

Seasonal Changes in Prevalence of Ectoparasitic Infection in Freshwater Fishes of Gonda District, U.P., India.

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Abstract- *The present investigation was conducted to find out the seasonal variation in prevalence of ectoparasites of Indian major carps. Total 9 species of ectoparasites were collected from 350 fishes. Out of ten, three were belong to Myxozoan (Myxobolus sp. and Henneguya sp), three were to Ciliophorans (Trichodina sp., Tripertiella sp. and Ichthyophthirus sp.), two were Monogeneans (Dactylogyrus sp. and Gyrodactylus sp.) and two were Crustaceans (Ergasilus sp., Argulus sp.). Among the ectoparasites, Myxobolus sp. is the most prevalent ectoparasites followed by Trichodina sp., Tripertiella sp. and Argulus sp. It was observed that the infection was the maximum in winter moderate in summer and minimum in monsoon season.*

Indexed Terms- *Ectoparasite, Prevalence, Fish*

I. INTRODUCTION

Fishculture is one of the most economically important applied strategies all over the world and fishes are one of the most beneficial and nutritional resources of human beings. Parasitic diseases are the limiting factors in fishculture, because of increased density of fish in lentic waterbodies where the fish pathogens can easily transmit from one fish to another. These pathogens may cause fish mortality in cultural fishes where the entire fish population of pond may be killed, resulting the great economic loss of fish farmers. Some parasites are serious pests in fish culture, others are probably potential threats to fish culture. On the other hands blue revolution and success of fisheries development programme depends on the intensification of fish parasitological research, as the improvement of fish yield can mainly be achieved from healthy fish stock. Thus, to prevent the economic loss and to increased fish production, proper fish health management is necessary.

Health of any population depends on the control of disease and maintenance of a healthy relationship between living organism and their environment. The parasite community of fish shows considerable variation with the environmental conditions in which fish live. The ectoparasites of fish constitute one of the most important problem associates with pond fish culture. Many fishes disasters in fish farms were caused by different considerable as ectoparasites (protozoa, monogenetic trematoda and crustacea), which have direct life cycle and facilitate translocation from host to host making huge damages to fish wealth (Al-Marjan and Abdullah 2009).

The most important prerequisite of fish production is availability of healthy fish fingerlings of carps. Because of easily availability of fish seed (fry and fingerlings) of the indigenous major carps, *Catla catla*, *Labeo rohita* and *Cirrihinus mrigala* are becomes the most common culturable freshwater fishes of eastern Uttar Pradesh. Studies on parasitic diseases of fishes particularly in this tarai region of eastern Uttar Pradesh are fragmentary (Prakash and Verma, 2017). Considering the above, the present study was aimed to study the ectoparasitic prevalence of indigenous major carp fingerlings as well as the correlation between ectoparasitic prevalence and environmental conditions.

II. MATERIALS AND METHODS

Fish collection: From the five fishery ponds of Gonda districts of eastern U.P., 350 Live host or freshly dead specimen of each indigenous carps, Catla (*Catla catla*), Rohu (*Labeorohita*) and Mrigal (*Cirrhinus mrigala*) were randomly sampled and collected from April, 2017 to March,2018 and transported to the Ichthyology lab, Department of Zoology, L.B.S.P.G. College, Gonda. The fishes were examined immediately after collection for detailed investigation on ectoparasites.

Parasites were identified under a compound microscope and following the description and figures of Gupta (1959), Yamaguti (1963), Lucky (1971), Kabata (1985) and Mukherjee *et. al.*, (2019).

The Parasitic prevalence was estimated with the help of Parasitic Frequency Index (PFI) which was calculated by taking the percentage of the number of hosts infected by an individual parasite species against the total number of hosts examined in a particular area under investigation. Prevalence frequency index (PFI) was estimated following the formula given by Margolis *et. al.*, (1982).

$$\text{Prevalence (\%)} = \frac{\text{Total no. of infected fishes}}{\text{Total no. of fish host examined}} \times 100$$

III. RESULTS AND DISCUSSION

Table1. List of Ectoparasites, host fishes and their infection sites

Parasitic Group		Infection sites of Host fishes		
		<i>Catla catla</i>	<i>Lab rohi ta</i>	<i>Cirrhinus mrigala</i>
Myxozoa n	<i>Myxobolus sp.</i>	Fins	Gill , Fins	Gill
	<i>Henneguya a sp.</i>	-	Fins	Gill
Ciliophorans	<i>Trichodina sp.</i>	Skin, Gill	Skin, Gill	Skin,
	<i>Tripertiella sp.</i>	Skin	Skin	Skin, Gill
	<i>Ichthyophthirus sp.</i>	-	Skin, Gill	Skin
Monogeneans	<i>Dactylogyrus sp.</i>	Gill	Gill	Gill
	<i>Gyrodactylus sp.</i>	-	Skin, Fin	Skin

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Crustacea n	<i>Ergasilus sp.</i>	Skin, Gill	Skin, Gill	Skin, Gill
	<i>Argulus sp.</i>	Skin, Fins, Operculum	Skin, Fins base	Skin, Fins,

In the present study total 9 genera belongs to 4 group of ectoparasites were collected from indigenous carps, Catla (*Catla catla* –Surface feeder), Rohu (*Labeo rohita* –Column feeder) and Mrigal (*Cirrhinus mrigala*-Bottom feeder). Among the collected parasites, two were Myxozoan parasites (*Myxobolus sp.*, and *Henneguya sp.*), three were Ciliophorans parasites (*Trichodina sp.*, *Tripertiella sp.* and *Ichthyophthirus sp.*), two were Monogeneans (*Dactylogyrus sp.* and *Gyrodactylus sp.*) and two were Crustaceans (*Ergasilus sp.*, *Argulus sp.*). Myxozoan were found on gills and fins of host fishes except Calta they were found only on fins. Ciliophorans were found on skin and gill but *Tripertiella sp.* was found only on the skin of host fishes. Monogeneans were found alive and strongly attached to gill,skin and fins base but the *Dactylogyrus sp.* was found gills of host fishes. Crustaceans were mostly found abundantly attached to the fin and skin and rarely on operculum.

