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ORIGINAL ARTICLE

Spectrum of Helminth Parasites in Freshwater Fish *Wallago attu* Bleeker, 1851 with Special Reference to Population Dyanamics

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ABSTRACT

The present study was conducted to analyse spectrum of Helminth parasites in freshwater fish Wallago attu (Bleeker, 1851) procured from Nanded, Maharashtra State during the period February 2011 to January, 2012. Four helminth parasites comprised Gangesia sp. (Cestode), Proteocephalus sp. (Cestode), Camallanus sp. (Nematode), Masenia sp. (Trematode) were collected from intestine, liver and stomach of the infected fish host Wallago attu. A total of 136 (56.66%) fish host Wallago attu (Bleeker, 1851) were found to be infected from 240 fishes sampled. Forty Eight fishes were infected with Cestoda of genus Gangesia sp. with a prevalence rate of 20%, Thirty Four (14.16%) fishes were infected with Cestode genus Proteocephalus sp. Twenty Nine (12.08%) fishes were infected by Nematoda of genus Camalanus sp. while the Digenean Trematode (Masenia sp.) infected Twenty Five (10.41%) fishes. Gangesia sp. and Proteocephalus sp. exhibited highest prevalence in the month of May, Camalanus sp. recorded highest in month of April while Masenia sp. recorded peak prevalence in March. High incidence, Density and Index of infection of Helminth parasites of Wallago attu (Bleeker, 1851) were recorded in Summer followed by Winter whereas infection was low in monsoon. Study reveals that, Helminthes show seasonality in incidence, intensity, density and index of infection.

Keywords: *Camalanus sp., Gangesia sp., Masenia sp., Proteocephalus sp., spectrum of Helminth parasites, Wallago attu (Bleeker, 1851)*

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INTRODUCTION

Helminthes are predominant group of parasites and important as pathogens of fishes around the globe. Parasites are one of the chief cause of mass mortality in fish populations. Freshwater fishes are major source of protein, but various diseases including parasitic infections pose a threat to fish culture (Yooyen *et.al.,* 2006). Helminth parasites are hazardous to a number of fish species in every type of water body. Each helminth parasite species prefer to live in a definite zone of the microhabitats, though some can migrate to the other organs, which are normally not their usual site of infection. Parasite interferes with nutrition, metabolism and secretary function of alimentary canal, damage nervous system (Markov, 1961) and even upset the normal reproduction of the hosts (Faust E.C., 1949). Parasitic diseases are among major public health problems of tropical countries including India. They infect man and also invade domestic animals and wildlife.

The diversity and population dynamics of Piscean helminth have been extensively studied and well documented by Dogiel *et. al.,* (1954); Dobson, (1961& 1965); Johnson, (1964); Euzeby, J.(1972); Anderson, (1974); Kenddey, (1975), Rajeshwar Rao (1983); Rohde, (1993); Moller *et. al.,* (1995); Poulin, R. (1995; Nanware (1996) and Bhure (2008). However, in southeastern part of Maharashtra State, the spectrum of helminth parasites

in freshwater fishes has been scantily studied. There is limited information available about this aspect. Freshwater teleost *Wallago attu* (Bleeker, 1851) is in great demand due to its good taste, flavour, invigorating effect and still its market price is quite affordable. As fishes are important from ecological, medicinal, nutritional and economical point of view, Keeping in view, importance of Helminth infections of freshwater fish, an attempt has been made to assess population dynamics of Helminthes parasitizing freshwater fish *Wallago attu* (Bleeker, 1851).

