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Occurrence of *Ceratothoa capri* (Trilles, 1964) in *Pomatomus saltatrix* (Linnaeus, 1766) in the Libyan Coasts

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تواجد *Ceratothoa capri* (Trilles، 1964) بأسماك المغرس *Pomatomus saltatrix* (Linnaeus، 1766) في السواحل الليبية

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Abstract

Ceratothoa is an important ectoparasite affecting many species of commercial fish. 40 individuals of wild bluefish, *Pomatomus saltatrix* (L, 1758), were collected during October and November 2022. One pullus *Cetratothoa capri* parasite was found inside the bluefish gill, *P. saltatrix* from the coasts of Libya, in the southern Mediterranean determination, the infection rate of the fish was 2.5%. This is the first study from Libya on the presence of *C. capri* in bluefish.

Keywords: *Bluefish; Ceratothoa capri; Pomatomus saltatrix.*

الملخص

تعتبر Ceratothoa أحد الطفيليات الخارجية المهمة التي تؤثر على العديد من أنواع الأسماك التجارية. تم جمع 40 عينة من أسماك المغرس (L, 1758) *Pomatomus saltatrix* خلال شهري أكتوبر ونوفمبر 2022. وجد طفيلي واحد غير ناضج من *Cetratothoa capri* داخل خياشيم سمكة المغرس وبهذا مثلت نسبة إصابتها 2.5%. تعتبر هذه أول دراسة في ليبيا عن وجود الطفيلي *C. capri* بسمكة المغرس.

الكلمات الدالة: سمكة المغرس، *Ceratothoa capri*، *Pomatomus saltatrix*.

1. Introduction

Cymothoid is considered one of the crustacean isopods that can be easily seen in the buccal cavity, gills, or the body surface of the fish host (Horton, 2000; Trilles & Öktener, 2009; Innal & Kirkim, 2012; and Hadfield *et al*, 2016), but it is still under recent studies, as the focus began on details and identifying information for it. Cymothoid is distributed worldwide in freshwater, brackish, and marine environments; one of the disadvantages is that it feeds on the blood of the host in many commercial fish species (Ferri *et al*, 2008; Ramdane *et al*, 2007; Öktener *et al*, 2009; Innal & Kirkim, 2012; and Başusta *et al*, 2017). It includes several genera such as Ceratothoa, Anilocra, Nerocila, and Emetha; Ceratothoa was distributed in various

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regions of the world on marine and freshwater, found in the Atlantic Oceans, the Mediterranean, and the Red Sea, including; *C. parallela*, *C. oestroides*, *C. oxyrrhynchaena*, *C. italica*, *C. collaris*, *C. steindachneri*, and *C.* capri they parasitize different species of fish (Horton, 2000; Ramdane *et al*., 2007; Ramdane & Trilles, 2008; Matasin & Vucinic, 2008; Trilles & Öktener, 2009; Innal & Kirkim, 2012; Al-Zubaidy & Mhaisen, 2013; and Hadfield *et al.*, 2016).

Pomatomus saltatrix L, 1766 (Perciformes, Pomatomidae) is considered one of the economically important commercial migratory fish in many countries of the world, which has decreased in its numbers in recent years (Kasim *et al.*, 2009; Trilles & Öktener, 2009; and IUCN, 2015). It is considered one of the fish that has a wonderful taste and is expensive. It is locally called Al-Maghars fish, and its common name is the bluefish. It has a dark spot at the base of the pectoral fin, a large head, and a row of strong teeth in each jaw, silver or grey-greenish in color on the dorsal side (Kasim *et al.*, 2009).

There are little of studies on Ceratothoa species or on *P. saltatrix* from the Libyan coasts, including Abdulla and Howege (1989); Shakman *et al*. (2009); and Mahmoud *et al*. (2018). The present study aims to identify and describe for the first time a species of an ectoparasitic Cymothoid isopod, *Ceratothoa capri* in *Pomatomus saltatrix* gill, from the coasts of Libya.

2. Materials and Methods

The Bluefish, *P. saltatrix* was obtained from the western coast of Libya, which is located in North Africa and south of the Mediterranean. They were collected during October and November 2022 and transferred in a container containing crushed ice directly to the laboratory of the Zoology Department, Faculty of Science in University of Tripoli, where the surface of the fish body, pectoral, pelvic; also caudal fins, buccal cavity, and gills were examined to detect the presence of any crustacean ectoparasites that will be found. The parasite was kept in a container containing alcohol. Then was examined by a binocular microscope, and determined through the use of identification keys (Trilles, 1964; 1972; and Horton, 2000).

3. Results and Discussion

A total of 40 *Pomatomus saltatrix* individuals were collected freshly from the mainland markets, one sample from 40 specimens (2.5%) was infected with a pullus parasitic isopod was found in the gill of the bluefish host species and belonged to the genus Ceratothoa.

3.1. Taxonomy

This species was identified as follows:

Order: Isopoda.

Suborder: Cymothoida Wägele, 1989.

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Superfamily: Cymothooidea Leach, 1814.

Family: Cymothoidae Leach, 1814.

Subfamily: Ceratothoinae Dana, 1852.

Genus: *Ceratothoa* Dana, 1852.

Ceratothoa capri (Trilles, 1964).

3.2. Morphology

This study showed the presence of one individual of the parasite *Ceratothoa capri* in the pullus stage, 5 mm T.L, shown in Figure (1) inside the gill of the male bluefish host (Total length 25.2 cm and Total weight 145.3 g).

Figure 1. Pullus of *Ceratothoa capri* in the *Pomatomus saltatrix* gill.

3.3. Description of *C. capri*

3.3.1. Body shape:

Elliptical, distinctly, the length is more than 1.5 times the width, smooth the dorsal side is dark and smooth (Fig. 2).

