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Studies on seasonal occurrence and intensity of infection of *Dactylogyrus megavaginalis* n. sp. on *Cirrhinus mrigala*

Sunita Rai

Department of Zoology, University of Lucknow, Lucknow, U.P., INDIA

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ABSTRACT

An attempt has been made to study seasonal variation of *Dactylogyrus megavaginalis* n. sp. on *Cirrhinus mrigala* (cyprinid). Study was carried out for two years and intensity of infection was recorded. A total of 1561 specimens of *D. megavaginalis* n. sp. were collected from 184 infected fishes, out of 360 examined. Infection starts rising in September and October reaching the peak in April, May and June. The infection pattern shows that the medium-sized fishes are most affected followed by small-sized and large-sized in that order.

1) INTRODUCTION

Dactylogyrus megavaginalis n. sp. a monogenoidean parasite of *Cirrhinus mrigala* Hamilton, (1822) a commercially important major carp were regularly collected for about two years (2006 & 2007) to study the fluctuation in monogenoidean population in this fish in Butler palace pond at Lucknow, where this fish is reared.

2) MATERIAL AND METHODS

Fishes for this study were either collected by drag net or purchased from fishermen who regularly collected this fish for marketing. To study the monthly fluctuation of the parasites, 360 fishes were examined and samples were drawn at the rate of 30 fishes examined per month throughout the year and the total number of parasites was recorded. For studies on seasonal variation, different data were collected and subjected to statistical analysis for the following parameters:

1. Percentage of Infection.
2. Intensity of Infection.

Following formulae were used for above parameters:

$$\text{Percentage of Infection} = \frac{\text{Number of fishes infected} \times 100}{\text{Number of host examined}}$$

$$\text{Intensity of Infection} = \frac{\text{Total worm burden}}{\text{Number of fishes infected}}$$

To study the infection in different size groups of the host, 426

fishes were examined out of which 360 fishes were found infected with *Dactylogyrus* species. 66 fishes were found free from infection and have not been taken into account. The fishes were divided into three categories viz., small (below 5 inches), medium (between 6 – 10 inches) and large (above 10 inches).

3) RESULTS

A total of 1561 specimens of *D. megavaginalis* n. sp. were collected from 184 infected fishes, out of 360 examined. Monthly fluctuation of these parasites is given in Table 1. Distribution of parasites in different sizes of host is presented in Table 2. By analyzing the data from Table 1, it is apparent that the seasonal fluctuation in the population of *D. megavaginalis* n. sp. shows a sharp continuous fall from July and August up to February. However, infection starts rising in September and October reaching the peak in April, May and June. Maximum number of worms was recorded in the month of May (315) while minimum in August (27).

It was also observed that where the number of worms was high, their size was smaller as compared to the parasites which were less in number in the host. It seems from Table 2 that the intensity of infection varies with the size of host. The infection pattern shows that the medium-sized fishes are most affected followed by small-sized and large-sized in that order.

* Corresponding Author: Dr. **Sunita Rai**

Email address: surender.krai@gmail.com

Table 1. Showing number of *Cirrhinus mrigala* examined, found infected and Percentage and Intensity of infection from January 2006 – December 2006.

Months	Number of fishes examined (a)	Number of fishes infected (b)	Number of parasites collected (c)	Percentage of infection	Intensity of infection
January	30	8	30	26.6	3.75
Feb.	30	12	109	40	6
March	30	21	198	70	9.4
April	30	25	270	83.3	10.8
May	30	26	315	86.6	12.1
June	30	22	242	73.3	11
July	30	10	96	33.3	9.6
August	30	9	27	30	3
Septem.	30	12	54	40	4.5
October	30	17	118	56.6	6.9
Novem.	30	12	64	50	5.3
Decem.	30	10	38	33.3	3.8

More or less same result was obtained during January 2007 – December 2007

Table 2: Showing distribution of parasites in different sizes of host.

Length of the fish	No. of fishes examined	No. of fishes infected	
Below 5 inches		142	96
Between 6 – 10 inches		142	114
Above 10 inches		142	50

4) DISCUSSION

The fluctuation in the population of a parasite in a host depends both on abiotic and biotic factors as discussed by Dogiel [1]. In the present studies abiotic factors were not taken into account. Among the biotic factors the population fluctuation in parasite is influenced by (1) age (2) feeding habit (3) availability of host.

Dogiel [1] postulated a rule correlating the increase in intensity and incidence of infection with age of fish. However, in the present study the monogonoidean *D. megavaginalis* n. sp. behaves differently from Dogiel's [1] observation. From the above observation it is apparent that age of fish plays an important role in the acquisition and fluctuation in the population of parasite. It is observed that medium-sized fishes are most prone to infection. It can be interpreted that in older fishes probably some sort of age resistance is developed and in turn parasite population starts declining. Thus intensity of infection is low in fishes above 10 inches.

