First Record of Lernaea cyprinacea L. 1758 (Copepoda: Cyclopoida) on Cyprinion macrostomus Heckel, 1843 from Eastern Anatolia, Turkey

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Abstract. This study was conducted while working on the fish population in the Murat River in Eastern Anatolia, Turkey. During the field surveys, Lernaea cyprinacea L. 1758, an ectoparasitic copepod species was detected on the soft parts the dorsal and anal fins of Cyprinion macrostomus. It was concluded from a review of the literature that no data on the parasite host was not reported in previous studies conducted in the all over the world.

Key words: Murat River, Cyprinion macrostomus, Lernaea cyprinacea, Copepod.

Introduction

Anchor worm, Lernaea cyprinacea L. 1758, is a parasitic copepod that burrows into the skin of freshwater fishes. It has anchors that can penetrate the tissues below the skin of the host fish. In summer and spring, when water temperatures exceed 14–15 °C, copepod larvae attach to the gills of fish and may cause their death (Ekingen 1983, Koyuncu & Dönmez 2006). Lernaea species have nine stages in the life cycle, including three free-living naupliar stages, five copepodid stages and one adult stage. After mating on the fish host, the males die and females metamorphose and insert their anterior body into the host tissue and then produce eggs (Nagasawa et al. 2007, Barson et al. 2008).

Anchor worm can cause lernaeosis, also known as anchor worm disease, which results in hemorrhagic ulcers at the attachment site. The species can thereby cause the death of the host due to secondary infections and massive bleeding (Wellborn & Lindsey 1970, Khalifa & Post 1976, Kabata 1985, Hoffmann 1999, Kupferberg et al. 2009). L. cyprinacea is the most common species that belongs to genus Lernaea among approximately 40 species in North America, South- and Southeast Asia, Africa and Europe (Acosta et al. 2013). The species is also known to parasite more than 100 hosts (Kabata 1979, 1985, Hoffmann 1999). L. cyprinacea recorded in Turkey and some European countries as Germany, France, Italy and Scandinavia. The parasite probably originates from Asia and spread to different parts of the world via the movement of aquarium species (Robinson & Avenant-Oldewage 1996, Innal & Oldewage 2012). It has also spread from the south of West Siberia to Japan throughout Central Asia. L. cyprinacea can grow in water temperatures of 23–30 °C displaying slightly thermophilic characteristics. Mature female parasites also reported in freshwater fish, frog and salamander in North America (Bauer 1959, Yashuv 1959, Hoffman 1967, Kupferberg et al. 2009).

Cyprinion macrostomus, which is stated as a host in our study, is a Cyprinid fish that is used in thermal springs to treat dermatological diseases (Arkhipchuk 1999). It has a limited natural range, but has been reported in one part of Euphrates River which is within the borders of Iran (Coad 1996); Topardizi and Kalkim Rivers in Sivas; Kangal thermal source; Diyarbakır, Karakaya, Devegeçidi Dams; and the Tigris River from Turkey (Kuru 2004, Daştan et al. 2012). This species known as Tigris king fish and Beni fish in Turkish which was recorded from Turkey by Kuru (2004) under the name C. macrostomus. Distribution on South-eastern Turkey and endemic to eastern Mediterranean, Asi River, Euphrates and Tigris river systems. Conservation status is endangered and sensitive to human activities (Fricke et al. 2007).

No faunistic record exists in the Murat River. This parasite was not encountered in previous studies on fish parasites in Murat River (Koyun 2011a,b,c, 2012). And also this study is the first record of L. cyprinacea parasitizing C. macrostomus.

Materials and Methods

Samples of C. macrostomus was caught with gill nets (22 mm width) and casting nets, from the area of Garip village (Bingöl, 38° 77´ 74″ N, 40° 57´ 70″ E, 992 m) on one of the small stream reaches of Murat River. L. cyprinacea was detected on the dorsal and anal fins on only five samples. It has been examined with stereoscopic microscope to identify the occurrence of Lernaea. The parasites were removed with a sharp implement. First, they were killed in formaldehyde solution of 4% (not boiled) then preserved in 70% ethanol. The parasite was photographed as totally (supplementary material 1).

Results

During this study, L. cyprinacea was observed on the skin of 5 fishes (5% prevalence) captured at one station on the Murat River at on January, 2012. Infection intensity was one, and Abundance 0.05, and located at soft part of the dorsal and anal fins regions. This parasite was not found on the Murat River at any of the remaining sampling stations where this fish was captured.

Despite a lot of fish examination only 5 specimens lernaeopodid were found. In present study we focused on the lernaeopod copepod (L. cyprinacea) an ectoparasite on the dorsal and anal fins of C. macrostomus.

Previous reports of the parasite fauna of C. macrostomus include trematodes, nematodes and monogeneans, (Rahemo & Kasim 1979, Rahemo1980). However, C. macrostomus has not been recorded previously as a host for L. cyprinacea. As such this finding represents the first record of L. cyprinacea parasitizing C. macrostomus at its natural range (Table 1). The
copepods that recorded in our study were adult female; they were anchored to host fins and feeds on the epithelial cells and mucus of the host, characteristically raising blisters on the fin surface.

