LOS PECES DE ARRECIFE EN UTRÍA: UN TESORO PARA LAS GENERACIONES FUTURAS

Alrededor de 110 especies de peces asociados a arrecifes de roca o coral se encuentran en Utría. Esta asombrosa diversidad, resalta la importancia de los bosques como proveedores de refugio y alimento para las especies, muchas de las cuales son aprovechadas por nuestros pescadores.

TIDE-RELATED VARIATION IN THE REEF FISH FAUNA OF UTRÍA NATIONAL PARK (COLOMBIA, TROPICAL EASTERN PACIFIC)

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INTRODUCTION

Tidal forces are noticeable in tropical coasts by the periodic inundation of mangrove, mud flats, sea grass and rocky shore areas. The temporary available space provides food and refuge to organisms able to undertake migrations "in miniature" with the tides[1].

These migrations in conjunction with twilight movements determine to a great extent the home-range movements of fishes in shallow-waters[2]. Direct and indirect evidences of tidal movements have been documented for mangrove[3], sea grass[4] and coral reef[5] fishes, pointing out the importance of such a mechanism.

The tropical eastern Pacific, a coral reef depauperated marine region, with extensive rocky-shores and a predominant macro-tidal regime is an appropriate area to assess the importance that tides may have for rocky reef fishes.

Research questions: (1) Are transient intertidal visitors a sub-set of the adjacent reef fish fauna? (2) Is the sub-tidal reef fish assemblage structure changing over a diurnal tidal cycle?

METHODS

Reef fish fauna was monitored at four sites within the Utria National Park (Colombian Pacific) during Nov 2007-March 2008.

Fig 1. Study site location

Fig 2 Rocky intertidal and subtidal seacapes of the study area

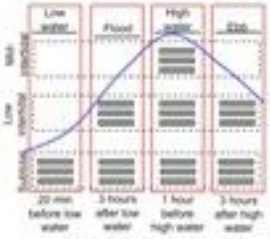

Fig 3. Sampling scheme

Underwater visual censuses (UVCs) were performed over the tidal cycle at set permanent transects (25x2 m) in intertidal and shallow subtidal zones (three transects per zone)

Analysis: (1) One-way ANOVAs and non-parametric Kruskal Wallis tests - to identify differences in species richness and density between tidal stages

(2) One-way ANOSIM – to determine similarities in assemblage structure (Factor: tidal stage)

(3) SIMPER – to identify species accounting for the observed dissimilarities

RESULTS

During 661 transect observations carried out at the four sites during different tidal stages, 106 species from 41 families were identified. More than 70% of them (76 species) were intertidal visitors.

Benthic reef species accounted for *ca.* 75% of the intertidal migrants. Mid-water and surface species from Carangidae, Belonidae, Mugilidae and Kyphosidae conformed the remaining percentage. Although intertidal occupation was predominately opportunistic, other strategies were observed (Fig. 7)

Tidal-related variation in the structure, mean species richness and densities of the subtidal assemblage was not detected (Fig. 4). However, the structure of intertidal and subtidal assemblages varied (Fig. 5) with the number of species and their densities decreasing from the subtidal to the intertidal zone (Fig 4).

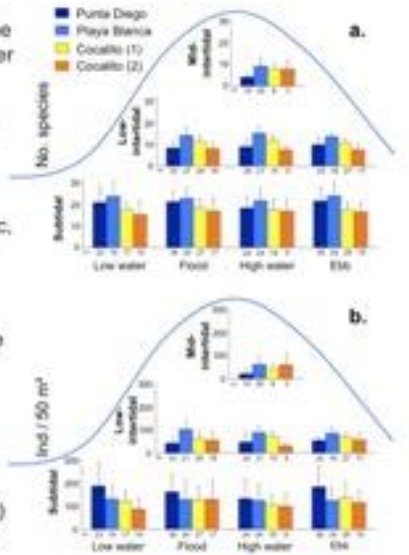

Fig. 4 Mean (+SD) spatial and temporal variation in fish (a) species richness and (b) density at the four rocky areas.

Table 1. Principal species (Pomacentridae and Labridae) accounting for dissimilarities between inter- and subtidal areas.

Species	Av Diss.
Thalassoma lucasanum	11.79
Chromis atrilobata	10.17
Stegastes acapulcoensis	7.93
Halichoeres notospilus	6.6
Abudefduf spp	3.82

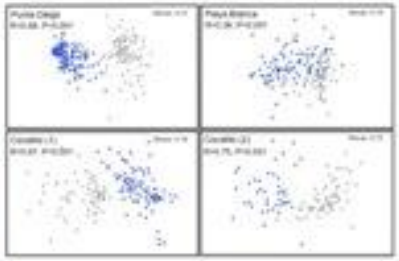

Fig 5. nMDS plots showing dissimilarities (ANOSIM R) in the (●) intertidal and (●) subtidal assemblages at three of the four sites.

Fig 6. Groups of Carangids, Kyphosids and Lutjanids found in intertidal areas

CONCLUSIONS

Results suggest that:

1.Rocky intertidal areas constitute an alternative, non-essential habitat for many reef fishes.

2.Tidal changes of subtidal reef fish assemblages may operate at the species level and may be size-group related.

3.The use of intertidal areas by reef fishes may be influenced by local intertidal topography.

4.Mid-water ubiquitous fish species are important components of intertidal migrants despite shallow water depths.

5.Subtidal fish densities were constant over the tidal cycle; suggesting that losses due to fish migrating to the intertidal may be compensated by fish moving up-shore from deeper areas.

6.Reef fish monitoring in macro-tidal areas should consider the tides as a potential source of bias in density estimates

Fig 7. Distribution of reef-associated fishes at low and high water in rocky shores. **(1)** Opportunistic reef migrant species; **(2)** Mid-water migrant species; **(3)** Permanent reef migrant species; **(4)** Species from deeper reefs moving to shallow areas; **(5)** Benthic reef fish that remain at the same location; **(6)** resident intertidal fish

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