

NEW RECORD OF *PLEUROBRACHIA PILEUS* (O. F. MÜLLER, 1776)
(CTENOPHORA, CYDIPPIDA)
FROM CORAL REEF, IRAQI MARINE WATERS

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ABSTRACT

The aim of this paper is to present the first record of ctenophore species *Pleurobrachia pileus* (O. F. Müller, 1776) in the coral reef as was recently found in Iraqi marine waters. The specimens were collected from two sites, the first was in Khor Abdullah during May 2015, and the second site was located in the pelagic water of the coral reef area, near the Al-Basrah deep sea crude oil marine loading terminal. Three samples were collected at this site during May 2015, February and March 2018 which showed that *P. pileus* were present at a densities of 3.0, 2.2 and 0.55 ind./ m³ respectively. The species can affect on the abundance of other zooplankton community through predation.

The results of examining the stomach contents revealed that they are important zooplanktivorous species; their diets comprised large number of zooplankton as well as egg and fish larvae. The calanoid copepods formed the highest percentage of the diet, reaching 47%, followed by cyclopoid copepods 30%, and then the fish larvae formed 20% of the diet.

The current investigation showed that the density of zooplankton decreased significantly in the second site of all the groups, but the highest was in Calanoida group (324 ind./ m³) coincident with the presence of noticeable numbers of *P. pileus* (0.55-3.0 ind./ m³), in the same site compared to the density of Calanoida in the first site, which amounted to 991 ind./ m³; as well, the increase was noticeable in relation to the rest of the other groups of zooplankton during the same period; such a state confirms the effect of predation by *P. pileus* on the zooplankton community. The study recommended that more attention should be given to investigate this group of zooplankton, and specific care should be exerted in preserving the specimens collected from the sea.

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Keywords: Carnivorous, Coral Reef, Ctenophora, *Pleurobrachia pileus*, Predation.

INTRODUCTION

Scientific reports have indicated the increase of the abundances and the instances blooms of the planktonic Ctenophores and the Hydromedusae in the marine ecosystems, especially in the enclosed seas and the semi-enclosed seas (Baltic Sea, Gulf of Mexico and Mediterranean sea) (Xian *et al.*, 2005; Lynam *et al.*, 2006; Ford and Link, 2014; Dehghan *et al.*, 2017). The expanding of this macrozooplankton is attributed to the combined impacts of many factors mainly, the climate change, eutrophication and overfishing (Fraser, 1970; Ford and Link, 2014). On the other hand, their role in the food regime of the marine coastal waters became more understandable and noticeable throughout the results of many studies focusing on their role in the food chains (preys and predators) in the marine ecosystems (Lynam *et al.*, 2006; Pitt *et al.*, 2008; Dehghan *et al.*, 2017). It has become well known that there are high rates of predation by these animals on a wide variety of other zooplankton, the calanoid copepods, fish eggs and fish larvae (Purcell and Arai 2001; Riisgard *et al.*, 2015; Dehghan *et al.*, 2017). Therefore, in some instances of their blooms, they caused a high decline of fish stocks. Also, these comb jelly fish are made a preferred prey to many known predators such as other Ctenophora, fishes (particularly some commercial species such as Sunfish and Shads), whales and turtles (Purcell and Arai, 2001; Duryanabard, 2004; Pitt *et al.*, 2008).

The Atlantic Ocean is a marine home of Hydromedusae and Ctenophora communities where more than 197 species were recorded, and the comb-jelly *P. pileus* is a well-known carnivorous medusoid species in the north-east and the north-west Atlantic as well as in the Black Sea (Kramp, 1959; Mutlu *et al.*, 1994; Bouillon, 1999; Gusmão *et al.*, 2015). Although, *P. pileus* was recorded in the Iranian and the Kuwait's marine waters of the Arabian Gulf (Al-Yamani *et al.*, 2011; Dehghan *et al.*, 2017), actually neither this species nor the other comb-jellies were recorded before in the Iraqi coastal waters, despite many studies on the zooplankton carried out in the area (Salman *et al.*, 1985; Al-Zubaidi, 1998; Salman *et al.*, 2012).

