



## Diversity patterns of reef fish along the Brazilian tropical coast

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### ABSTRACT

Causal mechanisms for broad-scale reef fish diversity patterns are poorly understood and current knowledge is limited to trends of species richness. This work compared the effects of ecological drivers on components of fish diversity across reefs spanning over 2.000 km of the tropical Brazilian coastline. A quarter of communities' diversity is accountable to common and dominant species, while remaining species are rare. Low-latitude sites were more diverse in rare species. Communities along the coast share common and dominant species, which display high densities across all reefs, but differ in rare species that show abundance peaks in particular reef morphotypes. The disproportionate distribution of rare species reveals a higher vulnerability of these communities to impacts and stochastic density fluctuations. Uneven conservation efforts directed to these morphotypes pose a threat to the maintenance of a paramount component of the reef fish diversity represented by rare species.

### 1. Introduction

Coral reefs host the most diverse communities of marine fish, yet, identifying the processes underlying reef fish diversity patterns is a challenging task. Fundamentally, widely accepted ecological drivers of diversity patterns in terrestrial communities, such as area effects and isolation, the mid-domain effect, Rapoport's rule, or the intermediate disturbance hypothesis, seem to be inconsistent for reef fish communities across different scales (Rogers, 1993; Rohde et al., 1993; Bell-

wood and Hughes, 2001; Connolly et al., 2003; Mora and Robertson, 2005; Paravicini et al., 2013; Mora, 2015). Furthermore, there are several limitations to studies attempting to identify causal mechanisms for broad-scale reef fish diversity patterns. Most of current work on this topic is based on the compilation of species checklists gathered from literature (Mora, 2015) and, although of great value, available inventories still present issues, such as misidentifications (which mistakenly extends some species ranges), invalid and outdated species names. Current estimates suggest that only 24% of

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