Biol. Mar. Mediterr. (2011), 18 (1): 290-291

N. Sturaro, S. Gobert, G. Lepoint, A. Pérez-Perera,
J.M. Guerra-García*

Laboratoire d'Océanologie, Université de Liège, Allée de la chimie 3, Sart Tilman, B6c - 4000 Liège, Belgium.
nicolas.sturaro@ulg.ac.be
*Laboratorio de Biología Marina, Universidad de Sevilla, Avda. Reina Mercedes, 6 - 41012 Sevilla, Spain.

DISTRIBUTION PATTERNS OF *CAPRELLA TAVOLARENSIS* (CRUSTACEA: AMPHIPODA) IN THE TAVOLARA-PUNTA CODA CAVALLO MARINE PROTECTED AREA

DISTRIBUZIONE DI CAPRELLA TAVOLARENSIS *(CRUSTACEA: AMPHIPODA) NELL'AREA MARINA PROTETTA DI TAVOLARA PUNTA CODA CAVALLO*

Abstract *- Distribution patterns of* Caprella tavolarensis *was investigated at the Tavolara-Punta Coda Cavallo Marine Protected Area. Results revealed that* C. tavolarensis *abundance may exhibit spatial patterns associated with the protection status of the zones, highlighting the importance of totally protected areas in species conservation and management.*

Key-words: Caprella tavolarensis*, Amphipoda, Marine Protected Area,* Posidonia oceanica*, Mediterranean Sea.*

Introduction - *Caprella tavolarensis*, described by Sturaro & Guerra-García (2011), was discovered in *Posidonia oceanica* meadows of the Tavolara-Punta Coda Cavallo Marine Protected Area (TMPA). The lack of ecological knowledge associated to the description of a new species is usually common. Consequently, this work details the distribution patterns of *C. tavolarensis* in the TMPA. We examine briefly (1) the spatial variability patterns of *C. tavolarensis* abundance at scales ranging from meters to kilometres, (2) the relationships between *P. oceanica* meadow characteristics and *C. tavolarensis* abundance, and (3) the effect of fish predation on *C. tavolarensis*.

Materials and methods - The sampling was carried out at the TMPA located in NE Sardinia (Italy). The TMPA was established in 1997 but enforcement became effective around 2003-2004. Sampling was performed in July-August 2007 and 2008 in the context of a larger study assessing the effects of protection status (totally, partially and non protected areas) on amphipod crustacean communities. Samples were collected from *Posidonia oceanica* beds (10-15 m) by SCUBA diving using an airlift sampler (about method see Michel *et al*., 2010). We used a hierarchical sampling design. Two plots (separated by ~10 m) were nested within each of 2 sites randomly selected (~100 m), nested within each of 4 levels of protection (>1000 m): zones A (integral reserve), B (partial reserve) and C (general reserve) of the TMPA and in an external zone. Four replicate samples were collected at each plot. Biometric parameters of *P. oceanica* were measured for each sampled surface (shoot density, maximum length of leaves, number of leaves per shoot, leaf surface, leaf and epiphyte biomasses). Experimental reduction of predation intensity using cages was carried out in the A zone from June to September 2009 to examine the impact of fishes on amphipod populations. Five cages, five partial cages and five controls were set up in the meadow between 9-12 m depth. Cages measured 75 cm × 75 cm × 120 cm and consisted of 12.7 mm mesh. Sampling was done after 8 weeks with an airlift. Effects of the cages on water flow and light attenuation were tested and found to be negligeable. Data of the hierarchical sampling design were analyzed using a nested ANOVA. The relationships were tested with Pearson correlation and Kruskal–Wallis H-test was used in caging experiment.

Results - A total of 271 specimens of the amphipod *Caprella tavolarensis* was sampled from the A zone (261) and the B zone (10) at the TMPA, while no specimens were collected in the C and external zones despite the same sampling effort. In the A zone, mean ± SD abundance was 64±75 and 25±32 individuals m^{-2} and reached a maximum of 271 and 97 individuals m^{-2}, in 2007 and 2008 respectively. There is a significant difference at the larger scale (zones) in 2007 ($p=0.003$) and 2008 ($p=0.001$), and at the plot scale in 2008 ($p=0.003$). Estimations of variation components showed that the variability attributable to samples (~1 m), plots (~10 m) and zones (>1000 m) are respectively of 48, 15 and 37% (in 2007) and 42, 27 and 31% (in 2008) of the total variability. There is clear evidence that most of the total variation was on the smallest spatial scale and might be attributable to variables associated to the ecology of *C. tavolarensis* such as intraspecific behaviors. The relationships between all six biometric parameters of *P. oceanica vs C. tavolarensis* abundance were not significant ($p>0.08$). It has been already pointed out that there is no correlation between parameters of the vagile fauna such as abundance and features of the *P. oceanica* meadow such as density (Scipione *et al*., 1996). Moreover, experiments dealing with fish predation showed that there were no significant differences for *C. tavolarensis* abundance between cages, partial cages and controls ($p>0.604$), indicating that this species is not or little predated by fishes. Probably the small size (2-6 mm) could let the specimens hide between *Posidonia* leaves and escape from predators (Sturaro & Guerra-García, 2011). Significant variations on the larger scale (zones) might reflect differences in physico-chemical conditions such as hydrodynamism. However, as most study sites were chosen with comparable *Posidonia* meadows, protection might be the factor which better explains the distribution patterns of *C. tavolarensis*.

Conclusions - These results do not allow determination of the role of *P. oceanica* biometric parameters and predation by fishes in affecting the abundance of *C. tavolarensis*, but they suggest complex interactions probably related to the ecological behavior of this species. Distribution of *C. tavolarensis* abundance observed at the TMPA suggests that the effects of protection may be responsible for these patterns.

References

MICHEL L., LEPOINT G., DAUBY P., STURARO N. (2010) - Sampling methods for amphipods of *Posidonia oceanica* meadows: A comparative study. *Crustaceana,* **83** (1): 39-47.

SCIPIONE M.B., GAMBI M.C., LORENTI M., RUSSO G.F., ZUPO V. (1996) - The vagile fauna of the leaf stratum of *Posidonia oceanica* and *Cymodocea nodosa* in the Mediterranean Sea. In: Kuo J., Phillips R.C., Walker D.I., Kirkman H. (eds), *Seagrass biology*. University of Western Australia, Perth: 249-260.

STURARO N., GUERRA-GARCÍA J.M. (2011) - A new species of *Caprella* (Crustacea: Amphipoda) from the Mediterranean Sea. *Helgol. Mar. Res.,* DOI 10.1007/s10152-011-0244-5.

This study was supported by the Belgian Fund for Research for the Industry and Agriculture (FRIA).