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New Records of Sessile Rotifers from Freshwater Fishponds of Tripura

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Five different species of sessile rotifers viz., *Ptygura melicerta* Ehrenberg, *Collotheca ornata* (Ehrenberg), *C. tenuilobata* Anderson, *C. trilobata* (Collins), and *C. mutabilis* (Hudson) are being reported for the first time from Tripura. During this study the different physico chemical factors of water, the nature of substrata and seasonal abundance of these rotifers are also observed.

Key Words: Sessile rotifer, New report, Ecological conditions

Introduction

Studies on sessile rotifers are important on the aquacultural point of view (Banik 1992). So, description of those biota is needed to recognise them in the waterbodies (Koste & Shiel 1989, Koste & Hollowday 1992). At the same time the knowledge on their ecological conditions is also essential to get clear idea regarding their distribution (Wallace 1980, Koste 1986, 1989), which is found to be lacking in most works of India (Bhardwaj 1985, Sarma 1988).

The present study communicates the description of five rotifer species with their ecological conditions (such as limnological factors, substrata preference and seasonal abundance).

Materials and Methods

This work has been conducted in two pisciculture ponds of Agartala (Latitude 23°50'15" N and Longitude 91°15'45"E), Tripura for a period of one year from December 1991 to November 1992. The mean depth of the study site varied from 1.5 m during summer to 2.3 m during monsoon. The ponds were stocked with different varieties of major and minor carps.

The description of rofier is based on 250 biotic samples, which have been studied in live condition. The biota has been collected through natural (such as roots, stems and leaves of hydrophytes) and artificial substrata (such as glass slides) at an interval of one week from both the ponds. The glass slides were immersed vertically in the water following the methodology of Banik (1987).

The different physico chemical conditions of water such as temperature, transparency, *p*H, carbon dioxide, dissolved oxygen, alkalinity, dissolved organic matter, salinity, silicate, chlorinity, phosphate phosphorus and nitrate nitrogen have been analysed following APHA (1985). The data of physico chemical factors of the two ponds are pooled together into a yearly mean (table 1) in order to get a clear idea regarding the limnological conditions. The present description of rotifers is based on camera lucida drawings. To identify them upto species, the works of Koste (1978), Pennak (1978), Pontin (1978), Edmondson (1992) and Hyman (1992) were consulted.

Table 1 *Physico-chemical conditions of the two freshwater fishponds studied during December* 1991 *to November* 1992

Physico chemical factor	Range	Mean
Water temperature	9.00-28.00°C	19. 7°C
Transparency	13.00-28.00 cm	19.98 cm
*p*H	.50-8.00	.78
Free carbon dioxide	1.40-2.30 ppm	1.98 ppm
Dissolved oxygen	3.00- . 0 ppm	5.88 ppm
Bicarbonate alkalinity	30.00-70.00 ppm	0.00 ppm
Dissolved organic matter	2.23- .00 ppm	4.13 ppm
Silicate	2.00-9.00 ppm	.00 ppm
Chlorinity	10.00-30.00 ppm	20.00 ppm
Salinity (‰)	0.01-0.03 ppt	0.02 ppt
Phosphate phosphorus	0.30-0.39 ppm	0.33 ppm
Nitrate nitrogen	0.34-0.38 ppm	0.34 ppm

Results

The present study consists of five species of sessile rotifers representing two families and five genera.

Family: Flosculariidae
Ptygura melicerta Ehrenberg

Family: Collothecidae
Collotheca ornata (Ehrenberg)
C. tenuilobata Anderson
C. trilobata (Collins)
C. mutabilis (Hudson)

Ptygura melicerta Ehrenberg

The body of this animal always bends continuously (figure 1A). That is why it is very difficult to get the exact measurement of this species. During relaxed condition the animal depicts swinging in search of food. Germovitellarium is more distinct in comparison to other loricated species. There is presence of malleoramate type of trophi with many teeth having distinct fulcrum (figure 1B). Only one amictic egg is found at a time and it is attached at the foot base. However, both the egg and foot base are covered with the hairs of the trap door of *Utricularia*. During high water temperature (more than 27°C) in the summer month the spiny resting egg (instead of amictic) is found to be recorded.

