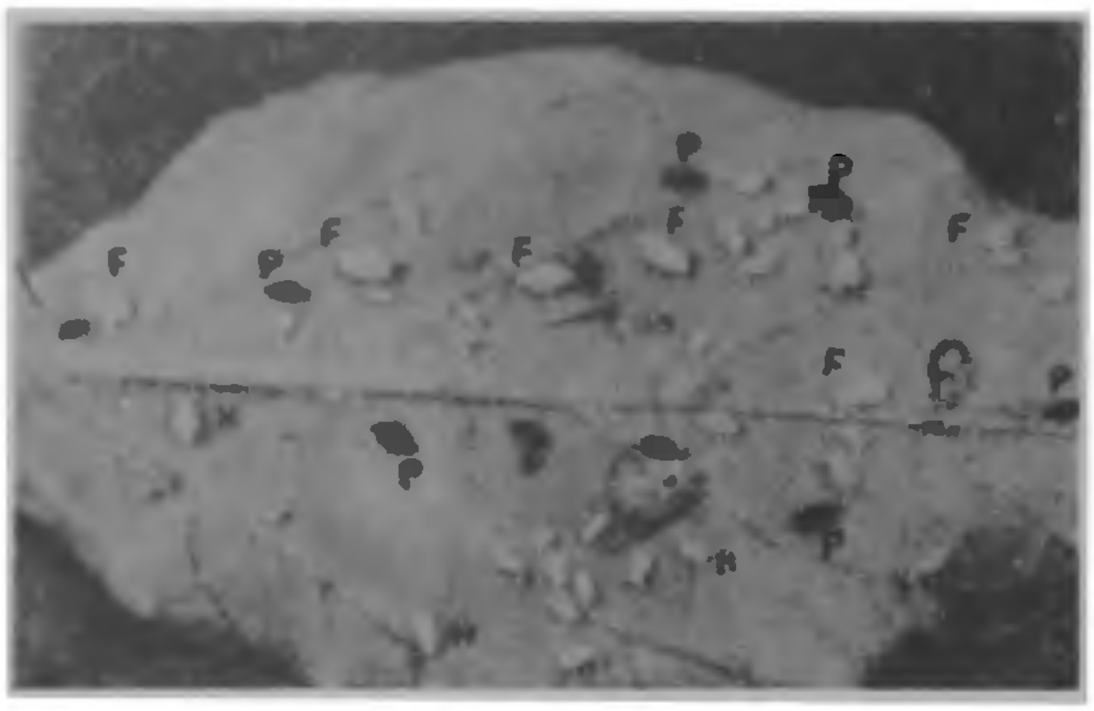

Figure 1. Chilli leaf with *M. persicae* and mummies due to its natural enemies. H = Healthy, F = Mummies due to fungus, *Fusarium semitectum*, P = Mummies due to parasitoid, *Aphelinus kurdjumovi*.

them were isolated on Sabouraud dextrose agar medium and identified. Mixed infections of *Fusarium semitectum* Berk and Rav and *Cladosporium* sp in the aphids collected from fields and *F. semitectum*, *Verticillium lamellicola* (F. E. V. Smith) W. Gams and *colletotrichum* state of *Glomerella cingulata* (Stomen) Spauld and Schrenk in the aphids collected from glasshouse were observed. Of the fungal pathogens, only *F. semitectum* was virulent and pathogenic to *M. persicae* and *L. erysimi* and the remaining fungi were either secondary invaders or contaminants.

The infected aphids were inactive and sluggish, crawled slowly dragging their legs and finally ceased to feed. The colour changed from pale yellow to pale reddish brown in case of *M. persicae* and pink in *L. erysimi*. The abdomen was dilated and the insect was mummified. The cadavers remained attached to the bottom side of the leaves by rhizoids. (figure 1).

