (nGOM) is a taxonomically rich and trophically complex ecosystem.



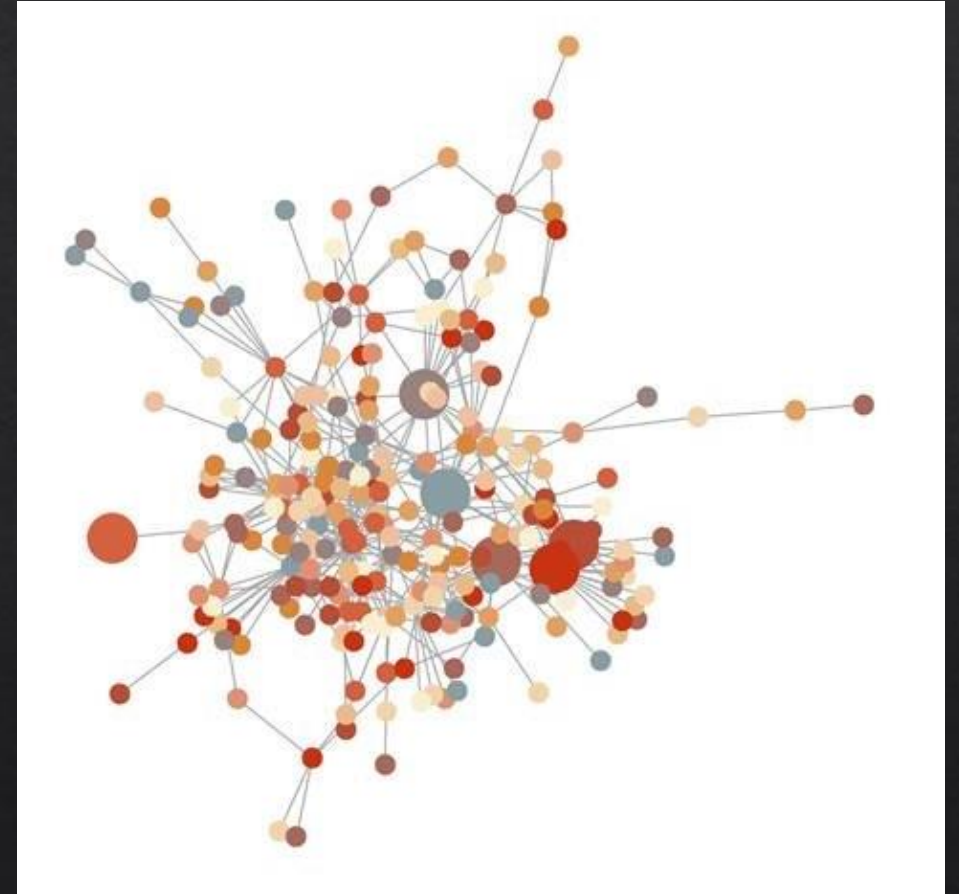
Northern Gulf of Mexico Trophic Dynamics

- ◆ The northern Gulf of Mexico (nGOM) is a taxonomically rich and trophically complex ecosystem.
- ◆ $n = 1443$ finfish species and approximately 100 species of sharks, rays, and skates (Chen, 2017)



Northern Gulf of Mexico Trophic Dynamics

- ◆ The northern Gulf of Mexico (nGOM) is a taxonomically rich and trophically complex ecosystem.
- ◆ Previous work has shown a high degree of trophic connectivity in the region (Oshima & Leaf, 2018).



