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Diversity Of Monogenean (Platyhelminthes) Parasites In Freshwater Fishes Of Kannur District, Kerala, India

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Abstract: **Monogeneans are ectoparasites of fishes that can cause serious damage in the aquaculture industry. Twenty five species of freshwater fishes collected from different freshwater habitats of the Kannur district of Kerala were analysed for monogenean infection. A total of seven species of monogeneans were recovered from six species of fishes and overall prevalence was 7.81%.The parasites recovered include *Gyrodactylus recurvensis, Dactylogyrus daniconi, Bifurcohaptor indicus, Dactylogyroides tripathii, Scleirocleidoides etropli, Diplozoon indicum* and *Neodiplozoon barbi*. Among the fish hosts, Cyprinidae was found to be most suitable host for monogeneans. Dactylogyridae was the most diverse family. Four new host records were reported and all the seven species are new to the locality.**

Keywords: **Monogenea, ectoparasite, prevalence of infection, Cyprinidae, Dactylogyridae, freshwater fish.**

1. INTRODUCTION

Monogeneans are the most important helminth group parasitizing the external surfaces of the fish. Monogeneans are hermaphrodite and have a direct life cycle. Due to their life strategies and adaptations to parasitic life, they can be regarded as very successful parasites (Valigurová *et al*, 2011).Monogeneans comprise two very distinct groups, the Monopisthocotylea and Polyopisthocotylea, which differ considerably, with important implications for pathogenicity, treatment and host response (Buchmann and Bresciani, 2006). Polyopisthocotyleans are blood feeders, whereas monopisthocotyleans are epithelial feeders, browsing the host surface and ingesting epithelial cells and occasionally some blood cells leaking from haemorrhages. Monogeneans are of great importance as agents of fish diseases particularly in aquaculture (Rohde, 2011). In farmed fish, monogeneans have been responsible for major epizootics with serious consequences. The degree of damage varies from minimal to severe depending on the condition and density of host. Moreover, monogenean infection also lead to indirect damage, making the fishes more susceptible to secondary infections by degrade and break the epithelium and mucous layer (Alvarez- Pellitero, 2008).

A review of literature showed that the monogenean fauna of freshwater fishes in North Kerala has not been a subject of any extensive investigation. The available information was limited to the reports of monogenean parasites by Bijukumar and Kearn (1996) on marine teleosts and Razia beevi and Radhakrishnan (2010) on freshwater fishes from South Kerala. The present investigation has been undertaken with a view to throwing more light on the monogenean fauna of freshwater fishes in Kannur region of Kerala.

2. MATERIALS AND METHODS

Freshwater fishes were collected from rivers, streams, irrigation canals, ponds and paddy fields in the district of Kannur, Kerala, India. A total of 2354 fishes were collected from January 2011 to June 2014.Fishes were examined carefully for the presence of monogenean parasites. Firstly, the body surface, fins, skin, scale, buccal cavity, nasal fossae and cloaca were examined using a hand lens and later under a stereo dissecting microscope (SDM). After a thorough examination of the external sites, gills, fins, scales and operculum were carefully examined under SDM at various magnifications.

The monogenean parasites found were collected and were examined alive under compound microscope using vital stain, neutral red. The parasites recovered were fixed in either 5-10% formalin or AFA (Alcohol Formalin Acetic acid). Completely flattened specimens were stored in 5-10% formalin or AFA. After fixation the parasites were stained using alum carmine, dehydrated in ascending grades of alcohol, cleared either in xylene or creosote and mounted either in DPX or Canada balsm.

Parasites were identified using standard keys (Yamaguti, 1963; Pandey and Agrawal, 2008). For each individual host examined, data were recorded on the numbers of parasites found together with the site of infection and numbers of individuals of each parasite species present. Data collected were analysed for various ecological parameters. Prevalence, mean intensity etc. were calculated as described by Margolis *et al*., 1982. Each parasite species was characterized as core, secondary and satellite species following the criteria of Hanski (1982). Core species are those with prevalence greater than 80% and satellite species are those with prevalence less than 10%. All species between these ranges are categorized as secondary species.

3. RESULTS AND DISCUSSION

A total of 2354 freshwater fishes belonged to 25 species were examined. Seven species of monogeneans were recovered from six species of freshwater fishes. The total prevalence of was 7.81%. The parasites recovered, their hosts, number of host examined and infected, site of infection, prevalence of infection and mean intensity are summerised in Table 1.

