



A study of some of the biology of the *Metapenaeus affinis* in the waters of the North Western Arabian Gulf

By:

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Abstract:

The study showed that the sex ratio of shrimp *Metapenaeus affinis* was highest in the summer, reaching 65% females and 35% males. This was followed by summer (58% females and 42% males), then autumn (52% females and 48% males), and the lowest was recorded in winter (51% females and 49% males). Laboring females were recorded throughout the year at various stages of maturity, with the most mature and developed occurring in the summer and spring. The largest lengths of females and males were recorded (16.7 and 12.5) cm, respectively, while the weights were (28.9 and 15.2) g, respectively.

Keywords:

Crustacean, Length/Weight, Marine Shrimp, Sex Ratio

How to cite: Al-Maliky, T., Hashim, M., Shakir, Z., & Jabbar, I. (2025). A study of some of the biology of the *Metapenaeus affinis* in the waters of the North Western Arabian Gulf. *GPH-International Journal of Agriculture and Research*, 8(8), 29-32.
<https://doi.org/10.5281/zenodo.17405897>.

Introduction

Studies related to the sex ratio of shrimp show that males and females cluster throughout the year and according to environmental conditions, and that the behavior of the sexes varies as a result of fishing. The sex ratio is expected to be 1:1 in nature, but we notice differences in the values of the sex ratios. This information and data help in evaluating the

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distribution of females and their migration behavior to deep waters for reproduction (Pravez *et al.* 1992).

The study is important in terms of providing information about the commercial type, as it is the desired species, known locally, and has been subjected to local studies, including: (Al-Maliky *et al.* 2019; Al-Maliky *et al.* 2021; Al-Maliky 2022 a,b; Al-Maliky *et al.* 2023; Mohamed *et al.* 2025).

The current study aims to provide information about the important commercial species in the Iraqi coastal environment. This information includes the sex ratios of males and females and some other important characteristics that give a clear picture of the extent of its spread and reproduction throughout the seasons of the year.

Materials and Methods

Quarterly samples of marine shrimp *M. affinis* obtained from Basra Central Market were collected during 2023-2024 and identified according to Al-Maliky (2013). Sex ratios, embryonic development, length and weight measurements were determined laboratory-based.

Results and Discussion

Table 1. shows the largest and smallest male and female *M. affinis*.

Sexes	Max total length (cm)		Max total weight (gm)	
	Max	Min	Max	Min
Males	12.5	8.0	15.2	6.4
Females	16.7	7.5	28.9	5.8

As for lengths and sizes, the current study was larger than what Al-Maliki (2022) recorded, because the study was conducted in a freshwater environment, while the current study was conducted in an Iraqi coastal environment, where shrimp sizes are large due to the abundance of food and the spaciousness of the environment (Table 1).

Table 2. shows the sex ratios of male and female *M. affinis* during the seasons of the year.

Seasons	Sex ratio (%)	
	Males	Females
Summer	42	58
Autumn	48	52
Winter	35	65
Spring	39	61

The reason for the increase in the sex ratio of females of *M. affinis* during the spring and summer (Table 2) may be attributed to the increased activity and movement of shrimp during these two seasons, when the temperature rises and is considered an ideal breeding

period for shrimp. As for the winter and autumn, the sex ratio is close between females and males, perhaps due to the lack of activity of shrimp and their sinking to the bottom.

Regarding the sex ratio, it was consistent with the study by Pravez *et al.* (1992) and Al-Maliki (2022) in which the sex ratio of females was higher than that of males, while it differed from the study by Mohamed *et al.* (2025), which mentioned differences in sex ratios in some months of the year.

Pregnant females have been recorded throughout the year at various stages of maturation, with the most mature and developed occurring during the summer and spring. This is attributed to the fact that shrimp are active during certain seasons, during which they reproduce, begin developing their ovipositors, and release fertilized eggs after maturation into the marine environment. Naturally, sexual maturity is at its peak during the hottest seasons.

The fertilized eggs went through four stages: the first was transparent, the second was yellow, the third was light green, and the fourth was dark green. The fourth stage was at the end of November, the first stage was at the beginning of September, the yellow stage was at the end of September, and the third stage was during October. This is considered the first spawning period. The second spawning period was at the beginning of January, the second stage was at the end of February, the third stage was during March, and the fourth stage was during April and May. This reproductive behavior is typical of the shrimp, with two spawning periods per year depending on environmental conditions during different seasons.

Conclusions

Females are larger than males, and the sex ratio of females is higher than that of males. Shrimp also continue to reproduce throughout the year, and their sizes in marine environments are larger than in inland waters. Two spawning waves have been confirmed as a reproductive pattern for this species, peaking during the months of November and April.

Acknowledgments

Thanks and gratitude to the Marine Biology Department - Marine Science Center as well as to the fishermen and shrimp market owners in Basra for their cooperation.

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