



Prevalence and Diversity of Cestode Parasites of Freshwater Fishes of Genus *Channa* Scopoli, 1777

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ABSTRACT

Study was conducted to investigate prevalence and diversity of Piscean cestode parasites of freshwater fishes of four species of the genus *Channa* Scopoli, 1777 viz. *Channa straitus* (Bloch, 1793), *Channa punctatus* (Bloch, 1793), *Channa marulius* (F. Hamilton, 1822) and *Channa gachua* (F. Hamilton, 1822) in and around Nanded district, M.S. India during March, 2012 to August, 2014 by applying statistical approach. Five cestode genera *Senga* (Dollfus, 1934), *Polyoncobothrium* (Diesing, 1854), *Gangesia* (Woodland, 1924), *Proteocephalus* (Weinland, 1858) and *Silurotaenia* (Nybein, 1942) were recorded during this investigation. High prevalence were recorded during Summer followed by winter where as prevalence was low in monsoon. High prevalence was reported due to infection of *Senga* sp., as compared to other cestode infection. Prevalence of these Cestode parasites and severity of infection vary considerably depending on environmental conditions such as humidity, temperature, rainfall, vegetation and management practices.

Keywords: *Channa* Scopoli, Cestode parasites, Diversity, Nanded District, Prevalence

1. INTRODUCTION

Parasitism is a natural way of life, among large number of organism and parasitic diseases are major public health problem, which results into morbidity and mortality in

tropical countries, particularly in socioeconomically under developed societies in the world. The identification of parasite is the first step of controlling the parasitic infection of *Channa sp.*

Fish play an important role in economy. Mortality of fishes occurs due to heavy infestation of these parasites. Keeping in view the increasing importance of fish as rich source of protein diet, the present study focused on diversity of tapeworm of *Channa sp.* from different localities of Nanded District (M.S.), India.

2. MATERIALS AND METHODS

2. 1. Study area

The study was conducted from different collection sites of Nanded district. It is situated in the south eastern part of Maharashtra State.

The Nanded district lies between 18.15 to 19.55 North latitudes and 97.07 to 98.15 East longitude. It covers an area of 10,528 sq. km.

In present study, survey on cestodes was conducted on intestines of freshwater fishes viz. *Channa straitus*, *Channa punctatus*, *Channa marulius* and *Channa gachua* during the period of March, 2012 to August, 2014. Freshwater fishes of genus *Channa* were collected and examined for cestode infection.

Cestode parasites were collected, preserved in hot 4% formalin, washed in saline and water, dehydrated in various alcoholic grades, stained with Harris haematoxylin and Borax carmine, cleared in xylene, mounted in D.P.X. Drawings were made with the aid of camera Lucida and identification by standard methods (Gerald D. Schmidt, 1934; Yamaguti, S., 1959; Wardle, R.A., Mcleod, J.A. and Radinovsky 1974; Khalil, Jones and Bray, 1994; Hiware, Jadhav and Mohekar, 2003; and Bhure, 2008).

On taxonomic observations Cestode genus identified are *Senga*, *Polyoncobothrium*, *Gangesia*, *Proteocephalus* and *Silurotaenia*.

2. 2. Statistical analysis

Prevalence (Incidence) of infection were recorded and calculated according to Margolis et al., (1982).

$$\text{Prevalence (Incidence) of Infection} : \frac{\text{Number of Host Infected}}{\text{Number of Total Host Examined}} \times 100$$

3. RESULTS AND DISCUSSION

Results of present study on diversity and prevalence of Piscean Cestodes are presented in Table 1, 2 & Figure 1.

Table 1. Diversity and Distribution pattern of Piscean Cestodes during March, 2012 to August, 2014.

