

Parasitic Burden of some Fresh Water Fishes of River Sindh in Kashmir in Relation to Season

Ibraq Khurshid¹, Fayaz Ahmad²

¹Researcher, Post Graduate, Department of Zoology, University of Kashmir, Srinagar, Kashmir, India

²Professor, Post Graduate, Department of Zoology, University of Kashmir, Srinagar, Kashmir, India

ABSTRACT: This study was conducted to investigate the parasitic distribution of some fishes (*Schizothorax* spp.) of river Sindh. This study was conducted for a period of two years from September 2011 to August 2013. During this period a total of 185 specimens of *Schizothorax niger*, 166 specimens of *S. esocinus*, 193 specimens of *S. labiatus* and 162 specimens of *S. curvifrons* were examined in four different seasons. In case of *S. niger*, prevalence was highest in summer (40.4%) and least in winter (2.5%). *S. esocinus* also showed the same pattern of infection with highest in summer (42.3%) and lowest in winter (3.0%). Prevalence of infection was also highest (39.5%) in summer and lowest in winter (3.8%) in case of *S. labiatus*. Out of 162 *S. curvifrons* examined, 38 were found infected with highest prevalence (44.6%) in summer and lowest (5.7%) in winter. Stastical analysis of the data was done using chi-square test. Parasitological analysis revealed that highest prevalence during this endeavour occurred in summer and lowest in winter in all fish species and the data was found to be statically significant ($P < 0.05$).

KEYWORDS: River Sindh, Fresh water, Fish, *Schizothorax*, Parasite, Helminth, Kashmir.

I. INTRODUCTION

The indigenous fish fauna (*Schizothorax*) of river Sindh is one of the earliest local fish faunas known to Science. Fish, the poor man's protein, being low in cholesterol, forms an important source of diet and are easily accessible to the people especially that of rural areas of Kashmir. They contribute a lot to the economy especially in Kashmir where there is abundance of freshwater reservoirs. But due to several factors these fishes are declining in number at a very fast rate from last few years as reported by Rukhsana *et al.* [1]. These parasitic diseases of fish either alone or in conjugation with other environmental stresses, may influence and alter its population characteristics and affect its economic importance as worked out by Rhode [2]. Parasites occupy a definite position in animal kingdom for their remarkable adaptations and damaging activities to host. The importance of parasites is directly related to the economic importance of fish that may affect general public health as advocated by Hoffman [3].

II. MATERIALS AND METHODS

The present work deals with studying the parasitic burden in different seasons of a year in fishes of river Sindh. Different study sites were selected in the water body on the basis of difference in topography, anthropogenic pressure and pollution in order to assess diversity pattern and the factors which influence these parameters. To fulfil the aims and objectives, separate methodological considerations were adopted. These include:

- Selection of collection sites;
- Collection of hosts in different seasons of the year;
- Collection of helminth parasites from the fish hosts;
- Preparation of inventory of the parasites collected from different fish hosts;
- Preservation of the parasites;

International Journal of Innovative Research in Science, Engineering and Technology

(An ISO 3297: 2007 Certified Organization)

Vol. 3, Issue 8, August 2014

- Compilation of results, and
- Statistical analysis of the results.

III. RESULTS

During the present study, 157 fish specimens were found infected with different types of helminth parasites out of the 706 specimens examined. The parasitic species recovered from the fresh water fishes include Cestodes, Trematodes and Acanthocephala. The observations are reproduced below in Table 1.

| Table 1 showing the pattern of infection in <i>Schizothorax</i> in river Sindh | | |
|--|----------------------------------|---------------------------|
| Parasite Group | Parasites recovered | Number of Fishes infected |
| Cestode | <i>Bothriocephalus</i> | 35 |
| | <i>Adenoscolex</i> | 17 |
| Trematode | <i>Diplozoon</i> | 38 |
| | <i>Clinostomum</i> | 30 |
| Acanthocephala | <i>Pomphorhynchus</i> | 25 |
| Mixed | Cestode+Trematode | 3 |
| | Trematode+Acanthocephala | 5 |
| | Cestode+Acanthocephala | 2 |
| | Cestode+Trematode+Acanthocephala | 2 |

Thus, during the present study, Incidence of trematodes was found highest followed by cestodes and Acanthocephala. As is reflected in Table 1, during the present study a total of 706 fish hosts were examined for helminth parasites, out of which 157 were found infected with at least with one type of helminth infection. The helminth parasites reported during the study include *Bothriocephalus* (Cestode), *Adenoscolex* (Cestode), *Diplozoon* (Trematode), *Clinostomum* (Trematode) and *Pomphorhynchus kashmirensis* (Acanthocephala). No Nematode parasite was however observed. These findings are quite comparable to the studies conducted in different parts of the globe. Majidah and Khan [4] reported two acanthocephalan parasites viz., *Pomphorhynchus kashmirensis* and *Neoechinorhynchus manasbalensis* from the intestine of fish - *Schizothorax* spp. from Wular Lake, Kashmir. Moravec [5] reported six helminth species from Salmon smolt from Elbe river basin.

