



First record of the blue crab, *Portunus segnis* (Forskål, 1775) in Sardinia: a new threat for Western Mediterranean Sea Biodiversity

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RAPID COMMUNICATION

The Mediterranean region, recognized as a hotspot for biological invasions, is particularly vulnerable to the establishment of alien species, especially in aquatic ecosystems. In this study, we report the first record of the blue swimming crab *Portunus segnis* (Forskål, 1775) from the eastern coast of Sardinia Island (Italy), representing the westernmost occurrence of the species within the Mediterranean Sea to date. Identification was performed by morphological examination and genetic analysis based on the mitochondrial Cytochrome C Oxidase subunit I (COI) gene, which showed an average identity of approximately 99% with reference sequences of *P. segnis*. Phylogenetic reconstruction and clustering analysis grouped the specimen within the *P. segnis* lineages, clearly separated from *P. pelagicus* and other congeners. Our findings confirm that the specimen belongs to *P. segnis*, extending the known distribution range of the species westwards within the Mediterranean. This record highlights the importance of continuous monitoring to assess the potential establishment of this invasive species in the northwestern Mediterranean and underlines the value of collaboration with local stakeholders for early detection and management of alien species.

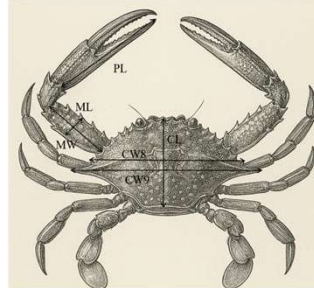
WORK FLOW and OUTCOMES

Collection area: Tortoli lagoon (OG) Eastern coast of Sardinia. Fishing gear: Baited trap (60x60x40 cm) positioned at a depth of about 2.5 m on a muddy bottom by local small-scale fishermen.



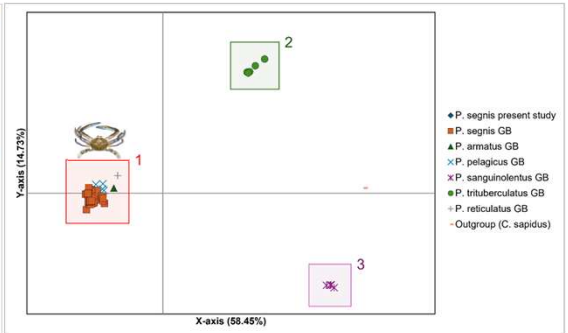
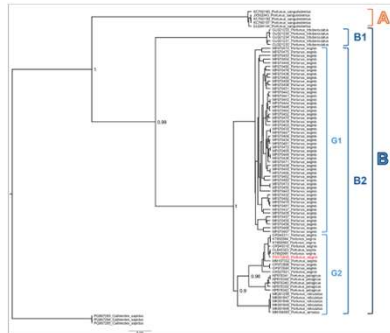
Biometric measures: Carapace width (CW8,9) and length (CL); Merus length (ML) and width (MW); Propodus length (PL). Reference points for the taxonomic identification from a morphological point of view following Lai et al., 2010 and Grati et al., 2023. The specimen analyzed exhibited a distinct coloration, characterized by the typical spotted pattern of the genus *Portunus* and remarkably elongated chelae (Fig. A).

The analysis of the main taxonomic reference point, the median teeth on the frontal margin of the carapace, resulted perfectly in line with the description provided for the species *Portunus segnis* (Fig. B). Sixth male abdominal somite relatively short, shaped, elongated paddles (Fig. C).



GENETIC ANALYSES

- mtDNA COI gene analysis: sequence identities ranging from 98.25% to 99.68% with *Portunus segnis*;
- Phylogenetic Bayesian Tree: two primary clades identified (A and B). The larger (B) included two main sub-clusters. Subcluster (G1) encompassed a large number of *P. segnis* sequences, all from the Iranian coasts, while the second (G2) included two internal sister groups. *P. segnis* sequences from both the native range and the Mediterranean, grouped together with the sequence from the present study, while the sister group included only *P. pelagicus* sequences;
- Species delimitation: Consistently with the Bayesian phylogenetic tree, suggests that group 1 can be considered a species different from *P. segnis*;
- Principal Coordinates Analysis (PCoA): the specimen analyzed overlapped with the *P. segnis* group, supporting the phylogenetic results.



CONCLUSIONS

The increasing occurrence of new invasive alien species in the Mediterranean Sea poses a serious threat to biodiversity conservation and to the socio-economic human activities closely linked to marine and coastal ecosystems. Although the present record represents an isolated finding in the western Mediterranean basin, the sightings of *Portunus segnis* throughout the region suggests that its occurrence must be constantly monitored to promptly identify any possible evidence of an increase in sighting frequency, which could be indicative of the species adapting to the conditions of the Northwestern Mediterranean.

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