S.N.	Cestode parasites	Host	Habitat	Locality
1.	<i>Senga pcyonera</i> Woodland, 1924.	<i>Channa straitus</i>	Intestine	Nanded, Mahur
2.	<i>S. lucknowensis</i> Johri, 1956	<i>Channa punctatus</i>	Intestine	Mudkhed, Bokar
3.	<i>S. khami</i> Deshmukh, 1980	<i>Channa marulius</i>	Intestine	Ardhapur, Nanded
4.	<i>S. godavari</i> Jadhav and Shinde, 1980	<i>Channa gachua</i>	Intestine	Degloor, Kandhar
5.	<i>S. raoi</i> Majid et. al., 1984	<i>Channa punctatus</i>	Intestine	Biloli, Bhokar, Nanded
6.	<i>S. jagannathae</i> Majid et. al., 1984	<i>Channa punctatus</i>	Intestine	Nanded, Loha, Mahur
7.	<i>S. madhavae</i> Bhure et. al., 2010	<i>Channa marulius</i>	Intestine	Degloor, Nanded
8.	<i>S. satatensis</i> Bhure et. al., 2011	<i>Channa punctatus</i>	Intestine	Bhokar, Umri, Naigaon
9.	<i>S. mangalbaiiae</i> Bhure et. al., 2011	<i>Channa gachua</i>	Intestine	Mukhed, Degloor
10.	<i>S. microrostellata</i> Bhure et. al., 2014	<i>Channa punctatus</i>	Intestine	Nanded, Mahur
11.	<i>Polygonocobothrium indicum</i> Nama, 1979	<i>Channa straitus</i>	Intestine	Kinwat, Mahur
12.	<i>P. srivastavai</i> Pande et. al., 2006	<i>Channa punctatus</i>	Intestine	Nanded
13.	<i>P. chauhani</i> Pande et. al., 2006	<i>Channa gachua</i>	Intestine	Nanded, Mahur, Kinwat
14.	<i>Gangesia godavarii</i> Kadam et. al., 1983	<i>Channa straitus</i>	Intestine	Nanded
15.	<i>G. paithenesis</i> , Kadam et. al., 1983	<i>Channa punctatus</i>	Intestine	Bhokar
16.	<i>G. maharashtrii</i> Hiware and Jadhav, 1995	<i>Channa marulius</i>	Intestine	Kandhar, Degloor

17.	<i>G. rohita</i> Pawar et.al, 2004	<i>Channa straitus</i>	Intestine	Kinwat, Mahur
18.	<i>G. pandeyae</i> Kasar et.al.,2010	<i>Channa gachua</i>	Intestine	Nanded
19.	<i>G. marathwadensis</i> Bhure et.al., 2011	<i>Channa punctatus</i>	Intestine	Degloor, Nanded
20.	<i>G.(G.) striatusii</i> Bhure and Nanware, 2012	<i>Channa gachua</i>	Intestine	Bhokar, Umri
21.	<i>Proteocephalus vitellaris</i> Verma,1928	<i>Channa marulius</i>	Intestine	Degloor, Nanded
22.	<i>P. raosahebae</i> Dandwate et.al., 2013	<i>Channa straitus</i>	Intestine	Mahur, Himayatnagar
23.	<i>Silurotaenia macroni</i> Shinde et al.,1984	<i>Channa marulius</i>	Intestine	Kandhar, Degloor
24.	<i>S. seenghala</i> Shinde et al., 1984	<i>Channa punctatus</i>	Intestine	Ardhapur, Nanded
25.	<i>S. ticto</i> , Shinde et al., 1984	<i>Channa gachua</i>	Intestine	Nanded, Kinwat, Mahur, Himayatnagar.
26.	<i>S. raoii</i> Bhure et.al., 2010	<i>Channa punctatus</i>	Intestine	Loha, Kandhar, Degloor

Table 2. Prevalence of Cestode parasites of *Channa Sp.* during March, 2012 to August, 2014.

Sr. No	Month & Year	No. of dissected Hosts	No. of infected Hosts	Prevalence %	No. of Cestode Parasites collected
1	March, 2012	32	21	65.63	29
2	April, 2012	32	22	68.75	26
3	May, 2012	32	26	81.25	34
4	June, 2012	32	10	31.25	13
5	July, 2012	32	04	12.50	06
6	August , 2012	32	06	18.75	09

7	September, 2012	32	07	21.88	10
8	October, 2012	32	09	28.13	11
9	November, 2012	32	11	34.38	15
10	December, 2012	32	13	40.63	18
11	January, 2013	32	16	50.00	20
12	February, 2013	32	16	50.00	19
13	March, 2013	32	19	59.38	23
14	April, 2013	32	21	65.63	27
15	May, 2013	32	25	78.13	30
16	June, 2013	32	11	34.38	15
17	July, 2013	32	05	15.63	08
18	August, 2013	32	07	21.88	11
19	September, 2013	32	06	18.75	10
20	October, 2013	32	08	25.00	13
21	November, 2013	32	12	37.50	16
22	December, 2013	32	14	43.75	19
23	January, 2014	32	17	53.13	23
24	February, 2014	32	18	56.25	22
25	March, 2014	32	21	65.63	28
26	April, 2014	32	23	71.88	33
27	May, 2014	32	27	84.38	34
28	June, 2014	32	11	34.38	16

