



IDENTIFICATION AND TAXONOMIC STUDY OF SHRIMPS IN BARDAWIL LAGOON, NORTH SINAI, EGYPT

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ARTICLE INFO

Article history:

Received: 14/03/2021

Revised: 19/03/2021

Accepted: 01/04/2021

Available online: 13/04/2021

Keywords:

Species,

Shrimps,

Taxonomic,

Bardawil lagoon

ABSTRACT

Taxonomic study of shrimp on the Bardawil lagoon, were studied in specimens of shrimp collected from Bardawil lagoon fishers from Seasonal occurrence of shrimp During, 2019. Identification of species was based on the morphological characters of rostrum (dorsal and ventral teeth), remarks of carapace, antenna, sub apical spines on telson and the colored pattern of the whole body based on standard keys and diagnoses available from the current literature. Modified Key identify shrimp species from Bardawil lagoon, was prepared after morphometric analysis. A total of 5 species from belong to three genus; *Penaeus*, *Melicertus* and *Metapenaeus*. Among these, two species belong to the genus *Penaeus* (*Penaeus semisulcatus* (**De Haan, 1844**) and *Penaeus* (*Marsupenaeus*) *japonicas* (**Bate, 1888**). The species which taken from genus *Metapenaeus* namely *Metapenaeus stebbingi* (**Nobili, 1904**) and *Metapenaeus monoceros*. (**Fabricus, 1798**), One species belong to the genus *Melicertus kerathurus*. (**Forskål, 1775**). Additional research is needed to more clearly define the distribution of shrimp species in Bardawil lagoon.



INTRODUCTION

Penaeid shrimps are important resources for worldwide fisheries and aquaculture. They supply the increasing population with animal proteins and provide significant earnings of foreign exchange for developing countries (**Jayawickrama, 2010**). Without taxonomy, nobody would be sure of the identity of organisms whether they belonged to the same or different species as the failure to recognize fishes as distinct biological units can lead to wrong diagnosis (**Guerra-Garcia** Without taxonomy, nobody would be sure of the identity of organisms whether they belonged to the same or different species as the failure to recognize fishes as distinct biological units can lead to wrong diagnosis (**Guerra-Garcia et al., 2008**; **Keat-Chuan et al., 2017**). This research is preliminary attempt to provide a detailed identification of shrimps in Bardawil lagoon.

MATERIALS AND METHODS

Bardawil lagoon (Fig. 1) is a shallow lagoon of high salinity. It's area about 685 km² (165,000 acres) and extends for a distance of about 95 km, from point 45 km east of Port Said to the point 18 km west of Al-Arish and its maximum width is 22 km and the average depth is 135 cm (**Gafrd, 2009**).

Sampling and Morphological Identification

The study was carried out during the 3 seasons (Summer- Spring-Autumn). The collection of 731 random samples of shrimp species from the commercial catch of Bardawil Lagoon, 2019. Which were iced in an ice bin and transported to the laboratory of the Institute of Environmental Studies, Arish University for taxonomic examinations and measurements. The present study was mainly based on the phenotype and meristic character observation of fresh specimens in the samples.

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<https://doi.org/10.21608/SINJAS.2021.67830.1012>

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Fig. 1. Satellite image of Bardawil lagoon

The present study was mainly based on the phenotype and meristic character observation of fresh specimens in the samples. Shrimps were examined using hand lenses and under a binocular stereo microscope (OPTIKA Stereomicroscope MB5–4083.B5, Italy). Samples were determined at the species level and before Measurement, samples were separated on the basis of phenotype. The identity was confirmed with the help of widely used references (De Bruin *et al.*, 1994; Carpenter and Niem, 1998 and Piratheepa *et al.*, 2016).