Discussion

According to Coad (1996) *C. macrostomus* is a native and endemic fish for Tigris-Euphrates basin, especially in Turkey, Iran and Syria freshwater system. This present report is the first diagnosis of *Lernaecya cyanicaea* in Murat River at Euphrates basin. The implication of this parasitosis for *C. macrostomus* is one of these species. Therefore, it is important to investigate the characteristics of *C. macrostomus* in detail. This study will provide significant contribution to determination of these fish parasites. The critical situation of this fish, which has medical importance, is given as an endangered in Turkey (Dagli & Erdemli 2009).

This species of parasite shows a cosmopolitan distribution; it mostly parasitizes Cyprinidae, whereas other freshwater fish species host other parasites. However, as is seen in Table 1, there is no data on *C. macrostomus* recorded in various countries at different times. According to Koyuncu & Dönmezer (2006) this parasite was reported on the gills of *C. macrostomus*. In literature, there are two species known as doctor fish and *C. macrostomus* is one of these species. Therefore, it is important to investigate the characteristics of *C. macrostomus* in detail. This study will provide significant contribution to determination of these fish parasites. The critical situation of this fish, which has medical importance, is given as an endangered in Turkey (Dagli & Erdemli 2009).

Table 1. List of *Lernaecya cyanicaea* records from different host species from all over the world.

<table>
<thead>
<tr>
<th>Host(s) of <em>Lernaecya cyanicaea</em></th>
<th>Country</th>
<th>References</th>
</tr>
</thead>
<tbody>
<tr>
<td><em>Leptocephalus</em>, <em>Oreochromis macrochir</em>, <em>Ctenopharyngodon idellus</em>, <em>Oreochromis mossambicus</em>, <em>Oreochromis placidus</em>, <em>Tilapia rendalli</em></td>
<td>Zimbabwe</td>
<td>Dale et al. 2012</td>
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<td><em>Natrops girardi</em>, <em>Macrophobis tetraneura</em></td>
<td>Mexico</td>
<td>Durham et al. 2002</td>
</tr>
<tr>
<td><em>Cyprinus carpio</em>, <em>Carassius cyanicas, Idas idas</em>, <em>Rutilus rutilus</em></td>
<td>Britain</td>
<td>Fryer 1968</td>
</tr>
<tr>
<td><em>Gambusia affinis</em></td>
<td>Italy</td>
<td>Benedetti et al. 1989</td>
</tr>
<tr>
<td><em>Ashyanax limaculatus</em></td>
<td>Brazil</td>
<td>Magalhaes 2006</td>
</tr>
<tr>
<td><em>Silurus asotus</em> <em>Arapaima gigas</em>, <em>Aruna japonica</em>, <em>Carassius auratus</em>, <em>Carassius auratus langsdorfi</em>, <em>Carassius auratus subsp.</em>, <em>Carassius cuvieri</em>, <em>Ctenopharyngodon idellus</em>, <em>Cyprinus carpio</em>, <em>Gnathocephalus elongatus sauvage</em>, <em>Hemibarbus labo, Oncorhynchus mykiss</em>, <em>Pseudobranchus tokonensi</em>, <em>Silurus asotus</em>, <em>Pseudorasbora parva</em>, <em>Pseudorasbora parva</em>, <em>Pseudorasbora parva</em>, <em>Pseudorasbora parva</em>, <em>Pseudorasbora parva</em>, <em>Pseudorasbora parva</em>, <em>Pseudorasbora parva</em></td>
<td>Japan</td>
<td>Ogawa 2004, Nagasava et al. 2007</td>
</tr>
<tr>
<td><em>Mugil cephalus</em>, <em>Gambusia affinis</em>, <em>Clarias lazera</em></td>
<td>Israeli</td>
<td>Yashuv 1959, Paperna 1964</td>
</tr>
<tr>
<td><em>Barbus altianalis</em>, <em>Lates albertianus</em></td>
<td>Uganda</td>
<td>Thurston 1969, 1970</td>
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<tr>
<td><em>Ctenopharyngodon idellus</em></td>
<td>Pakistan</td>
<td>Tasawar et al. 2009</td>
</tr>
<tr>
<td><em>Catla calla</em>, <em>Leptocephalus</em>, <em>Catla calla</em>, <em>Ctenopharyngodon idellus</em>, <em>Pseudoposteuthmis multiria</em></td>
<td>Pakistan</td>
<td>Iqbal et al., 2012, Kanwal et al. 2012</td>
</tr>
<tr>
<td><em>Galaxias occidentalis</em>, <em>Edela littata</em>, <em>Bosteckia porosa</em>, <em>Tandanus bosecki</em>, <em>Carassius auratus</em>, <em>Gambusia holbrooki</em>, <em>Phallichros caudimaculatus</em></td>
<td>W. Australia</td>
<td>Marina et al. 2008</td>
</tr>
</tbody>
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References


