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Seasonal Variations in Gonadosomatic Index, Hepatosomatic Index, and Condition Factor of *Metapenaeus affinis*

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ABSTRACT

Samples of *Metapenaeus affinis* were collected from the marine waters off the Iraqi coast between January 1 and December 1, 2022, to investigate the development of sexual maturity. Seasonal variations in gonadal function were observed in males, with peak rates (0.052) recorded in the summer and the lowest rates (0.024) in the winter. In females, the highest rates (0.979) occurred in spring, while the lowest (0.549) ones were observed in the winter. Liver function development was correlated with the stages of sexual maturity. In males, liver function was at its highest (0.234) in winter and lowest (0.108) in spring. In females, the highest liver function (0.404) was observed in fall, and the lowest (0.265) was in summer. The physical condition index also aligned with the stages of sexual maturity. In males, the highest values (13.789) were recorded in summer and the lowest (8.697) in spring. In females, the index peaked (9.499) in fall and was at its lowest (8.925) in winter. This study revealed that the shrimp exhibits a broad reproductive cycle. Statistical analyses showed that for females, the condition factor and liver function did not vary significantly across seasons. However, gonadal function exhibited significant differences between spring and the other seasons, with no significant differences between the remaining seasons. In males, the condition factor showed significant differences between summer and the other seasons, with no significant differences among the remaining seasons. Liver function showed significant variation between winter and the other seasons, with no differences among the rest. Regarding reproductive function, significant differences were observed between spring, summer, and fall, with no differences among those three seasons.

INTRODUCTION

Metapenaeus affinis is a member of a group of shrimp species that are found in the world, including the Arabian Gulf, the Indian Ocean, and the internal waters of Iraq. It is

considered one of the commercially important species in the Iraqi marine catch, with two reproductive peaks **(Al-Maliky *et al.*, 2009; Al-Maliky, 2013)**. The life cycle of shrimp plays a crucial role in the environment. Studying the environmental and biological characteristics of shrimp provides valuable insights into the life cycle of each species.