Prevalence of parasites in fresh water pond fishes from district D.I Khan, Pakistan

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Abstract

Common carp (Cyprinus carpio) is the first cultured fish species in Pakistan. Due to confined water bodies in this area, ecto-parasites are a serious problem for this species. The present study aims to investigate ecto-parasites of C. Carpio in D. I. Khan, Pakistan. A number of ecto-parasites including Leach spp (Crustacea: Maxillopoda), Glochidium spp, Lernaea cyprinacea (Crustacea: Copepoda), Gyrodactylus spp. (Platyhelminthes; Monogenea), Probopyrus pandallcola, Copeps spp, and Argulus spp. were identified during three different trials. During the first trial 19 parasites, the second 11 parasites and the third 3 parasites were identified. Subsequently 20 parasites from 500g fish and 13 from 1000g fish were recorded. Hopefully, our results would provide a clue about parasitic infestation in fresh water fish species and further detailed study may require for improving fish life.

Keywords: Parasites, Fishes, D.I Khan, KPK, Pakistan

1. Introduction

Parasites reported for infecting fresh water pond fishes like Cyprinus carpio are mostly protozoan and ectoparasites (Linnaeus, 1758), such as Chilodonella species spp. (Ehrenberg, 1838), Trichidina (spp) (Ehrenberg, 1831) Gyrodactylus spp (monogenetic trematod) (von Nordmann, 1831), Lernaea cyprinaceae, (Linnaeus, 1758) Ergasilus spp (Nordmann, 1832) bopyrid isopodes, (Müller, 1785) and Crustaceans, (Ahmed et. al. [1]). For cultured fish population, the parasites are reported as to involve in the serious outbreak of disease (Kayis [9]). The crowded culture conditions, temperature and slow water flow increases the parasites multiplication and infestation (Bednarska [3]). Mature parasites are more dangerous to fish depending on the modes of attachment, size and weight of the host (Jalali [8]). Parasitic investigation in farms and ponds depends on many factors which are ideal for the propagation and development of parasitic population. The factors like density of fish population, limited space in or out flow of water, host age and sex, pollution from their own metabolic waste, environmental and physical condition and genetic resistances play vital role in determining susceptibility of the fishes to diseases and type of parasite.
The parasitic activity and closeness to habitat of the fishes leads to easy parasitic movement and fulfillment of their life cycle among fishes (Dogiel [6]). Parasitic infection not only affects the normal growth of fish (Mdegela [10]), but also reduce fish population by increasing mortalities (Piasecki [13]). Ecto-parasites attacks to gills and skin resulting in localized hyperplasia, disturb osmoregulation and ultimately kill the host (Piasecki [13]). The incidence and intensity of parasite also varied with season (Bichi [4]). Young fishes are more prone to infection than old ones (Ozturk [11]).

Common carp (Cyprinus carpio) is apparently the most widely geographically distributed fish species (Baruš [2]). In Pakistan, common carp is the first cultured fish and due to confined water bodies in Pakistan, the ecto-parasites are a serious problem for this species (Tasawar [16]). Owing to its adaptation to a wide range of climatic and geographical conditions, a substantial number of almost all major taxa of parasites have been found in wild and domestic carp. The most complete checklist of carp parasites records a total of 310 parasite species (Baruš [2]). The current study was conducted to know the parasitic rates and damaging effects on the host body (Cyprinus carpio) in local fish farms of District D.I Khan, Pakistan.

2. Methods and Materials

2.1 Study Area

District of D. I. Khan, bounded on the east by the Bhakkar and Dera Ghazi Khan districts, of Punjab, to the southwest by South Waziristan, and to the northwest by Tank and Lakki Marwat districts. The district has an area of 7,326 km² (2,829 sq mt) and a population of 852,995 as per 1998 Census.

2.2 Sample Collection

Host Fish (cyprinus carpio) with an average length of 500g and 1000g were collected live from Paracha fish farms of D. I. Khan. Fish were collected three times during the months of October, November, and December. Gills were taken out and placed in petri dishes, and checked carefully under the field with magnifying glass.

2.3 Examination of Specimens

A total of 99 fresh water fish (cyprinus carpio) ranged from 500-1000g body weight were collected alive from Paracha fish farms. The necropsy technique of parasitological examination of skin, fins and gills was carried out for the presence of external parasites. The gills of fish were examined through magnifying glass and the recovered parasites were fixed.

2.4 Parasites Identification

Parasites were identified by aquarists were ciliates by observing tiny hair-like structures called cilia. Chilodonella were identified from scrapings of skin mucus or gill filaments by magnifying glass. Monogenean trematodes, were also identified using magnifying glass.

3. Results and Discussion

During the present study a total of 99 fresh water C. Carpio fish (Cypriniformes: Cyprinidae) were studied. A sum of 7 different parasites Leach spp (Crustacea: Maxillopoda), Glochidium spp, Lernaea cyprinacea (Crustacea: Copepoda), Gyrodactylus spp (Platyhelminthes; Monogenea), Probopyrus pandallcola, Copepds spp, and Argulus spp. were identified collectively. Among total (99) samples 33 (33.33%) were found infected by ectoparasites and remaining 66 (66.66%) were healthy they and in normal condition. The skin, scales and head region parasites were visible but those of the gills were examined through magnifying glass. The sequence of parasites observed during 3 months was, Leech 16 times (48.48%); Glochidium, (3 times in adult stage and 3 in stage realizing by adult mollusks) 6 times (18.18%); Lernaea spp, 4 times (12.12%) Gyrodectylus (monogenea) 3 times (09.09%); bopyrid isopod (Probopyrus pandallcola) 2 times (06.06%); Copepds 1 time (03.03%) and Argulus 1 time (03.03%) (Table 1).

