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ECOLOGICAL STUDIES ON LARVAL DIGENETIC TREMATODES INFECTED WITH MOLLUSCAN SNAIL, *LYMNEA LUTEOLA* IN AND AROUND DARNA RIVER IN NASHIK DISTRICT, MAHARASHTRA, INDIA.

Vikram R. Kakulte
Department of Zoology, Smt. Vimlaben Khimji Tejookaya Arts, Science and Commerce College, Deolali camp, Nashik, Maharashtra, India

ABSTRACT
A survey of digenetic larval trematodes infected with Molluscan snails in the water reservoir, ponds, ditches, lakes in and around Darna river, Nashik, Maharashtra, India is carried out period October 2011 to September 2012. Molluscan snails prevailing to the ecological condition is studied in detail considering importance of environmental parameters such as physico-chemical examination i.e. temperature, humidity and rainfall, total hardness, total solids, total alkalinity, pH, chlorides. This study reveals that percentage of infection of larval trematodes and snail population in increasing order from December 2011, maximum in May 2012 and in decreasing order from June 2012 to Sept. 2012.

KEY WORDS: *Lymnea luteola,* parasites, trematodes, Snails, Water reservoir.

INTRODUCTION

Ecological studies on larval trematodes and their first intermediate host have been carried out by several workers; Manson-Bah Fairley (1920) investigated the seasonal occurance of *Schisotsomia cercariae* in Egypt. Soparkar (1917) studied the seasonal incidence of cercariae *Schistosoma spindalis* over a period of two years. In India, the research work by Sewell (1922) has been a valuable contribution to the knowledge of molluscs and cercariae. Miller et.al.(1926) study the seasonal infection of *Nassa obsoleta* with larval trematodes. Abdel-Malek (1958) reported few factors conditioning the habitat of bilharziasis intermediate host of the family Planorbidae. Ecology of larval and parthenite stages was observed by Vasilev *et. al.* (1980).The important contribution of Karykarte and Yadav (1981) is of equal importance who studied ecology of larval trematodes. Oleg Ditrich *et.al.* (1997) examined 4055 molluscs of 10 species from freshwater reservoir in Mexico and reported 13 larval trematodes. Dama *et al.,* (2000). Studied the control of the Helminthiasis vector snail *Lymnaea auricularia* by fresh water fish, *Clarius batrachus*. A. Epperts *et.al.* (2002) reported Biomphalaria globrata snails infected with Schistosoma mansoni with very high percentage. Sey *et.al.* (2003) reported nine species of digenetic trematodes in Hungari. Todd Huspeni and Kevin Lifferty (2004)evaluate the success of ecological restoration project in California using larval digeneans infecting snail. Nkwengulila and Kigadye (2005) A survey was carried out an digenean larvae infecting freshwater snails in five habitats in Dar Salaam, Ruvu and Morogoro. They reported 9424 snails belonging to 12 species from five families were examined for digenean infection in Tanzania. A. Farahnak et.al. (2006)worked on cercariae from freshwater snails Melanopsis spp. and their role in disease transmission. Lowrence A. Curtis (2007)studied the hypothesis that infecting trematodes influence the spatial distribution of the estuarine snail *Hyanossa obsoleta* was tested. Sami Bdir and Ghaleb Adwan (2011) reported larval juvenile trematodes in *Melanopsis praemorsa* snail from freshwater in Palestine. Gulam Murtaza Harshad *et. al.* (2011) reported southern Punjab Pakistan prevalence and ecology of freshwater snails. Chandore *et.al.,* (2011) reported snails as a intermediate host in Girna Dam and surrounding reservoirs where domesticated mammals act as definitive host and he studied juvenile ceracriae, metacerariae, radia and sporocysts. The study of relationship between a trematode parasites its intermediate host brings about the ecological studies of molluscs.

The present study was undertaken as preliminary step to define digenetic trematode fauna in ponds, ditches, lakes in and around Darna river, Nashik District, Maharashtra, India. It was hoped that this investigation useful for control of molluscan agents of helminthes parasites of agricultural and veterinary importance.

