



Background

- Invasion events can alter ecosystem properties and species interactions
- Current scientific research struggles to quantify the effects of biotic invasions on ecosystem structure and function
- Measuring functional diversity, or the diversity traits such as feeding and living habits, in an ecosystem can provide important information about how organisms and the environment respond to environmental or climatic change
- Here, we investigate functional diversity of the Chordates in a marine Southern Ocean community that has already been affected by biological invasion

Methods

- In order to assign functional traits to organisms we used literature searches and databases (PBDB, Fishbase) to assess which types of traits (Table 2)
- Used R Studio to calculate functional diversity metrics:

Abbrev.	Metric	Description
S	Species Richness	Total numbers of unique species displaying a functional entity within a class
FE	Functional Entities	The number of unique combinations of traits within a class
FV	Functional Vulnerability	Percentage of the functional entities that are reported in one species in the class

$$FV = \frac{FE - \sum_{i=1}^{FE} \min(n_i - 1, 1)}{FE} (2)$$

Table 1. Summary of diversity metrics used to assess species and functional diversity.

Results

Trait	Trait Type Examples
Motility	Attached, fully motile, slow moving, fast moving
Feeding Habit	Suspension feeder, predator, prey, omnivore
Tiering	On the seafloor (epifaunal), in the sediment, free swimming

Table 2. Summary of traits and trait types assessed for the present study.

