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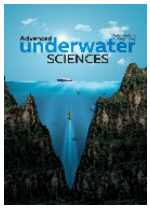

The Determination of Ecto parasites in Two Lessepsian Fish Species Caught in the North East Mediterranean Shores (Mersin)

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Keywords
Nemipterus randalli,
Sphyraena chrysotaenia,
Lernanthropus sp,
Paragnathia sp.

ABSTRACT

This study was conducted between March 2019 and March 2020. Samples were taken monthly. As a result of this study, two types of ectoparasites were encountered in the gills of Randall's threadfin bream (Nemipterus randalli, Russell, 1986) fish, Lernanthropus sp. (Blainville 1822) and Yellowstripe barracuda (Sphyraena chrysotaenia, Klunzinger 1884) in the fins of fish Paragnathia sp.

1. INTRODUCTION

With the opening of the Suez Canal in 1869, the Mediterranean Sea has seen the biggest ecological changes in the world caused by human intervention. There has been a rapid rise in migratory activities of aquatic organisms between both environments with the removal of the geographical barrier between the Mediterranean and the Red Sea because of this intervention (Halim et al., 1995: 1-133). Especially in the eastern part of the Mediterranean, a great bio-ecological change has started leading to the migration of many vertebrate and invertebrate organisms showing high ecological adaptability to wide range of abiotic factos such as salinity and temperature, towards the Eastern Mediterranean and Aegean coasts (Basusta, 1996: 12).

Disease agents such as bacteria and parasites that the fish could bring with them through these migrations also threaten the fauna in the regions where they migrate. Disease agents could cause mass mortality by affecting the fish in the region in various ways and this might cause severe economic losses by minimizing the fishing activities in the region (Grabda, 1991: 1-304). Fish in natural populations and culture environments are constantly in danger of being infected by parasites.

It is very difficult to observe the damage caused by parasites in fish populations living in natural environments. On the other hand, parasites could cause serious infections in aquaculture as well. In particular, the presence of natural fish populations near to the farming site may cause an increase in the density of parasite species and infest fish in the farms. Parasites on body surface of fish, fins, gills filament, inner and outer surfaces of the gill cover (operculum) and the mucus of the host by adhering to the mouth, they feed on epithelial and/or blood tissue. Hold organelles and nutrition patterns mechanical damage to the tissue and They can cause the development of stress and secondary infections on the host, and indirectly the death of the host fish species due to the lesions that occur afterwards.

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(Roberts, 2012:). Mersin province is an important fishing center due mainly to its long coastal line and fish species that are in high economic value. There are studies available on parasites found in fish in different geographical regions. However, no previous research has been found on ectoparasites living in Lessepsian fish species on the Erdemli-Anamur coastline that is considered one of the important fishing areas of the Eastern Mediterranean. In addition, as far as the number of existing and future fish farming projects are concerned, it is understood that extensive aquaculture activities will be conducted on the coastal lines of Mersin province in the coming years (Koyuncu, 2020: 1409-1420).

For all these reasons, it is vital to identify and investigate the damage that these ectoparasites create on fish considering ectoparasites are one of the biggest disease causing agents in natural fish species.

This study was able to identify the presence of ectoparasites in two commercially important Lessepsian fish species living on the coastline of Mersin province (Erdemli-Anamur). The findings of this investigation are also expected to help the efforts of determination of the ecto parasite fauna which has not yet been identified for the region and to assist future parasite studies.

2. MATERIAL and METHODS

The fish examined in this study were purchased from the fishermen operating in Erdemli-Anamur districts beginning from east towards west between March 2019 and March 2020.

