

Coprophagy by herbivorous fishes in the Caribbean

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INTRODUCTION

Parrotfishes & surgeonfishes are key herbivores that indirectly benefit corals by grazing on algae, yet also graze on a diverse array of other food sources.



In this study, we quantified coprophagous behavior (see above picture) of herbivorous fishes on Brown chromis (*Chromis multilineata*) fecal pellets compared to algae and other food sources.

Reefs are nutrient limited and fish feces may be an important dietary component for some fishes. Yet, coprophagy (consumption of feces) by tropical fishes has received little attention and, to our knowledge, has not been previously documented in the Caribbean.

METHODS

Field observations:

- Surveyed 4 sites on the Caribbean island Bonaire.
- **Fecal follows:** Proportion of *C. multilineata* fecal pellets consumed by herbivorous fishes.
- **Behavioral surveys:** Parrotfishes & surgeonfishes feeding behavior ($n=6-12$ /species, 20 min each).



Statistical analyses:

- Permutation test comparing proportional consumption of feces by fish density.
- Kruskal-Wallis test of median % bites on feces.

RESULTS

- 77% of observed feces were consumed ($n = 135$).
- There were significant species-specific differences in proportion of feces consumed ($p < 0.05$).
- Based on fecal follows, *Scarus taeniopterus* consumed a larger proportion of feces than other fishes, after accounting for relative density ($p < 0.001$).

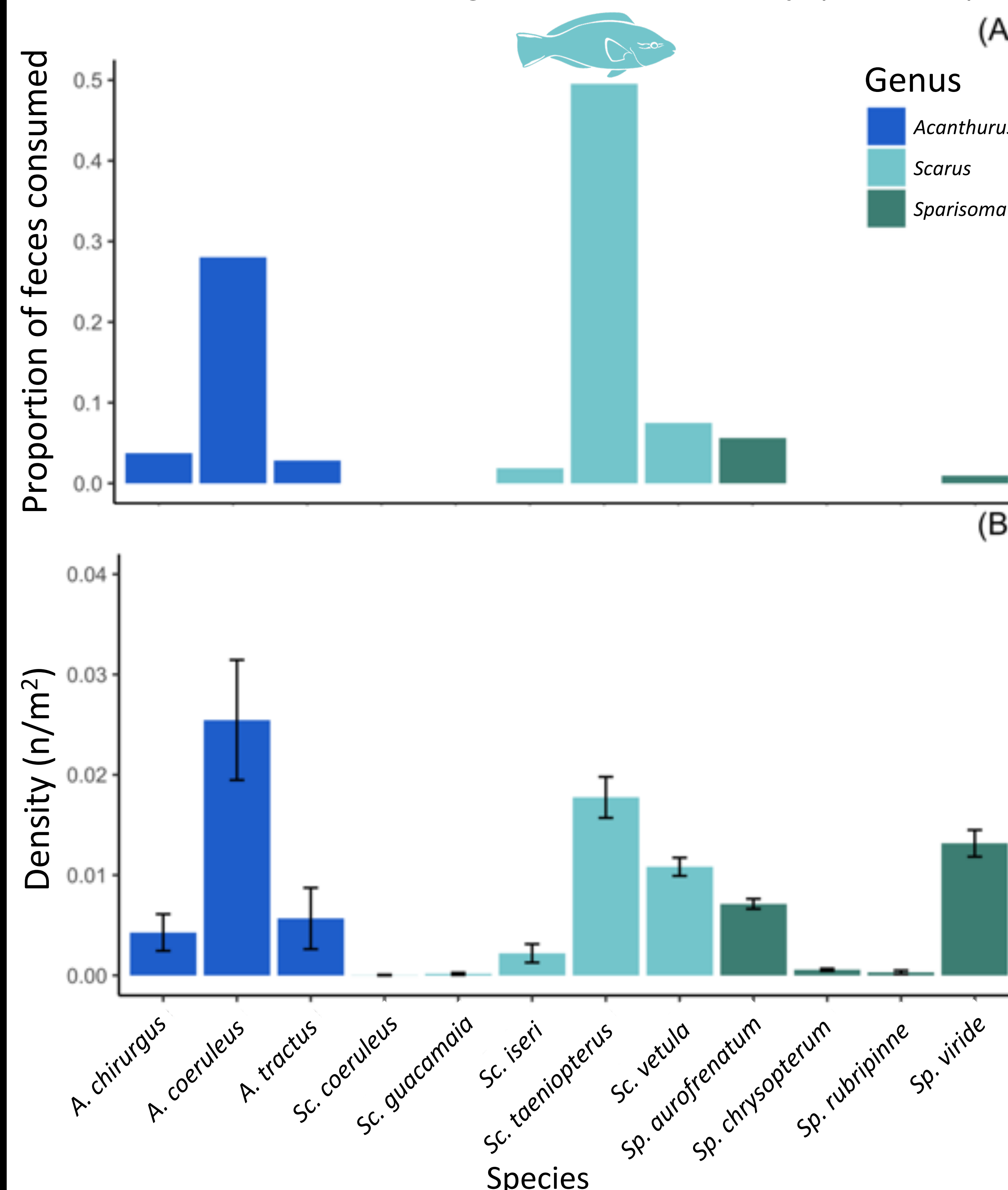


Fig.1. (A) Proportion of *C. multilineata* feces consumed by herbivorous parrotfish & surgeonfish species ($n = 135$ fecal pellet observations). (B) Mean density of herbivorous fishes across sites \pm SEM ($n=4$ sites).