Table 1: Individual ectoparasitic infestation in common carp at (PFF) D.I Khan, Pakistan.

<table>
<thead>
<tr>
<th>S.No</th>
<th>Ecto-parasites</th>
<th>No of infected fish</th>
<th>% of infected fish</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Leach</td>
<td>16</td>
<td>48.48</td>
</tr>
<tr>
<td>2</td>
<td>Glochidium</td>
<td>06</td>
<td>18.18</td>
</tr>
<tr>
<td>3</td>
<td>Lernaea</td>
<td>04</td>
<td>12.12</td>
</tr>
<tr>
<td>4</td>
<td>Gyrodectylus</td>
<td>03</td>
<td>09.90</td>
</tr>
<tr>
<td>5</td>
<td>Isopod</td>
<td>02</td>
<td>06.60</td>
</tr>
<tr>
<td>6</td>
<td>Copepds</td>
<td>01</td>
<td>03.30</td>
</tr>
<tr>
<td>7</td>
<td>Argulus</td>
<td>01</td>
<td>03.30</td>
</tr>
<tr>
<td>Total</td>
<td>7</td>
<td>33</td>
<td>100</td>
</tr>
</tbody>
</table>
As this study was conducted in three month (phases), therefore during first month (October) 33 samples were collected, among them 19 (57.57%) were infected by ectoparasites in which Leech was dominant compared to others followed by Glochidium spp., Lernaea spp., Gyrodactylus spp. and copepds spp. In November 33 samples were collected with 11 (33.33%) were found infected by ectoparasites in which Leech was again leading, followed by Lernaea spp., Argulus spp. and isopod (Protopyrrus pandallcola). During 3rd trial in December 33 samples were collected in which 3, (09.09%) were infected by monogenea. Weight-wise, 15 samples of 500g and 18 of 1000g were there in the samples collected during October, in which 11 fish recorded infected were of 500g weight while 8 fish were those of 1000g. Similarly during November, 13 sample of 500g and 20 of 1000g weight were collected in which 6 samples were of 500g and 5 were of 1000g fish. During December, 17 samples of 500g and 16 of 1000 fish were observed in which 2 samples of 500g and 1 of 1000g were found infected by monogenae (Table 2).

Table 2: Month wise prevalence of ectoparasites of common carp at (PFF) district D.I.Khan.

<table>
<thead>
<tr>
<th>Months</th>
<th>No of Fish examined</th>
<th>Infected fish</th>
<th>500g Fish</th>
<th>1000g fish</th>
<th>% Age of infected fish</th>
<th>Normal fish</th>
<th>% Age of normal fish</th>
</tr>
</thead>
<tbody>
<tr>
<td>October</td>
<td>33</td>
<td>19</td>
<td>11</td>
<td>8</td>
<td>57.57</td>
<td>14</td>
<td>42.43</td>
</tr>
<tr>
<td>November</td>
<td>33</td>
<td>11</td>
<td>6</td>
<td>5</td>
<td>33.33</td>
<td>22</td>
<td>66.67</td>
</tr>
<tr>
<td>December</td>
<td>33</td>
<td>3</td>
<td>3</td>
<td>0</td>
<td>9.9</td>
<td>30</td>
<td>90.9</td>
</tr>
<tr>
<td>Total</td>
<td>99</td>
<td>33</td>
<td>20</td>
<td>13</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

In our study, Gyrodactylus spp. was 09.09% and Argulus spp. was 03.03% while Perveen [12] reported as Argulus sp (7.1%) and Gyrodactylus sp (10.8%) in their study on common carp. Moreover they reported a high percentage of Leech spp. compared to our study. The variation of our results is probably due to the different geo-climatic condition like season and habitat, because Bichi [4] reported that the abundance and intensity of parasite varied with season and habitat. Our results in percentage like Leech, (48.48%) Glochidium, (18.18%) Lernaea sp, (12.12%) Gyrodactylus (monogenea), (09.09%) bopyrid isopod (Protopyrrus pandallcola), (06.06%) Copepds, (03.03%) Argulus, (03.03%) are about in accordance with the findings of Ahmed [1] who recorded the same parasites with a little less percentage. Lernaea spp which we found in our study, are also declared as the basic parasitic burden for C. Carp by Tasawar [15]. According to Shafir [14] parasites like Gyrodactylus grow faster in summer than in winter. Cable [8] also elaborated this statement by reporting that the number of ecto-parasites reduces in winter due to decreased activity of their hosts. And according to Harrison [7] temperature is very important for determining the existing of Argulids parasites. Probably due to this reason we have found less number of parasites like bopyrus isopodes, copepods, Argulids and Gyrodactylus in our study, where temperature was ranged from 20 °C to 25 °C during October to December. No specific literatures are available regarding Bopyrus isopods existence in our studied site. Over all in our study, the ectoparasitic infestation in common carp was relatively higher than others. The possible reasons may be the crowded culture condition, confined water and temperature and the less attention of the fisheries department to fish health. Hopefully, our findings would help researchers to overcome this problem.

6. References


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