Physico-chemical condition: They never observed at *p*H more than 7.0 and also at bicarbonate more than 60.00 ppm. High number of this species is found during water temperature of 23 to 26°C. The animals are available in such littoral area in which tree sheds are available. Their populations are poor in that pond in which the amount of dissolved oxygen is comparatively low (3.00 to 4.93 ppm).

Substratum: Found at the entrance of the trap door of *Utricularia* and on the glass slide (in very low number).

Seasonal abundance: Maximum numbers are found both in the monsoon and in the winter while minimum in the summer is being observed.

Collotheca ornata (Ehrenberg)

In most cases the adults are covered with transparent lorica (figure 2A). The bristles on the tip of the five blunt lobes help in food collection. Although this animal prefers food of animal origin but algal foods are also found to be captured by these bristles. Before entry into the stomach the unsuitable prey is ejected out. Probably the cilia on the diaphragm control the quality of the food while the trophi inhibits the large sized food matter to enter into the stomach. The trophi is of uncinate type with distinct uncus and sub uncus (figure 2B). Germovitellarium is clearly visible during the reproductive period. When the organism is ready for egg laying the whole body comes to resting condition. After egg laying the cloacal opening remains open for few seconds. Maximum six amictic eggs are found at a time inside the lorica.

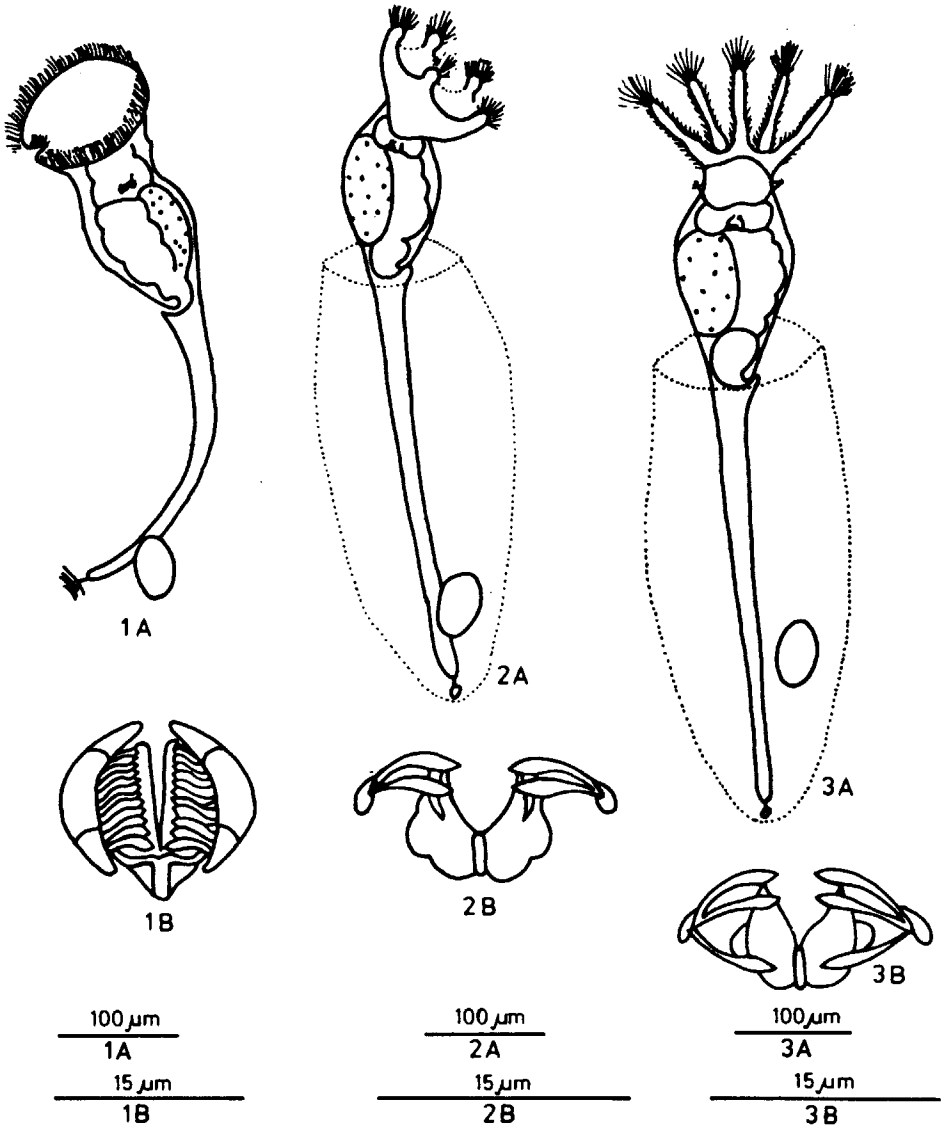

Fig. 1-3. **1A**, *Ptygura melicerta* Ehrenberg; **1B**, Malleoramate type of trophi; **2A**, *Collotheca ornata* (Ehrenberg); **2B**, Uncinate type of trophi; **3A**, *Collotheca tenuilobata* Anderson; **3B**, Uncinate type of trophi

Physico-chemical condition: Although the animals are available throughout the year but high density is being observed at water temperature of 21°C during which both *p*H (6.50 to 7.00) and bicarbonate (30.00 to 40.00 ppm) show narrow range of variation. At the same time the results of dissolved oxygen (5.83 to 6.36 ppm), dissolved organic matter (4.44 to 5.66 ppm), and phosphate phosphorus (0.30 to 0.37 ppm) are found to be