MATERIALS AND METHODS

In the present study 240 specimens of host fishes *Wallago attu* (Bleeker, 1851) {Fig.1.} were examined for Helminthic infection during February, 2011 to January, 2012 from Nanded District, Maharashtra State India. Collected Cestodes and trematode were preserved in hot 4% formalin, stained with Borax carmine, dehydrated in asending grades of alcohol, cleared in xylene, mounted in D.P.X. Nematode were preserved in glycerol, Mounted in Glycerine jelly. Drawings are made with the aid of camera lucida attachments. Photomicrographs were taken by Trinocular computerized Research microscope. Identification is done by using appropriate keys (Yamaguti, S., 1958,1959,1961,1971; Wardle, R.A., Mcleod, J.A. and Radinovsky, 1974; Khalil, Jones and Bray,1994) . On taxonomic observations identified Helminth are *Camalanus sp.*, *Eumasenia sp.*, *Gangesia sp.*, *Proteocephalus sp.* Obtained data were recorded; processed for populational features of helminthes of freshwater fish *Wallago attu* (Bleeker, 1851). The prevalence, intensity, density and index of infection were recorded and calculated according to Margolis et.al.,(1982).

$$\text{Incidence of Infection} = \frac{\text{Infected hosts}}{\text{Total hosts examined}} \times 100$$

$$\text{Intensity of Infection} = \frac{\text{No. of parasites collected in a sample}}{\text{No. of infected hosts}}$$

$$\text{Density of Infection} = \frac{\text{Number of parasites collected in a sample}}{\text{Total hosts examined}}$$

$$\text{Index of Infection} = \frac{\text{No. of hosts infected x No. of parasite collected}}{(\text{Total hosts examined})^2}$$

RESULTS AND DISCUSSION

A total of 240 host specimens of *Wallago attu* (Bleeker, 1851) were sampled out of which 136 were found to be infected. Four Helminth parasites (Fig.2 and 5) Viz. Cestoda represented by two genera *Gangesia sp., Proteocephalus sp.* Nematoda representing genus *Camallanus sp.* and Digenea with genus *Masenia sp.* were collected from intestine, liver and stomach of freshwater catfish *Wallago attu* (Bleeker, 1851). Population dynamics of Helminth parasites of *Wallago attu* (Bleeker, 1851) are presented in Table No. 01 to 04 & Graph 1 to 4.

From the obtained results, it is clear that incidence, intensity, Density and Index of infection of Helminthes of *Wallago attu* (Bleeker, 1851), were highest in Summer followed by Winter, minimum during monsoon. *Gangesia sp.* and *Proteocephalus sp.* exhibited highest prevalence in month of May, *Camalanus sp.* recorded highest in month of April while *Masenia sp.* recorded peak prevalence in March. In *Wallago attu* (Bleeker, 1851) the parasitic fauna is predominated by Cestodes followed by digenea and nematode.

Fig.1. Microphoplate of *Wallago attu*

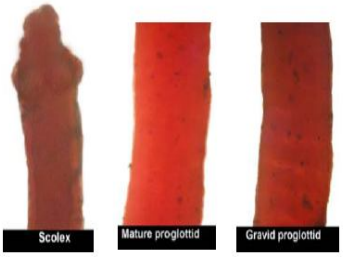


Fig.2. Microphoplate of *Gangesia sp.*

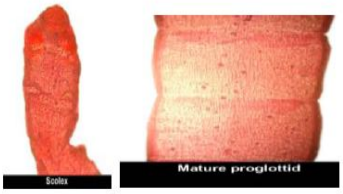


Fig.3. Microphoplate of *Proteocephalus sp.*

Fig.4. Microphoplate of *Masenia sp.*

Fig.5. Microphoplate of *Camallanus sp.*

Table1: Population Dynamics of *Gangesia* sp. infected to *Wallago attu* (Bleeker, 1851)

Months	No. of host Examined	No. of host Infected	Total No. parasites collected	Incidence %	Intensity %	Density %	Index of infection %	Habitat
February, 2011	20	05	08	25	1.60	0.4	0.10	Intestine
March, 2011	20	06	09	30	1.50	0.45	0.14	Intestine
April,2011	20	07	11	35	1.57	0.55	0.19	Intestine
May,2011	20	10	14	50	1.40	0.7	0.35	Intestine
June,2011	20	02	03	10	1.50	0.15	0.02	Intestine
July,2011	20	01	01	5	1.00	0.05	0.00	Intestine
August,2011	20	01	02	5	2.00	0.1	0.01	Intestine
September, 2011	20	02	03	10	1.50	0.15	0.02	Intestine
October, 2011	20	02	04	10	2.00	0.2	0.02	Intestine
November, 2011	20	03	05	15	1.67	0.25	0.04	Intestine
December, 2011	20	04	07	20	1.75	0.35	0.07	Intestine
January, 2012	20	05	07	25	1.40	0.35	0.09	Intestine
Total	**240**	**48**	**74**	**20.00**	**1.54**	**0.31**	**0.06**	**Intestine**

