IS THERE A PROLIFERATION OF ANTIPODAL CELLS IN *LEIOTHRIX* RUHL., (ERIOCAULACEAE)?

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Recently Monteiro-Scanavacca and Mazzoni[1] in their paper "Embryological studies in *Leiothrix flavitans*" reported the proliferation of antipodal cells in the developing seed. Our investigations on the related taxa, namely *Leiothrix nubigena* (Koern) Ruhl. and *Paepalanthus bifidus* (Schard.) Kunth, have revealed different results and the observations are presented below.

The development of embryosac in the two species conforms to the Polygonum type[2] as in the other investigated members of the family[3–6]. The chalazal quartet of nuclei contributes to the three antipodal cells and the chalazal polar. After organization, the antipodal cells lose their walls. The three resulting uninucleate protoplasts gradually fuse together producing an extremely conspicuous cyst. As the cyst acquires dense cytoplasm, its three nuclei unite to form a triploid body. Marked changes occur within the embryosac soon after the polar nuclei fuse forming the secondary nucleus. The central cell enlarges and extends towards the chalazal side. As a consequence, the antipodal cyst is pushed down and its protoplast gradually degenerates. Then it appears as a conspicuous, condensed deep stained body located below the central cell (Fig. 1). There is, therefore, no proliferation of antipodal cells whatsoever as stated by Monteiro-Scanavacca and Mazzoni[1].

Moreover, ontogenetic studies of endosperm in *Leiothrix nubigena* and *Paepalanthus bifidus* have shown that the primary endosperm nucleus divides at the chalazal end of the embryosac. Its first and subsequent few divisions are free nuclear. Cell wall formation in the endosperm starts from the chalazal end, it gradually extends towards the micropylar side. Further growth of endosperm is by cell divisions and is centripetal. When the entire embryosac is filled with endosperm tissue, three regions become histologically differentiated. They are the chalazal group of densely protoplasmic downwardly pointed elongated cells (Figs. 2 and 3), a peripheral layer of narrow, densely protoplasmic cells and the rest of endosperm bulk consisting of isodiametric cells. Further, a comparative embryological study[6,7] of 20 taxa belonging to both Indian and South American Eriocaulaceae has revealed that antipodal cells never proliferate to form a tissue as concluded by Monteiro-Scanavacca and Mazzoni[1]. In every one of them the

Figs. 1–3. Fig. 1. L.s. chalazal part of ovule of *Leiothrix nubigena* showing disorganizing antipodal cyst, × 1200. Fig. 2. L.s. chalazal part of young seed of *L. nubigena*: note the conspicuous chalazal endosperm cells and remnants of the degenerated antipodal cyst below them, × 1200. Fig. 3. L.s. chalazal part of an older seed of *Paepalanthus bifidus*; note the downwardly pointed, densely protoplasmic elongated endosperm cells, × 1500. (AC, antipodal cyst; CE, chalazal endosperm cells).

three cells lose their walls and their protoplasts fuse forming a cyst which degenerates subsequently.

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OBSERVATIONS OF BREEDING AND FREQUENCY OF SEX IN THE ISOPOD CRUSTACEAN *LIGIA INDICA* OF TUTICORIN COAST

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Introduction

THE isopod *Ligia indica* inhabits the rocky shore of Tuticorin coast (Lat 8° 47′ N; Long. 78° 9′ E) where boulders are found in large numbers. The environment in which isopod *L. indica* inhabits is intermediate in character between land and sea like *L. pallasii*[1]. Even though a lot of information is available regarding water and salt balance[5–7], egg incubation and yolk utilization[3] of *Ligia* sp., very little is known about breeding behaviour of the genus. The present study deals with the breeding and frequency of sex in *Ligia indica* of Tuticorin coast.

Materials and Methods

Collection of *Ligia indica* was made once in a month during the study period from August 1978 to July 1979, numbering over 300 animals in each collection. During each population census over 300 *Ligia indica* were collected at random from the demarcated study area of $4m^2$. Collection was made in the early morning during the low tide period. The isopods from each collection were sexed and the frequency of each sex was noted. If female, note was taken about the external reproductive state.

Results and Discussion

From the collection data it has been found that females usually grow to a size less than 15 mm and never grow larger than 21 mm. Adult females are always smaller than the males. The mean length of gravid females was found to be $14{\cdot}8 \pm 1{\cdot}2$ mm (S.D. based on 80 individuals) and the mean number of eggs or juveniles per brood was 33 ± 6 (S.D. based on 36 individuals).

During the study period it has been found out that even though the maximum number of berried females occur in the month of June, July and August, gravid females do occur in less frequency in other months (Fig. 1). The percentage of females reaches as high as 70 in the month of July and August and as low as 30 in January and February, while that of males is found to be less in July, August and September (28–40%) and reaches its maximum in December, January and February (55–68%) (Fig. 2).

