EVENTS IN A NATURAL POPULATION OF DAPHNIA LUMHOLTZI SARS (CRUSTACEA: CLADOCERA)

M. B. RAGHUNATHAN

Zoological Survey of India
Western Ghat Regional Station
Calicut

1. INTRODUCTION

In India the information available on the natural population of zooplankton is scanty. However certain life cycle studies of cladocerans were made in the laboratory by Navaneethakrishnan and Michael (1971), Murugan and Sivaramakrishnan (1973, 1976) and Murugan (1975a, 1975b, 1977). The few studies made on the natural populations are by the Michael (1962) and S. Vijayaraghavan (1970) and Sharma and Dattagupta (1984). From Lake Pewa, Nepal, seasonality of Daphnia lumholtzi was studied by Swar and Fernando. (1979).

Near Madras, quite a number of perennial and semiperennial freshwater bodies are existing. Under a programme of studying the zooplankton periodicity of these freshwaters, periodical collections were made. In Kamakoti pond, near Kamakotinagar, 10 km. west of Madras city, a sudden bloom of Daphnia lumholtzi, a rare cladoceran was recorded for the first time. Hence a study was made with special reference to this phenomenon. This pond is having an area of 0.5 hectare with an average depth of 0.5 M. Only during rainy months this tank will be filled up with rain water.

2. MATERIAL AND METHODS

After noting down the air and water temperature, pH of the water was estimated by employing a Hellige-neo-comparator. The plankton collections were made by using a net with a diameter of 25 cm, (0.3 mm. meshsize). The net was thrown to that 2.55 M. of the attached rope was in the water. For each sample four throws were made. (Hebert, 1977). The collected samples were preserved in 5% formalin and made upto 250 ml. From this subsample of 2 ml. was examined in Sedgewick-rafter cell for counting purposes. Total number of specimens collected were given. Samples were collected from 5th February 1981 to 28th May 1981.

3. RESULTS

Between 5 February 1981 and 6 March 1981, plankton samples were represented with Ceriodaphnia cornuta, Mesocyclops leuckartii calanoid copepods and very few Daphnia
In rholtzi. But on 9 March 1981, the other forms were less in number and the collected sample was full of Daphnia lumholtzi. Again the sample collected on 13 March 1981 was almost like a monoculture of Daphnia lumholtzi. But on 21 March 1981, Daphnia lumholtzi started diminishing in numbers with few only on 26 March 1981. On 4 April 1981, only one example was encountered while counting. From 8 May 1981, these forms were completely absent.

3.1. COMPOSITION OF DAPHNIA LUMHOLTZI

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Parthenogenetic females with eggs.</td>
<td>250</td>
<td>725</td>
<td>375</td>
<td>125</td>
</tr>
<tr>
<td>Parthenogenetic females without eggs.</td>
<td>9375</td>
<td>8375</td>
<td>2625</td>
<td>875</td>
</tr>
<tr>
<td>Neonata</td>
<td>1250</td>
<td>4000</td>
<td>2000</td>
<td>250</td>
</tr>
<tr>
<td>Embryo with head rudiment</td>
<td>1375</td>
<td>125</td>
<td>375</td>
<td>250</td>
</tr>
<tr>
<td>Released eggs</td>
<td>5125</td>
<td>750</td>
<td>725</td>
<td>750</td>
</tr>
</tbody>
</table>

Also among Daphnia lumholtzi certain peculiar forms with bent shell spines were noted.

4. DISCUSSION

Eventhough there are instances of sudden blooming of certain cladocerans like Daphnia magna Straus, Daphnia similis Claus (Mitra and Thakurta, 1973) and Moina dubia (Parabramam et. al 1967) so far no account of blooming of Daphnia lumholtzi is available from India. Moreover Daphnia lumholtzi is a very rare cladoceran and as per Fernando (1980) not even a single representative was available from 95 zooplankton samples collected from tropical (south) India. However Daphnia lumholtzi has been recorded earlier by Brehm (1950), Biswas (1971), Nayar (1971), Michael (1973) and Sharma and Dutta Gupta (1984).

In Kamakoti tank; it is interesting to note that Daphnia lumholtzi started increasing in number from 9th March 1981 at such a rapid rate that the samples collected on 13 March 1981 were full of these forms. The population on the whole lasted only for a month as per the collections. During this period the temperature ranged from 26·0°C to 30·5°C and the pH was between 7·0 and 7·3. During the same period plenty of Gerris sp. were noted in the surface. In Lake Pewa, Nepal also maximum number of Daphnia lumholtzi was found in the samples during May and June. They reappeared in the samples in July and were present till December. (Swar and Fernando, 1979).

Here all the specimens of Daphnia lumholtzi collected including the egg bearing females were helmeted forms. But considering the previous records of Daphnia lumholtzi in India, reveals that among the specimens collected from probe bed of Pulta water works (Brehm, 1950) the females with eggs had unarmoured round head. The helmeted forms by egg bearing females were also recorded by him from a tank in Cuttack, Orissa. On the other hand Nayar (1971) recorded both the forms from two different places namely helmeted forms
RAGHUNATHAN : Natural Population of D. lumholtzi

...form Mount Abu of Rajasthan and non-helmeted forms from Udaipur, Rajasthan. Biswas (1971) has recorded non-helmeted forms from Rajasthan. Swar and Fernando (1979) have recorded only helmeted forms from Nepal. While discussing about cyclomorphosis in Daphnia lumholtzi, Sharma and Dattagupta (1984) have attributed temperature as the main factor influencing the head and tail length.

In Chingleput tank near Madras, Daphnia lumholtzi were noted in the samples in few numbers only during January and February 1980. On the contrary Daphnia lumholtzi were collected in large numbers from Ooty lake at an altitude of 2500 M, both during 11th March 1978 and during 16th March 1979 (Raghunathan, 1985).

The specimens of Daphnia lumholtzi collected from Kamakoti tank, and the few specimens from Chingleput tank were helmeted. The specimens collected from Ooty lake were also helmeted but the helmet size were comparatively smaller. Further the few forms collected with bent shell spines from Kamakoti tank deserve further investigations.

SUMMARY

While qualitative collections of zooplankton were made from different freshwaters in and around Madras, Daphnia Lumholtzi Sars, a rare cladoceran was observed in large numbers from Kamakoti pond during March 1981. A study was made on this natural population of Daphnia lumholtzi.

Key words: Daphnia lumholtzi, cladocera, population.

5. ACKNOWLEDGEMENTS

The author is grateful to Dr. B. K. Tikader, Director, Zoological Survey of India, Calcutta, to Dr. R. S. Pillai, Deputy Director, Southern Regional Station, Zoological Survey of India, Madras and to Dr. G. U. Kurup, Officer-in-Charge, Western Ghat Regional Station, Zoological Survey of India, Calicut for facilities and encouragement.

6. REFERENCES