Death usually occurred within 3 to 7 days after infection and the cadavers turned dry, shrunken, shapeless and lost hold with the leaves. Such mummies would be blown off if dry climate prevailed or else they will be attached to the leaves for about a week and then dropped off. The time taken for sporulation of fungus from the mummies at 25°C and 100% RH was 36–48 hr. The fungus was whitish, later turning to buff brown due to the formation of numerous spores.

The occurrence of *F. semitectum* on aphids seems to be the first report. However, a number of species of this genus were reported infecting insects belonging to different orders. For instance, recently, *F. oxysporum* Schlecht on *Coccus viridis*[3] and *F. equiseti* (Corda) Sacc on *Coccidohystrix insolita*[1] and *Nephotettix virescens*[2] were reported from India.

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THIOLA-INDUCED EFFECTS ON RAT EPIDIDYMAL SPERMATOZOA

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EFFECT of Thiola at a dose of 20 mg/kg body weight/day for 30 and 60 days was investigated on cauda epididymal sperm metabolism, count and motility of adult rats. The data revealed that the cauda epididymal sperm motility and count were reduced in rats treated for 30 and 60 days as compared to control. The activities of acid phosphatase, succinate dehydrogenase and total ATPase as well as protein content were also declined with the duration of treatment. These effects were related to alterations in their oxidative/energy metabolism and to maturational changes.

The –SH compounds used for protecting animal systems against the injurious effects of ionizing radiations were of high toxicity[1]. One of the radiochemical protectors is 2-mercaptopropionyl glycine (MPG), commercially known as Thiola is reported to give effective protection on irradiated organs at a very low dose[1, 2]. But the long-term treatment of this chemical to normal adult rats brought about a significant decline in circulating levels of testosterone and an increase in testicular cholesterol content indicating probable inhibition of androgen synthesis. This in turn caused androgen deprivation effect to androgen target tissue, which led to marked changes in their structure and metabolism of treated rats[3–5]. Loss of fertility was

also reported as a result of reduced sperm count, motility and an increased number of abnormal spermatozoa in cauda epididymidis of these rats[3, 5]. Inhibition of rat and human sperm motility in vitro was also documented with graded doses of Thiola[6]. However, its effects on rat epididymal sperm metabolism and maturation are not yet investigated. Hence, this study was undertaken.

Healthy adult male rats of Charles Foster strain (*Rattus norvegicus*) weighing from 225 to 250 g were used for the experiments. They were maintained on a standard diet and water was provided *ad libitum*. The control group received physiological saline as a vehicle and the experimental groups were injected with Thiola intramuscularly (Santen Pharmaceuticals Co Ltd, Japan) at a dose of 20 mg/kg body wt/day for 30 and 60 days separately. Three groups contained each of 8 to 10 animals. Accordingly, the animals were autopsied and the cauda epididymides were used. The sperm motility and count were done using haemocytometer[7]. The epididymal sperm suspension was prepared according to methods published earlier[8, 9] and used for the biochemical estimations. The protein content, acid phosphatase (ACP; EC 3.1.3.2) and succinate dehydrogenase (SDH; EC.1.3.99.1) activities were assayed by the methods described elsewhere[4]. The total adenosine triphosphatase (ATPase; EC.3.6.1.3) activity was estimated following the method of Quinn and White[10]. A minimum of six replicates was done for each parameter and the data were statistically analyzed using student's *t* test.

The cauda epididymal sperm count and percentage motility were decreased in Thiola treated rats as compared to control. The decrease was significant ($P < 0.001$) with respect to sperm motility by 60 days treatment. The same trend was noticed in the activities of SDH and ATPase and protein content, as observed for sperm motility ($P < 0.02$; $P < 0.01$; $P < 0.001$) respectively. An insignificant decline in ACP activity was found in rats treated for 30 and 60 days as compared with control (table 1).