RESULTS AND DISCUSSION

Morphological Analyses and Shrimp Species

In this study, a total of five species of Penaeid shrimps were identified by morphologically. Shrimp were determined based on the following morphological characteristics. Number of rostral teeth, down area telson and exopods on fifth pereopods were considered one of the major morphological characteristics used to identify shrimp species, which is categorized under one family, the Penaeidae family. It became clear through the study, there are five species belong to three genus; *Penaeus*, *Melicertus* and *Metapenaeus*. Among these, two species belong to the genus *Penaeus* (*Penaeus semisulcatus* and *Penaeus (Marsupenaeus) japonicas*). The species

which taken from genus *Metapenaeus* namely *Metapenaeus stebbingi* and *Metapenaeus monoceros*. One species belong to the genus *Melicertus* (*Melicertus kerathurus*). Morphometric characteristics showed more distinguish between individuals of *Penaeus* and *Metapenaeus* as the identification of shrimps traditionally are relied on morphometric analysis; however, it is well known that such characteristics are influenced by environmental conditions (Bowman *et al.*, 1982). Piratheepa *et al.* (2016), described *Penaeus semisulcatus* as having a reddish brown to pale brown body color may be Dark in color. The pulpit has 5-8 teeth on the top and 2-4 teeth on the ventral side. Based on the morphological characteristics, two groups of *P. semisulcatus* are distinguished in the Persian Gulf. The first group is characterized by a reddish body color with deep red or brown transverse bands, cream and brown striped color of the whip antenna. Second group subspecies of *P. persicus*, is characterized by a creamy pink body color without distinct transverse stripes, and its whip antenna has a cream color without stripes (Rahnama *et al.*, 2010). Otero *et al.* (2013), were identified *Marsupenaeus japonicus*, result showed a well-developed rostrum with 7 - 11 teeth on the dorsal margin and 1 tooth on the ventral marginal. The body was pale, with brown bands and the pereopods and pleopods were pale yellow near their bases with blue markings near the tips. FAO (2011) describe

Melicertus kerathurus body is light creamy brown with gray spots and rust colored. Carapace is Creamy. Rostrum has Mostly 9 teeth on the top and 1 tooth appear on the ventral side. There are 3 cicatrices on the last abdominal segments. **Piratheepa et al. (2016)** descriptive remarks for *Metapenaeus monoceros* as follows body pink, antennae with a red Colour; pereopods and pleopods of same Colour as body, sometimes more intensely pink. Carapace is pink with a grayish dark spot. Rostrum has 9-12 teeth on the top and no tooth appear on the ventral side. The outer tip of the Telson is blue. **Jayawickrama (2010)**. Describe of *Metapenaeus stebbingi*. Body white to creamy–yellow with grey and rust coloured specks; antennae Colour to grey–purplish. The rostrum there is no tooth on ventral side and 7-10 teeth on the top. Telson with spines. All of these results are in complete agreement with the results of this thesis in describing their type in terms of appearance.

Key Identifies Shrimp Species from Bardawil Lagoon

1. Rostrum with teeth on its dorsal side only *Genus Metapenaeus*.
2. Rostrum with 9–12 teeth on dorsal side, telson with movable spines and there are basal spines on first 3 pereiopods *Metapenaeus monoceros*.
3. Rostrum with 8–10 teeth on dorsal side and no ischial spine on 1st pereiopod *Metapenaeus stebbingi*.
4. Rostrum with teeth on its dorsal and ventral side.....Genus *Penaeus*.
5. Rostrum with 2–4 teeth on ventral side *Penaeus semisulcatus*.
6. Rostrum with 5–8 teeth on dorsal side, and no spines on telson and antennae banded white and brown. Dark green to dark brown cross bands on the abdomen, leg with yellow and reddish bands *Penaeus semisulcatus*.

7. Rostrum with one tooth on ventral side *Penaeus (Marsupenaeus) japonicas* and *Melicertus kerathurus*.
8. Rostrum with 9–10 teeth on dorsal side, pereiopods and pleopods yellow and blue and 3 pairs of movable spines on telson. Body with yellow and brown bands*Penaeus (Marsupenaeus) japonicas*.
9. Rostrum with 8–13 teeth on dorsal side and there are spines on base of first 2 pairs of pereiopods *Melicertus kerathurus*.

Shrimps were identified based on the morphological characteristics. Through virtual examination and microscopic examination inside the laboratory, each species was determined separately by studying its phenotype as a follow:

***Penaeus semisulcatus* (De Haan, 1844)**

Common name

Green tiger prawn.

Colour

Pale reddish brown with dark brown dorsal transverse stripes. White and brown antenna.

Descriptive remarks

The carapace is reddish brown Colour with Brown transverse lines. The rostrum has 5-8 teeth on the top and 2-4teeth appear on the ventral side. Antenna banded white and brown.