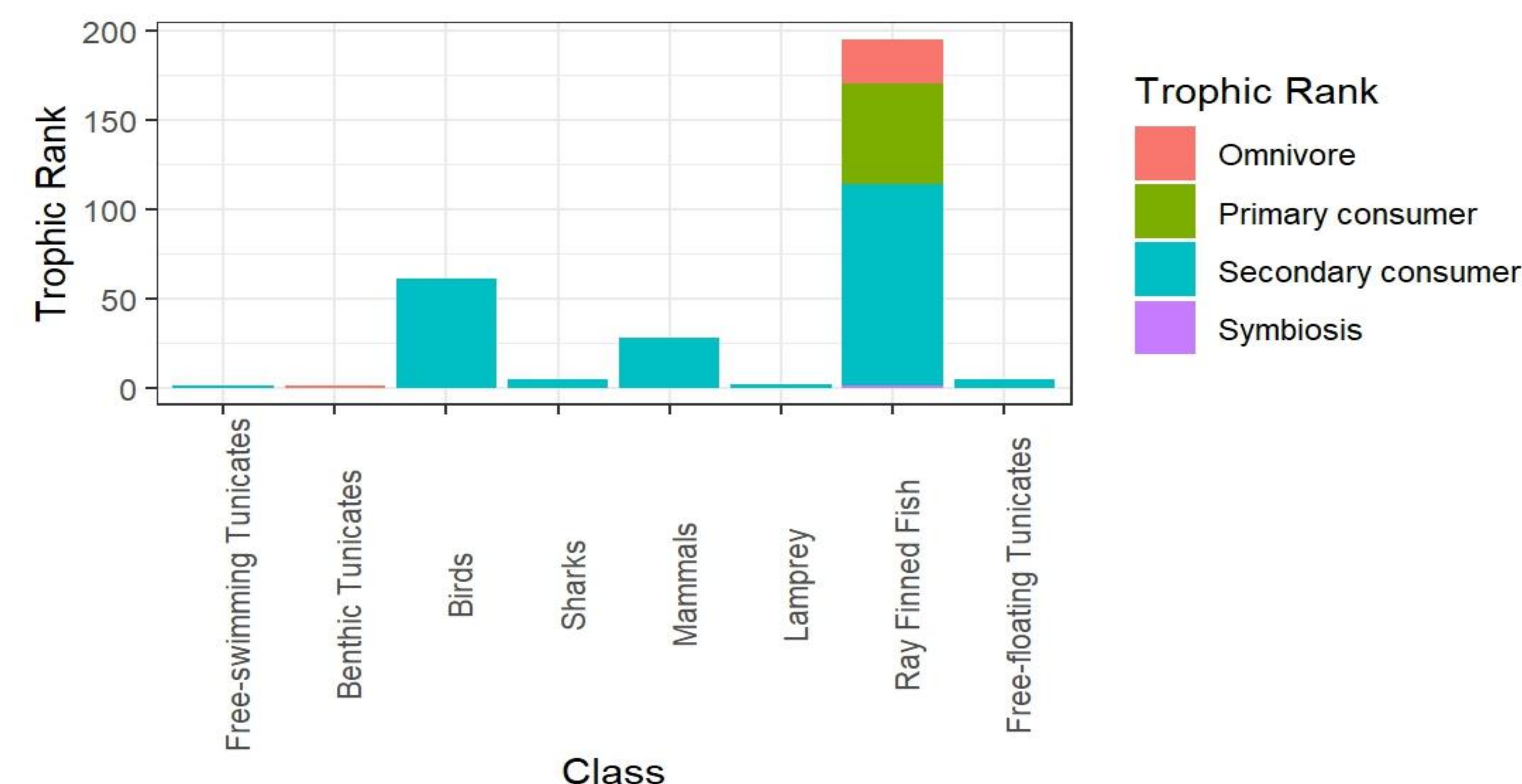


Figure 1. Trophic rank distribution in each Class

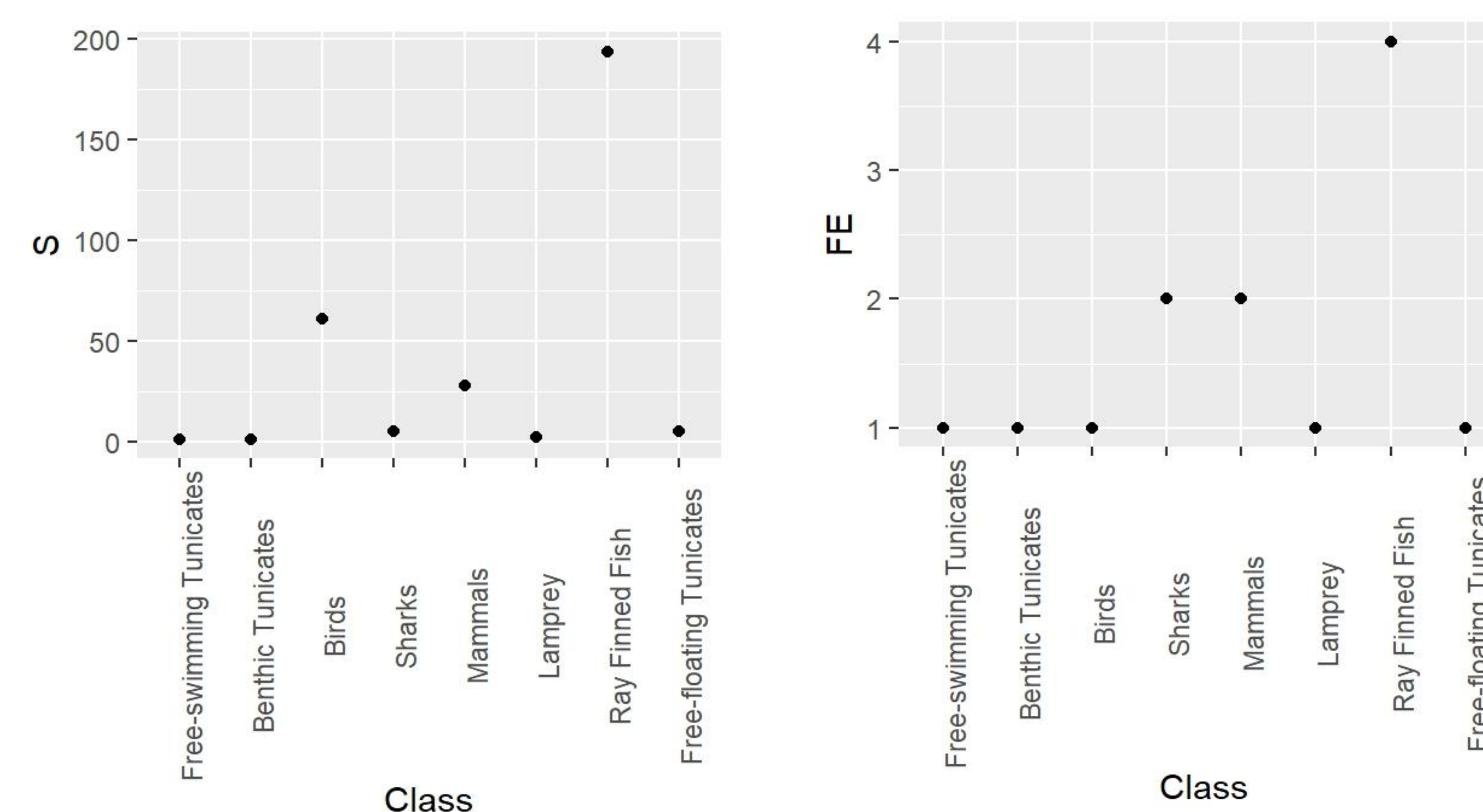


Figure 2. Left: Number of unique species in each Class (S). Right: Number of unique functional entities (FE) based on motility, feeding habit, and tiering.

