

Benthic diversity in the Patagonian scallop fishing grounds along the Argentine shelf-break front, Southwestern Atlantic Ocean

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INTRODUCTION & AIM



The Patagonian scallop fishery (*Zygochlamys patagonica* (P.P King, 1832)) began in 1996 and constitutes one of the main invertebrate fishing resources of Argentina. This scallop is a dominant species in a rich and biodiverse benthic community associated with the shelf-break front.

The goal of this study was to provide comparative information regarding richness, diversity and biomass of the benthic invertebrate community in two of the main Fishing Grounds (named as FG D and FG E) of the Patagonian scallop in Argentina during the period 2015-2022.

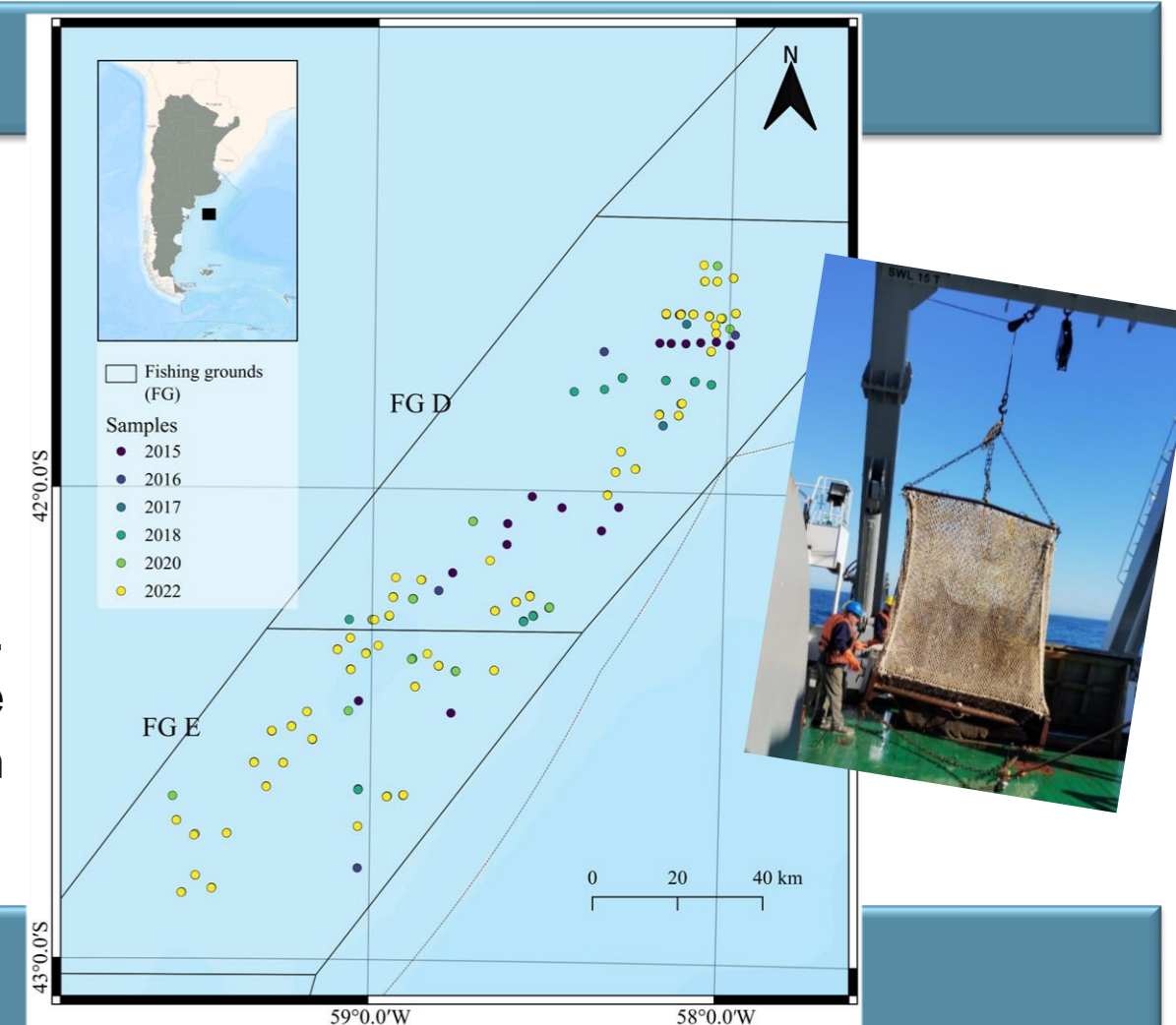
METHOD

The study area is located between 41°25'S and 43°02'S in the southwest Atlantic, at depths between 87 and 131 m. It is characterized by the presence of soft bottoms (mainly sandy bottoms).

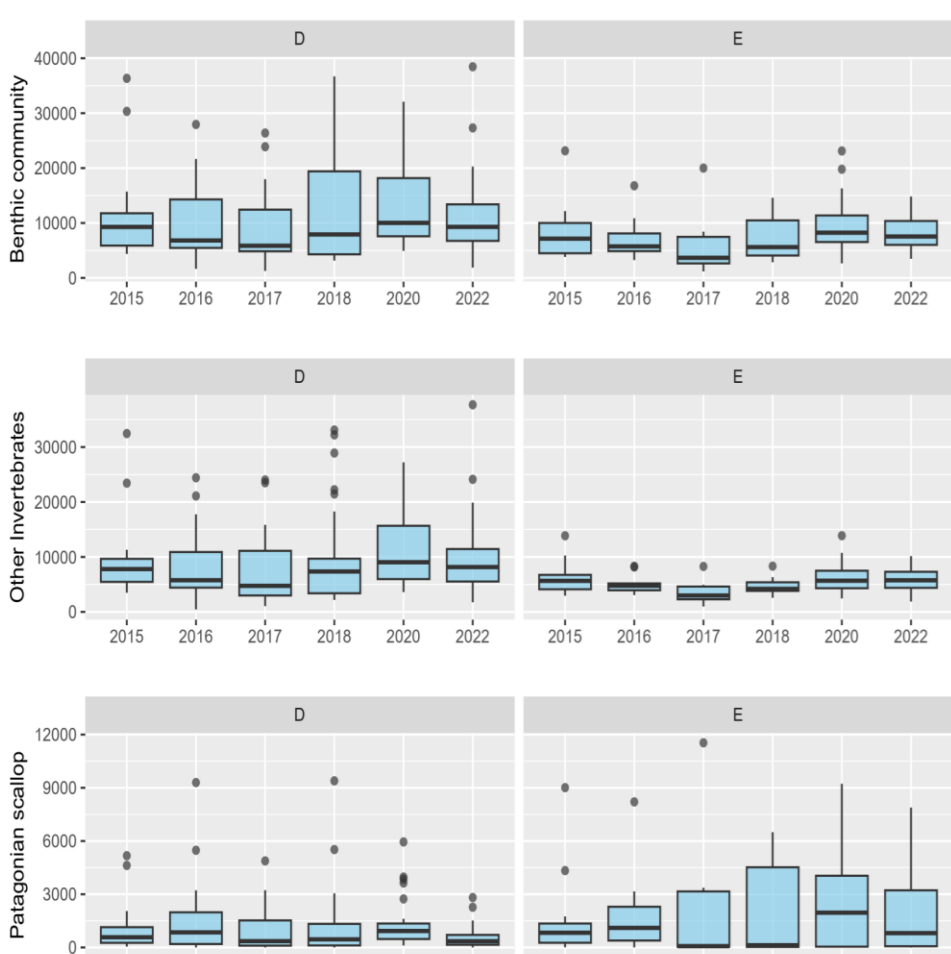
We analyzed a total of 254 samples (~ 10 vol.) collected between 2015 and 2022 during five stock assessment surveys of the Patagonian scallop, using a non-selective 2.5 m dredge.

