

# DIEL FLUCTUATIONS OF A SHALLOW-WATER FISH ASSEMBLAGE IN PRAPRATNA BAY (SOUTHERN ADRIATIC, CROATIA)

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## Abstract

The shallow-water fish assemblage from Prapatna Bay was sampled with a small beach seine at 4-h intervals over 24-h periods between April 2003 and March 2004. A total of 51802 individuals from 58 species (55983,27 g) were caught. The dominant species (*Boops boops*, *Atherina boyeri*, *Sardina pilchardus* and *Sarpa salpa*) were caught in consistently higher numbers and biomass in different times of the diel period. At the assemblage level, generally more species were caught during daytime whereas a larger number of individuals and biomass were caught during night.

**Keywords :** *Fishes, Biodiversity, Adriatic Sea.*

## Introduction

Coastal shallow-water areas are important feeding and nursery grounds for many fish species. In these areas there is usually a distinct periodicity to the catch rate over the 24 h period [1]. In part, this reflects net avoidance, as fish can see the net in daytime and avoid it [1,2]. This can also be due to real changes in the abundance and structure of the fish assemblage. Diel changes in assemblage structure, which are superimposed on the seasonal one could have a profound effect on the perception of a fish assemblage [2]. The present study provides data on the diel changes in catches of shallow-water fish community in the Prapatna Bay, southern Adriatic Sea.

## Material and methods

Monthly samples were collected with a small beach seine (mesh size 8 mm in outer wings and 4 mm at the bag end, knot to knot) between April 2003 and March 2004, every 4-h over a 24-h period (daily samples were taken at 08.00, 12.00, 16.00h; night samples at 20.00, 24.00, and 04.00h) in the Prapatna Bay, southern Adriatic Sea (N 42° 48' 58.1"; E 17° 40' 50.6"). Sampling depth ranged from 2.5 to 0 m. The substratum is clean sandy bottom sporadically overgrown by *Cymodocea nodosa* beds. Collected material was kept on ice and returned to the laboratory for identification. Species were identified according to [3]. Data were analysed using PRIMER [4]. Data were transformed for presence/absence and the Bray-Curtis similarity matrix was used to generate a 2-dimensional plot with the non-metric multidimensional scaling (nMDS) technique.

## Results

Over the sampling period a total of 51802 individuals and 55983.27 g of fishes, belonging to 24 families and 58 species, were caught. The dominant species with respect to both numbers (57.21%) and weight (49.90%) were *Boops boops*. Except in April, the greater numbers of species were caught during night and there was also a significant higher number of individuals ( $p=0.002$ ) and biomass ( $p=0.031$ ) during night. *Boops boops* (57.21%), *Atherina boyeri* (19.70%), *Sardina pilchardus* (6.82%) and *Sarpa salpa* (6.60%) made a significant contribution to the overall number of individuals (92.48%) or biomass (70.56%). With respect to both numbers of individuals and biomass *Boops boops*, *Pagellus acarne*, *Sarpa salpa*, *Atherina boyeri* had higher catches during night and *Mullus barbatus* during day. The other species did not show any strong diurnal or nocturnal tendency in catches. Community parameters fluctuated during the diel period and was higher during the daytime. Results of the ANOSIM test for the two-way crossed analysis showed that there was significant difference in species assemblages among seasons ( $\rho_{av}=0.118$ ,  $P=0.017$ ), but there was no significant difference in those catches between day and night. The nMDS plot showed that there is a clearly visible overlapping of the day and night samples (Figure 1).

## Discussion

Diel fluctuations in fish communities are a summation of the diel fluctuations of the component species [2]. Over the diel cycle in the Prapatna Bay, there were fluctuations in both number of individuals and number of species. The dominant species were either primarily diurnal or nocturnal and it is the relative abundance of these species in each period which determines the assemblage structure during day or night. The greater number of species caught at night was similar to that of other studies [5].

However, the greater number of individuals and biomass caught during the night in the Prapatna Bay differs from that in the Azores [2]. Differences in catches between day and night can have a profound effect on the perception of a fish community and it is apparent that a full description of an assemblage or assemblages within an area must incorporate both time periods. The Prapatna Bay fish assemblage is typical of many marine fish assemblages with relatively few species constituting the majority of individuals and biomass [2,5]. In general, the fish assemblage at Prapatna Bay were dominated by juveniles. One might expect that an assemblage with such a high proportion of juveniles may be a nursery area. Shallow-waters are often utilised as nursery areas as they provide suitable food, shelter and reduction in predation [1,2,5].

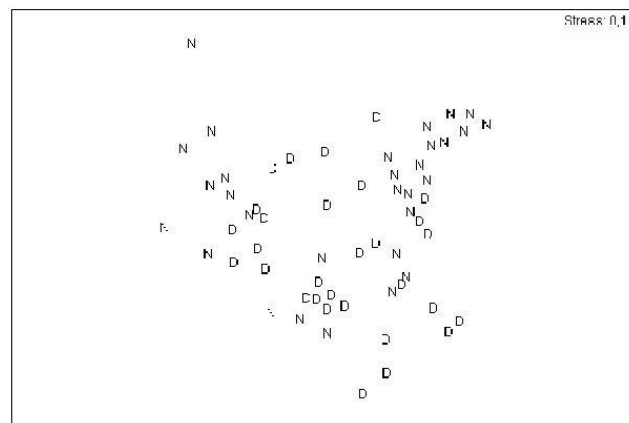


Fig. 1. Non-Metric Multidimensional Scaling ordination plot for fish assemblages in Prapatna Bay for day and night sampling: D=day, N=night

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