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HAEMOGLOBIN LEVEL OF THE FISH *HETEROPNEUSTES FOSSILIS* DUE TO TRYPANOSOMA INFECTION

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MANY species of Trypanosomes from fish have been described all over the world, particularly in India where a number of new species were encountered[1–8]. Tandon *et al* initiated work on the physiology of fish blood infected with Trypanosomes and observed the changes in the haemoglobin level. The present study adds further knowledge to the haemoglobin level of the fish infected with *Trypanosoma danilewski* var *saccobronchi.*

T. danilewski var *saccobronchi* was observed in 75% of the fish *Heteropneustes fossilis* collected at Warangal region. The infected fish ranged from 14.3–69.6 g in weight and in length from 12.8–21.7 cm. Normal fish ranged from 16–70 g in weight and 15 cm–22 cm in length. The infection was heavy in all the fishes. The blood was drawn and the haemoglobin content was estimated in normal as well as in the infected fish by Sahli's method. The results were statistically analysed by the students *t* test. The haemoglobin levels of the infected fish were 9.35 $\pm$0.46 g/100 cc while those of the normal were 12.91 $\pm$0.72 g/100 cc. Decrease in the haemoglobin level was observed in the infected fish compared to the normal fish. In the earlier reports the decrease in *clarius batrachus by Trypanosoma maguri* was 20% and in *Mystus vittatus by Trapanosoma vittati* was 60%[5]. In the present study the percentage of decrease is 30%. Decreased level of haemoglobin is an important factor for the anemia in fish leading to their death. Woo[9] stated that due to the haemoflagellate infection in the blood, the antibody-antigen forms a coating on the RBC and the compliment is induced for the lysis of the RBC. Ultimately the number of RBC's will be reduced and the haemoglobin level decreases. Another important factor now noticed is the host and species specificity. The decrease in the haemoglobin varied from host to host and also due to different species of Trypanosomes, though the infection was heavy in all the hosts. This indicates that the host and species specificity is involved in utilizing the haemoglobin.

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PRELIMINARY OBSERVATIONS ON THE CARDIOPHYSIOLOGY OF *MOINODAPHNIA MACLAYI* (KING).

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THE crustacean heart has been a subject of several investigations[1–3]. However, the main focus has been more on the heart of decapoda and still more so as of the family potamonidae. This situation is understandable since they are larger animals, more often in shallow waters and easy to collect for examination. However there is still a wide gap in the knowledge of comparative properties of freshwater estuarine and marine potamonids[3]. Moreover, although ubiquitous cladocerans have been observed repeatedly under microscope, very scanty information is available on the cardiophysiology of these micro-organisms[4]. The present note hopes to fill in this lacuna by recording the exact cardiac rhythms in these micro-organisms.

The specimens were collected from the ponds and tanks in the vicinity of Poona University. They were

isolated by micropipettes and maintained in glass-troughs. They were fed at 22° + 1°C with plant and animal micro-organisms. Observations were made on a single individual at a time. The water medium was changed after every 30 min. The heart beats were traced on a kymographic paper using a lever activated tracer connected to a hairline ocular micrometer.

Kymographic recordings gave the following results. Male 90 ± 5 beats/min, male after moulting 120 ± 5 beats/min, female 105 ± 5 beats/min, and female with embryos 120 ± 5 beats/min. Average of ten individuals of each category was studied before recording the heart beats. The gross observations revealed that the heart beats of the males and females are quite different (figure 1).

