

NOTES ON THE BIOLOGY OF *PERCNON GIBBESI* (BRACHYURA, GRAPSIDAE) IN THE CENTRAL MEDITERRANEAN SEA

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Abstract

The flat rock crab *Percnon gibbesi*, found for the first time in 1999 in Linosa (Pelagic Islands-Italy), was expanded in southern and western Mediterranean. This study focused on some aspects of its biology in order to investigate the causes of its rapid spreading. Crabs examined were collected during August 2003 in 4 different sites in the Central Mediterranean (Linosa, Lampedusa, Palermo and Marzanemi, Sicily-Italy). Carapace length sex and ovigerous condition were determined. Some differences were evidenced between the samples collected on natural and artificial rocks.

Key words: biology, reproduction, Percnon gibbesi, Central Mediterranean

Introduction

Percnon gibbesi (H. Milne Edwards, 1853) is an alien species, recorded for the first time in the central Mediterranean sea in 1999 (1). Since now several records of this species were marked in different areas of the Mediterranean sea (2,3,4) together with several oral communication (www.ciesm.org/atlas/), demonstrating the rapid spreading of this species. Some preliminary studies were focused on reproduction (5) and feeding (6), but despite its large abundance in the southern coasts of Italy (Sicily and Pelagic islands) many aspects of its biology and ecology are still unknown. The aim of this study is to contribute to the knowledge of some biological aspects of this exotic species.

Material and Methods

A total of 229 specimens of *Percnon gibbesi* were collected in the southern coast of Italy (see Fig. 1) in August 2003, from 0 to 3 m of depth.

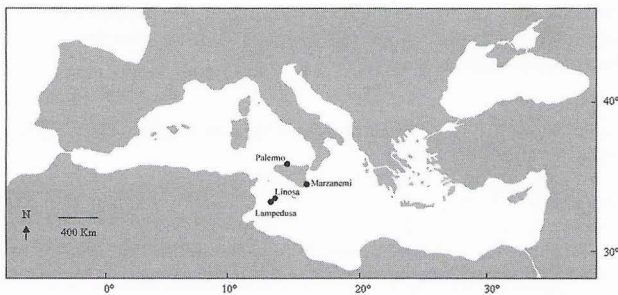


Fig. 1. Sampling sites.

All the samples were measured in mm (carapace length CL with the accuracy of 0.1 mm). Normality of the length data was determined using the Kolmogorov-Smirnov test prior to comparing the differences between samples collected on natural (specimens collected in Linosa) and artificial rocks (specimens from Lampedusa, Palermo and Marzanemi). To estimate fecundity, eggs from 20 recently spawned females were manually removed from the pleopods and then the procedure suggested by Abello (7) was followed. Sex-ratios by 1 mm size classes were determined and tested by a chi-square analysis.

Results and Discussion

The length frequency distribution of the whole sample, grouped in 1 mm, showed that CL ranges between 11 mm and 38 mm and the distribution is plurimodal. Three modes are recognisable peaking at CL ranges of 11-18 mm, 19-28 mm, and 29-38 mm. Linosa population was mainly formed by smaller animals (CL: 11-28 mm), while Lampedusa, Palermo and Marzanemi populations were chiefly composed by medium and large size specimens (CL: 14-38 mm). This can be probably due to the wider crevices offered by the artificial reefs to larger individuals, comparing to natural rocks, that give a more suitable protection to the smaller specimens. The normalized distributions of natural rocks and artificial rocks samples (natural rocks K-S $d=0,22278$, $p<0,10$; Lilliefors $p<0,01$; artificial rocks: K-S $d=0,18037$, $p>0,20$; Lilliefors $p<0,05$) resulted different.

Of a total of 229 individuals, 123 (53.7%) were males and 106 (46.3%) females with a sex-ratio of 1:0.86. Males are bigger than females and the maximum size recorded in this study overreaches the values referred by Manning and Holthuis (8) (a male measuring 38,2 mm CL and 39,9 mm CW). The smallest females carrying eggs had a 14 mm CL, FMS for August resulted 13,4 mm CL. In the sampling period 92% of studied females carried eggs in different development stages. The brood size of these females ranged from 38 (the smallest female carrying eggs) to 11.881 eggs.

Some hypothesis may be formulated in order to explain the rapid spreading:

- 1) *P. gibbesi* could have occupied an empty niche;
- 2) Its apparent long reproductive period, as reported by Puccio *et al.* (3), together with a low FMS as reported in this study;
- 3) Its feeding habits, mainly focused on algae and coralline algae (4), abundant and no competitive resources in its living habitat.

Further biological and ecological studies are necessary to understand the role of this species in the coastal ecosystem and the potential implications in the Mediterranean trophic webs.

References

- 1 - Relini M., L. Orsi, V. Puccio and E. Azzurro, 2000. The exotic crab *Percnon gibbesi* (H. Milne Edwards, 1853) (Decapoda, Grapsidae) in the Central Mediterranean. *Scientia Marina*, 64(3): 337-340.
- 2 - Garcia L. and B. Reviriego, 2000. Presència del cranc subtropical *Percnon gibbesi* (H. Milne Edwards, 1853) (Crustacea, Decapoda, Grapsidae) a les Illes Balears. Primera cita a la Mediterrània occidental. *Bolletí de la Societat d'Història natural de les Balears*, 43: 81-89.
- 3 - Mueller C. First record of *Percnon gibbesi* (Crustacea: Decapoda: Grapsidae) for the Balearic Islands, 2001. *Senckenb. Marit.* 31(1): 83-89.
- 4 - Pipitone C., Badalamenti F., Sparrow A., 2001. Contribution to the knowledge of *Percnon gibbesi* (Decapoda, Grapsidae), an exotic species spreading rapidly in Sicilian waters. *Crustaceana* 74(10): 1009-1017.
- 5 - Puccio V., Relini M., Azzurro E. 2002. Osservazioni sulla riproduzione di *Percnon gibbesi* (H. Milne Edwards, 1853) a Linosa. Symposium SIBM, Castelsardo, Italy: 3-8 June 2002.
- 6 - Puccio V., Relini M., Azzurro E., Relini L.O., 2002. Feeding habits of *Percnon gibbesi* (H. Milne Edwards, 1853) in the Sicily strait. VIII Colloquium on Crustacea Decapoda. Corfù, Greece: 2-6 September 2002.
- 7 - Abellò P. 1989. Reproduction and moulting in *Liocarcinus depurator* (Linnaeus, 1758) (Brachyura: Portunidae) in the Northwestern Mediterranean sea. *Scientia Marina*, 53(1): 127-134.
- 8 - Manning R.B., Holthuis L.B., 1981. West African Brachyuran Crabs (Crustacea: Decapoda). *Smithsonian Contribution to Zoology*, 306, 379 p.