***Penaeus (Marsupenaeus) japonicus* (Spence Bate, 1888)**

Common name

Kuruma prawn

Colour

Lightly brown to greenish brown with blue edge at tail fan.

Descriptive remarks

The carapace is soft and shiny. The rostrum has one tooth on ventral side and 9 teeth on the top. Telson has a mixture of three colors brown, yellow and blue.



Fig. 2. *Penaeus semisulcatus* from Bardawil lagoon during fishing season, 2019



Fig. 3. *Penaeus (Marsupenaeus) japonicus* from Bardawil lagoon during fishing season, 2019



Fig. 4. *Melicertus kerathurus* from Bardawil lagoon during fishing season, 2019

Melicertus kerathurus (Forskål, 1775)

Colour

The body is light creamy brown with gray spots and rust colored.

Descriptive remarks

The carapace is Creamy. The rostrum has 9 teeth on the top and 1 tooth appear on the ventral side. There are 3 cicatrices on the last abdominal segments.

Metapenaeus monoceros (Fabricus, 1798)

Common name

Ginger prawn.

Colour

Body pink, antennae with a red Colour; pereopods and pleopods of same Colour as body, sometimes more intensely pink.

Descriptive remarks

The carapace is pink with a grayish dark spot. The rostrum has 9-12 teeth on the top and no tooth appear on the ventral side. The outer tip of the Telson is blue.

Metapenaeus stebbingi (Nobili, 1904)

Common name

Peregrine shrimp

Colour

White to creamy-yellow with grey coloured specks and antennae by Colour grey.

Descriptive remarks

The carapace is cream colour. The rostrum has 7-10 teeth on the top and no teeth appear on the ventral side. Telson with a spine.



Fig. 5. *Metapenaeus monoceros* from Bardawil lagoon during fishing season, 2019



Fig. 6. *Metapenaeus stebbingi* from Bardawil lagoon during fishing season, 2019

Conclusion

During the present study, Randomly collection of samples and transported for taxonomic examinations and measurements. The present study was mainly based on the phenotype and meristic character observation of fresh specimens. and through the examination presence was recorded five species *Penaeus semisulcatus*, *Metapenaeus stebbingi*, *Penaeus japonicus*, *Metapenaeus monoceros* and *Melicertus Keraturus* in Bardawil lagoon in North Sinai and their identifying characters were very closely similar with the descriptions given by Many previous studies.

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المخلص العربي

دراسة تصنيفية للتعرف على أنواع الجمبري في منخفض البردويل

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تمت اجراء دراسة تصنيفية للتعرف على أنواع الجمبري الموجودة في منخفض البردويل حيث تم جمع 731 عينة من الجمبري من الصيادين وفحصهم واخذ القياسات التصنيفية. استندت الدراسة الحالية بشكل أساسي على التميز من خلال النمط الظاهري وملاحظة السمات المميزة للعينات الطازجة. باستخدام مقياس تحليلي 0.001 مجم وكذلك تم اخذ القياسات المورفومترية من خلال دراسة الطول الإجمالي لكل فرد إلى أقرب مم من طرف المنصة إلى نهاية الذيل. تم قياس طول الدرع إلى أقرب مم من طرف المنصة إلى الهامش الخلفي للدرع. تم تسجيل الوزن الإجمالي لأقرب 0.1 جم باستخدام ميزان الدقة الإلكتروني. تم دراسة وفرة الأنواع والتوزيع الموسمي، ثم تم التقاط بعض الصور لأجزاء من الجمبري تحت الميكروسكوب. وتم التأكيد على هوية خمسة أنواع من الجمبري في البردويل وجد انهم ينتموا إلى ثلاثة أجناس: (*Penaeus, Melicertus, Metapenaeus*)، وجد ان الجمبري السويسي موجود بنسبة 84.54% من إجمالي العينات. والجمبري الابيض يمثل 6.1%. والجمبري القزازي يمثل 2.8%. والجمبري المبرقش يمثل 3.8% والجمبري الملكي يمثل 2.6%. لذلك توصي الدراسة بتكملة الابحاث التصنيفية على أنواع الجمبري التي تم التعرف عليها وتقديم معلومات وفيرة عن الانواع والنسب المختلفة لتواجد كل نوع.

الكلمات الاسترشادية: الأنواع، الجمبري، التصنيف، منخفض البردويل.

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