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A Brief Note On The Biology Of Furcocercous Cercariae

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Abstract

Cercariae as a rule do not feed during their free life. Their activities pre-dominantly depend upon the reserve food material which they accumulate during their parasitism while inter-molluscan stage. It is seen that the main reserve substances present in the cercarial body are glycogen and fat. Glycogen are found in some quantities in the form of large, rounded stellate cells with bubble like nucleus located on either side of caudal excretory canal. However, accumulation of lipid takes place in parenchymatous cells in the form of refractile granules. The amount of glycogen and fat varies from species to species. This present communication deals with the study of biology of furcocercous cercariae. The observations are concentrated around the amount of reserve food material, life span, nature of movement, circadian rhythms of larval emergence. Findings are discussed herewith in detail.

Key words: *Furcocercous cercariae, reserve food material, cercarial activity*

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Introduction

Furcocercous cercariae include both monostome and distome cercariae and are characterized by presence of forked tail. Oral sucker is in the form of an anterior protrusible organ. Cercariae develop inside sporocyst or redia and after emerging from the molluscan hosts they remain suspended in water with their body upside down. To the best of my knowledge, Soparkar (1921) for the first time reported furcocercous cercariae from Bombay. Subsequently, Sewell (1922), Baugh (1954), Singh (1955), Agarwal (1959), Singh (1959), Khan (1962), Singh (1962), Singh and Malaki (1963), Thapar (1969), Dutt (1970), Pandey (1973), Pandey and Agarwal (1977) described the taxonomy and morphology of Furcocercous cercariae from the different parts of the country. But practically no attention was paid to the biology of these cercariae. Thus with a view to enrich our knowledge and attempt has been made to study the biology of furcocercous cercariae.

Results

During the free life span, cercariae do not feed. They depend upon the reserve food substances such as glycogen and lipid which accumulated in the cercarial body during their parasitism while inter-molluscan stage. Large rounded and stellate cells of glycogen are located on either side of caudal excretory canal. . However, accumulation of lipid takes place in parenchymatous cells in the form of refractile granules which can be visualized with the help of phase contrast microscope. The amount of glycogen and fat varies from species to species. It was observed that their exists, great variation in the life span of different species of cercariae even if they are maintained at identical condition. It was also observed that the cercariae which emerge in morning and evening live longer as compared to those which emerges at mid day.

Apart from this it was also observed that their occurs visual differences in the original quantity of glycogen. Freshly emerged cercariae have more glycogen reserve in the form of caudal bodies. Size of caudal bodies gradually reduces with the time as shown in figure (1-5).

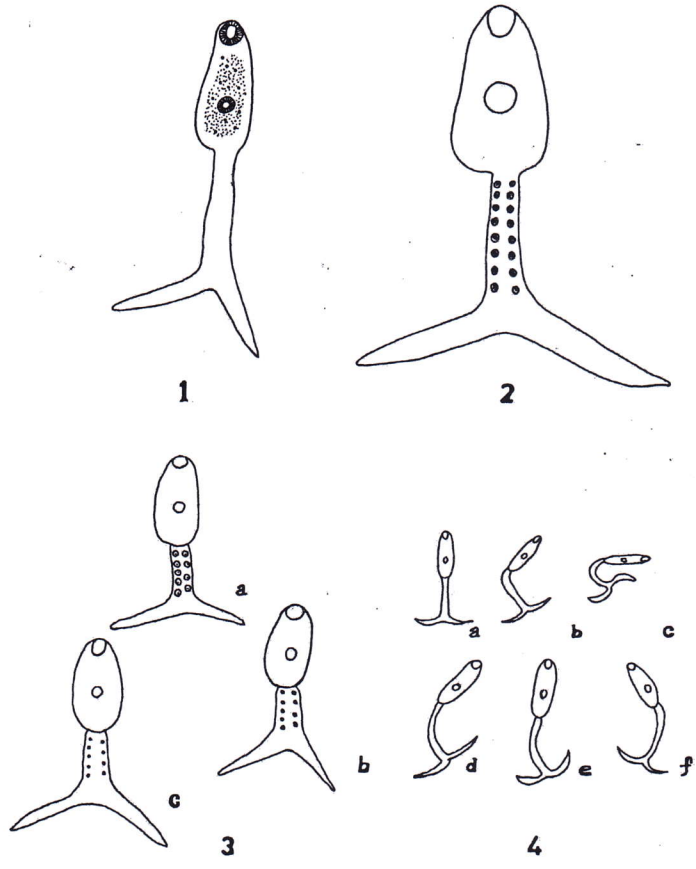

Figure 1: A *Furcocercous cercaria*, 2: Freshly emerged cercaria having rich food reserve, 3: Size of food reserves gradually reduces with the time from a-c, 4: Various mode of cercarial movement.