high. This species shows comparatively low population at water temperature of 28°C in the summer.

Substratum: *C. ornata* is found to be available on the stem and leaf of *Utricularia*, root of *Eichhornia crapis*, stem and leaf of *Trapa* and on the glass slides also. However, populations are more on the leaves of *Utricularia*, and very low on the stem and leaf of *Trapa*.

Seasonal abundance: Highest abundance during the winter and lowest in the summer have been observed.

C. tenuilobata Anderson

Most of them are found in the community of sessile protozoans. Presence of long bristles on the lobe and very short interlobal cilia (figure 3A). The prey of this animal such as protozoans, enter into the pharynx due to their thigmotactic activity. At the same time the trunk contacts alongwith the arms in order to pass the food into the stomach. They show slow and gradual relaxation of the body if the food definitely reached the stomach. However, quick relaxation of the body causes ejection of the unwanted food particle. The trophi is of uncinate type (figure 3B). Holdfast is clearly visible on the glass slide rather than on the natural substrata. The number of amictic egg found at a time varies from one to four.

Physico-chemical condition: The water temperature varies from 15.93 to 19.00°C during the period of availability of this species. However, populations are comparatively high at temperature of 19°C. The transparency during this time found to be low (13.00 cm). At the same time the dissolved organic matter shows relatively high value (4.33 ppm).

Substratum: This species is found on the stem and leaf of *Utricularia*. root of *Eichhornia crapis*. root of *Salvinia* and also on the glass slide.

Seasonal abundance: Available in the winter months only.

C. trilobata (*Collins*)

Corona is relatively wide and large (figure 4A). While opening the corona the larger hood like lobe opens first but during food capture it closes last. Longitudinal and circular muscles of the coronal lobes are very distinct. Only in a particular position of the animal, the two lateral antennae are visible at the junction between the coronal funnel and the trunk. The animal detached from the subtra-

