



FULL LENGTH ARTICLE

Basic assessment of *Portunus segnis* (Forskål, 1775) – A baseline for stock management in the Western Arabian Gulf



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Abstract *Portunus segnis* (Forskål, 1775) is the representative species of the *Portunus pelagicus* (Linnaeus, 1758) complex described as inhabiting the Arabian Gulf. It represents one of the most important decapod resources within this semi-enclosed hyper-saline and hyper-thermal marine eco-region. Previous biological and ecological descriptions for *P. pelagicus* (*latu sensus*) have focused on other *Portunus* species while *P. segnis* from the Arabian Gulf has remained undescribed. This is a matter of concern as without taxonomic and ecological descriptions a scientific baseline for standing stock management cannot be created. In order to collate comprehensive baseline data for *P. segnis* vital biological, ecological and taxonomic information was examined and those results can be used to form the basis of a management strategy for this species within the Arabian Gulf. The research combines an overview of local unpublished works and new information about morphometric relations, body size ratios, size maturity, mortality, fecundity, spawning, recruitment, growth, sex ratio, sex dimorphism, colour pattern, habitat, taxonomy and discussion about the effects of temperature and salinity on this species.

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Introduction

Qatar in the western Arabian Gulf, presents a unique amalgamation of extreme environmental conditions within a shallow marine basin, with water temperatures reaching almost 40 °C

in summer and salinity measurements as high as 70 ppt (Kämpf and Sadrinasab, 2006; Le Vay and Falamarzi, 2009; Riegl and Purkis, 2012). Qatar's marine environment is one of the least described regions within the Arabian Gulf in relation to its biodiversity and ecology. A literature overview of the relevant scientific journals associated with the Arabian Gulf reveals a lack of research into baseline ecological and biological aspects of its marine organisms. Therefore it is vital that these matters be addressed if an understanding of the current stock status of a primary fishery resource within the region is fully understood.

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The swimming crab previously identified as *Portunus pelagicus* (Linnaeus, 1758) is a major component of the decapod fishery in the Western Arabian Gulf. Despite its economic and regional importance within the fishery, no biological or ecological description exists of the species in the relevant scientific literature. The most comprehensive description is currently in an unpublished technical report (Le Vay and Falamarzi, 2009), which has been used in this study for some biological descriptive references. Lai et al. (2010) recently undertook a revision of the *P. pelagicus* species complex which recognises four individual species: *P. pelagicus* (Linnaeus, 1758), *Portunus segnis* (Forskål, 1775), *Portunus reticulatus* (Herbst, 1799) and *Portunus armatus* (A. Milne-Edwards, 1861). The authors identified the species in the Arabian Gulf as being *P. segnis* based on morphological and DNA characteristics. Prior to the research by Lai et al. (2010) *P. pelagicus* was considered to have worldwide distribution with the main ecological and biological information for the species based on studies performed in Australia (Wassenberg and Hill, 1987; Shields and Wood, 1993; Potter and de Lestang, 2000; de Lestang et al., 2003; Kumar et al., 2003; Sumpton et al., 2003). Therefore *P. segnis* in the Arabian Gulf still remains without ecological and biological descriptions. The absence of this baseline information represents a fundamental missing component to the creation of any worthwhile stock management strategy which would be specific to the fishery within the region.

Recent analysis of *P. segnis* (Forskål, 1775) specimens from Qatar and further unpublished information found in literature overview highlights some biological and ecological differences comparing previous descriptions for this species (Lai et al., 2010). In addition, the semi-enclosed hyper-saline and hyper-thermal marine eco-region of the Gulf has been shown to stimulate allopatric speciation, meta-population conservation and hybridisations (Riegl and Purkis, 2012) emphasising the need

for a better understanding of the adaptations within the biodiversity which allows species to survive these harsh conditions.