We estimate the mean biomass of the total benthic community, but also of the Patagonian scallop and of the invertebrate by-catch species.

Biodiversity was estimated as the effective number of species (true diversity measures) per year and fishing ground, according to Hill's series. Rarefaction/extrapolation (R/E) curves were used to compare diversity across years in each fishing grounds. The diversity analyses were performed using the iNEXT 3.0.0 package in R, utilizing a species incidence matrix. The community composition was analyzed through multivariate techniques.



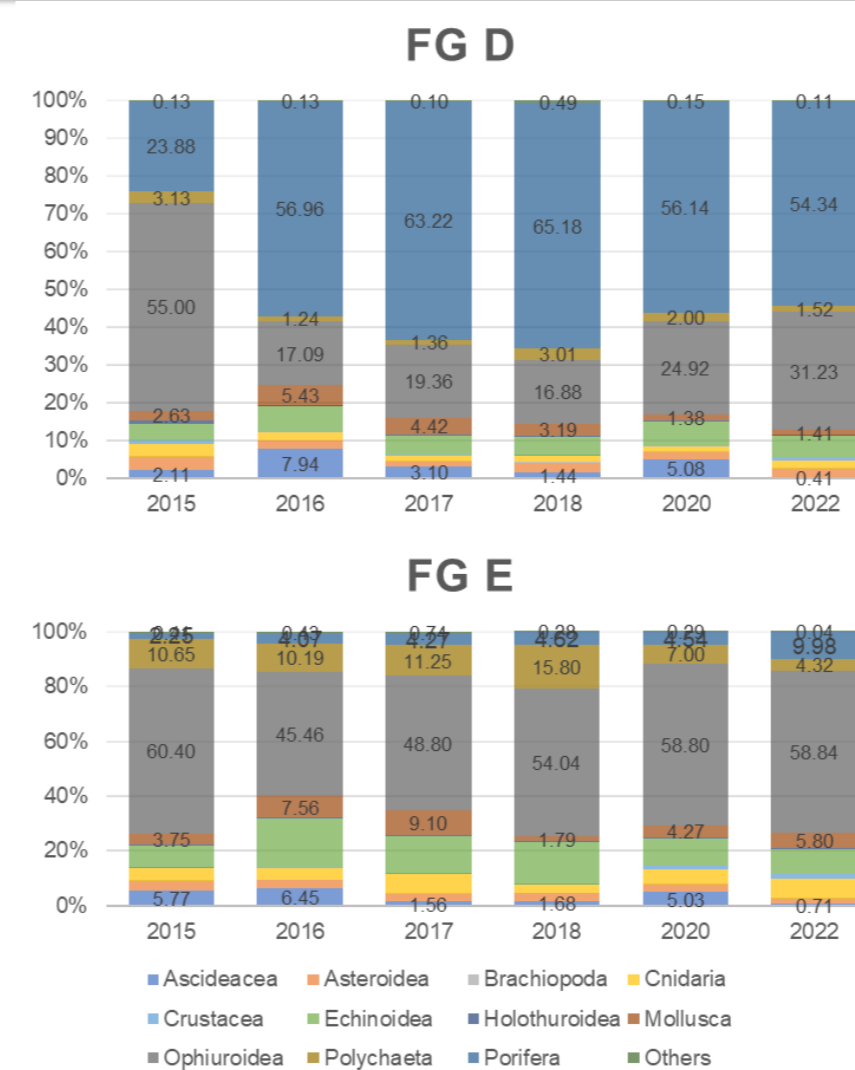
RESULTS & DISCUSSION



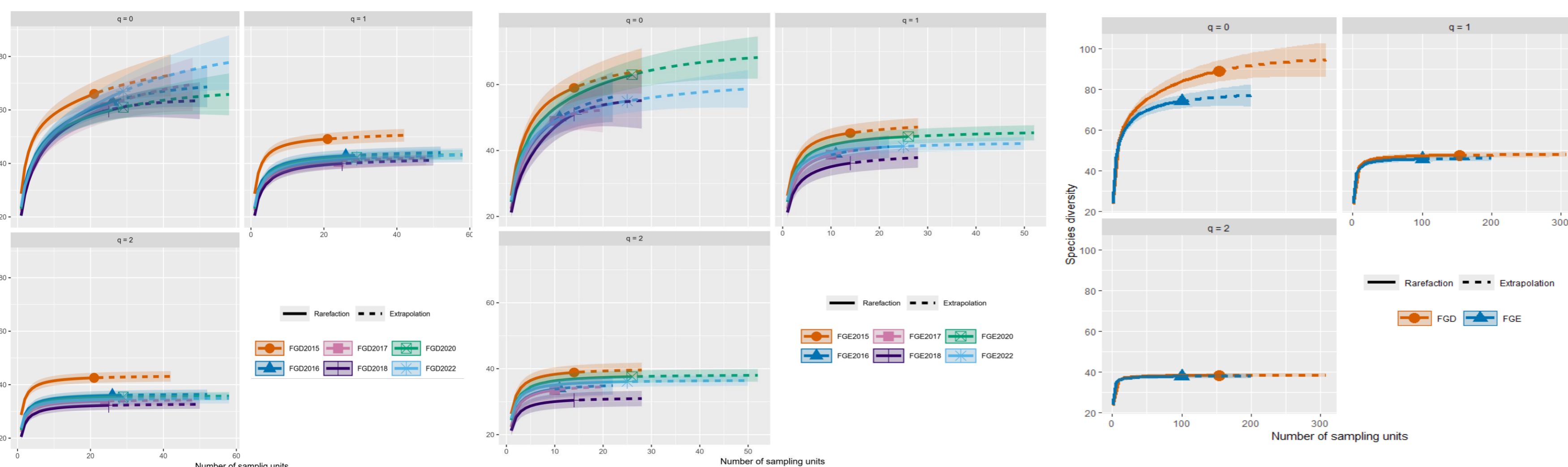
- ✓ A total of 90 invertebrate taxa were recorded in the area.
- ✓ Biomass of total benthic community and by-catch species were higher at FG D.



Some of the frequently recorded invertebrates



- ✓ Porifera (blue) showed a clear dominance in FG D. Its contribution, in terms of biomass, ranged from 23.88% to 65.18% during the analyzed period, followed by Ophiuroidea (grey).
- ✓ In FG E, Ophiuroidea (grey) was the most important group in terms of biomass in the benthic community, while the second most important group varied between Echinoidea, Porifera, and Polychaeta depending on the year. These groups were registered in higher proportions in FG E compared to FG D.



- ✓ The observed and estimated effective numbers of common and dominant species were similar in both FGs.
- ✓ Species richness did not vary between years in the fishing grounds analyzed.
- ✓ The specific richness was significantly higher in FG D.
- ✓ The asymptotic specific richness was 98 species in FG D and 74 species in FG E.

- ✓ The most conspicuous species association was conformed by the Patagonian scallop *Z. patagonica*, the brittle stars *Ophiosabine vivipara*, *Ophiactis asperula* and *Ophiuroglypha lymani*, sponges (Porifera), the sea urchin *Sterechinus agassizii* and the cnidarian octocoral *Alcyonium* sp.

CONCLUSION

- ✓ The dominant taxon in the benthic community of FG D was Porifera, displacing the Patagonian scallop. The decrease in the biomass of the Patagonian scallop may be related to a low recruitment and to the activity of the scallop fishing fleet in the area.
- ✓ Although the species association showed some differences between years, these were related to variations in the biomass contribution of the main species to the total community but not to species loss.
- ✓ The composition of the benthic community and the species association did not differ from those previously recorded for these FG.
- ✓ Our results emphasize the significance of continual monitoring and analysis of benthic communities, which contributes to ecosystem-based management and supports decision-making in resource management.