The study of molluscs harboring the cercariae of various trematodes involves in the study of environment in which the molluscs live. Freshwater harbours a wide variety of animals depending upon its physico-chemical nature. There is a definite work is to study the ecobiological conditions There is definite relation between the chemical composition, presence of molluscs and infection of cercariae prevailing in water reservoir, lakes, ditches and ponds in and around Darna river, various molluscs living in cercariae they horbour.

MATERIALS AND METHODS

Sampling:- The samples of water for analysis were collected from a fixed point of Darna river. The samples were collected of an interval of 30 days from Oct.. 2011 to Sept. 2012.

Collection of water samples: - water samples for theses analysis were collected according to approved limnological methods (American Public Health Association- APHA 1976). While collecting the water was taken to obtain a sample

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that was truly a representative of existing conditions of physical and chemical parameters in the Darna River. The samples were brought to the laboratory in wide method, screw capped, air tight and opaque polythene containers.

Physico-chemical examination :- (Approved limnological methods APHA-, 1976)

- Temperature: - The atmospheric and water temperatures were recorded with a mercury thermometer.
- Humidity and Rainfall:-The information pertaining to yearly rainfall and dates on humidity were collected from meteorological department, Nashik. 3) Total Hardness:- EDTA titrimetric method.
- Permanent hardness (as So4, cl):- Soda reagent method.
- Total solids(as Inorganic and Organic)
- Fixed solids(as Inorganic)
- Total alkalinity(as HCo3, Co3 and OH):Methyl organge
- pH
- Chlorides:- Argantometric method
- Ammonia Nitrogen
- Albuminoidal nitrogen
- Nitrate nitrogen (N2O5)
- Nitrite nitrogen (as N2O3)
- Ferric Oxide:- Phenolphthalein method.

RESULTS AND DISCUSSION

The climatic conditions of Darna river recorded for the last one year (Oct. 2011 to Sept.2012). The physical characteristics were recorded throughout the year Octo. 2011 to Sept. 2012 in all the three seasons. It was observed that in the month of Jan. (last month of winter) the water was colourless, odourless and clear in summer months (from Feb. 2012 to May 2012) there was absolutely no change in the physical nature of water, it was colourless, odorless and clear. The onset of monsoon in the month of June changed the physical characteristic of the water. It had a mud colour and odour. The clarity was lost and it became turbid. In the month of October it was partially clear having muddy odour. The atmospheric temperature was maximum during the summer months ranging from 36.9 c to 41.7 c. correspondingly, the water temperature during the same period ranged between 27.8 c and 29.0 c. During monsoon season in the month of June, atmospheric temperature was 34.6 c and water temperature was 24.2 c. In the month of September, the atmospheric and water temperature were 31.4 c and 22.8 c respectively. The downward trend of the temperature was noted in the month of Dec.i.e.28.8 c corresponding the water temperature was 19.5 c. The maximum humidity was noted in the monsoon months from June to September. It was 87% in June and 92%in September. In winter months, the humidity ranged between 48 % and 53%. The atmosphere was comparatively dry in summer and humidity ranged between 38 % and 41 %.The rainfall during monsoon season was maximum in the month of August (84.4 cm) and minimum in the month of June (76.4 cm). The total hardness showed variations during the year minimum hardness 106.00 ppm was noted in the month of October (first month of winter) and maximum hardness 134.00 ppm during the last month of summer. Variations in total solids and fixed solids were also noted. The total solids were maximum (214 pp m) in the month of May (last month of summer) and minimum (106 ppm) in the first month of winter. The quality of fixed solids was maximum (168 ppm) during May and minimum (136ppm) in September (last month of monsoon). The total alkalinity showed variations during the year. Minimum total alkalinity 72.00 ppm was noted in the month of January(last month of winter) and maximum alkalinity 106.00 ppm during the last month of monsoon(September). The water of Darna River was alkaline in nature, the pH varied from 7.1 to 8.6. The minimum pH (7.1) was noted in the month of September and maximum (8.6) in the month of January. The chlorides showed marked seasonal variations. In summer months, the chlorides increased progressively from 26.00 ppm in February to 32.00 ppm in May. The quantity also increased in monsoon months from 34.00 ppm in the month of June 40.00 ppm to the month of September. A downward trend was noted in the winter months. The maximum amount of albuminoid nitrogen was noted at the onset of monsoon in the month of June. The quantity was 4.06 ppm. There was a continuous decrease from July onward and minimum reading was noted in the last month of summer i.e. 1.75 ppm. In monsoon, ammonia nitrogen increased from 0.89 ppm to 0.96 ppm in September. A decrease was noted in the winter months from 0.82 ppm in October to 0.67 ppm in January. In summer months, there was gradual decrease from 0.61 ppm in the month of February to 0.49 ppm in May. The minimum quantity of nitrate nitrogen was noted in the first month of winter i.e. October. It was0.60 ppm and increased progressively to the last month of winter i.e. January to 1.80 ppm. During monsoon season a downward trend was noted in June, it was 1.50 ppm and in September 0.65 ppm. Nitrite nitrogen was noted to be absent in water at Darna river. However, a negligible quantity was indicated during September, October, and November. In summer, the water current for ferric oxide showed only traces of ferric oxide. However, the readings carefully noted showed a downward trend from 0.09 ppm (February) to 0.05 ppm (May). During monsoon there was a progressive increased from 0.20 ppm to 0.80 ppm between months of June and September respectively.