Similar trends have been recorded for Digeneans by Layman [2] and Srivastava and Mukherjee [3]. Wunder [4], Uspenskaya [5] and Paperna [6] have held that the decrease in incidence and intensity of *D. vastator* in second half of the summer was most likely on account of formation of epithelial outgrowths on the gill lamellae on which the parasites were unable to survive and so died. Similar observations were made by Bauer & Nikol'skaya [7], Prost [8] and Paperna [6] in *D. extensus* and Wilde [9] in *D. macracanthus*. From monthly fluctuation it is seen that the infection shows a decline in rainy and winter months. This may be due to the role of temperature

in the life cycle of the worms. Dogiel [1] also reported higher infection rate of monogeneans during the summer months. In winter months the temperature became quite low hampering the normal development of eggs. Similarly in rainy season chances of infection is also reduced due to rainfall and rapid flow of water.

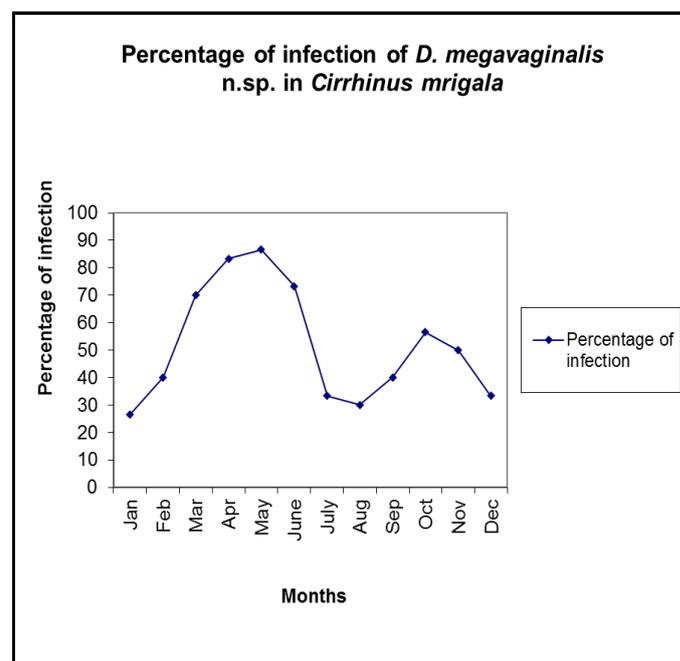


Fig 1: showing Percentage of infection of *D. megavaginalis*

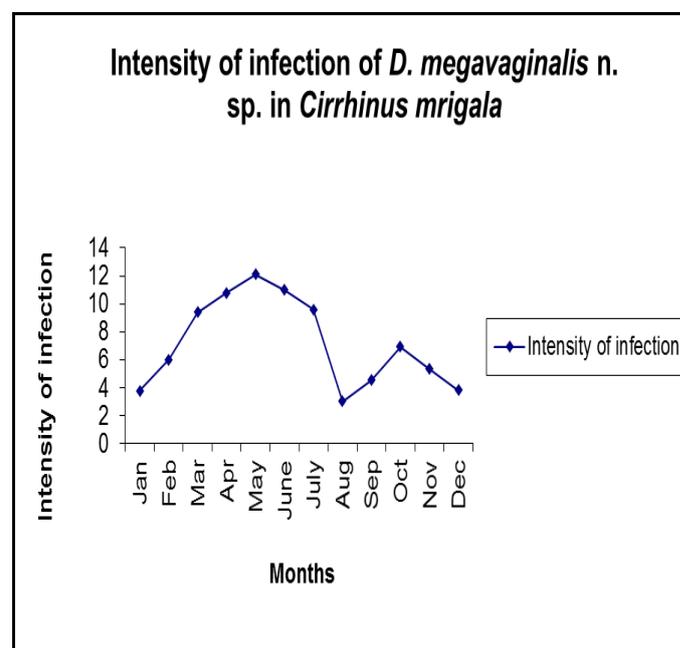


Fig 2: showing Intensity of infection of *D. megavaginalis*

5) CONCLUSION

It can be concluded that parasitic fauna of cyprinids is greatly influenced by biotic factors. Since, there is no published work on seasonal occurrence of *D. megavaginalis* prior to this; the present work can form the baseline for further research and comparative studies. The study shows maximum parasitic density in April-May which indicates the role of temperature

in the life cycle of parasites. The study also presents the evidence that intensity of infection varies with the size of the host.

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