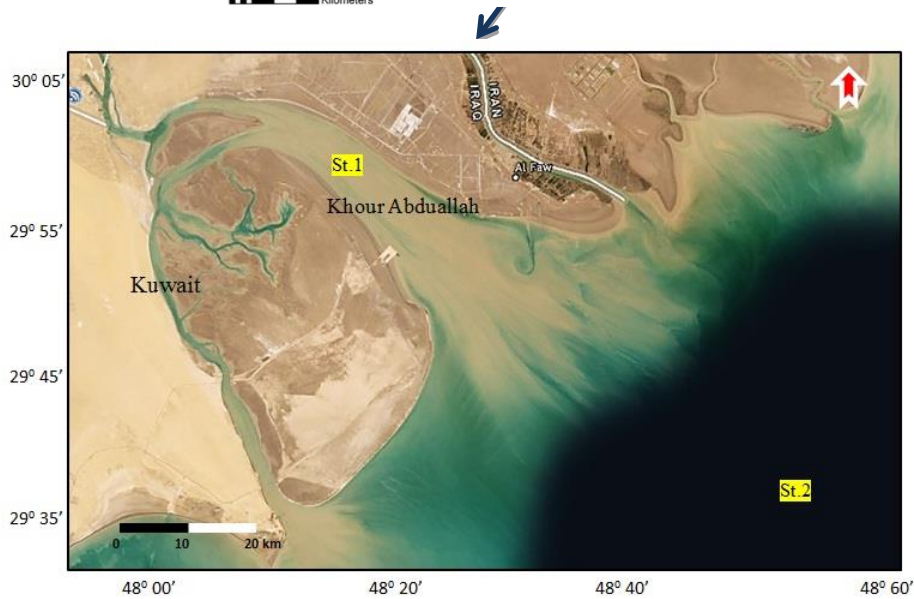
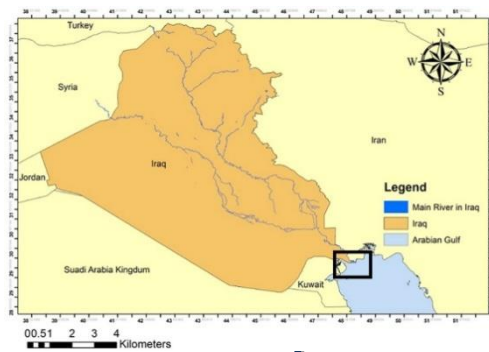
The aim of this study is to present the first record of this species in the unique coral reef (Palinurus Rock) which was recently discovered in 2012 in the Iraqi coastal waters (Pohl *et al.*, 2014; Ahmed and Ali, 2017; Ali *et al.*, 2017; Gutekunst *et al.*, 2018) and also lay light on its role in the ecosystem.

MATERIALS AND METHODS

Plankton specimens were taken from two sites in the marine coastal waters of Iraq, Khour Abdullah (30° 06'00 N, 47° 91' 00E) in May 2015, and the coral reef area (29° 37' 00 N, 48° 48' 00 E) May 2015, February 2018 and in March 2018 (Map1). Specimens were collected by net of 58 cm aperture and 120 micron mesh size. The net was towed off by the research vessel of the Marine Science Center/ University of Basrah, at a constant speed (3 Knots) for 15 min., and accordingly, the total filtered sea water volume calculated was 367 m³ in each case.

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Specimens were preserved in 85% ethanol; the zooplankton samples were diluted to 1 liter volume, and 3 replicates subsamples of 10 ml each were examined by a Wild stereo dissecting microscope (M30, Heerdruo Switzerland), counted for density estimates, and the length measurements were done with the aid of an ocular micrometer. Forty specimens were dissected under the dissecting microscope using a fine needle to search for food preys in the stomachs of the present species (Purcell, 2003).



Map (1): The study area of *Pleurobrachia pileus* in Basrah, Iraq, north-west Arabian Gulf. (Source: Work by Arc GIS.10.4.1, the American landsat 8 pandats. Marine Science Center/Marine Physics Dept.)

Identification of *P. pileus* and the other zooplankton species were done on the basis of their morphological characteristics using taxonomic keys available in the local and regional publications (Al-Yamani and Prusova, 2003; Al-Yamani *et al.*, 2011).

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The examined materials of *P. pileus* were conserved in alcohol and placed in the marine collection at the Ocean genome legacy aquatic museum laboratory at the Marine Science Center/ University of Basrah.

RESULTS AND DISCUSSION

Plate (1) shows a photograph of *P.pileus* collected from the Iraqi coastal waters, at st.2 of the coral reef area (Palinurus Rock), and systematically identified according to the following references: Dehghan *et al.*(2017) and Al-Yamani *et al.* (2011).