29	July, 2014	32	06	18.75	09
30	August, 2014	32	08	25.00	14
	Total	960	420	43.75	561

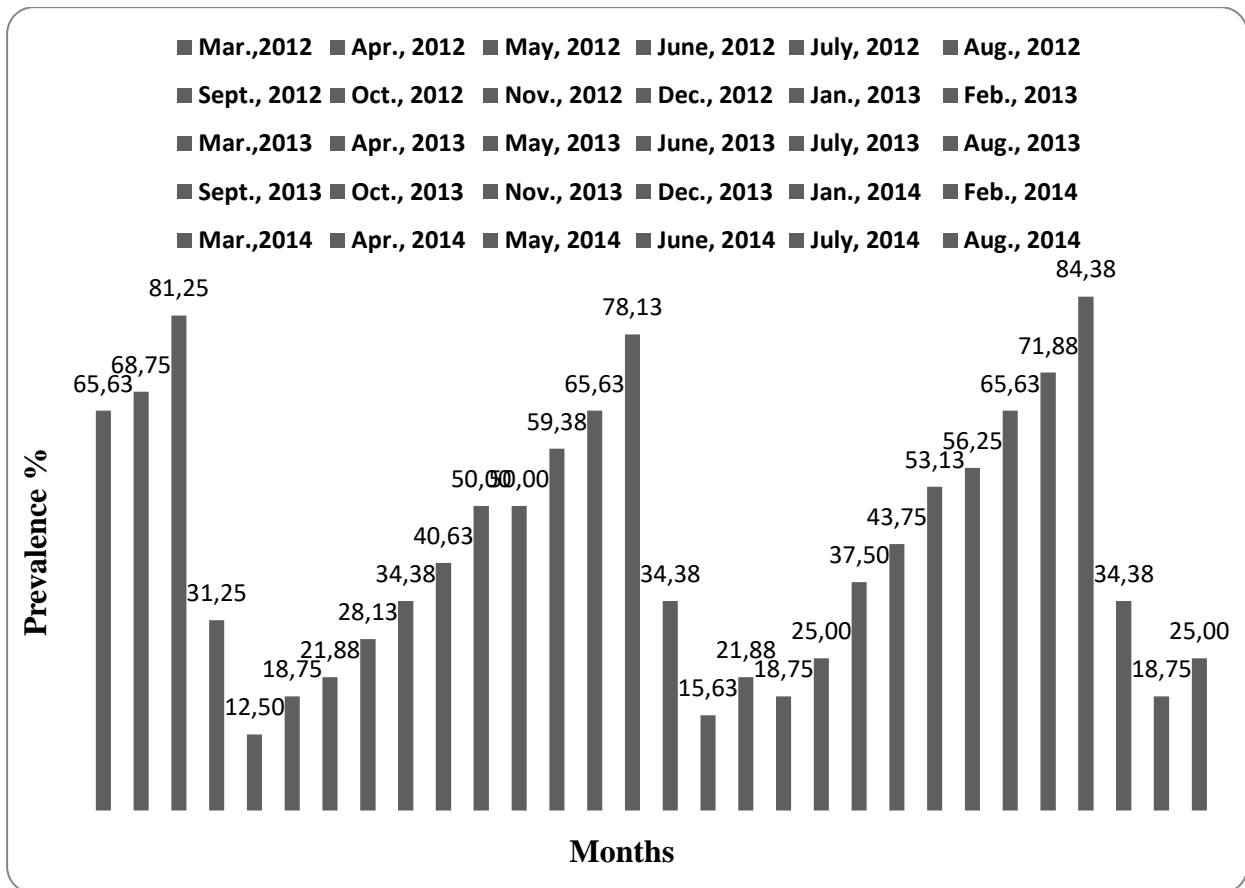


Figure 1. Prevalence of Cestode Parasites of *Channa Sp.* during March, 2012 to August, 2014.

Diversity of piscean Cestodes includes 26 species of five genera (Fig. 2). Ten species of *Senga*, Seven of *Gangesia*, Four of *Silurotaenia*, Three of *Polyoncobothrium* and Two of *Proteocephalus* were reported from *Channa sp.* (Fig. 2).

All these species differs from each other in general topography of organs. Nanware et al., 2013 reported 85 different species of Piscean tapeworms belonging to 08 genera viz. *Lytocestus* Cohn, 1908 (20 sp.); *Lytocestoides* Baylis, 1928 (08 sp.); *Bothrioccephalus* Rudolphi, 1898 (02 sp.); *Proteocephalus* Weinland, 1958 (01 sp.); *Polyoncobothrium* Diesing, 1834 (04 sp.); *Senga* Dollfus, 1934 (22 species); *Gangesia* Woodland, 1924 (18 sp.); and *Silurotaenia* Nybelin, 1942 (10 sp.) from different localities of Marathwada Region of Maharashtra.