Table 2: Population Dynamics of *Proteocephalus* sp. infected to *Wallago attu* (Bleeker, 1851)

Month	No. of host Examined	No. of host Infected	Total No. parasites collected	Incidence %	Intensity %	Density %	Index of infection %	Habitat
February, 2011	20	04	05	20	1.25	0.25	0.05	Intestine
March, 2011	20	05	07	25	1.40	0.35	0.09	Intestine
April,2011	20	05	08	25	1.60	0.4	0.10	Intestine
May,2011	20	07	10	35	1.43	0.5	0.18	Intestine
June,2011	20	01	01	5	1.00	0.05	0.00	Intestine
July,2011	20	00	00	0	0.00	0.00	0.00	--
August,2011	20	01	02	5	2.00	0.1	0.01	Intestine

September, 2011	20	01	03	5	3.00	0.15	0.01	Intestine
October, 2011	20	02	04	10	2.00	0.2	0.02	Intestine
November, 2011	20	02	05	10	2.50	0.25	0.03	Intestine
December, 2011	20	03	05	15	1.67	0.25	0.04	Stomach
January, 2012	20	03	06	15	2.00	0.3	0.05	Intestine
Total	**240**	**34**	**56**	**14.17**	**1.65**	**0.23**	**0.03**	**Intestine, Stomach**

Table 3: Population Dynamics of *Camallanus* sp. infected to *Wallago attu* (Bleeker, 1851)

Month	No. of host Examined	No. of host Infected	Total No. parasites collected	Incidence %	Intensity %	Density %	Index of infection %	Habitat
February, 2011	20	03	04	15	1.33	0.2	0.03	Intestine
March, 2011	20	04	06	20	1.50	0.3	0.06	Intestine
April,2011	20	07	09	35	1.29	0.45	0.16	Intestine
May,2011	20	05	07	25	1.40	0.35	0.09	Intestine
June,2011	20	01	02	5	2.00	0.1	0.01	Stomach
July,2011	20	00	00	0	0.00	0	0.00	--
August,2011	20	00	00	0	0.00	0	0.00	--
September, 2011	20	01	01	5	1.00	0.05	0.00	Intestine
October, 2011	20	01	02	5	2.00	0.1	0.01	Intestine
November, 2011	20	02	03	10	1.50	0.15	0.02	Stomach
December, 2011	20	02	04	10	2.00	0.2	0.02	Intestine
January, 2012	20	03	05	15	1.67	0.25	0.04	Intestine
Total	**240**	**29**	**43**	**12.08**	**1.48**	**0.18**	**0.02**	**Intestine, Stomach**

Table 4: Population Dynamics of *Masenia* sp. infected to *Wallago attu* (Bleeker, 1851)