Table 1 *Biochemical parameters, concentration and motility of cauda epididymal spermatozoa in normal and Thiola-treated rats*

Parameter	Normal	30 days	60 days
Cauda sperm count (million/ml)	50 ± 6.11	41 ± 1.61	35 ± 5.5
Motility(%)	72 ± 3.52	45 ± 2.71	+14 ± 0.7
*SDH	25.60 ± 2.46	21.10 ± 1.70	14.25 ± 1.13
**ACP	0.24 ± 0.02	0.20 ± 0.01	0.18 ± 0.02
***Protein	1.85 ± 0.38	1.57 ± 0.05	1.16 ± 0.02
****ATPase	0.76 ± 0.10	0.51 ± 0.03	0.28 ± 0.03

Values are Mean ± S.E.; +sluggishly motile spermatozoa observed; * μg formazan formed/15 min/mg protein; ** μmol of *p*-nitrophenol released/hr/mg protein; ***mg/ml sperm suspension; **** μmol of i.p. released/hr/mg/protein.

The present data revealed that the sperm motility and density were reduced by both the treatments leading to loss of fertility in rats[3, 5]. The cauda epididymal sperm morphology was also adversely affected[5]. These effects were related to alterations in sperm structural and biochemical components as well as changes in epididymal physiology as a result of androgen deprivation[3–5]. It is well known that sperm maturational changes depend on special environment created by androgen-dependent activity of epididymal epithelium[11–13].

The biochemical data elucidated that the sperm ATPase activity was reduced by the treatment, which could be attributed to loss of sperm motility in this study, since this enzyme plays a most essential role in energy metabolism of spermatozoa. The contractile protein, dynein is rich in ATPase activity, necessary for conversion of ATP into mechanical energy for sperm flagellar movement[14, 15]. The mitochondrial oxidative enzyme (SDH) activity also decreased in the spermatozoa markedly by the treatment. This supports the fact that sperm oxidative/energy metabolism was affected. Moreover, the decreased enzyme activity was correlated with reduced sperm count and motility. The acid phosphatase (ACP) is a lysosomal enzyme present in sperm acrosome. The acrosomal enzymes including phosphatases participate in the penetration of mammalian eggs by spermatozoa[15, 16]. The decline in ACP activity in treated rat sperms is probably due to alterations in sperm-egg penetration and their membrane surface integrity. The reduction in protein content in this study might also affect sperm glycoproteins, which secreted by epididymal epithelium and coat/incorporate sperm membrane to stimulate motility during their passage through epididymis[11–13]. Thus, these effects induced by Thiola administration to rats led to loss of motility, fertilizability and survival of spermatozoa in cauda epididymidis.

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DAPHNIA LONGECEPHALA HEBERT 1977 (CRUSTACEA, CLADOCERA)—A NEW RECORD TO THE ORIENTAL REGION.

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WHILE studying the Cladocera of temporary ponds of southern Tamil Nadu (Madurai, Ramnad, Tirunelveli and Kanyakumari districts; Lat.: 8°–11° N), several females of *Daphnia longecephala* Hebert were found. This species was first described from New South Wales, Australia[1]. This is the first record of the occurrence of this species in oriental region. A brief description of the material found is presented in this note.