ACKNOWLEDGEMENTS

We thank Emma Barton & Peter Vanderbloomer for field research assistance & STINAPA Bonaire for logistical support. This research was supported by the Cal Poly Baker/Koob Award, Frost Fund, Myers Oceanographic & Marine Biology Trust, Harvard Travellers Club Fund, AMNH Lerner-Gray Memorial Fund, and in-kind donations by the Balabas, Everloves, & Dive Friends Bonaire.

- Based on behavioral surveys, *Acanthurus coeruleus*, *Sc. iseri*, *Sc. taeniopterus*, and *Sp. aurofrenatum* consumed more feces than other species observed.

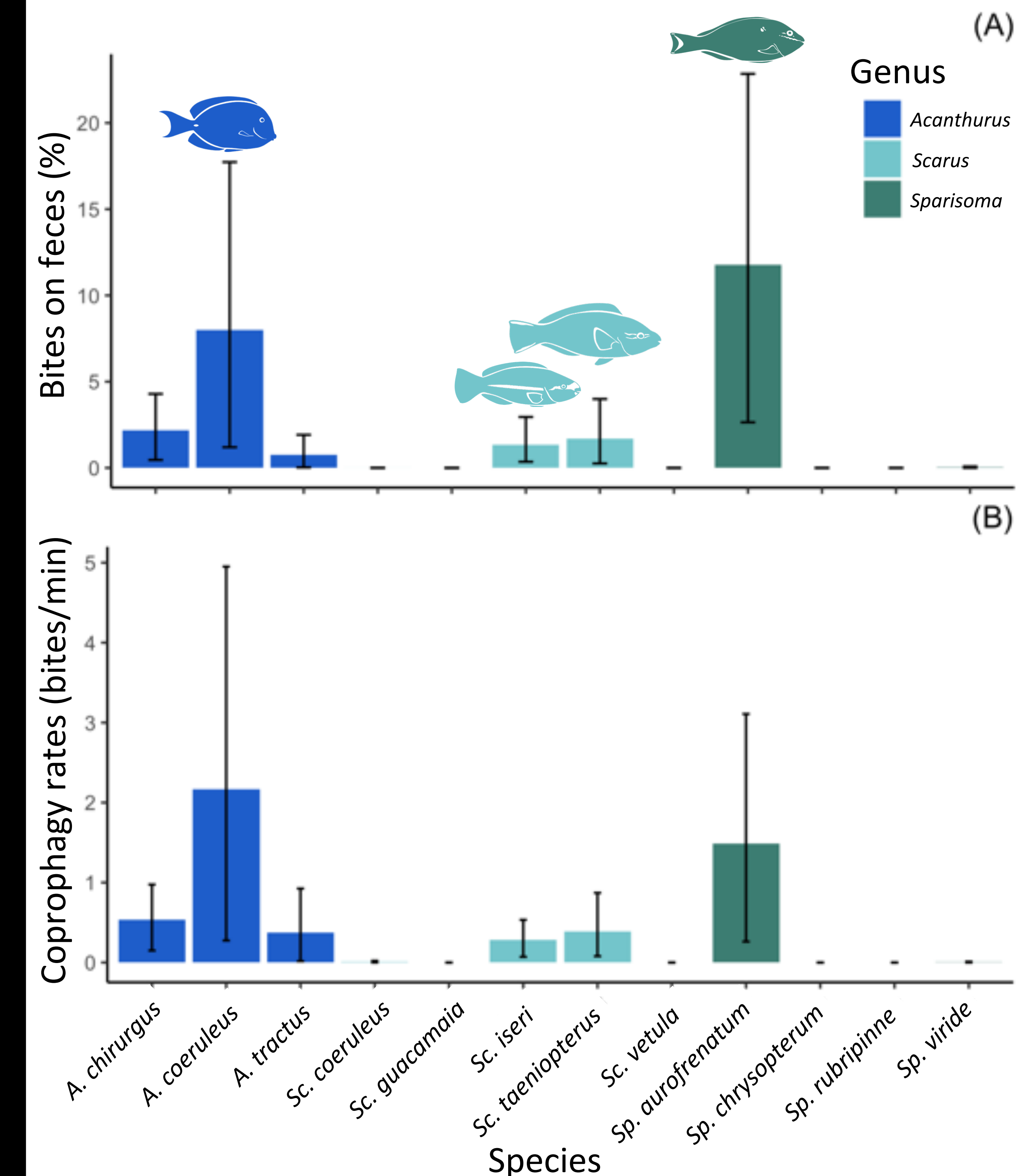


Fig.2. (A) Median % of bite on feces compared to other food sources. (B) Mean coprophagy rates (bites/min). Bootstrapping generated 95% CI from 1000 interactions ($n=6-12$ behavioral surveys/species).

CONCLUSIONS

Summary: 79% of *C. multilineata* fecal pellets were consumed; consumption rates varied by species.

Future directions: Quantify nutritional value of *C. multilineata* fecal pellets by comparing protein, lipid, and carbohydrate content to other food sources (i.e. algae). Data will help understand possible nutritional drivers of this understudied behavior on reefs.