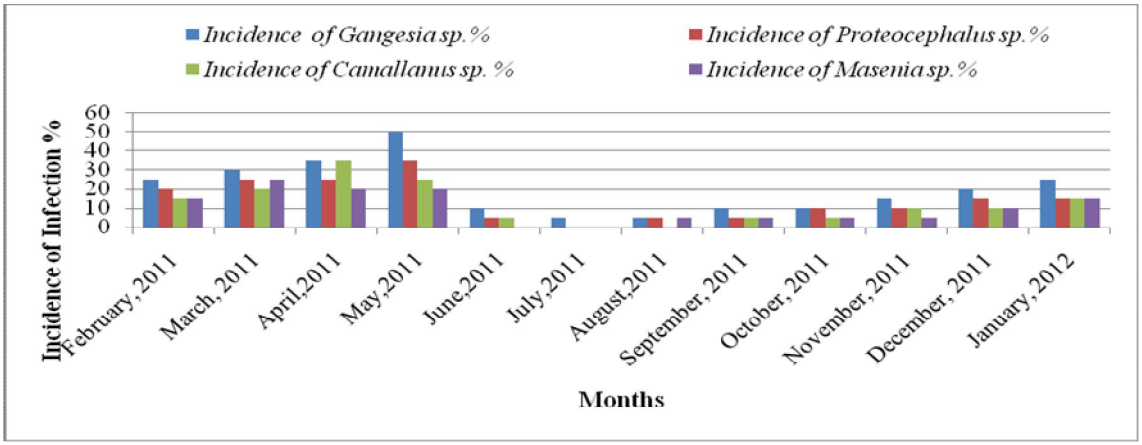
Month	No. of host Examined	No. of host Infected	Total No. parasites collected	Incidence %	Intensity %	Density %	Index of infection %	Habitat
February, 2011	20	03	06	15	2.00	0.3	0.05	Stomach
March, 2011	20	05	10	25	2.00	0.5	0.13	Intestine
April,2011	20	04	07	20	1.75	0.35	0.07	Stomach, Liver
May,2011	20	04	08	20	2.00	0.4	0.08	Intestine
June,2011	20	00	00	0	0.00	0.00	0.00	--
July,2011	20	00	00	0	0.00	0.00	0.00	--
August,2011	20	01	02	5	2.00	0.1	0.01	Liver
September, 2011	20	01	03	5	3.00	0.15	0.01	Intestine
October, 2011	20	01	02	5	2.00	0.1	0.01	Stomach
November, 2011	20	01	03	5	3.00	0.15	0.01	Intestine
December, 2011	20	02	05	10	2.50	0.25	0.03	Stomach
January, 2012	20	03	07	15	2.33	0.35	0.05	Intestine
Total	**240**	**25**	**53**	**10.42**	**2.12**	**0.22**	**0.02**	**Intestine, Stomach, Liver**

Kennedy C.R. (1976) reported temperature; humidity, rainfall, feeding habits of host, availability of infective host and parasite maturation are responsible for influencing the parasitic infections. Feeding activity of host is reason for seasonal fluctuation of infections (Pennuyuick1973). Jadhav and Bhure (2006) noticed high temperature, low rainfall and sufficient moisture ware necessary for development of parasite.

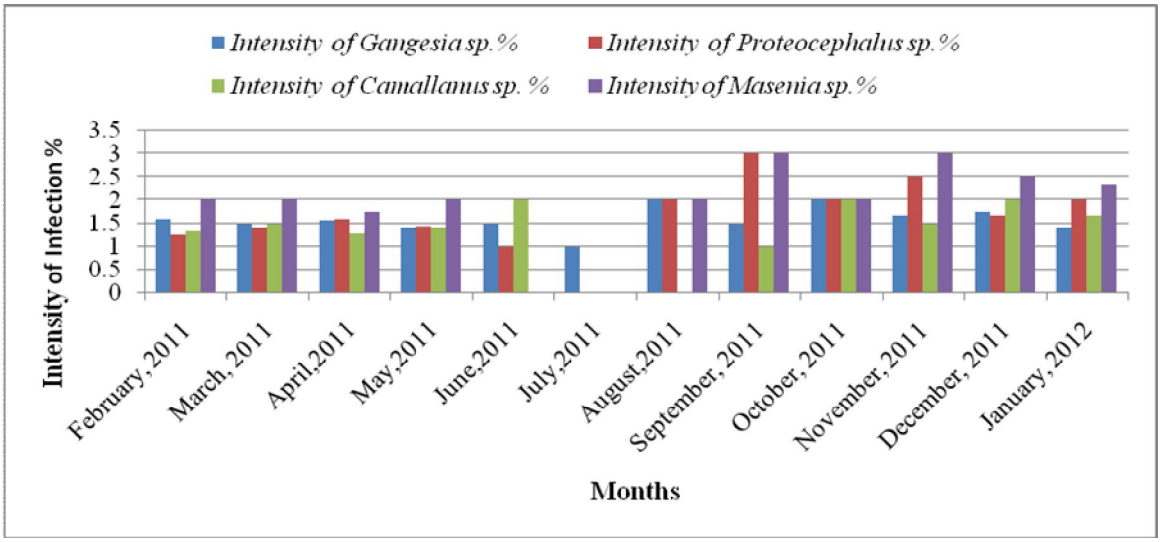
Findings of present investigation agree with Kanth and Srivastava (1987) who showed that *Pallisentis ophiocephali* had two peak periods during May and August and then