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The seasonal variations in the occurrence of snails were studied for one year (October 2011 to September 2012). In Lymnea luteola, there are seven types of cercariae are found. They are Echinostome cercariae, Furcocercus, Xiphidiocercariae, Distome, Monostome, Amphistome and Cercariae indicae(xviii Sewell, 1922). The seasonal variation in the occurrence of cercariae showed that all seven cercariae were available from the last month of winter (January)to the last month of summer (May). The percentage of infection and availability of the snails is increased from December 2011 to May 2012 observed.

Table 1. Seasonal variation of Snail and Percentage of infection

Season	Months	Total collected	Infected	% of Infection
Winter	Oct.2011	300	24	**8.00**
	Nov.2011	900	590	**65.55**
	Dec.2011	700	504	**72.00**
	Jan.2012	693	513	**74.03**
Summer	Feb.2012	1211	941	**77.70**
	Mar.2012	1296	1012	**78.09**
	April 2012	1323	1062	**80.27**
	May 2012	1408	1184	**84.10**
Mansoon	June 2012	1243	194	**15.60**
	July 2012	746	86	**11.53**
	Aug.2012	654	61	**9.33**
	Sept.2012	**403**	**35**	**8.69**

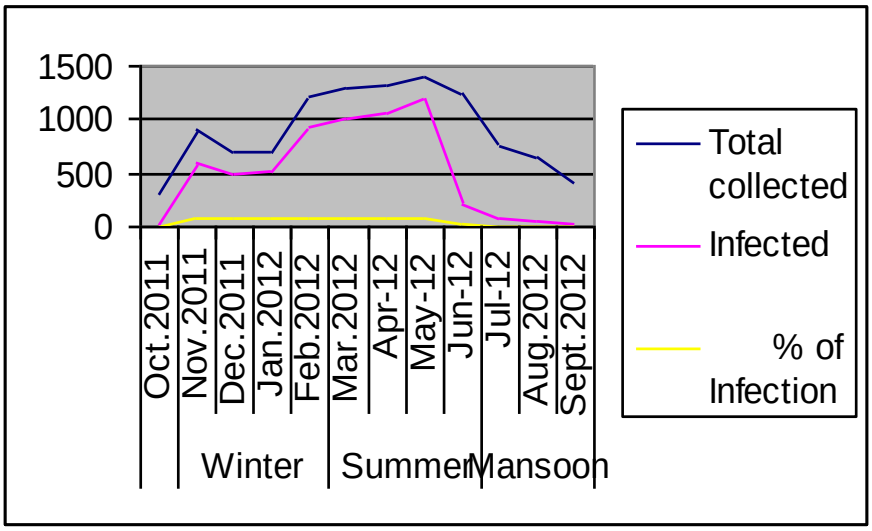

Figure 1. Shows increase availability of snail percentage of infection

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