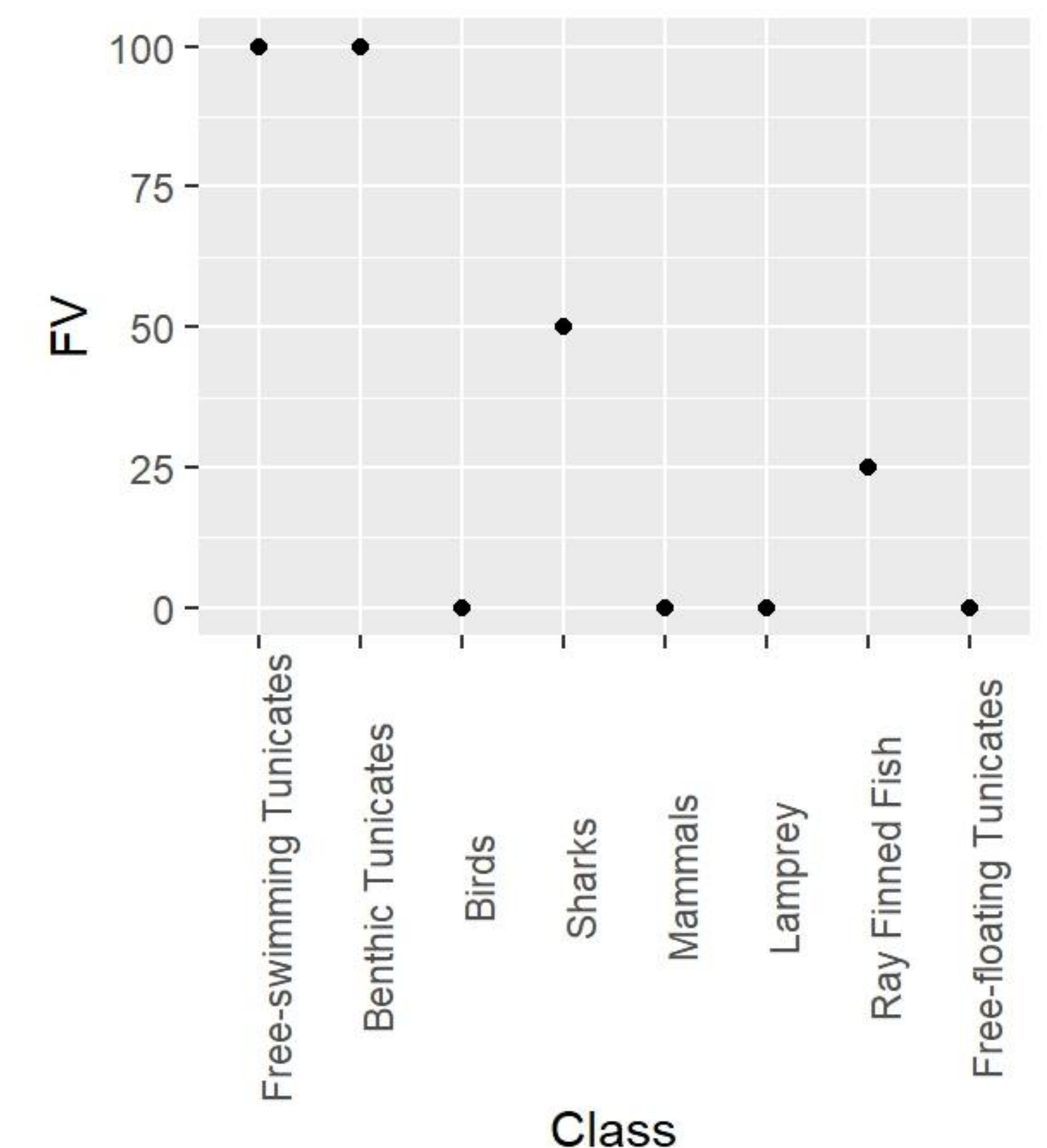


Figure 3. Functional vulnerability within each Class

Conclusions

- We found that the ray finned fish Class had the most trophic rank diversity
- Overall, we found that species richness varied amongst Classes but was not always correlated with functional diversity
- Sharks and ray finned fish had more trait types and were less vulnerable to losing functions post biological invasion

Acknowledgements

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Literature Cited

Raymond et al., 2011. "A Southern Ocean Dietary Database: Ecological ArchivesE092-097." *Ecology* 92 (5): 1188-1188.