Application of Trophic Dynamics Modeling

- ◆ The trophic linkages of many economically and ecologically important species are still not well understood (Oshima & Leaf, 2018).
- ◆ They play a crucial role in the management of harvested stocks.
 - ◆ Ecosystem assessment
 - ◆ Role of forage fish

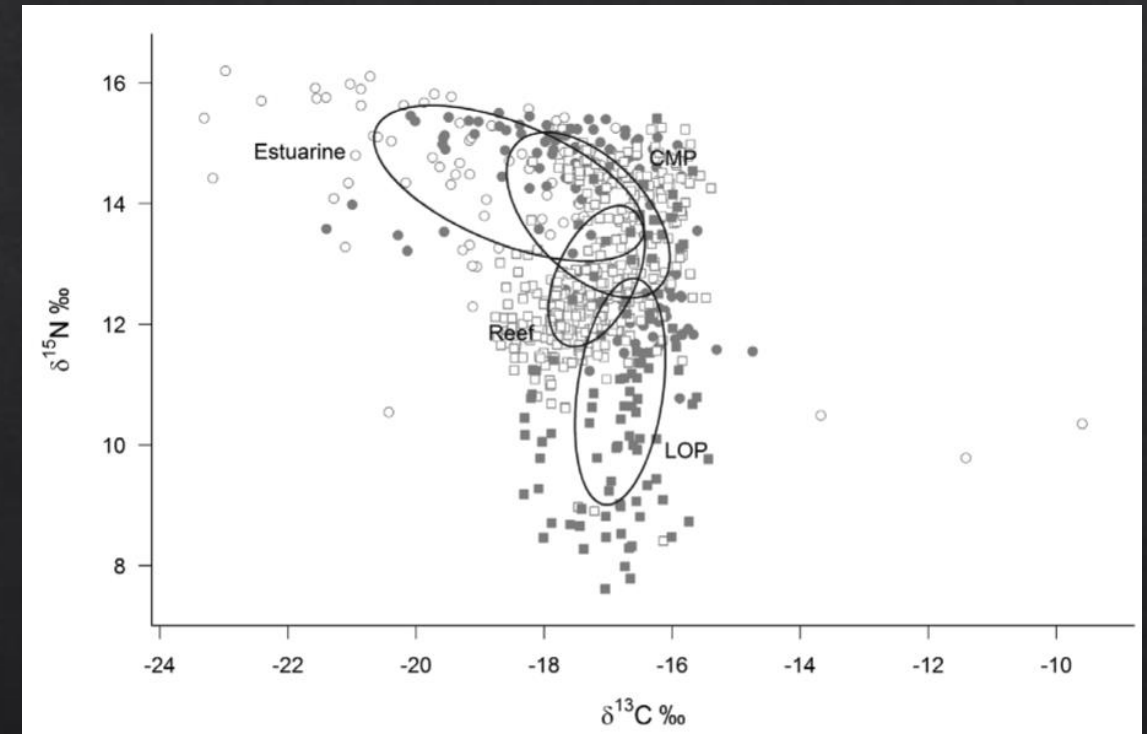
Description of Trophic Dynamics

- ◆ **Stomach contents analysis** allows for identification of prey.
- ◆ Quantify recent consumption.
- ◆ Enables frequency of occurrence of prey taxa to be described.



Description of Trophic Dynamics

- ◆ **Biotracer analysis** is used to provide insights into a consumer's long-term feeding habits.
- ◆ Stable isotopes of Carbon ($\delta^{13}\text{C}$) and Nitrogen ($\delta^{15}\text{N}$) indicate dietary source and trophic level.

