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ON VARIATIONS OF *HELEOPERA SYLVATICA* PENARD (PROTOZOA : HYALOSPHENIIDAE) IN INDIA AND ITS CAUSATIVE FACTORS

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ABSTRACT

The extent of morphological variations observed in populations of *Heleopera sylvatica* Penard collected from mosses growing on boles of trees at Calcutta (West Bengal) and Calicut (Kerala) during different seasons are noted. The tests of the species show considerable variations in its structure and texture due to the collective effect of the substratum and environmental factors, both biotic and abiotic, during different seasons. The factors which seem to cause the variations are also noted in the paper.

Introduction

Detailed ecological observations for describing the testacean rhizopods are found necessary by earlier workers like Wallich (1864), Penard (1902) and Deflandre (1937). Stepanek (1952) noted that in *Difflugia* and *Lesquereusia*, the structure of the test depended largely on the substratum. Bonnet (1961) stated that the soil dwelling testaceans are not only smaller in size than those from aquatic habitats but also differ in shape. Chardez (1963) depicted the structure and number of the nucleus of some species of testacean rhizopods. Heal (1963) stressed the importance of applying culture techniques to determine the exact taxonomic status of doubtful species. Based on the water content of the habitat Bartos (1940, 1946) grouped the species as Hydrophiles, Hygrophiles and Xerophiles.

Testacean rhizopods offer interesting material for microecological studies. *Heleopera sylvatica* Penard described in 1902 as a form inhabiting the mosses growing on hedge banks in Switzerland is reported from other parts of the world since then. Nair & Mukherjee (1969) reported its occurrence in Calcutta, India. Several (total 345 approximately) specimens of this species examined in 1969, 1970 from the mosses growing on the tree trunks at Calcutta and in 1982 at Calicut from mosses on wall tops displayed considerable variations in the texture of their tests. The extent of these variations of the species and the co-relation of environ mental factors are elucidated in this paper.

Materials

The moss growth from the boles of trees of Calcutta and wall tops at Calicut were collected and examined at different seasons. The individuals were isolated, examined and their diagrams were drawn from each lot of material taken during active monsoon, just after the cessation of monsoon and in the dry period extending upto summer. Some tests from each lot were examined often crushing under the coverslips by gentle pressure in distilled water, and also in dry state on slides. Measurements were taken with the aid of a calibrated micrometer.

Description

The specimens isolated from the first lot are elegantly shaped with a transparent chitinous test having oval scales on its surface (Fig. 1), plasma being visible through the test. Individuals were very active, often putting forth eight to ten lobose pseudopodia. Test measurements are as follows : length 59-70 μm, width of broad side 30-39 μm, that of narrow side 18-25 μm, and aperture size 16×12×6 μm.

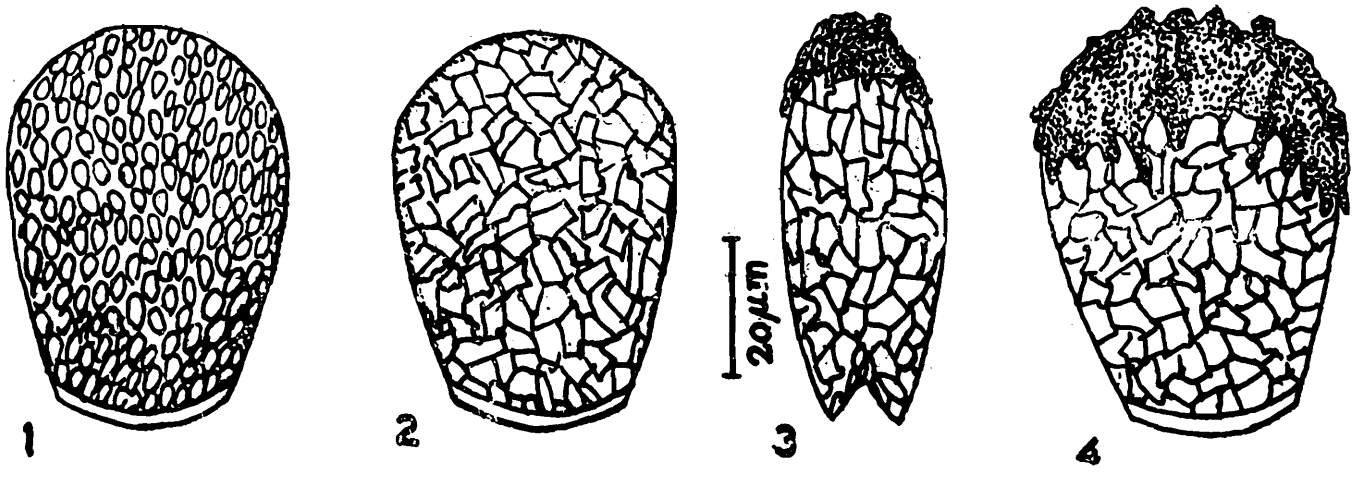
The tests of specimens isolated from the second lot *ie.* post-monsoon are partly covered by oval scales and also partly or wholly covered by amorphous scales (Fig. 2). Test size ; length 62-72 μm, broad side with 33-39 μm; narrow side width 23-28 μm, aperture size 22×15×8 μm.

& 4). Test size : length 63-74 μm, broad side width 33-39 μm, narrow side width 23-30 μm, aperture size 22×15×8 μm. Individuals are less active, putting forth only two or three pseudopodia occasionally. The observation of plasma is rendered difficult due to the opaque nature of test. Several individuals were seen in encysted condition.

The tests of specimens inhabiting the mosses on tree boles are with little rosy tinge unlike the colourless of those isolated from mosses growing on wall surface.

Discussion

Heleopera sylvatiea Penard existing in a habitat subject to the seasonal conditions referred above shows the collective effect of the substratum as well as the environmental



Figs. 1-4. *Heleopera sylvatica* Penard (Pseudopodia Omitted).

1. Broad side view of test with oval scales.
2. Broad side view of test with amorphous scales.
3. Narrow side view of test with little encrustation on fundus.
4. Broad side view of test with thick encrustation on fundus.

The third lot from dry season contained specimens having their tests covered entirely with amorphous scales and also with encrustation of materials of indeterminate nature on the fundus. The volume of encrustation on the fundus also varied considerably (Figs. 3

factors acting on the morphology in a remarkable manner. Specimens observed during the monsoon period are elegant and active since they are bathed in enough rain water falling on the habitat. The cessation of the monsoon rainfall and the consequent gradual drying

up of the habitat make the specimens less active. Fine flakes from the ground blown up by the wind get deposited on the moist regions in between the moss plants. These amorphous flakes in turn get adhered on the test of individuals and gradually obliterate the oval scales. During locomotion the individuals adopt a vertical position to the substratum and this habit further facilitates the deposition of extraneous matter on the fundus. The amount of deposition depends on the volume of matter falling on the habitat and also on the time taken to get cemented on the fundus. The black lump removed from the fundus and crushed by gentle pressure exhibits a fine granular structure.

This colour is perhaps due to the fine carbon particles (soot), suspended in the atmosphere settling and getting incorporated on the fundus. In the monsoon season the possibility of deposition of fine flakes and other extraneous matter on the habitat is considerably less since the habitat as well as the specimens are bathed in rain water.

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