Channa gachua (F. Hamilton, 1822)



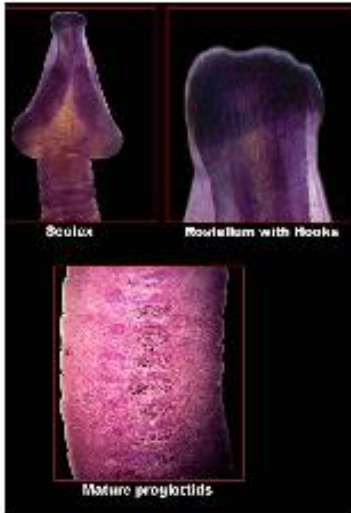
Channa punctatus (Bloch, 1793)



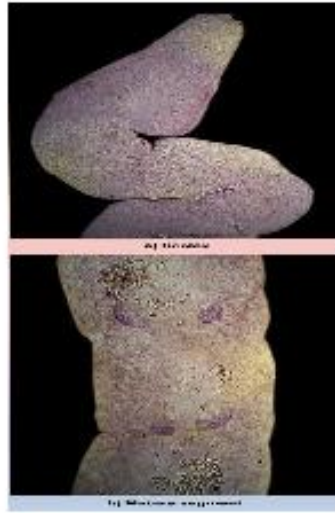
Channa marulius (F. Hamilton, 1822)



Channa straitus (Bloch, 1793)



Senga (Dollfus, 1934)



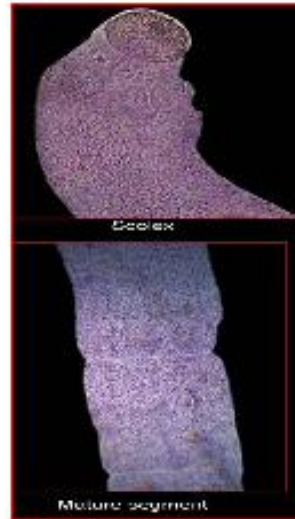
Polygoncobothrium (Diesing, 1854)



Gangesia (Woodland, 1924)



Proteocephalus (Weinland 1858)



Silurotaenia (Nybein, 1942)

Figure 2. Photoplates of Host and Cestode Parasites.

Bhure et al., 2013 described twelve species of genus *Cotugnia*, five sp. of *Davainea*, five sp. of *Raillietina*, four sp. of *Valipora* and four sp. of *Mogheia* Parasitic in *Gallus gallus domesticus* of locality Nanded.

Jadhav et al., 2015 studied population dynamics of *Cotugnia sp.* parasitizing domestic fowl and showed High incidence, density and index of infection were reported in Summer followed by Winter whereas infection was low in monsoon. Bhure and Nanware 2015 studied Faunestic diversity of Piscean, Avian and mammalian cestodes of genus *Lytocestus*, *Senga*, *Gangesia*, *Cotugnia*, *Davainea*, *Raillietina*, *Moniezia*, *Stilesia* and *Avitellina* from Nanded region (M.S.) India.

It was found that, high incidence of infection of these species were recorded in Summer followed by winter whereas infection was low in monsoon. Kennedy (1976) explained temperature; humidity and rainfall, feeding habits of host, availability of infective host and parasite maturation are responsible for influencing the parasitic infections. Jadhav and Bhure, (2006) reported high temperature, low rainfall and sufficient moisture were necessary for development of parasite. Feeding activity of the host is reason for seasonal fluctuation of infections (Pennuyuick1973). Nair and Nadakal, (1981) noticed retarded growth, decreased egg production, reduced weight gain, significant haemoglobin depression due to infections of cestode parasites in chickens.

Results of present study are in agreement with 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. Bhure et al., 2013 reported high prevalence in summer where as low in monsoon season, he explained domestic fowl infected with cestode parasites showed clinical signs in the form of dullness, emaciation, weakness, reduced growth, uneven body weights, reduction in voluntary food intake, loss of productivity, diarrhoea and decreased egg production. Bhure et al., 2013 studied seasonal variation of Caryophyllidean tapeworms, which showed maximum infection in winter (71.66%) followed by summer (43.33%) whereas lower infection in monsoon season (15.00%). 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 season (38.09%, 33.33% & 38.09%).

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. Salam 2015 studied highest load of prevalence of *Ascaridia galli* was found highest in Summer with total of 312 parasites recovered from 56 infected chicken.

Availability of food and feeding activity of host also may be reasons for occurrence of parasitic diversity. Maximum infections occurred in host *Channa punctatus* and *Channa gachua*. Infections are host specific because morphological, physiological and ecological factors affect host specificity. Morphological factors are those which like a parasite with its host at the site of attachment. Ecological factors are such as, distribution, and environment of host, diet and mode of feeding. These adaptations often provide important role for limiting a parasite to a particular host sp. in particular season.

Recorded data of present study shows high incidence of infections of cestodes was in summer followed by winter where as low in monsoon due to environmental factors and feeding habitat influence the seasonality of parasitic infection either directly or indirectly.

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