infestation rate declined gradually through September to February and rose through March to have peaks in May and August. Bhure et. al., 2010 reported high incidence (51.78%), intensity (1.18%) and density (0.613%) of *Rhabdocona sp*. in summer followed by winter and rainy season.

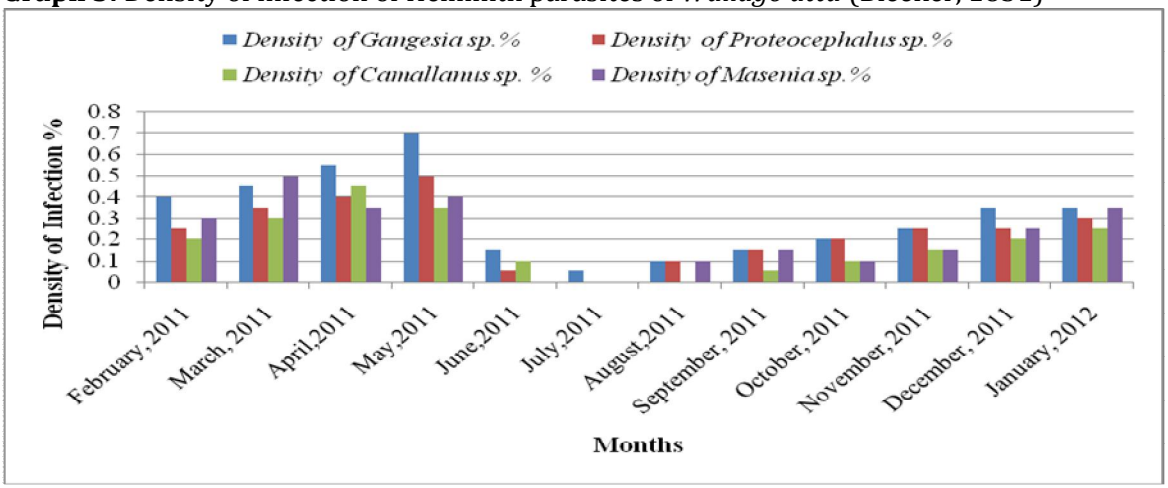
Graph 1: Incidence of infection of Helminth parasites of *Wallago attu* (Bleeker, 1851)