The data pooled for seasonal estimation of helminth infection revealed definite seasonal prevalence of infection in all the four species with highest infection in summer and lowest in winter (Tables 2 to 5).

| Table 2 showing Season wise Prevalence of helminth infection in <i>S. niger</i> | | | | |
|---|--------------|--------------|----------------|-----------------------------|
| Season | No. examined | No. infected | Prevalence (%) | P- Value |
| Spring | 49 | 10 | 20.4 | DF = 3, P- Value = 0.008 |
| Summer | 47 | 19 | 40.4 | |
| Autumn | 49 | 14 | 28.5 | |
| Winter | 40 | 1 | 2.5 | |
| Total | 185 | 44 | 23.7 | |

Table 2 shows that in case of *S.niger* out of 185 specimens examined 44 specimens were found infected with helminth parasites showing highest prevalence of helminth parasites during summer (40.4%) and least (2.5) was found during winter season, showing p-value of 0.008.

International Journal of Innovative Research in Science, Engineering and Technology

(An ISO 3297: 2007 Certified Organization)

Vol. 3, Issue 8, August 2014

| Table 3 showing Season wise Prevalence of helminth infection in <i>S. esocinus</i> | | | | |
|--|--------------|--------------|----------------|--------------------------|
| Season | No. examined | No. infected | Prevalence (%) | P- Value |
| Spring | 41 | 5 | 12.1 | DF=3, P value = 0.004 |
| Summer | 52 | 22 | 42.3 | |
| Autumn | 40 | 11 | 27.5 | |
| Winter | 33 | 1 | 3.0 | |
| Total | 166 | 39 | 23.4 | |

The above table shows that out of a total of 166 specimens of *S. esocinus* 39 specimens were found infected showing a prevalence of 23.4% with highest prevalence in summer (42.3%) and lowest (3.0) in winter, showing a p-value of 0.004.

| Table 4 showing Season wise Prevalence of helminth infection in <i>S. labiatus</i> | | | | |
|--|--------------|--------------|----------------|-------------------------|
| Season | No. examined | No. infected | Prevalence (%) | P- Value |
| Spring | 51 | 7 | 13.7 | DF=3, P Value= 0.002 |
| Summer | 48 | 19 | 39.5 | |
| Autumn | 42 | 8 | 19 | |
| Winter | 52 | 2 | 3.8 | |
| Total | 193 | 36 | 18.6 | |

In case of *S. labiatus* 36 specimens out of 193 examined specimens were found harbouring helminth parasites showing an overall prevalence of 18.6%, with highest prevalence (39.5%) in summer and lowest (3.8%) in winter, p-value being 0.002.

| Table 5 showing Season wise Prevalence of helminth infection in <i>S. curvifrons</i> | | | | |
|--|--------------|--------------|----------------|----------------------|
| Season | No. examined | No. infected | Prevalence (%) | P- Value |
| Spring | 40 | 6 | 15 | DF=3, P value= 0.003 |
| Summer | 47 | 21 | 44.6 | |
| Autumn | 40 | 9 | 22.5 | |
| Winter | 35 | 2 | 5.7 | |
| Total | 162 | 38 | 23.4 | |

Like other species, *S. curvifrons* also shows highest (44.6%) prevalence in summer and lowest (5.7%) in winter with a p-value of 0.003. Thus, all the fish species show similar mode of prevalence *i.e.*, highest in summer and lowest in winter.

IV. DISCUSSION

These findings of high prevalence during summer agree closely with the agro climatic conditions of Kashmir valley. The valley has a temperate climate marked by well-defined seasonality, consisting of four different seasons with wide variations in temperature and other weather conditions that influence the occurrence of parasitic infection in fishes. Vincent and Font [6] while working on seasonal and yearly population dynamics of two exotic helminths observed that in *Camallanus cotti* prevalence and mean abundance were higher in Hawaiian summer (47.7%) than in winter. Mustafa and Atunel [7] showed that the highest incidence of helminth parasites occurred during the summer followed by the autumn and least during winter.