Taxonomic hierarchy follows world register of marine species (WORMS):

Phylum: Ctenophora Eschscholtz, 1829

Class: Tentaculata Eschscholtz, 1825

Order: Cydippida

Family: Pleurobrachiidae Chun, 1880

Genus: *Pleurobrachia* Flemming, 1822

P. pileus (O.F. Müller, 1776)

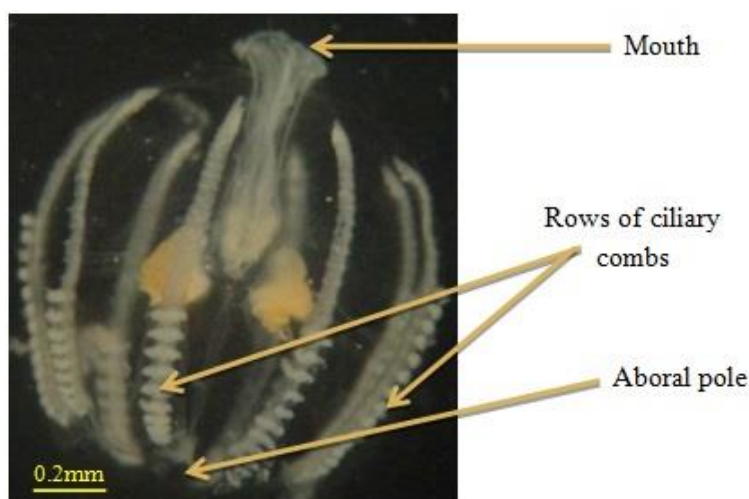


Plate (1): The photograph of *P. pileus* from the Iraqi coastal waters.

Diagnostic characters of *P. pileus*

A small species (25 mm in length), oval to spherical shape comb jelly, the tentacles are up to twenty times the length of the body and fringed with filaments along one edge. Body bears four pairs of longitudinal rows of cilia known as combs extending about 3/4 the length of the animal between mouth and aboral ends; body transparent and the combs rows are milky white, tentacles, sheaths and pharynx are organ incolour.

The species *P. brachi* is of a similar shape species but can be distinguished from *P. pileus* by have elliptical body, and the comb rows (ctense) extend nearly the entire length of the body, and their tentacles are much shorter.

The results of the zooplankton counting show that in the coral coastal waters (site 2), *P. pileus* numbers were 3.0, 2.2 and 0.55 (ind./m³) at the sampling periods May 2015, February 2018 and March 2018 respectively, the mean density 1.91 ind./m³.

In site 2, only few specimens of comb jelly were in good status, others were damaged, therefore no counting was done; however, their number was few.

Table (1): Numbers of total zooplankton (individual/ m³) in the two sampled sites of the Iraqi marine coastal waters.

No.	Groups	Site 1	Site 2
1	<i>Pleurobrachia pileus</i>	uncounted	0.55-0.3
2	Calanoida	991	324
3	Cyclopoida	468	196
4	Postlarvae of Shrimp	193	87
5	Zoea of Crabs	89	74
6	Larvae of Fishes	68	29

The examination of the stomach contents of 40 individuals of *P. pileus* revealed that 47% of their preys were calanoid copepods, 30% cyclopoid copepods and 20% were larvae of fishes (Diag. 1).

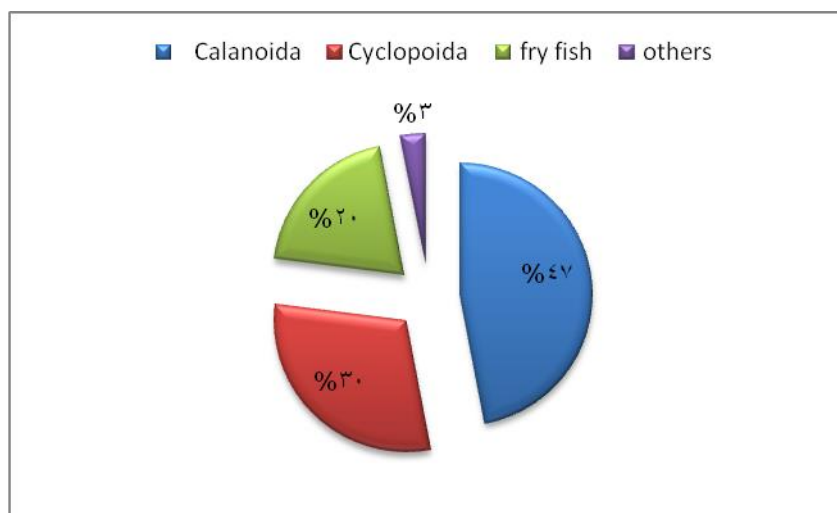


Diagram (1): The percentages (%) of food components in *P. pileus* stomachs of 40 individuals collected from the Iraqi coastal waters in 2017.