Figure 2. *Ceratothoa capri* pullus in *Pomatomus saltatrix* (**A**: dorsal view, and **B**: ventral views).

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3.3.2. Cephalon:

Triangular in shape from the dorsal side, the cute lateral marigin transcend the well-distinct and large oval eyes (Fig. 3).

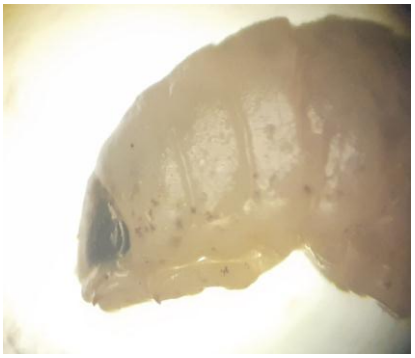

Figure 3. Cephalon of *Ceratothoa capri* in *Pomatomus saltatrix*.

3.3.3. Pereonites:

The anterior side is sharp and straight, heading forward towards the anterior margin of the eyes. Pereonites 1-5 increase in length and width as we go to the posterior side, and its maximum expansion is at Pereonites5, then it gradually approaches and narrows from Pereonites 6-7.

3.3.4. Perepods:

Its length is about 1.7 times the width, and it contains a bulge on the proximal side of the Merus, there are no expansions of the merus. The carpus is a straight margin; expansions occur only at the lower edge of pereopods VI &VII (Fig. 4).

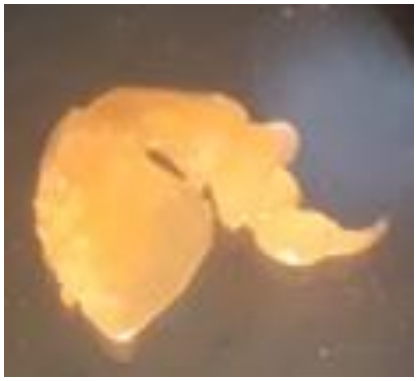

Figure 4. Perepod VII of *Ceratothoa capri* in *Pomatomus saltatrix*

3.3.5. Pleonites:

The first is narrow, while the second to the fifth is narrow and rounded. The fifth is characterized as free because it does not overlap with Pleonites 4.

3.3.6. Pleotelson:

It is narrow, the posterior edge is angled, and has slightly convex lateral margins. In the dorsal part, there are submedial depressions.

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According to Trilles (1964 & 1972) *C. capri* was found in the gills, and in the bottom of the buccal cavity of *Capros aper* (Trilles). This agrees with the present study, where it was found in the gill. While this study differs from several studies that found infection with *C. capri* in the buccal cavity from the fish, including of the study of Kirkim *et al.* (2008); Innal and Kirkim (2012) for *Boops boops* and *Spicara smaris*; study of Kirkim *et al.* (2009) for *Centracanthus cirrus*; and Al-Zubaidy & Mhaisen (2013) showed the infection of *Chelon macroleps*; Başusta *et al*. (2017) was found the parasite-infected in *Raja miraletus*, which is considered elasmobranch fish.

This study obtained just one pullus individual of *C. capri*, and did not find any mature individuals of this species. While it was found by Al-Zubaidy & Mhaisen (2013) that there were two specimens of the parasite (15-18 mm T.L and 7-9 mm W); also according to Kirkim *et al.* (2008), 12 males and 27 females were found; Horton (2000) was found female (19.5 T.L and 5.5 W); Trilles (1972) explained the range of total lengths of males (6-7 mm), females (13-20 mm) and second pullus (2.5-3.5 mm). So, *Pomatomus saltatrix* is infected with several species of Cymothoids, where Trilles and Öktener (2009) found *Ceratothoa oesteroides*; according to Trilles (1994), they included *Anilocra physodes, Nerocila cephalotes, N. orbignyi, N. macleayi, Livoneca redmanni, Aegathoa medialis Olencira praegustator, Mothocya taurica*.

4. Conclusion

Parasitism affects living organisms, where the parasite usually obtains its food by sucking the blood of the host, causing diseases and sometimes leading to death, and thus it affects the food chain, and causes damage to the ecosystem. Cymothoid has increased in recent decades in the eastern Mediterranean, exceeding 20 species; on the coasts of North Africa, 16 species have been identified from Algeria, 15 from Morocco, 11 from Tunisia, and from Egypt 4 species according to the literatures, while have been identified on the coast of Libya by Shakman *et al*. (2009) were recorded *Anilocra frontalis, A. physodes, Nerocila bivittata, N. orbignyi, N. maculata, Ceratothoa parallela, C. oestroides and C. oxyrrhynchaena*. Also, the C. paralella was identified by Mahmoud *et al.* (2018) in *Boops boops*. While the present study is considered the first record in Libya of the infection of *P. saltatrix* with the *C. capri* parasite. There are currently about 30 species belonging to the genus Ceratothoa, many studies describing *C. capri* and working to define it. *Pomatomus saltatrix* is considered one of the Teleostei, that exist in small quantities and their numbers are decreasing successively, and they have the problem of parasitism of one of the Cymothoids, as it was found in this study that it was infected in the gill region from the inside with pullus the *C. capri*.

The fishermen return fish lice (crustacean isopods) to the sea again as soon as they see this parasite on the fish, thus the life cycle of the parasite is repeated to infect the same species of fish or another, this action may be the main reason that I did not get the mature stage of the parasite, especially since the pullus of *C. capri* was 5 mm long and hidden at the base of the gill, it's hard to watch easily. SO, Fishermen must be alerted to the danger of

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returning parasites to the sea and they must find a correct way to get rid of them in order to preserve the life of marine organisms and the integrity of the ecosystem.

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