Ehab and Faisal [8] studied the interaction between *Protocephalus ambloplitis* and *Neoechinorhynchus spp.* in largemouth bass, collected from inland lakes in michigan, USA. They found highest prevalence of these parasites in

International Journal of Innovative Research in Science, Engineering and Technology

(An ISO 3297: 2007 Certified Organization)

Vol. 3, Issue 8, August 2014

summer and least during the winter. Allumma and Idowu [9] reported that parasite infection was found higher in May-June both in gills and stomach compared to other months of study.

Singh and Mishra [10] carried seasonal study from October 2008 to September 2010, to study the impact of helminth parasites of catfishes of Lucknow. The fish fauna viz., *Clarias batrachus*, *Heteropneustes fossilis*, *Wallago attu*, *Mystus vittatus* and *Rita rita* were examined for helminth parasites. Trematode, cestode, nematode and acanthocephalan parasite communities singly or mixed were recovered from these fishes. The collected parasitic species include two monogenean species (*Gyrodactylus* and *Dactylogyrus*), seven digenean species (*Clinistomum*, *Euclinostomum*, *Gastrotylax*, *Paramphistomum*, *Opisthorchis*, *Aspidogaster* and *Fasciola*), one cestode species (*Taenia*), one nematode species (*Trichinella*) and one acanthocephalan species (*Pallisentis*). The data showed significant highest parasitic communities during the summer season, moderate in monsoon and lowest in winter season.

V. CONCLUSION

From the above results it is clear that the highest prevalence studied during the present endeavour of infection occurred in summer and lowest in winter in all fish species. In case of *S. niger* the maximum prevalence (40.4%) of GIH infection occurred in summer season, and lowest (2.5%) in winter with significant difference between the seasons ($p > 0.05$). In other species viz., *S. esosinus*, *S. labiatus* and *S. curvifrons*, also the highest prevalence was in summer and lowest in winter. The rainy season which starts in spring and continued to early summers, makes the environmental conditions more favourable for the development and survival of the pre-parasitic stages of helminth parasites and leads to an increased availability of infective stages in rainy and post-rainy seasons. This results in higher prevalence and level of parasitism in summer and post-summer months; therefore, parasite burden also reaches maximum levels in summer and autumn.

REFERENCES

- [1] Rukhsana, A., Chishti, M. Z., Fayaz, A., Rehana, Bilal, A. B. and Firdousa, A. "Comparative Studies on Helminth Parasites of Declined Fish *Schizothorax esocinus* from two Water Bodies". *4th JK Science Congress*, p. 194, 2008.
- [2] Rhode, K. "Ecology of Marine parasites, an introduction to marine parasitology" 2nd edition. CAB international, 1993.
- [3] Hoffman, G. L. "Parasites of the northern American fresh water fishes". University of California press, Berkeley and Los Angeles, 1967.
- [4] Majidah, R. and Khan, A. R. "Acanthocephalan parasites of fishes of Wular Lake with an analysis of seasonality". *Fifth National Seminar on fish and their environment*, pp. 26-28, 1999.
- [5] Moravec, F. "Observations on the metazoan parasites of the Atlantic Salmon (*Salmo salar*) after its reintroduction in to the Elbe River basin in Czech Republic". *Folia Parasitologica*, vol. 50 pp. 298-304, 2003.
- [6] Vincent, G. A. and Font, W. F. Seasonal and yearly population Dynamics of two exotic helminthes, *Camallanus cotti* (Nematoda) and *Bothriocephalus acheilognathi* (Cestoda), parasitizing exotic fishes in Waianu Stream, Hawaii. *The Journal of Parasitology*, vol. 89 no. 4 pp. 756-760, 2003.
- [7] Mustafa, K. and Atunel, F. N. "Metazoan parasites of bleak, Crucian carp and Golden carp in Enn Dam Lake, Turkey". *International Journal of Zoological Research*, vol. 3, no. 2 pp. 94-100, 2007.
- [8] Ehab, E. and Faisal, M. "Interactions between *Protocephalus ambloplitis* and *Neoechinorhynchus spp.* in large mouth bass, collected from inland lakes in Michigan, USA". *The journal of American Science*, vol. 4 no. 4, pp. 44-51, 2008.
- [9] Allumma, M. I. and Idowu, R. T. "Prevalence of gill helminths of *Clarias gariepinus* in bage side of lake Chad". *J. Appl. Sci. Environ. Manage.*, vol. 15, no. 1, pp. 47-50, 2011.
- [10] Singh, K and Mishra, A. "A comparative study on seasonal distribution of the helminth parasites communities of some catfishes". *Int. J. Pharm. Bio. Sci.*, vol. 4, No. 3, pp. 19 – 30, 2013.