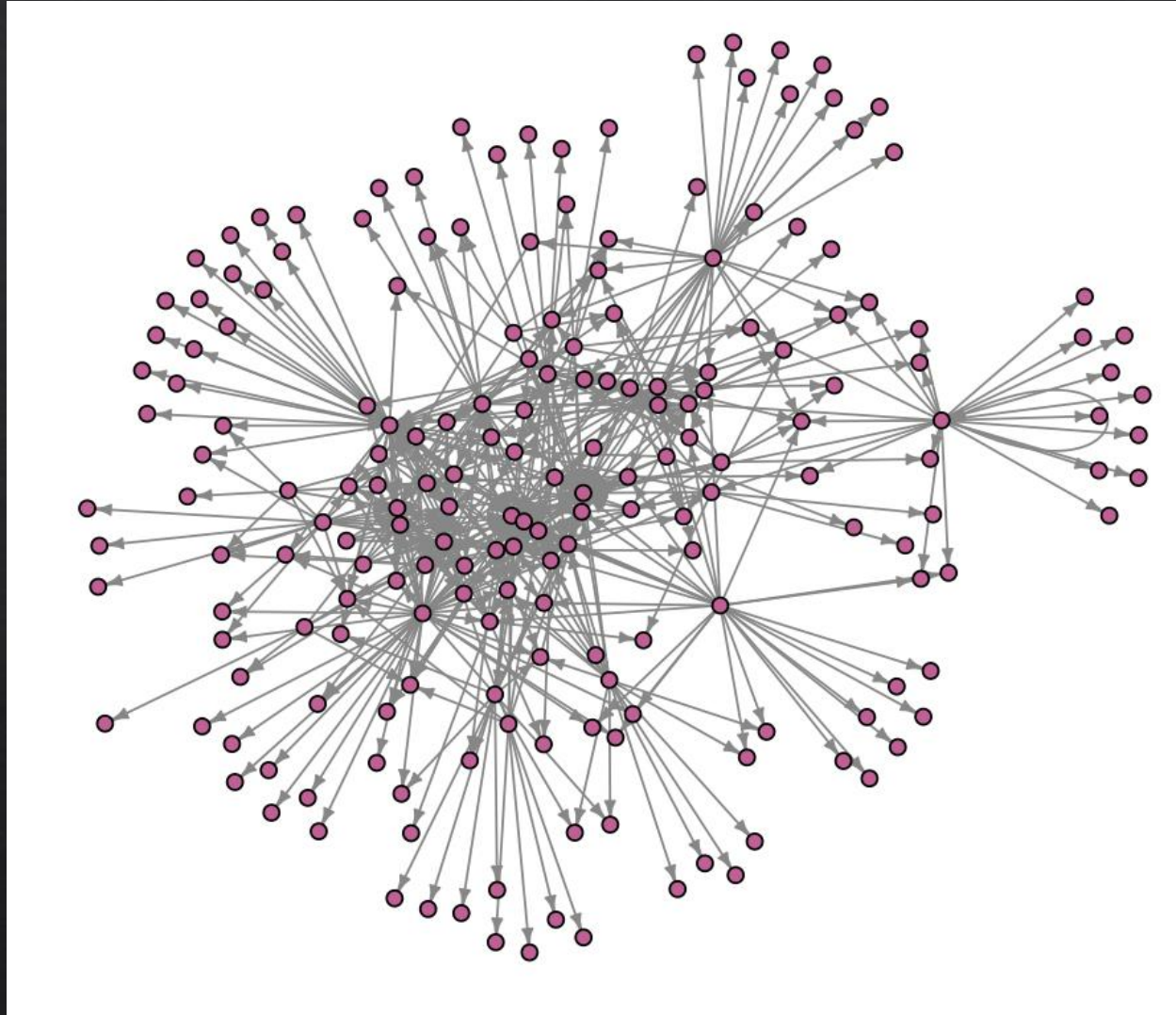


Dillon et al. 2021

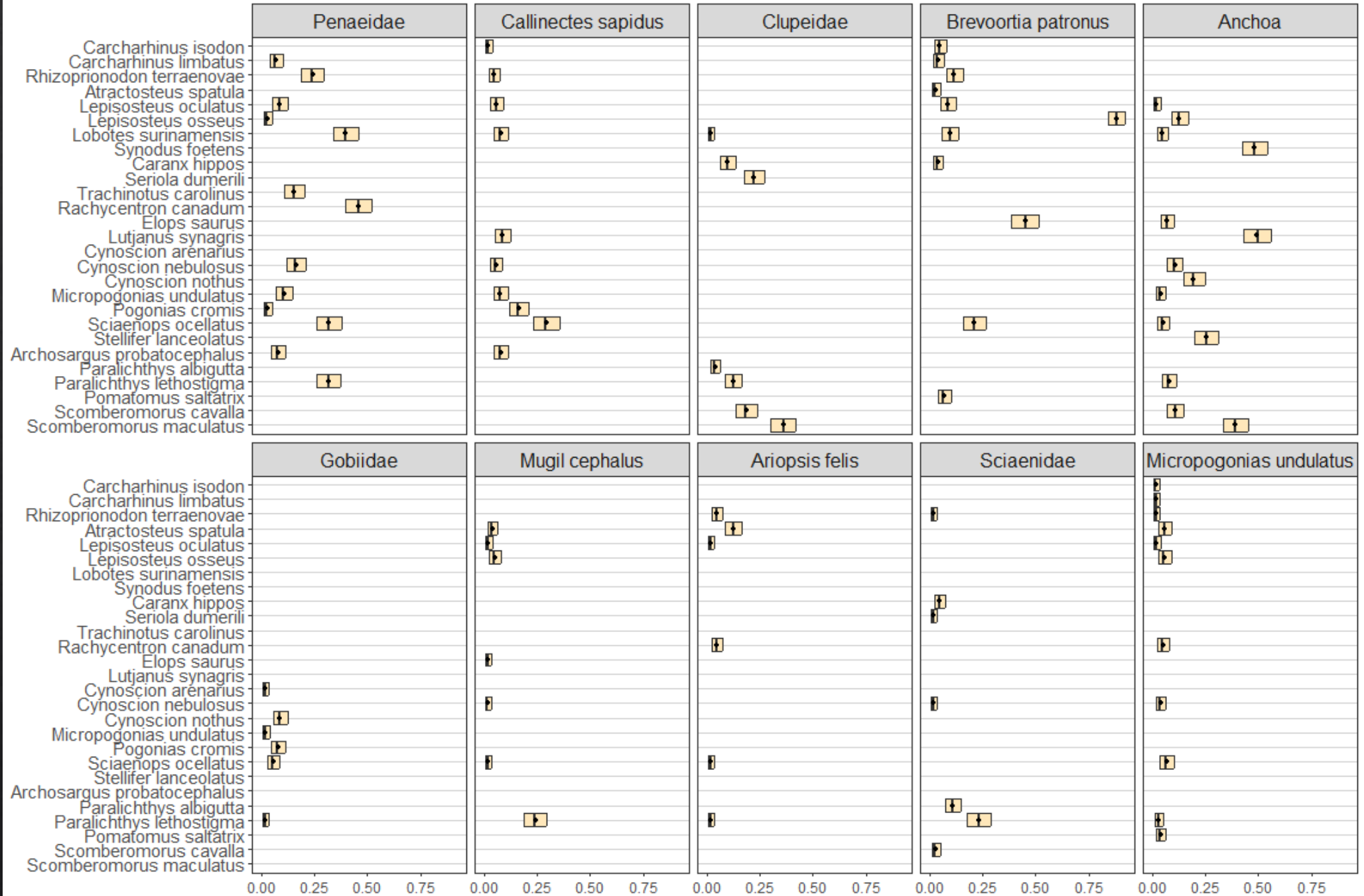
EcoDiet Model (Hervann et al. 2021)

- ◆ Model to estimate food-web structure and diet composition of consumers by combining information from biotracer and stomach contents analysis.
- ◆ EcoDiet is a hierarchical Bayesian model.
 - ◆ Novel modeling approach
- ◆ EcoDiet output:
 - ◆ Trophic Link Probability
 - ◆ Proportion of prey in diet