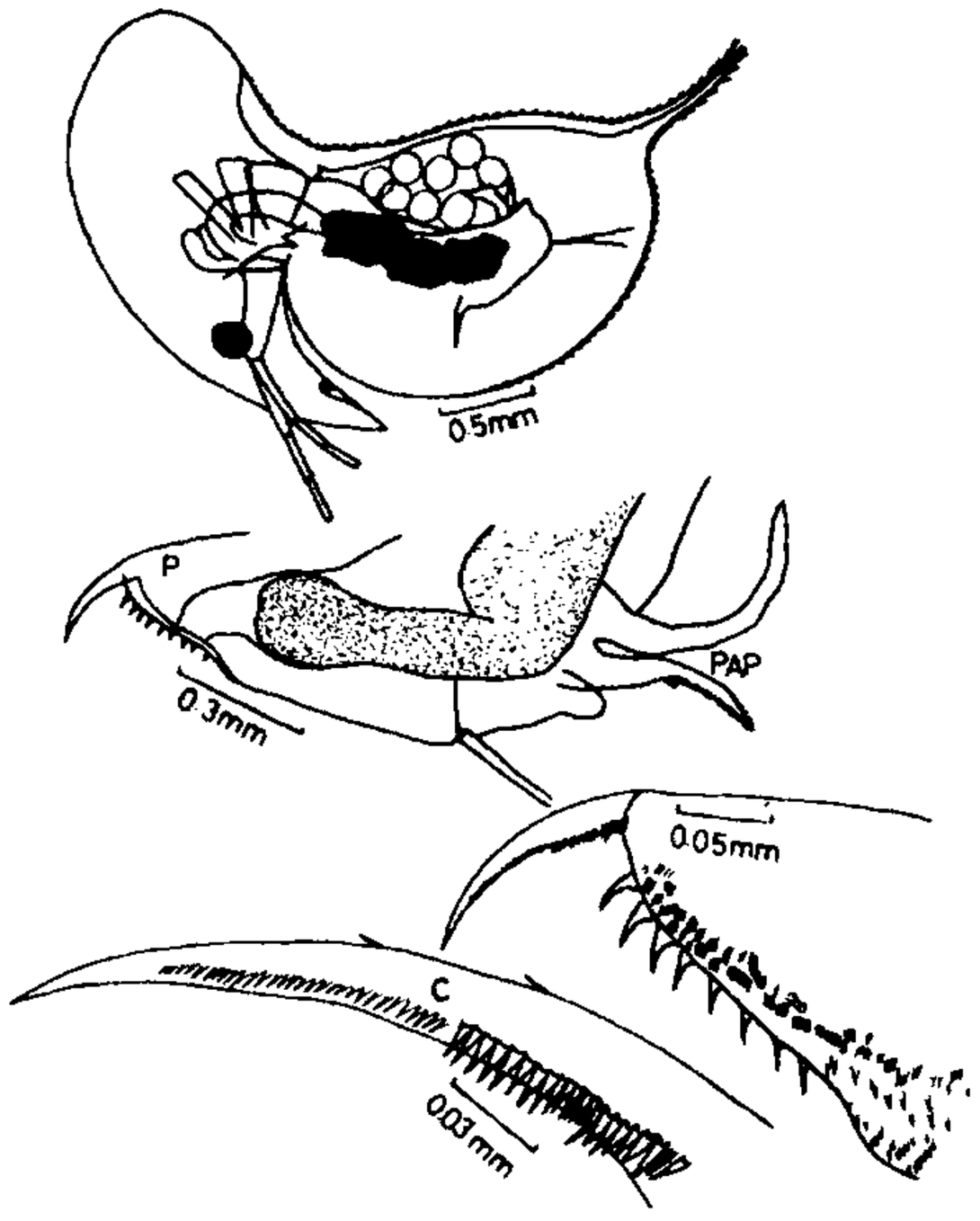

Figure 1. *Daphnia longicephala* female: P—post-abdomen; PAP—postabdominal palp, C—claw.

Female body size 4.2 mm ($n = 35$); antero-dorsal cephalic crest present; shape and length of the crest vary; dorsal margin bears a number of well developed spines; rostrum acute, extending along the ventral carapace margin. Eye situated well away from the margin; ocellus often absent, if present very minute. Post-abdomen with 8–12 and spines; claw with 9–10 proximal, 14–16 middle and 28–36 distal pectens.

Michael[2] and Santharam[3] described a *Daphnia* species as *D. cephalata* resembling *D. longecephala* Hebert from a pond near Madurai. The specimens examined in this study agree well with Michael's and Santharam's descriptions. Well-developed antero-dorsal helmet and conspicuous spines on the dorsal margin are distinguishing characters which separates this species from *D. cephalata* (figure 1). However,