The fish were immediately taken to the Fish Diseases Laboratory of Mersin University Faculty of Fisheries and kept at -20 °C until the parasitological examination. Before the dissection process, the fish were thawed and their live weights and total lengths were measured and recorded. Then, the oral cavity of the fish, fins, body surface and their macroscopic investigations and the dissected gills were carefully examined using a stereo-microscope. After these procedures were completed, the dissection process was started. Then in the dissection process; first of all, the operculum (gill covers) of the fish were cut. Following this procedure, the gill arch on both sides was cut and removed separately. The detected parasites were separated from the tissue with a forceps and then fixed in 70% ethanol solution for two days before the species identification. Parasites removed from gill filaments were kept in lactic acid for two hours for cleaning purposes before starting the identification process. The general appearance of the cleaned individuals was photographed using a Nikon (Eclipse 80 i) phase contrast microscope.

The species-specific structures of the parasites were identified according to the previously reported procedures (Kabata, 1979: 1-468; Davies et al., 1987: 134-147; Kırkım, 1999: 1-237; Diebakate, 1994: 1- 90; Bahri et al., 2002: 253-267, Ho et al., 2008: 251-280; 2011: 611-635) along with the utilization of morphological features of the species themselves.

3. RESULTS and DISCUSSION

This study involved the ecto-parasite screening of Nemipterus randalli and Sphyraena chrysotaenia individuals caught with an average length of 11.88 ± 0.64 cm (n=1230) and 28.94 ± 1.35 cm (n=200) respectively. The results of this study demonstrated that Lernanthropus sp. on the gills of Nemipterus randalli and Paragnathia sp. on the fins of Sphyraena chrysotaenia were existed (Fig. 1,2).

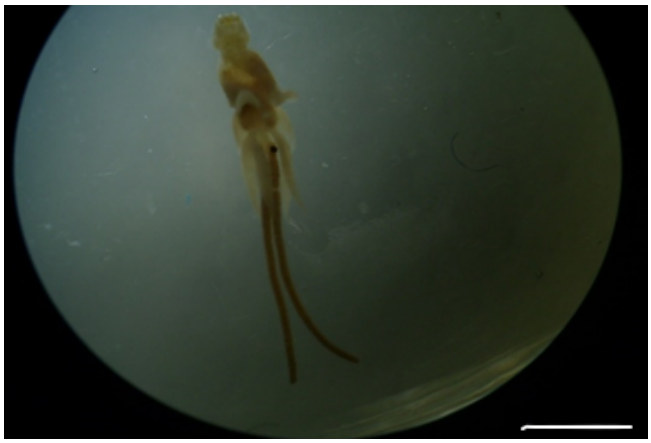

Figure 1. Lernanthropus sp.(female) (Blainville 1822) (Scale:1mm).

Parasite: Lernanthropus sp. (Blainville 1822) (Siphonostomatoida: Lernanthropidae)

Host Fish: The randall's threadfin bream (Nemipterus randalli, Russell, 1986)

Collection date: June 2019

Infestation Site in the Host: Gill arch and spines

Infestation Locality: Erdemli Beach

Number of fish examined: 1230

Number of parasitic fish: 7

Percentage of Infected Fish: 0.56%

Minimum-maximum number of parasites in a fish: 1-2

Total number of parasites: 7 female

Measurements (length in mm): The body length of female individuals was measured between 4-5 mm on average (Figure 2).

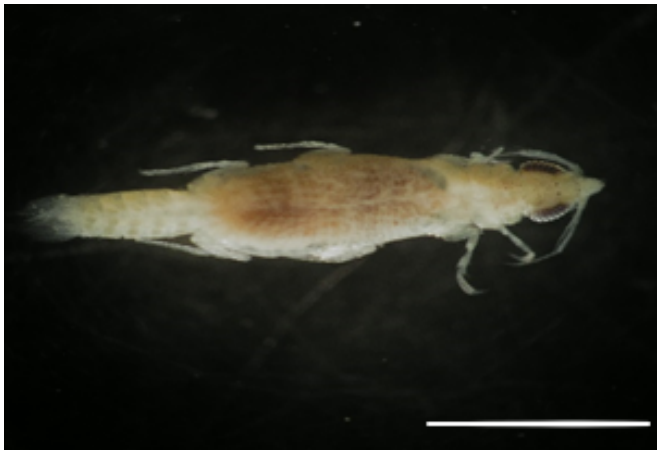

Figure 2. Paragnathia sp. (Praniza larva stage)(Scala: 1 mm).

