The Prevalence and Pathogenicity of the “Anchor Worm” (Lernea spp, Phylum Arthropoda) within the Finfish Inhabiting the Danube Delta Area

Marius Hangan, Laura Urdeș*, Daniela Ianițchi

University of Agricultural Sciences and Veterinary Medicine Bucharest, 011494-Bucharest, Marasti Bvd, 59, Romania

Abstract
This research was conducted as a series of cross-sectional epidemiological studies. It started in the 2003 and ended in 2008, having as sample sites the Sontea-Fortuna, Gorgova-Uzlina, Dunavat-Dranov and Razim-Sinoie lakes. The aim of the research was to assess the distribution and the pathogenicity of the Lernaea copepod among the inhabiting finfish populations, in various seasons of the time period.

Lernaea spp was found in ctenopharyngodon idella, cyprinus carpio, liza aurata and liza haematocheila, only in two out of the four sampled complex of lakes, Razim-Sinoie and Dunavat-Dranov.

The highest prevalence of the parasite was recorded in the autumns and at the beginning of the springs. The frequency of the parasitism was highest in the C. idella captured in the Dunavat-Dranov complex lakes (86.29%).

The lesions caused by the copepod were mainly localized on the eye balls, the tegmentum and on the fins, where hemorrhagic and proliferative processes, as well as an overall increase in tegmentum mucus secretion, were noticed.

Keywords: freshwater finfish, Lernea spp, pathogenicity, prevalence

1. Introduction
Lernaeidae family comprises fourteen genuses, of which species are widespread all over the world. Lernae genus includes 70 species of temporary parasites for many aquatic animal species [1]. It is assumed that only the female needs a temporary host [2]. Usually, the parasite is found on the tegmentum (i.e. at the base of scales), fins, gills and around the eyes and the buccal cavity of the fish host. The parasite has a worm-like body, with chitin growths at the anterior part of the body, through which it attaches to the host body [3]. Although lerneosis is not a zoonosis, the epidemiologic significance of the disease resides in its seasonal (i.e. endemic) occurrence, as well as in the lesions that it causes to its host when attaching to the body, and which are responsible for making the hosts further susceptible to other opportunistic pathogens [4]. Moreover, the finfish infested with Lernaea spp are withdrawn from human consumption.

This study focused on assessing the current exposure status of the studied fish populations within the region. The results of the study were expressed in terms of disease prevalence [2].

2. Materials and methods

The study was conducted between 2003 and 2008 within the Dunavat-Dranov and Razim-Sinoie natural complexes, on two fish species: ctenopharyngodon idella and cyprinus carpio.

The catchments were performed mainly during the springs, summers and falls. The clinical observation [5] included the integrity of the tegmentum, the scales and apparent mucosae, the

* Corresponding author: Laura Urdeș, PhD DVM laurau_2005@yahoo.com
body condition status, as well as the fish general behavior into the water. There were sampled a total of 2694 C. idella individuals and 985 C. carpio individuals, with an average per studied year of 449 C. idella individuals, and 164 C. carpio individuals (based on the data extracted from Table 1). All the captured fish were clinically examined, only the fish fitting into the above mentioned case definition being retained for further (parasitological) examination.

3. Results and discussion

On the occasion of the clinical examination, Lernaea spp were found on the tegmentum and fins in both studied species. The series of cases were recorded more than once within a year, in different seasons (Table 1).

Table 1. The prevalence of lerneosis in ctenopharyngodon idella and cyprinus carpio captured between 2003 and 2008 from Dunavat–Dranov (DD) and Razim–Sinoie (RS)

<table>
<thead>
<tr>
<th>Study Year</th>
<th>Total samples</th>
<th>Lerneosis occurrence</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>C. idella DD</td>
<td>C. idella RS</td>
</tr>
<tr>
<td>2003</td>
<td>255</td>
<td>167</td>
</tr>
<tr>
<td>2004</td>
<td>268</td>
<td>152</td>
</tr>
<tr>
<td>2005</td>
<td>241</td>
<td>148</td>
</tr>
<tr>
<td>2006</td>
<td>273</td>
<td>134</td>
</tr>
<tr>
<td>2007</td>
<td>294</td>
<td>145</td>
</tr>
<tr>
<td>2008</td>
<td>197</td>
<td>98</td>
</tr>
<tr>
<td>Total per Study Period</td>
<td>1528</td>
<td>844</td>
</tr>
<tr>
<td>TOTAL</td>
<td>2694</td>
<td>985</td>
</tr>
</tbody>
</table>

The degree of the lesions caused by the arthropods were from discrete to highly visible, under the form of hemorrhages, scale depreciation and mucus excess on the body surface (Figures 1-5). Apart from the studied species, there were recorded similar cases (but to a much lesser extent) in liza aurata and liza haematocheila.

Figure 1. Lernaea spp and scale erosions in ctenopharyngodon idella

Figure 2. Missing scales, erosions and ulcers of the scales and tegmentum in ctenopharyngodon idella

At the end of the prevalence study years and following the examination of ctenopharyngodon idella, we recorded a maximum of the disease frequency in 2006, in Dunavat-Dranov, with 254 diagnosed cases out of 273 studied fish (93.04%), (Table 1).
As for the *cyprinus carpio*, the highest disease frequency was found in the samples gathered from Dunavat-Dranov in 2005, with 62 cases out of 106 studied fish (58.49%), (Table 1). As it can be seen in the Figure 6 below, among the studied species, the highest average frequency of the disease was found in *C. idella*, with 86.29%.

Irrespective of the species though, the Dunavat-Dranov sample site apparently provided many more infestation cases than the Razim-Sinoie site: 86.29% versus 64.61% in *C. idella* and 50.68% versus 42.91 % in *C. carpio* (Figure 6, Table 1). Higher frequencies of the lerneosis cases were recorded during the autumns and at the beginning of the springs.
Figure 6. A comparative analysis of the infestation level with Lernaea spp in *Ctenopharyngodon idella* and *Cyprinus carpio* captured between 2003 and 2008 from Dunavat–Dranov and Razim–Sinoie

### 4. Conclusions

- Following the study period and according to the obtained results, it ensures that:
- Four fish species in total were found infested with *Lernaea* spp: *C. idella*, *C. carpio*, *L. aurata* and *L. haematocheila*; the frequency of lerneosis cases was only assessed in the *C. idella* and *C. carpio*.
- The highest prevalence of the disease was recorded during the autumns and at the beginning of the springs.
- The pathogenicity of *Lernaea* spp was found in both studied fish species, consisting of lesions of scales, skin and fins under the form of erosions, ulcers and punctiform tegmental hemorrhages.

- The mean prevalences among the two sample sites and studied fish species varied greatly, with maximum mean values for *C. idella* (i.e. 86.29% in Dunavat-Dranov, and 64.61% in Razim Sinoie), by comparison to *C. carpio* (i.e. 50.68% in Dunavat-Dranov and 42.91% in Razim-Sinoie),
- Overall, we rate the recorded prevalences for the study period as high to very high, with the highest rate among the fish samples in *C. idella*, and among the studied sample sites, within the Dunavat-Dranov aquatic complex.

### References