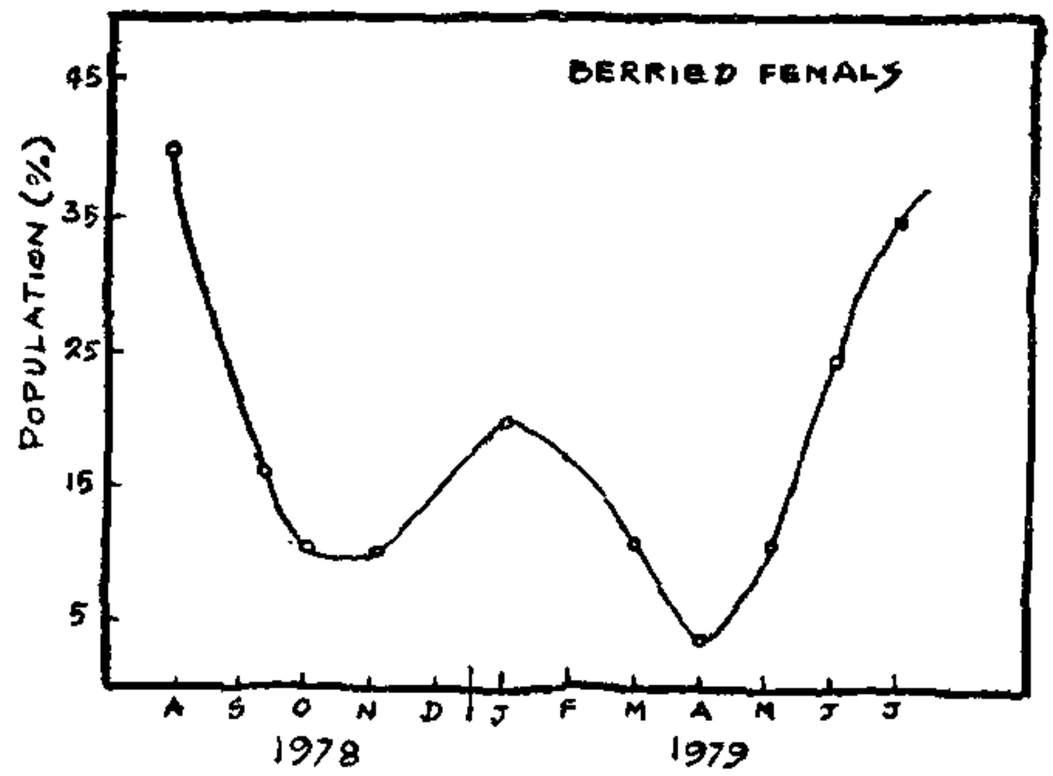

FIG. 1

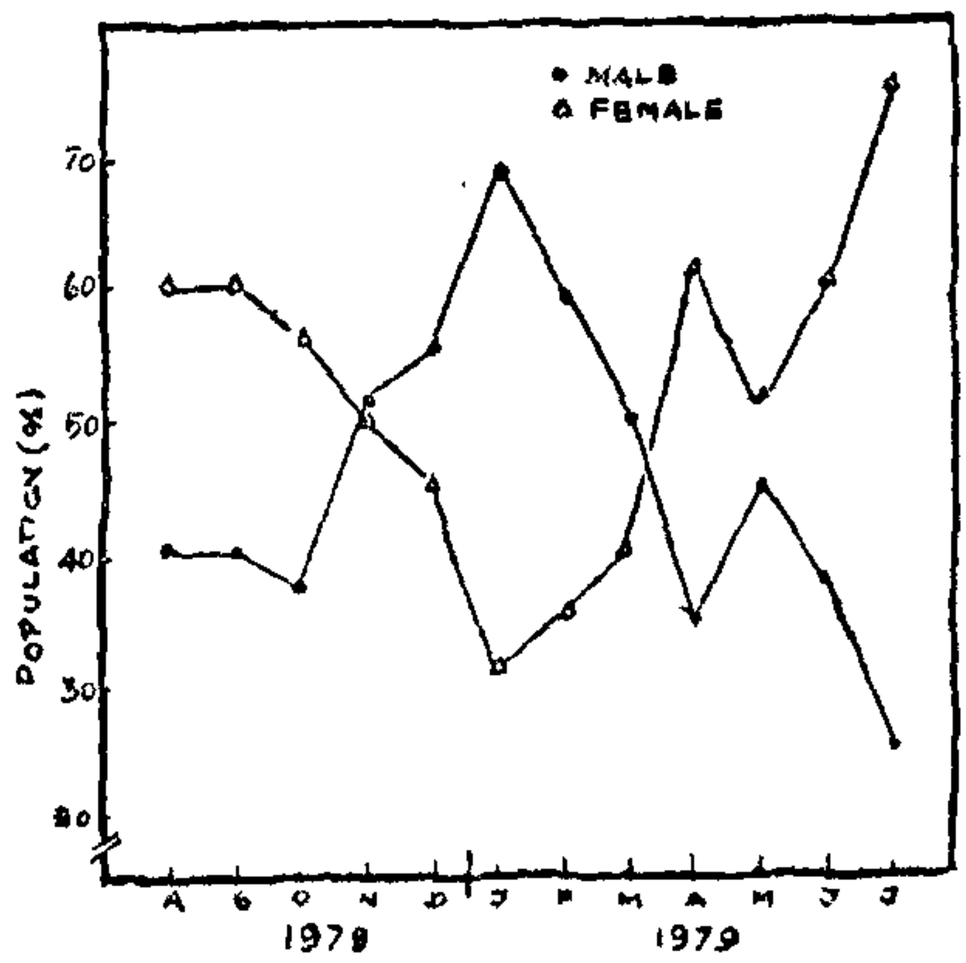

FIG. 2