In most of the cases the cercariae emerging from the snail host are very active. Some of them are so active that is very difficult to observe the nature of their movement. During the course of study, the nature of movement, was observed and it was seen the cercariae move by putting anterior as well as posterior end forward. These movements are exclusively accomplished by active contraction of muscles of the caudal stem. The wave of contraction either runs back forward or front backward. Forks of the tail act as guide during this movement. The cercariae first perform active, rapid and spiral rise and

subsequently descend slowly. The intermittent period of active swimming is usually shorter than passive gliding. It was also observed that the movements of cercariae gradually reduced with the increase in the life span and finally the larvae start creeping with the help of suckers.

The rhythms of emergence of cercariae showed, a definite positive co-relation with temperature and light. The cercariae starts emerging since morning at 8.00 hours; their number reaches eak at 12.00 hours and finally stops at 18.00 hours.

Discussion

Presence of glycogen and fat as reserve food substances in the body of the cercariae confirm the findings of Lutta (1939), Palm (1962), Cheng (1963) and Ginetsinskaya (1988). Presence of glycogen in the form of large, rounded , stellate cells with bubble like nucleus on the either side of caudal excretory vessel, corroborates with the findings of earlier workers like Erasmus (1958), Ginetsinskaya (1960), Ginetsinskaya and Dobrovolskii (1962, 63). These workers reported similar findings in the cercariae of *Notocotylus, Echinostoma, Cotylocercous* and *Marocercous.*

It is seen that fat is accumulated in Furcocercous cercariae in its parenchymatous cells and along the course of excretory vessels in the form of refractile granules which are clearly visible under the phase contrast microscope. Earlier, Ginetsinskaya (1961) have also reported similar findings in *C. nigrospora* and cercariae of *Sphaerostoma* but he did not assign any region for the presence of fat in association with excretory system. In my opinion, since accumulation of reserve food substances takes place in cercarial body during their presence in the body of molluscs, its hepatopancreas, a large quantity of fat deposit occurs because the larva has not yet started metabolic activity. Thus in order to eliminate the fat out of the larval body. They are accumulated in the excretory system. Similar postulations have been made by Ginetsinskaya (1988).

Variations in the amount of glycogen and fat, reserve in cercarial body was noticed during course of study and quantity and nature of distribution of reserve food substances was directly related to the biology of the cercariae. This may be because cercariae that have small glycogen appear to be sluggish and passive after emergence from the molluscs. They adhere to the surface of the water and hang themselves absolutely immobile. Whereas those which are active perform rigorous movements and have large amount of reserve food substances in them.

During the course of study, variations in the life span of different species of cercariae were also noticed.

It was also observed that the larvae emerging in morning and evening hours live longer as compared to those which emerge during the mid day. Besides this, it was also seen that amount of glycogen reserve decreases with the increase of the age. These observations proved that the life span of cercariae depend upon the amount of reserve food substances. Principally, they utilize glycogen as source of energy and life span is directly related to the speed of metabolism. Earlier workers like Krull (1935), Ginetsinskaya (1960), Palm (1962), Chemrmogorenko (1962), Hunter and Vernberg (1955), Olivier *et.al* (1953) have drawn similar conclusions.

As regard to the movement of cercariae, Wunder (1924), who for the first time studied the movement of cercariae of *Bucephalus*. Later workers like Wesenberg- Lund (1934), Neuhaus (1953) and Pearson (1959) have made some contribution on the nature of movement of some cercariae viz: *Bucephalus*, *Trichobharzia* and the cercariae of trematode belonging to genus *Alaria*. and have also observed similar findings.

During the course of the investigation, a positive co-relation was recorded in cercarial emergence with light and temperature. Earlier Cort (1922) and Dubois (1929) suggested that the periodicity of cercarial emergence is controlled by the succession of day and night temperature. Faust and Halfman (1934), Giovannola (1936) and others concluded that light is the cause of the cercarial emergence during the day light hours. Kuntz (1947) considers that the most of the cases, emergence of cercariae greatly depends upon the changes in temperature. Gumb, *et.al.*(1957) reported that light plays an important role in the emergence of cercariae of *Schistosoma japonicum*. Rees (1931) in *C. limbifera* and Verma (1954) in cercariae of *Cotylophoron* reported that as soon as molluscs are transferred from light to darkness they cease to emit cercariae.

It may be concluded that large number of factors, both biotic and abiotic, intrinsic as well as extrinsic are responsible for circadian rhythms and emergence of larvae. Moreover, from different studies, it is clear that light and temperature both plays an important role in the emergence of larvae.

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