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Actually, the prey assemblages found in the stomachs of *P. pileus* reflects their ambient habitat in the studied area as given in Table (1); similar results were found in other regions (Bamstedt, 1998; Mazlum *et al.*, 2018; Riisgard *et al.*, 2015). Nevertheless, the composition of zooplankton, in general, is similar to those of other studies carried out in the coastal waters of Iraq (Salman *et al.*, 1985; Al-Zubaidi, 1998; Morad, 2011) in which the concern focused on the copepods as the dominant group of zooplankton assemblage. On the other hand, many other researches revealed that the list of preys of *P. pileus* as well as some other hydromedusae consists of a large number of zooplankton species; eggs and larvae of fishes and other invertebrates (Fraser, 1970; Frank, 1986; van der Veer and Sadée, 1984).

There is no specific study on the abundance of *P. pileus* in the Arabian Gulf; Dehghan *et al.* (2017) reported that 29 species of jellyfish and combjelly comprised less than 0.2% of the plankton in the north Arabian Gulf, and *Pleurobranchia* density was 6.9 ind./ m³ which may comprise 4 species. This value is more or less comparable to the density (0.5-3.0 ind./ m³) of the present study.

By reviewing the previous studies concerning the zooplankton of the Iraqi coastal waters (Salman *et al.*, 1985; Al-Zubaidi, 1998; Salman *et al.*, 2012), no records whatsoever, were found for this species or any other species of comb-jellies. This may be attributed to the difficulties in preserving these soft jellies as had been mentioned by other reports (Ringvold *et al.*, 2015), and by our personal observations on the samples collected in 2015 (Khour Abdullah site). The samples taken from this site were not examined directly, but were left for several months from the time of collection; therefore, the comb-jelly specimens were mostly damaged due to their soft bodies, and hence they were hard to be counted (Tab. 1). However, some specimens were good enough to be recognized; moreover, there is the possibility that there was less attention given to this group of invertebrates in the local studies, due to the lack of knowledge about their role in the marine habitats. In conclusion, further attention should be given to this group of zooplankton as well as the method of their preservation.

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تسجيل جديد للنوع المشطي
Pleurobrachia pileus (O. F. Müller, 1776)
(Ctenophora, Cydippida)
من منطقة وجود المرجان في المياه البحرية العراقية

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الخلاصة

خلال هذه الدراسة سُجِّل النوع المشطي *Pleurobrachia pileus* (O. F. Müller, 1776) من شعبة Ctenophora رتبة Cydippida لأول مرة في المياه البحرية العراقية وتحديداً في منطقة الشعاب المرجانية التي عُثِر عليها حديثاً في المياه الاقليمية العراقية.

جمعت النماذج من محطتين، الأولى كانت في خور عبد الله خلال شهر آيار 2015، اما المحطة الثانية فكانت في منطقة وجود المرجان قرب الميناء العميق خلال الاشهر آيار 2015 و شباط 2018 و آذار 2018 التي اظهرت وجود النوع المشطي *P. pileus* بكثافات 3.0، 2.2 و 0.55 فرد/م³. يؤثر النوع على مجتمع الهائمات الحيوانية بشكل كبير من خلال عملية الافتراس؛ وقد بينت نتائج فحص محتويات المعدة، ان الفرائس تشتمل على عدد كبير من الهائمات الحيوانية والبيض ويرقات الاسماك، وقد شكلت مجموعة الكلانويدا اعلى نسبة اذ بلغت 47% تلتها مجموعة دائرية الاقدام بنسبة 30% ثم يرقات الاسماك حيث بلغت نسبتها 20%.

اظهرت الدراسة ان كثافة الهائمات الحيوانية تناقصت بشكل ملحوظ في المحطة الثانية لكل المجاميع الهائمة لكن بدرجة كبيرة مجموعة الكلانويدا (324 فرد/م³) مع وجود أعداد ملحوظة لهذا النوع في المحطة نفسها خاصةً

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خلال آذار 2018 مقارنة بكثافة الكلنويدا في المحطة الاولى والتي بلغت 991 فرد/م³ وكذلك الزيادة كانت ملحوظة فيما يتعلق ببقية المجاميع الاخرى من الهائمات الحيوانية خلال الفترة نفسها، ما يؤكد تاثير الافتراس من قبل النوع المشطي على مجتمع الهائمات الحيوانية.

خلصت الدراسة الى ان اهتماما أكبر يجب ان يعطى لدراسة هذه المجموعة من الهائمات والعناية بشكل ادق لحفظ العينات المجموعة من البحر.