

# Damselfish territories and juvenile coral density: a previously overlooked association



T Gordon<sup>1,\*</sup> and B Cowburn<sup>2</sup>, A Rocha Kenya Marine Conservation and Research Program

1. Christ's College, University of Cambridge 2. Department of Zoology, University of Oxford

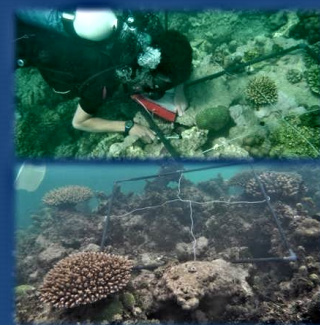
\*Correspondence: tacg2@cam.ac.uk

## ABSTRACT

Several damselfish species, including the jewel damsel (*Plectroglyphidodon lacrymatus*), aggressively defend small territories on coral reefs, in which they cultivate lawns of edible macroalgae<sup>1</sup>. Previous research on the effects of these territories on corals has been inconclusive and focussed on percentage cover, overlooking effects on juvenile corals. Frequency counts were used to establish paired comparisons of juvenile coral density inside and outside visually conspicuous jewel damselfish territories on lagoon patch reefs in Watamu Marine National Park, Kenya. Over 41 territories, juvenile coral density was similar for all size classes in non-defended areas but reduced by up to 12-fold in the smallest size classes in defended areas. Inhibitory effects of territories were greatest for smaller corals, with decreased effects as coral size increased. The territories of damselfish can occupy a large proportion of a coral reef<sup>2</sup>; territorial behaviour in fish may have greater impacts on reef structure, in particular the resilience and growth-rate of juvenile corals, than previously appreciated.

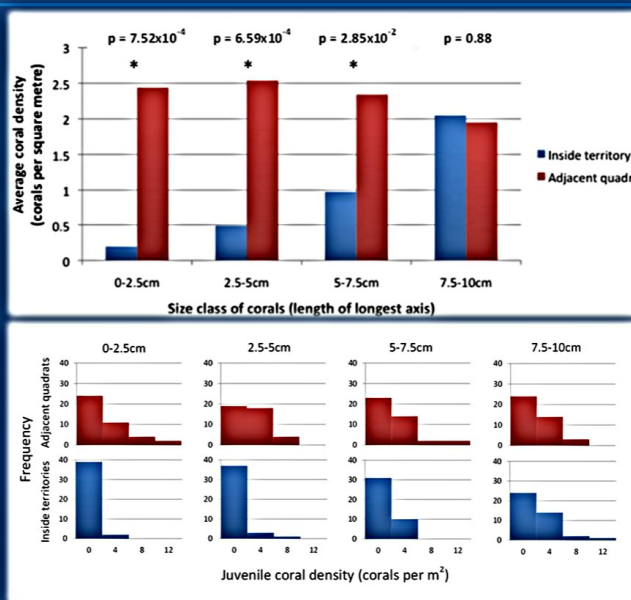
## METHODS

- Haphazard transects over 6 lagoon patch reefs in Watamu National Marine Park, Kenya.
- Paired frequency counts of juvenile corals **inside and adjacent to visually conspicuous territories** of jewel damselfish.
- **Juvenile corals in 4 size classes** by length of longest axis: 0-2.5cm; 2.5-5cm; 5-7.5cm; 7.5-10cm.
- Differences in coral density analysed using a **two-tailed paired-sample Wilcoxon test**.



## RESULTS

- 41 territories across 17 different transects across 6 different reefs.
- Pairwise comparisons showed that **juvenile coral density was similar for all size classes in non-defended areas**.
- **Juvenile coral density was reduced by up to 12-fold inside territories** compared to non-defended areas.
- No significant difference in the largest size class; **differences decreased as coral size increased**.



## DISCUSSION

- Reduced density of small juvenile corals in defended territories could be explained by **several hypotheses**.
  - Direct farming effects of the damselfish
  - Indirect inhibitory effects from higher algal densities in territories.
  - Habitat choice in damselfish.
- **Territorial behaviour in fish may have greater impacts on juvenile coral than previously appreciated.**

## CONCLUSIONS

- **Juvenile coral density is reduced inside damselfish territories.**
- **Larger corals are less affected by this.**

## REFERENCES

1. Lassuy, D.R. (1980) Effects of "farming" behaviour by *Eupomacentrus lividus* and *Hemiglyphidodon plagiometopon* on algal community structure. *Bulletin of Marine Science*, 30, 304-312.
2. Ceccarelli, D.M. (2007) Modification of benthic communities by territorial damselfish: a multi-species comparison. *Coral Reefs*, 26, 853-866.

## WITH THANKS TO...

