

# UNVEILING THE SECRETS OF A SUCCESSFUL INVADER: PRELIMINARY DATA ON THE BIOLOGY AND THE ECOLOGY OF THE CRAB *PERCNON GIBBESI* (H. MILNE EDWARDS, 1853)

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## Abstract

The great increase of human activities in the sea has contributed to the transformation of the natural geographical ranges of species. In the Mediterranean Sea the invasion of alien species has increased enormously in the last years and one of the most successful invaders is the decapod crustacean *Percnon gibbesi*, presumably arriving from the Atlantic Ocean. This work offers a preliminary account on structure, bathymetric distribution, microhabitat preference and diet of a population newly recorded in northwestern Sicily. Our data, although preliminary, demonstrate that the studied population is now perfectly adapted to the colonized shores.

*Keywords:* alien, *Percnon gibbesi*, diet, habitat

## Updated distribution in the Mediterranean Sea

One of the most successful marine invaders in the Mediterranean Sea is the decapod *Percnon gibbesi*, presumably arriving from the Atlantic Ocean, through vectors still to be identified. *Percnon gibbesi* is a subtropical species, distributed along the American Pacific coast, and both sides of the Atlantic Ocean (1, 2). Its presence in the Mediterranean Sea was first recorded in the summer of 1999: contemporaneously reported from the Balear Islands, Spain, (3, 4), southeastern Sicily, (5) and the Straits of Sicily (6). In 2000, the crab was recorded at Pantelleria and Ustica islands, along northwestern and eastern Sicily (7, 2). The most recent records come from northern Sicily, Tyrrhenian coast of Calabria (2), Malta (2), Ionic coast of Sicily, Ischia and Ponza Islands and Southern Sardinia.

The present contribution aims at (1) showing the results of preliminary field and lab work on the spatial and feeding preferences of individuals of *P. gibbesi* belonging to a newly recorded population (northwestern Sicily); (2) insights for the success of this alien species in the Mediterranean Sea.

## Microhabitat preferences and natural diet

**Methods.** In order to assess habitat preferences, underwater surveys were carried out during the summer of 2003 in the MPA of Capo Gallo - Isola delle Femmine (northwestern Sicily). Individual specimens belonging to different size classes were randomly chosen and their occurrence within the different microhabitats and behavioural patterns were recorded. A total of 44 specimens were collected from two sites of the MPA for stomach contents analysis (8).

**Results.** *Percnon gibbesi* colonised the shallow subtidal, between 0.5 and 3 m depth. Our data show a strong preference for large submerged boulders, bare or with a limited macroalgal cover. Both small and large crabs prefer these microhabitats, while medium-size individuals are common in all microhabitats. Individuals of all size classes are more active at dusk, daytime activity is minimal (Fig. 1).

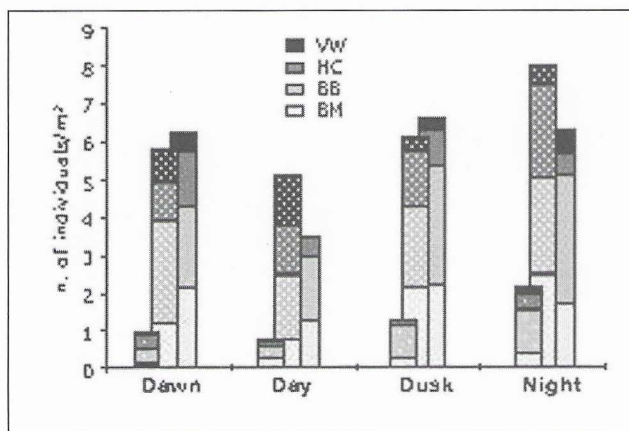


Fig. 1. Average density of *P. gibbesi* at different stages of the day in the four microhabitats considered: vertical walls (VW), holes and crevices (HC), bare boulders (BB), boulders with macroalgae (BM). The three size classes are reported: large (sparse dotted bars), medium (dense dotted) and small individuals (plain). Standard errors ranged from 0.04 to 0.8.

All crabs showed a high fidelity to individual areas. Active small- and medium-size crabs forage for about 50% of the time, while large males were also patrolling their activity areas. Interspecific interactions were rarely spotted and were directed at the ornate wrasse *Thalassoma pavo* and the rainbow wrasse *Coris julis*.

*Percnon gibbesi* is an omnivor (animal matter = 43.2% ± 7.47). A total of 27 taxa were identified from stomach contents, accounting for a generalistic, broad range, diet composition. The multivariate analyses showed no difference in diet composition related to sex and size. However, differences occurred between the diet of the two sub-populations sampled (ANOSIM test, 2-way crossed; factor size: R=0.118, p=0.833; factor sub-population R=0.151, p=0.03). The preferred food items of the two sub-populations were gastropods and *Gelidium* sp. (Rhodophyta) and crustaceans and *Cladophora* sp. (Chlorophyta), respectively.

## Conclusions

This Atlantic invader is still fast spreading along the rocky subtidal habitat of the Italian waters and our preliminary results allow some hypotheses on its success. *Percnon gibbesi* colonises bathymetric zone and microhabitat previously free from autoctonous large-size benthic algal browsers, and its plastic feeding habits provide it with a powerful tool to colonise new habitats.

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