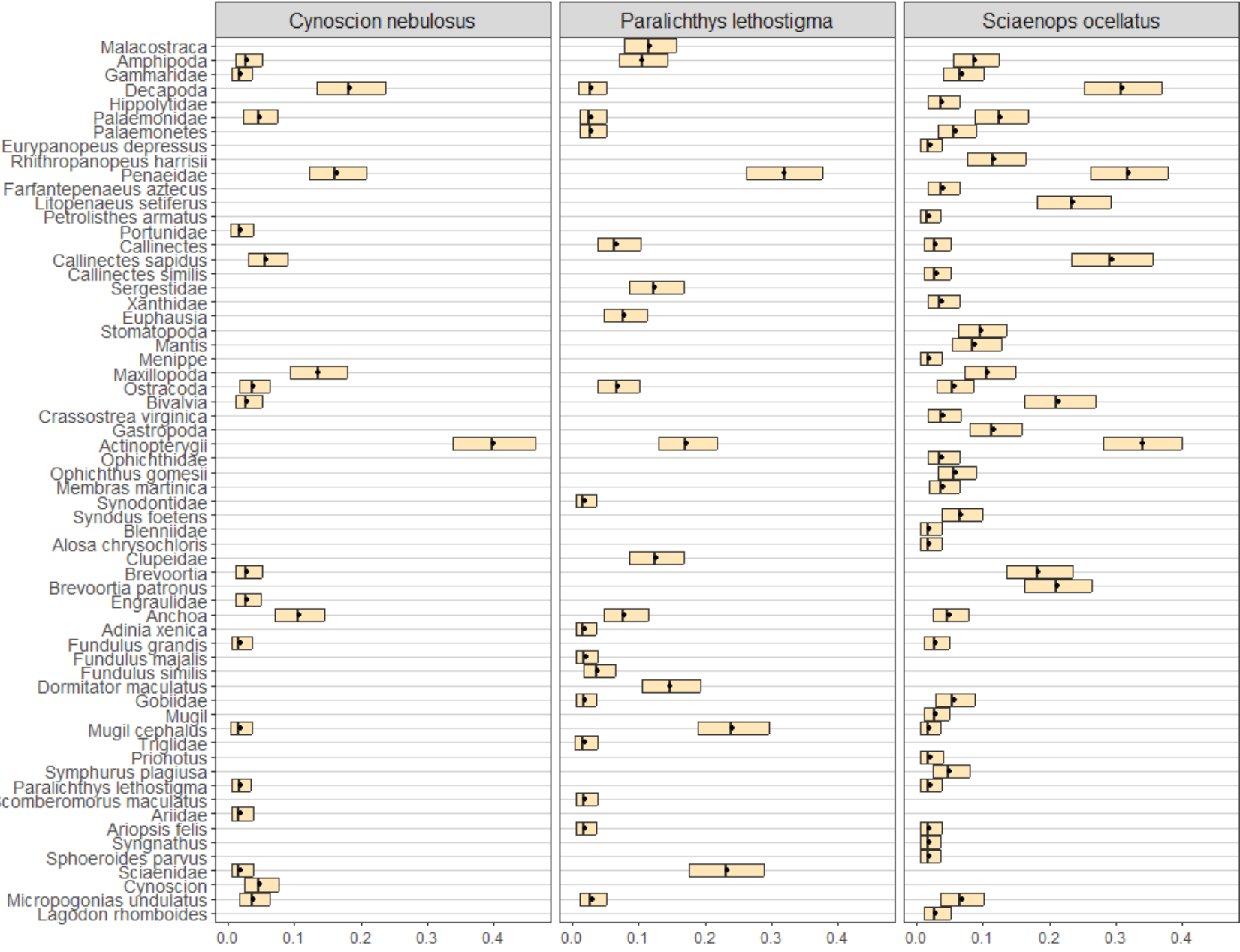
Modeled Interactions



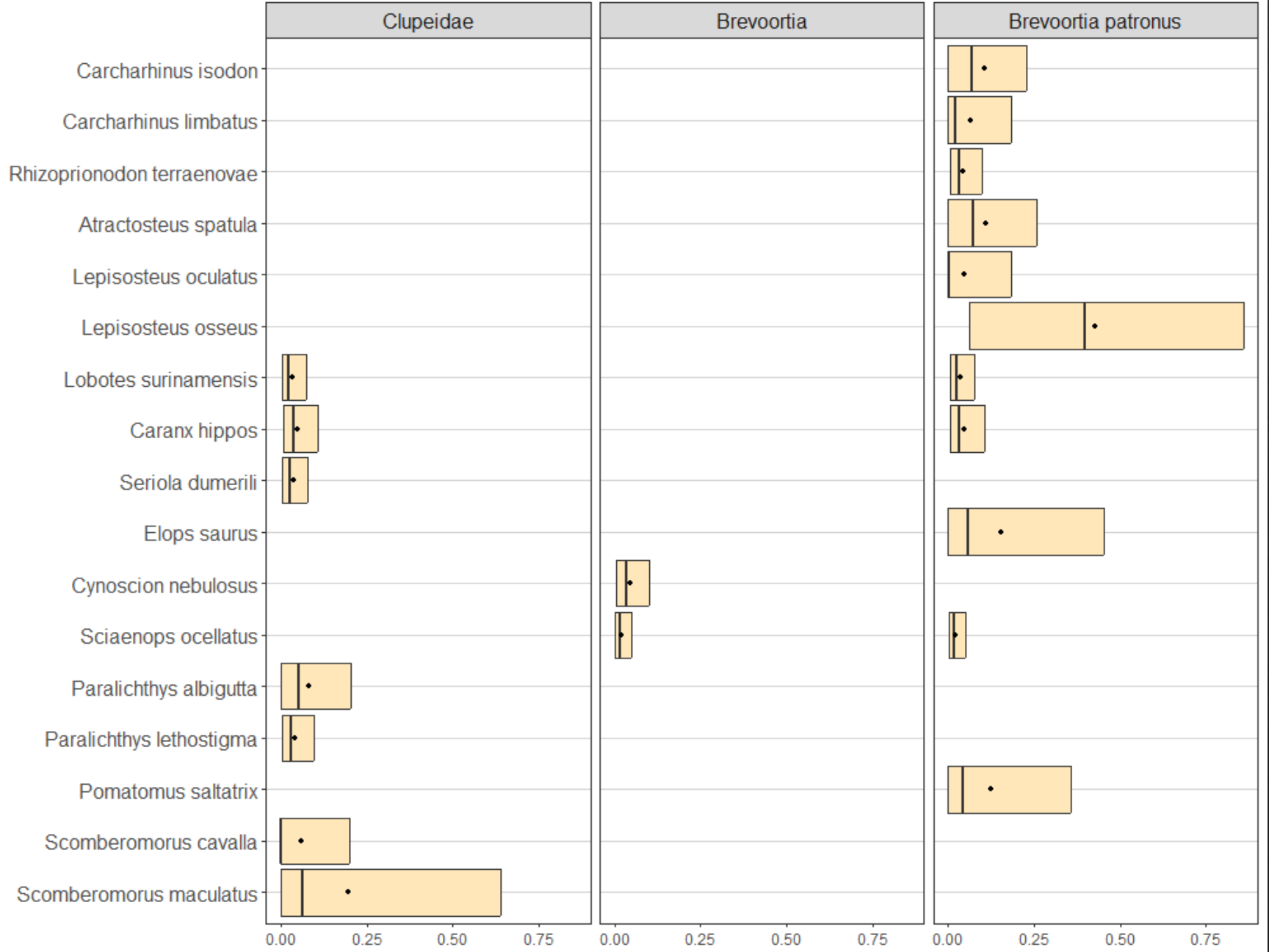
Trophic Link Probabilities

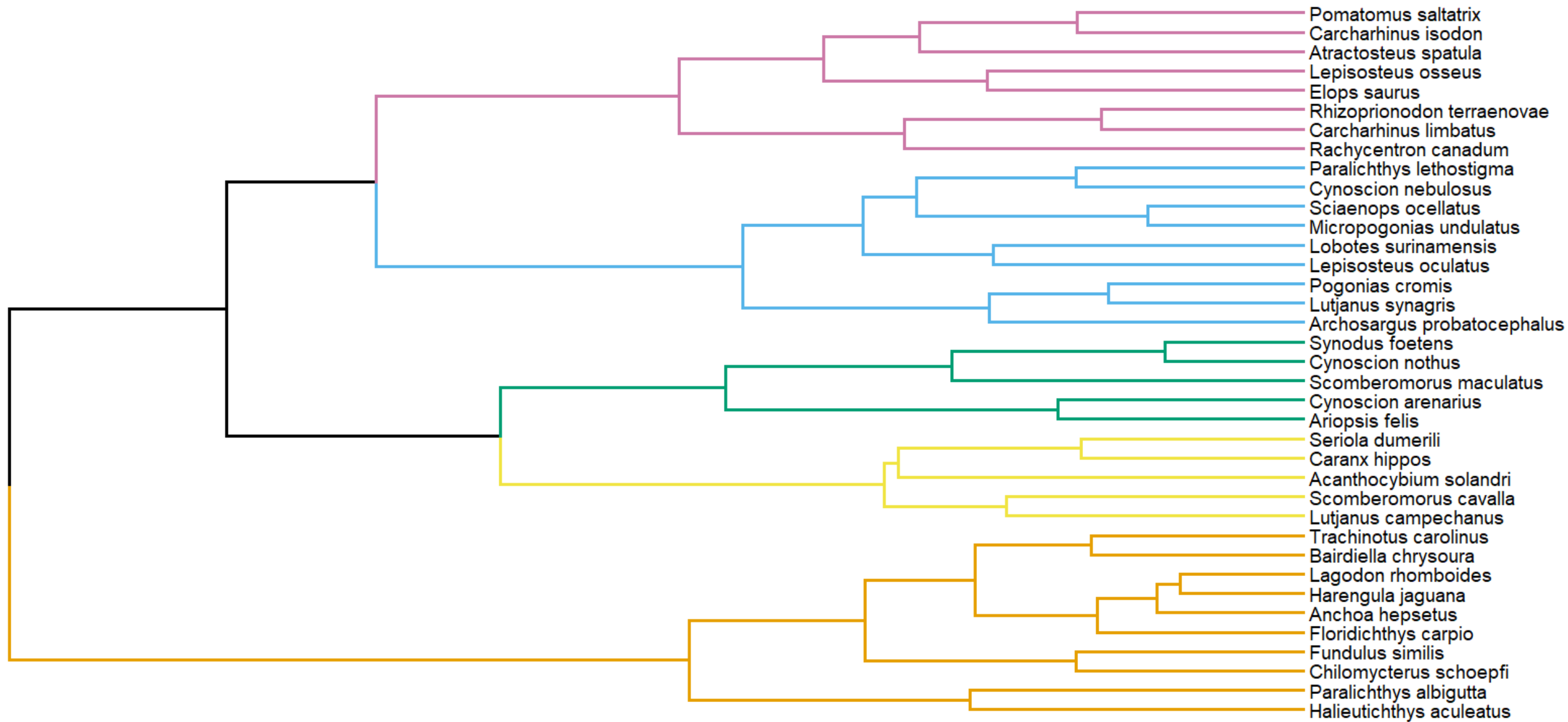


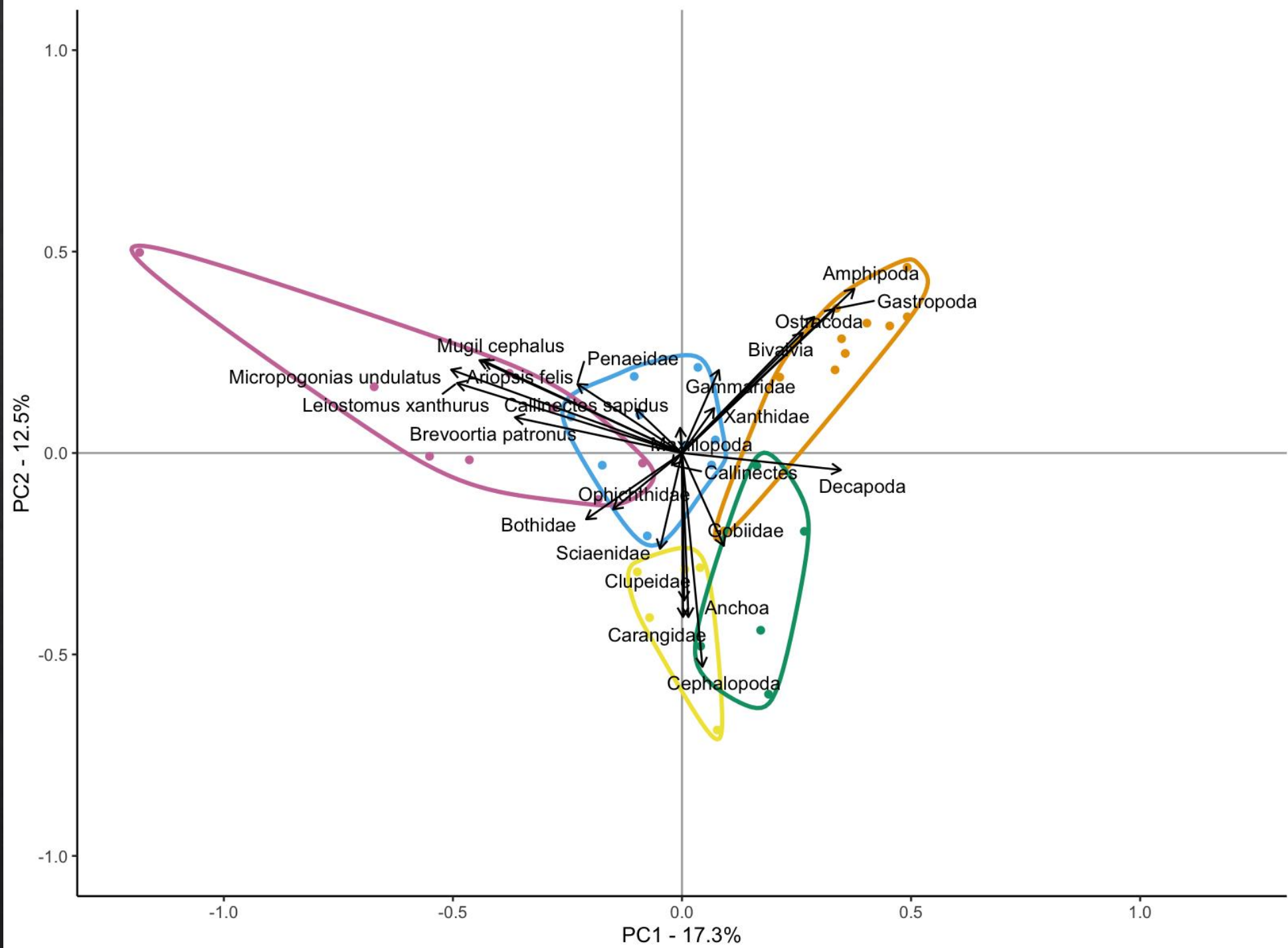
Trophic Link Probabilities



Diet Proportions







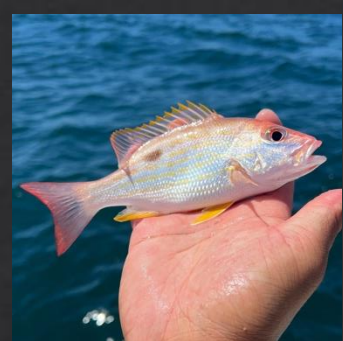
Summary

- ◆ In this study, we use EcoDiet, which simultaneously evaluates stomach contents and biotracer data, to quantify trophic dynamics.
 - ◆ Comprehensive modeling approach using all available trophic data.
- ◆ Our results validate previous findings that fishes in nGOM are generalists.
 - ◆ This presents challenges to ecosystem assessment efforts.
- ◆ EcoDiet output can be used as the diet matrix input.

Acknowledgements

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Questions?