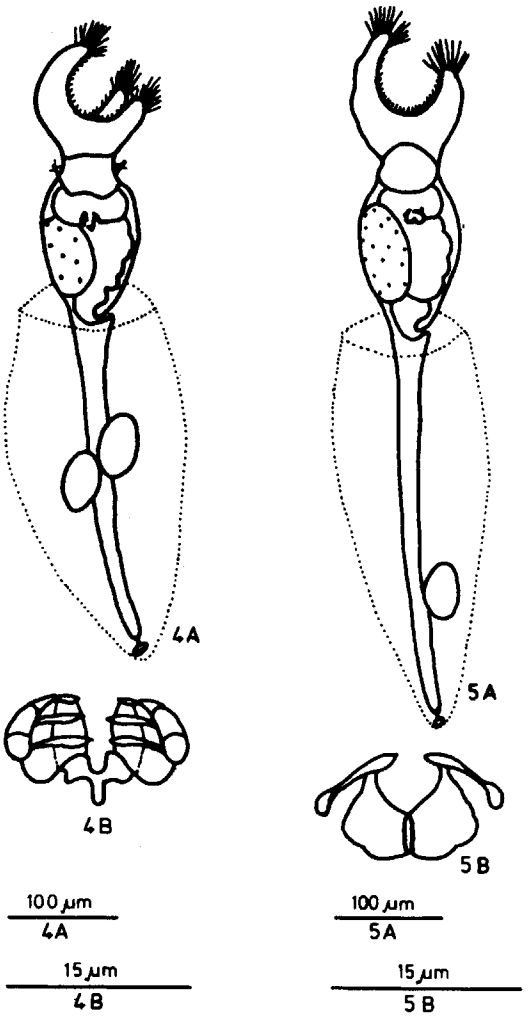

Figure 4-5. **4A**, *Collotheca trilobata* (Collins); **4B**, Uncinate type of trophi; **5A**, *Collotheca mutabilis* (Hudson); **5B**, Uncinate type of trophi

tum slowly contracts the body and tries to hold the substratum with the help of the corona and then the foot moves slowly for attachment to the substratum. There is presence of uncinate type of trophi (figure 4B).

Physico-chemical condition: The water tempearture varies from 22 to 24°C during their high population. However, they never found at *p*H more than 6.8 and also at bicarbonate more than 60.00 ppm. They show very low abundance at temperature of 27°C or more during which resting egg (instead of amictic one) is found. The dissolved organic matter at this time found to be low (2.23 to 2.79 ppm). The dissolved oxygen shows low concentration (3.00 to 3.83 ppm) and the dissolved frees carbon dioxide shows comparatively high concentration (2.30 ppm) at the same period.

Substratum: Available on the stem and leaf of *Utricularia*, root of *Eichhornia* carpis and on the glass slide. However, populations are relatively high in the stem and leaf of *Utricularia*.

Seasonal abundance: They show highest abundance both in the autumn and winter and poor abundance in the summer.

C. mutabilis (*Hudson*)

Found in the periphytic community in which free swimming rotifers such as *Rotaria, Philodina* are very common. The foot length of this species is more than twice the trunk (figure 5A). The trophi is uncinate type (figure 5B). One to four amictic eggs are found at a time inside the lorica. However, during unfavourable environmental conditions in the summer period the spiny resting egg is found to be recorded.

Physico-chemical condition: The water tempeature varies from 19 to 22°C during their highest abundance. The *p*H (6.90 to 7.80 ppm), bicarbonate (40.00 to 0.00 ppm), free carbon dioxide (1.80 to 2.00 ppm) and dissolved oxygen (6.00 to 6.38 ppm) depict considerable variation at this time. However, poor populations are observed during water temperature of 27 to 28°C. At this time the concentration of the free carbon dioxide (2.00 to 2.30 ppm) is found to be relatively high but the dissolved organic matter (2.30 to 2.63 ppm), phosphate phosphorus (0.30 ppm) and nitrate nitrogen (0.34 ppm) are being found in low concentration..

Substratum: Found on the stem and leaf of *Utricularia,* leaf and root of *Lemna,* root of *Eichhornia crapis* and also on the glass slides. Interestingly, high populations are observed on the leaves of *Utricularia* and low on the roots of *E. crapis*.

Seasonal abundance: Highest abundance during the winter and poor abundance in the summer are being observed.

Discussion

In order to describe the presently observed species such as *Ptygura melicerta* Ehrenberg, *Collotheca ornata* (Ehrenberg), *C. tenuilobata* Anderson, *C. trilobata* (Collins), and *C. mutabilis* (Hudson), the most important taxonomical characteristics are put together after comparing with our own observations. It is observed that all sessile species recorded in the present work are available in a particular limnological condition(s) (Banik 1992) and in a definite season beyond whch it is hardly possible to collect a single animal (Banik & Datta 1991).

Although these five species had earlier been reported (Sarma & Rao 198 , Sarma 1988) from some other states of India, they are reported for the first time from Tripura, which confirms their occurrence all over India. Of them, *P. melicerta* Ehrenberg (Koste 1972), *C. ornata* (Ehrenberg), *C. trilobata* (Collins) and *C. mutabilis* (Hudson) had also been reported earlier from various corners of the world (Pontin 1978, Koste & Wolfgang 1987). Hence, except *C. tenuilobata* Anderson, the presnt report also confirms their nature of cosmopolitan distribution (Dumont 1983).

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