In order to present comprehensive baseline data related to *P. segnis* management in the Arabian Gulf, this study collected important biological, ecological and taxonomic information about *P. segnis* (Forskål, 1775) in the western Arabian Gulf.

Material and methods

Study area

Four inshore sites were selected on the North and East coast of Qatar (Doha, Ras Rakan, Al-Khor and Al-Wakrah). All sample sites were located in shallow water between 0.5 and 10 metres deep with variations in substrate types ranging from bedrock to sand and sea grass (Fig. 1).

Sampling methods

Biological material was collected by local fisherman in November 2014, using anchored gillnets fished on the seabed positioned at depths between 0.5 and 10 m. Personal communication with local fishermen confirmed that the shallow coastal waters are the most abundant habitat for this species. Only large mature specimens were used to describe taxonomic characteristics, morphological proportions, sexual dimorphism, and colour pattern. The sample species were caught and transported live to the biological laboratory at Qatar University. The morphological characteristics for each specimen were measured to the nearest 0.1 mm using electronic Vernier® callipers. Each individual crab was then photographed and deposited in the marine taxonomic collection at Environmental Science Centre at Qatar University (ESCQU). Terms and definitions used in this study are as

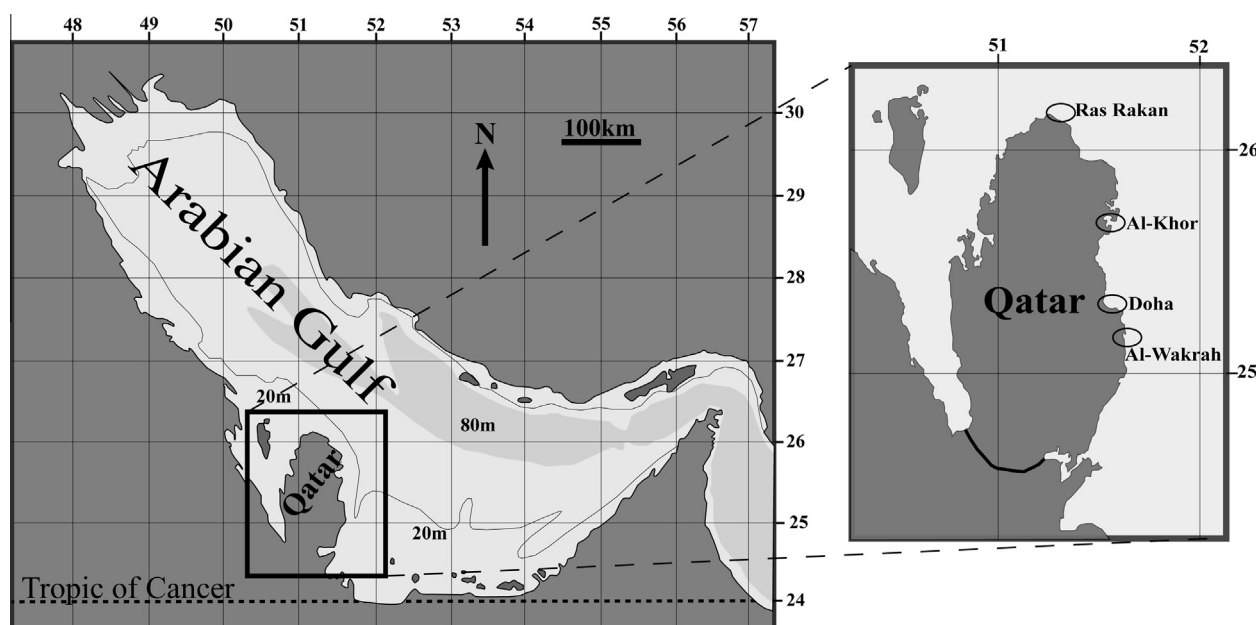


Figure 1 Map with geographic coordinates showing the position of Qatar in Arabian Gulf, the shallow area limits (20 m) and the sample sites in Qatar.

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