Pakistan Journal of Aqua Biosciences
Vol. 2 (1), Jul, 2025 pp. 01-11

Population Dynamics of *Portunus segnis complex*: Sustainable Fishery in Pakistan

Noor Us Saher[1*], Nayab Kanwal[1], Farah Naz[2], M. Asif Gondal[3], Zunaira Amanat[1], Naureen Aziz Qureshi[4]

[1]Centre of Excellence in Marine Biology, University of Karachi, Karachi 75270, Pakistan
[2]Department of Zoology, University of Karachi, Karachi 75270, Pakistan
[3]Department of Biosciences COMSATS Institute of Information Technology Park Road Islamabad, Pakistan
Govt Girls College University Allama Iqbal road Faisalabad Pakistan

*[E-mail: noorusaher@yahoo.com]

The Portunidae family of brachyuran crabs includes economically important species, widely distributed in the Indo-West Pacific region. Swimming crabs of family Portunidae, *Portunus segnis*, one of the valuable seafood items of great demand in both the domestic market and export industry of Pakistan. The population dynamics of *P. segnis complex* investigated by using FiSAT II software of FAO on length-based data. Sampling carried out through gill net on the monthly basis during March 2005 to April 2007in Sonmiani Bay (SB) Balochistan, Pakistan. The Asymptotic carapace length (CL) as (L∞:9.94 cm and the von Bertalanffy Growth Function (VBGF) growth parameter as (K: 1.5 yr -1). The total mortality (Z) as (Z: 5.37yr -1) and the fishing mortality (F) was (F: 2.31yr -1). The natural mortality (M) was (M: 3.06yr -1) by using Pauly's empirical equation, where the mean temperature of (SB) during March 2005 to April 2007was 25.9 °C. FiSAT shows the observed extreme carapace length (CL) was 8.90 cm where predicted extreme (CL) was 10.34 cm and the growth performance index (□') was 2.171. The exploitation rate (E) was 0.43 and deceptive under exploitation of *P. segnis*. Consequently, current management practices suggest that there is no immediate need for reducing fishing pressure, as the exploitation rate remains below optimal levels, ensuring sustainable utilization and recruitment.

[**Keywords:** Population structure, Mortality, *P. segnis*, FiSAT II, Pakistan Stock assessment, Length at maturity]

INTRODUCTION

The *Portunus segnis* is an economic species of Pakistan and forms a major component of commercial and recreational fisheries throughout the Indo-Pacific (Kailola et al., 1993; Clarke and Ryan, 2004, Naz, 2018). It inhabits a wide range of inshore and continental shelf areas, including sandy, muddy and seagrass habitats, from the intertidal zone (Sen and Williams, 1982; Edgar, 1990; Clarke and Ryan, 2004) and caught as bycatch in bottom trawls, gill net, (targeted for shrimps and fishes), operated in depths up to 50 m. It has been utilized by both small-scale and commercial fisheries and the production used for consumption and export. Portunid crabs, found in the coastal waters of Pakistan, exhibit various morphological differences. Recent molecular evidence has elucidated that the swimming crab *P. pelagicus* comprises four distinct species (Lai et al., 2010) among these, two species, *P. sgnis* and *P. reticulatus*, inhabit the coastal waters of Pakistan (Naz, 2018). According to Takween and Qureshi, (2001), *P. plegicus* currently recognised as *P. segnis complex* (in this study), *P. sanguinolentus, C. feriata, S. olivacea* and *S. serrata* are commercially important in Pakistani waters and constitute 63% of the total catch of the fishery. These species form a significant portion of shellfisheries; they are available in the local market and exported as fresh, canned and frozen products. *P. segnis complex* and *P. sanguinolentus* are dominating landings on the coast of Pakistan (Takween and Qureshi, 2001). The total landing of crabs was highest at 5,680 metric tons in 1998 and 5,840 metric tons in 2009. However, the total export of the crab was 4,037 metric tons including alive and frozen meat (AHFSP, 2006). Similarly, the total landings of crabs were 5,840 metric tons in 2009, out of which 1,616 metric tons were exported as frozen, whereas 3,464 metric tons were exported as alive (AHFSP, 2012). Pakistan exports Portunid crabs to many countries including the USA, Japan, and Malaysia. Species of *Scylla* are the highly prized species exported alive while *P. sanguinolentus* and *P. segnis complex* are exported as frozen condition (Takween and Qureshi, 2001; 2005; Khan and Mustaquim, 2013; Khan et al., 2014; Rasheed and Mustaquim, 2010; 2014). Marine fisheries are mostly based on stocks of populations inhabiting the sea and the accomplishment of capture fisheries depends on the state of these available stocks.

Stock assessment and management of resources depend on estimation of population parameters i.e.