Table2. Seasonal variation in PFI (%) of Indian major carps fingerlings.

Parasitic Groups	PFI % of the affected Indian Major Carp				
	<i>Ca tla cat la</i>	<i>Lab ro hita</i>	<i>Cirrh inus mrigala</i>	Aver age % PFI	
Monsoon season					
Myxozoan	<i>Myxobolus sp.</i>	20.0	28.0	24.0	24.0
	<i>Henneguya sp.</i>	0.0	0.0	0.0	0.0
Ciliophorans	<i>Trichodina sp.</i>	15.0	22.0	18.0	18.33

	<i>Tripertiel la sp.</i>	18.0	22.0	20.0	20.0
	<i>Ichthyophthirus sp.</i>	0.0	0.0	0.0	0.0
Monogeneans	<i>Dactylogyrus sp.</i>	0.0	0.0	0.0	0.0
	<i>Gyrodactylus sp.</i>	0.0	0.0	0.0	0.0
Crustacean	<i>Ergasilus sp.</i>	0.0	0.0	0.0	0.0
	<i>Argulus sp.</i>	0.0	0.0	0.0	0.0
Winter season					
Myxozoan	<i>Myxobolus sp.</i>	42.0	58.0	46.0	48.6
	<i>Henneguya sp.</i>	2.0	4.2	3.4	3.20
Ciliophorans	<i>Trichodina sp.</i>	30.3	38.2	32.5	33.6
	<i>Tripertiel la sp.</i>	22.4	35.1	22.6	27.7
	<i>Ichthyophthirus sp.</i>	0.0	7.4	6.8	4.73
Monogeneans	<i>Dactylogyrus sp.</i>	4.6	7.8	6.6	6.33
	<i>Gyrodactylus sp.</i>	0.0	2.4	1.8	1.40
Crustacean	<i>Ergasilus sp.</i>	9.4	16.4	14.8	13.5
	<i>Argulus sp.</i>	34.2	48.8	42.6	41.8
Summer season					
Myxozoan	<i>Myxobolus sp.</i>	25.0	33.0	27.0	28.3
	<i>Henneguya sp.</i>	0.0	0.0	0.0	0.0
Ciliophorans	<i>Trichodina sp.</i>	20.0	30.0	24.2	25.0
	<i>Tripertiel la sp.</i>	20.0	28.0	24.0	24.0
	<i>Ichthyophthirus sp.</i>	0.0	0.0	0.0	0.0
Monogeneans	<i>Dactylogyrus sp.</i>	2.0	4.0	3.0	3.00

	<i>Gyrodactylus sp.</i>	0.0	2.0	1.4	1.20
Crustacean	<i>Ergasilus sp.</i>	0.0	0.0	0.0	0.0
	<i>Argulus sp.</i>	0.0	4.8	2.4	2.4

Table.2 revealed that some group and some genera of ectoparasites are totally absent in particular season, such as Crustaceans are found only in winter season and rarely in summer season. The monogeneans parasites were not found in monsoon season. The *Ichthyophthirus sp.* of Ciliophorans and *Henneguya sp.* of Ciliophorans were found only in winter season. The present study also revealed that some parasites such as *Henneguya sp.*, *Ichthyophthirus sp.* and *Gyrodactylus sp.* were host specific because these were not infect the *Catla catla* (Table2). Among the ectoparasites, *Myxobolus sp.* is the most prevalent ectoparasites followed by *Trichodina sp.*, *Thelohannellus sp.*, *Tripertiella sp.* and *Argulus sp.*, These ectoparasites are the most common parasites of Indian major carps in West Bengal, India, (Mukherjee *et. al.*, 2019) which support the present findings.

The prevalence of ectoparasites of carp in different seasons have been presented in Table2. Among the different groups of ectoparasites, myxozoan has shown highest prevalence throughout the year followed by Ciliophorans, Crustaceans and monogenean. In winter season, the prevalence of ectoparasites reached maximum and gradually decreased in summer and monsoon. This indicates that the ectoparasitic infection changed with the change of season.

CONCLUSION

On the basis of present study it can be concluded that the post monsoon season, i.e. winter season, along with the low water temperature, high level of dissolved oxygen, moderate pH and low hardness provides favorable environmental conditions for the ectoparasitic infections, specially *Myxobolus sp.*, *Trichodina sp.*, *Tripertiella sp.* and *Argulus sp.* Thus, it could be concluded that the water quality has a great impact on the abundance of pathogens and their ability to survive on host. So the stocking density of fish seed

and water quality parameters should be maintained properly to avoid parasitic infestation in pond fishes.

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