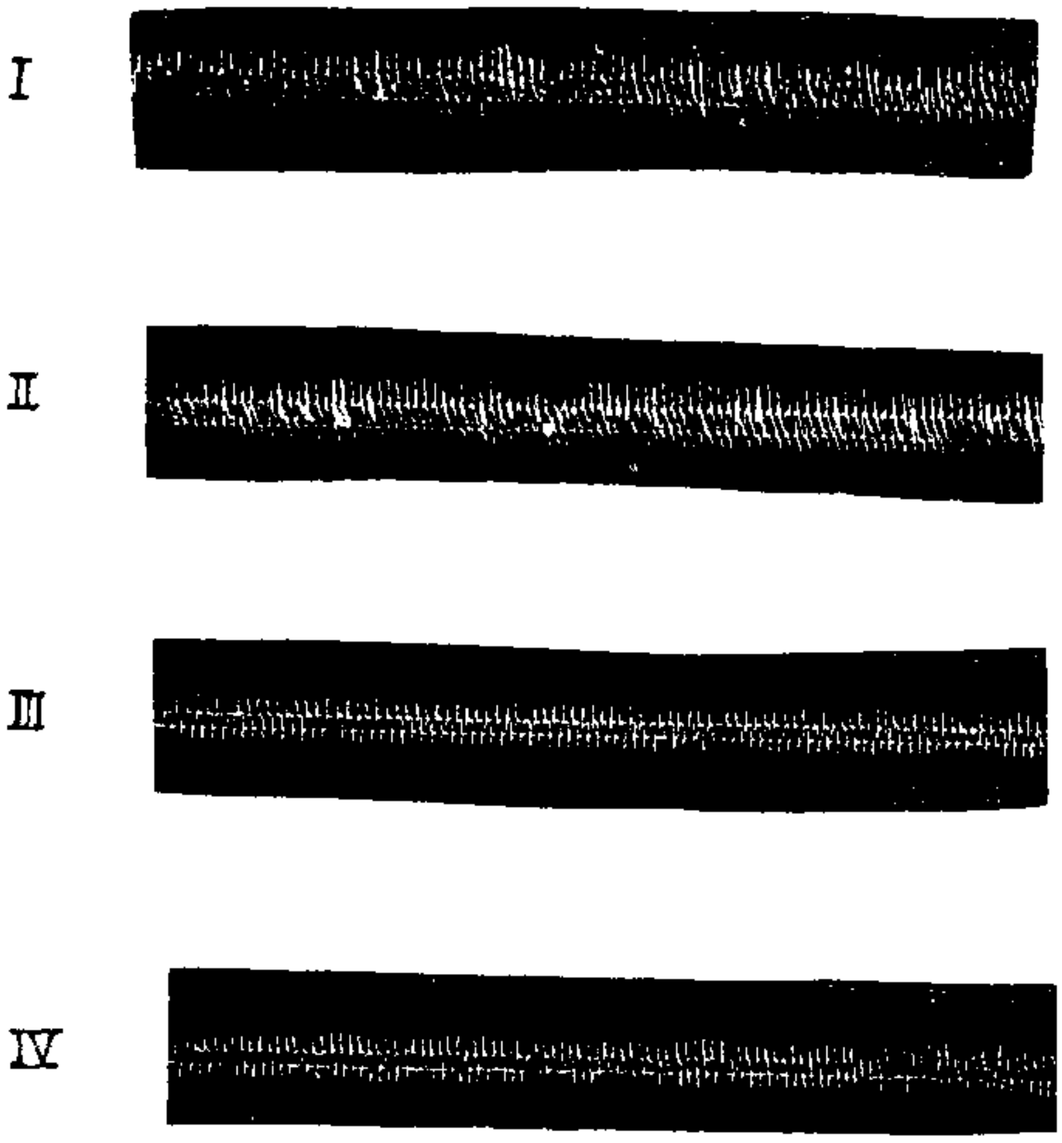

Figure 1. Kymographic recordings of the heart beats of *Moinodaphnia macleayi* (King). I: Male (90 ± 5 beats/min) II: male after moulting (120 ± 5 beats/min.), III: female (105 ± 5 beats/min.), and IV: female with embryos (120 ± 5 beats/min.) Cardiogram was recorded at 2.5 mm./sec.

It is therefore not surprising that the number of heart beats differs under different ecological conditions. The above observations are also consistent in view of an earlier report on *Simocephalus*, a genus related to *Daphnia*, in which heart rate maxima recur periodically when eggs or embryos are in brood pouch[5]. In the prawn, *Alpheus dentipes*, the heart rate increases before and after each moult[6]. The rate of beating of the crustacean heart is remarkably variable not only in different kinds of crustacea, but even within one species[7]. In *Daphnia*, the heart rate increases shortly after feeding or among uncrowded animals[8]. It has been noted that environmental factors such as temperature, pH and light have significant consequences on the cardiac rhythms.

In view of the abundance of these sensitive micro-organisms, the cardiophysiological responses to several known water pollutants have been investigated. The details will be reported in due course.

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