Parasite: Paragnathia sp. (Hesse, 1864) (Isopoda:Gnathiidae)
Host Fish: The yellowstripe barracuda (Sphyraena chrysotaenia Klunzinger, 1884)
Collection date: June 2019
Infestation Site in the Host: On the Fins
Infestation Locality: Anamur Beach
Number of fish examined: 200
Number of parasitic fish: 17
Percentage of Infected Fish: 8.5%
Minimum-maximum number of parasites in a fish: 1-3
Total number of parasites: 38

Measurements (length in mm): The average length of parasites detected in the study was measured as 2.8-3.0 mm (n=38). (Fig. 2)

This study was able to identify the first record of one type of parasite copepoda belonging to Lernanthropidae family in Nemipterus randalli, (Russell, 1986) and one type of parasite from Gnathiidae family in Sphyraena chrysotaenia (Klunzinger, 1884) classified as Lessepsian fish species caught from the North East Mediterranean Coasts (Mersin Province).

Ho, et al., (2011) emphasized that the family Lernanthropidae includes about 150 species and is one of the largest families of siphonostomatoid copepods.

The parasite Lernanthropus nordmanni was first reported by Tareen (1982) in Dicentrarchus labrax (Linnaeus, 1758) caught in Turkish coast of the Aegean Sea. Later, studies by Altunel (1983), Akmirza (2000) and Özel et al. (2004) were all able to report the parasites Lernanthropus kroyeri in the gills of Liza aurata (Risso, 1810), Lernanthropsis mugilis and Lernanthropus brevis in Dicentrarchus labrax caught from the Aegean Sea respectively. In addition, Öktener et al. (2010) were also able to report Lernanthropus kroyeri in the gills of Dicentrarchus labrax caught in the Black Sea.

Lernanthropus indefinitus parasite was reported for the first time in Argyrosomus regius (Asso, 1801) caught from Mersin coast of Mediterranean by Koyuncu et al. (2012). Later, Özak et al. (2016) recorded Lernanthropus callionymicola parasite in the gill filaments of Umbrina cirrosa (Linnaeus 1758) and Lernanthropus callionymicola in Callionymus filamentosus (Valenciennes, 1837) in their investigation conducted in the Eastern Mediterranean. Furthermore, Romero et al. (2010) found Mitrapus oblongus in the gill arches of Sardinella aurita (Valenciennes, 1847) occuring in the Mediterranean. This study, on the other hand, was able to determine Lernanthropus sp., a copepod species in the gills of Nemipterus randalli, (Russell, 1986).

Kırkım ,1998) detected parasitic isopods in marine fish and decapods sampled from the Aegean Sea in their study. The authors were able to first report of Paragnathia sp. parasites on the body surface of Sphyraena chrysotaenia caught from Turkish waters.

Genç, (2007) reported that 128 out of 468 Grouper (Epinephelus marginatus, Lowe 1834) caught and investigated from the Eastern Mediterranean coast were found to be infested with Gnathia parasite in the Praniza larva stage Their research also concluded that Paragnathia sp. was found only in August .

It is known that there are studies available on the parasites of marine fish both in other parts of the world and in our seas. However, it appears that there are not enough studies on the lessepsian fish species in our country. In this respect, the parasite fauna of these species which are considered to be an important source of income in the future should be well known. It is also thought that further research generating new information regarding to parasite infestation of these fish will contribute economically to the fishing sector by understanding the control mechanisms of possible parasitic diseases.

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Author contributions

All contributions belong to the author in this paper.

Conflicts of interest

The authors declare that they have no conflict of interest.

Statement of Research and Publication Ethics

For this type of study formal consent is not required.

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