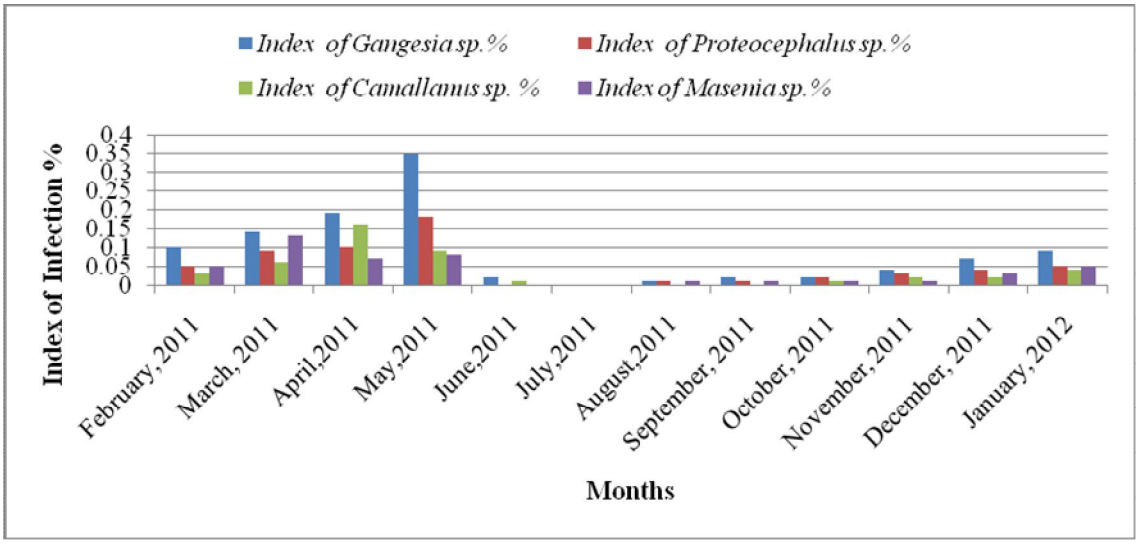
Graph 2: Intensity of infection of Helminth parasites of *Wallago attu* (Bleeker, 1851)



Graph 3: Density of infection of Helminth parasites of *Wallago attu* (Bleeker, 1851)



Graph 4: Index of infection of Helminth parasites of *Wallago attu* (Bleeker, 1851)



Shahin *et.al.,* 2011 studied prevalence of Chicken Cestodiasis in Egypt and reported highest incidence in summer 5.54% and Autumn 5.6% and lowest incidence during Winter 3.3% and Spring 2.2%. Bhure et al., 2013 studied diversity and prevalence of avian cestodes and reported high prevalence in summer, low in monsoon season. Bhure and Nanware, 2014 reported high incidence of infection of *Cotugnia dignopora, Cotugnia diamarae* and *Raillietina (R.) domestica* in summer (75%, 67.85 % & 71.42%) followed by winter (60%, 52 % & 48%) whereas low infections in monsoon (38.09%, 33.33% & 38.09%).

Ibraq Khurshid and Fayaz Ahmad 2014 recorded highest prevalence of helminthes in *Schizothorax* sp. during summer and lowest in winter. Bhure et.al., 2014 reported prevalence of helminths of *Mastacembelus armatus* from Nanded Region and noticed high incidence of infections in summer (Feb., 2014-May, 2014) followed by winter (Oct., 2013-Jan., 2014) where as low in monsoon (June, 2013 –Sept., 2013). Bhure and Nanware,(2014) reported high prevalence of *Procamallanus hyderabadensis* occurred in Summer(Feb.,2014-May,2014) was 79.16% followed by Winter(Oct.,2013- Jan., 2014) was 43.75% whereas infection was low in monsoon (June, 2014 –Sept., 2014) was 37.50%. Bhure and Nanware, 2014 recorded high incidence of infection of *Senga sp., Gangesia sp., Proteocephalus sp.* infected to *Channa sp.* was in summer (76.66 %, 73.33 % & 70.00 %) followed by winter (65.21 %, 52.17% & 56.52%) whereas infection was low in monsoon (36.84%, 26.31% & 31.57%). Nanware *et.al.,* 2015 reported High incidence, Density and Index of infection of Piscean nematode of genus *Camallanus sp.* and *Spinitectus sp.* in Summer followed by Winter whereas infection was low in monsoon.

CONCLUSION

Recorded data of present study shows incidence, intensity, density and index of infections of Helminths of freshwater teleost *Wallago attu* (Bleeker, 1851) were high in summer followed by winter where as low in monsoon due to environmental factors and feeding habitat of host influenced the seasonality of parasitic infection either directly or indirectly. Prevalence of infection is higher in summer and least in winter which may be due to availability of more intermediate hosts in summer and least in winter. Rainy season starting with spring and continuing to early summers made environmental conditions more favourable for the development and survival of pre parasitic stages of helminth parasites and lead to increase availability of infective stages in post rainy seasons, and resulted in higher prevalence of parasitism in summer.

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