

# METAPOPULATION STRUCTURE OF A BENTHIC HARPACTICOID COPEPOD AND ENVIRONMENTAL FACTORS.

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## Abstract

*Tigriopus fulvus* (Fischer, 1860) is a benthic harpacticoid copepod of the supralittoral environment, the study subject population is currently resident in Genova Nervi rockpools (Ligurian Sea, 44°22'52.561 N; 9°2'12.570 E).

Main environmental rockpools parameters were studied from March To September 2014. Salinity, temperature, pH, density, copepod abundance and rockpools trophism (Seston and Chlorophyll "a") were assessed, these parameters were chosen as more relevant for copepod population development.

Populations trends and occasional extinction events suggest, together with appropriate statistic treatment, a metapopulation structure for *T. fulvus*, even though a genetic evidence is required.

**Keywords:** *Rocky shores, Ligurian Sea*

## Introduction

In the supralittoral environment rockpools, events extinction and colonization of *igriopus fulvus* (Copepoda: Harpacticoida) occurred. This factor, driven by biological and physical factors, determine patches occupation of such fragmented environment. Such structure, that led to a metapopulation determination, has been observed for *Tigriopus californicus* [1] and *Tigriopus brevicornis* [2], but not for Mediterranean *Tigriopus fulvus*, particularly in the Genova Nervi study area, where this species has been studied before [3]. During a monitoring campaign that went from March to September 2014, three rockpools were studied monitoring environmental parameters and resident *T. fulvus* populations. Samplings kept a fortnightly cadence, salinity, temperature, pH, water density, Chlorophyll "a" and Seston were measured alongside copepod population samples. Rockpools were chosen at different heights and distances from the sea, covering most of the possible conditions.

## Materials and Methods

Salinity and temperature data were acquired with a multiparametric probe (YSI 30M/50 FT; 0.1°C and 0.1 psu resolution) while pH had a dedicated instrument (Etekcity 009, 0.1 resolution; 0.1 accuracy at 20°C). Density was measured with an hydrometer. Chlorophyll "a" pigments were analysed with a spectrophotometer following an overnight extraction in 90% (v:v) acetone solution [4]. Seston content was analysed with a water sample filtration on 45µ porosity Sartorius cellulose acetate filters. Both the analysis were performed on a 1l sample. Copepod population samples were collected with a 0.5l plastic bottle, sorting and counting was made under binocular microscope Nikon SM7-U (Zoom 1:1). *Tigriopus fulvus* is the only copepod living in this environment, identification is therefore obbligated. Number of individuals collected was then took to a correct measure unity (Ind/l) and the data were statistically elaborated.

## Discussion

*Tigriopus fulvus* extinction events happened during drought event that occurred in upper rockpool and during low-nutrients periods in lower rockpool. One of the three rockpools never dried and the resident *T. fulvus* population never went through an extinction event. Moreover, the latter rockpool showed significantly reduced environmental parameters range, if compared to the other two. This seems to highlight a "sink and source" dynamic, where a more stable population is source of organisms for the others. Spearman rank correlations did not show any significant connection between the different populations, as expected for metapopulation structure ( $r_s$ : AvsB= 0.167, AvsC=0.336, BvsC=0.344). Preliminary data suggest a metapopulation structure for *Tigriopus fulvus*, despite the absence of the appropriate genetic analysis. This recalls what already discovered on *Tigriopus brevicornis* and *Tigriopus californicus* [1,2], but in a non-tidal environment where the main diffusion factor is therefore probably represented by rainfall and waves.

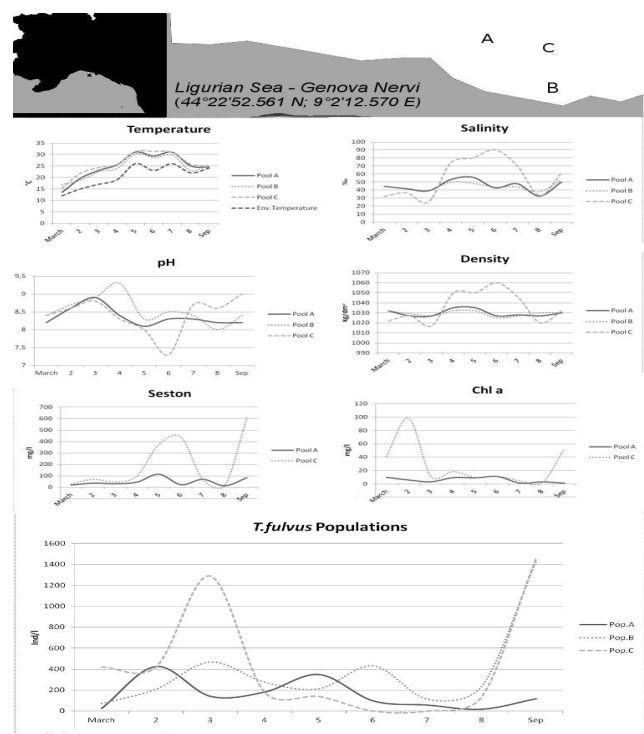


Fig. 1. Rockpools position, environmental parameters and *Tigriopus fulvus* populations.

## References

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