Among the monogeneans, *Diplozoon indicum* and *Neodiplozoon barbi* are Polyopisthocotyleans and all others are Monopisthocotyleans. The highest prevalence of infection was shown by *Dactylogyrus daniconi* (12.09%) and the lowest, *Gyrodactylus recurvensis* (1.40%). *Sclerocleidoides etropli* also had a low prevalence (3.85%). All species except *Dactylogyrus daniconi* was said to be satellite species. *D.daniconi* is the secondary species to the host get infected. The prevalence of infection of all recovered species of monogeneans were comparatively low. Within their natural hosts, monogeneans generally occur in low numbers (Ramasamy *et al*., 1985).

Cyprinidae is found to be the most preferred host family for monogenean parasite, infested by four monogeneans, ie, *Dactylogyrus daniconi*, *Dactylogyroides tripathii*, *Diplozoon indicum* and *Neodiplozoon barbi*, agrees with previous reports (Shameem, 1997; Kearn, 2014).

The Dactylogyridae was the most dominating family among the freshwater fishes of Kannur, represented by 4 species - *Dactylogyrus daniconi*, *Bifurcohator ndicus*, *Dactylogyroides tripathii and Sclerocleidoides etropli.* The family Dactylogyridae of Monogenea class is found to be the highest abundance and diversity which shows the successful establishment of these parasites on their respective host (Chiary *et al*., 2013). All monogeneans showed narrow host specificity. Each species of parasite recovered was from single species host fish only. Monogeneans (flatworms) are among the most host-specific of parasites in general and may be the most host-specific of all fish parasites (Whittington *et al*., 2000).

Four new host records (Table.2) were observed and all the seven species recovered are new to the locality.

Table.1 Monogenean parasites recovered, their hosts, total number of fishes examined and infected, site of infection, prevalence of infection and mean intensity

Monogenea	Host	Fish		Site	P(%)	MI
		Examined	Infected	of infection		
Gyrodactylus recurvensis Rukmini and Madhavi, 1987	**Aplocheilus lineatus**	**285**	**4**	**Scales, fins**	**1.40**	**2.25**
Dactylogyrus daniconi Raziabeevi and Radhakrishnan 2010	**Rasbora daniconius**	**273**	**33**	**Gill filaments**	**12.09**	**4.06**
Bifurcohaptor indicus Jain,1958	**Mystus malabaricus**	**104**	**8**	**Gill filaments**	**7.69**	**1.63**

Dactylogyyroides tripathii (Tripathi,1959; Yamaguti,1963) Gussev, 1963	**Puntius amphibius**	**192**	**12**	**Gill filaments**	**6.25**	**2.42**
Sclerocleidoides etropli (Gussev, 1963) Agrawal, Yadav and Kristky, 2001	**Etroplus maculatus**	**78**	**3**	**Gill filaments**	**3.85**	**1.67**
Diplozoon indicum Dayal,1941	**Devario malabaricus**	**210**	**20**	**Gill filaments**	**9.52**	**1.75**
Neodiplozoon barbi (Tripathi,1957) Tripathi, 1960	**Rasbora daniconius**	**273**	**24**	**Gill filaments**	**8.79**	**1.29**

P= Prevalence of infection; MI= Mean intensity

Table.2 New host records of the monogeneans recovered.

Sl No.	Parasite	Host
1.	Gyrodactylus recurvensis	Aplocheilus lineatus
2.	Bifurcohaptor indicus	Mystus malabaricus
3.	Dactylogyyroides tripathii	Puntius amphibius
4.	Diplozoon indicum	Devario malabaricus

4. CONCLUSION AND RECOMMENDATION

The study of monogeneans parasites of freshwater fishes was first conducted in Northern Kerala. Eventhough no new species were encountered, four new host records were reported. Prevalence of monogenean infection was very low. This low prevalence of monogenean parasitic fauna in freshwater fishes may be due to anthrapogenic activities. Since monogeneans are almost exclusively ectoparasites, variations in abiotic factors may affect them adversely. They may act as bioindicators of anthropogenic pollution and ecological state of the water body. So special attention should be given to make aware farmers about the impact of chemical fertilizers in aquatic ecosystem and enhance them to use biofertilizers.

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