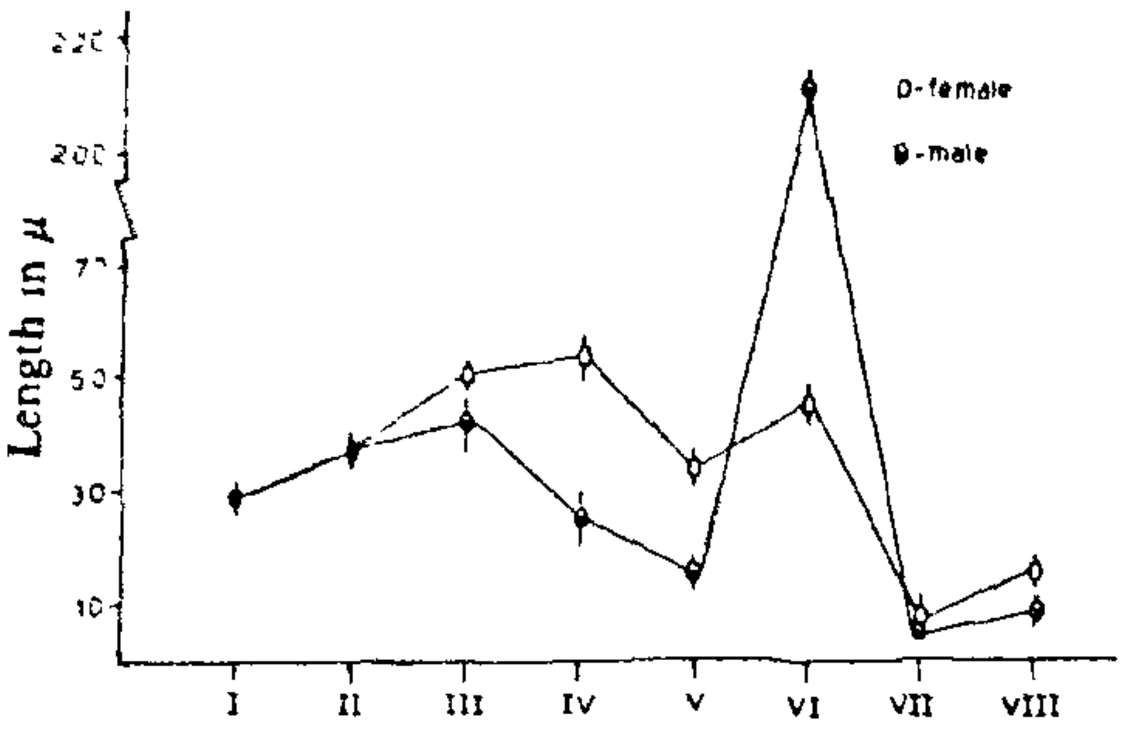

Figure 2. Variation observed in the length of the antennal segments of males and females.

female and much longer than the combined lengths of the other segments. Graph indicates the variation observed in the length of the antennal segments of males and females of *M. nilgiriensis*. No differences were evident between the sexes with respect to the first and second antennal segments. However statistical analysis shows significant differences between the sexes for the 4 and 5 segments at 5% level and 6th segment at 1% level.

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1. Bhatti, J. S., *Bull. Entomol.*, 1961, **2**, 26.
2. Ananthakrishnan, T. N., *Pan. Pacific Entomol.*, 1960, **36**, 37.
3. Ananthakrishnan, T. N., *Indian Thysanoptera*, C.S.I R. *Zool. Monograph-1*, 1969, p. 171 p.
4. Bhatti, J. S., *Oriental Ins.*, 1969, **3**, 378.
5. Ananthakrishnan, T. N., *Taxonomy of Indian Thysanoptera*, Z.S.I. Hand Book-1, 1980, p. 234.

ACID PHOSPHATASE ACTIVITY IN THE TESTIS OF THE ERI SILKWORM: *PHILOSAMIA RICINI* (Hutt.)—A HISTOCHEMICAL STUDY

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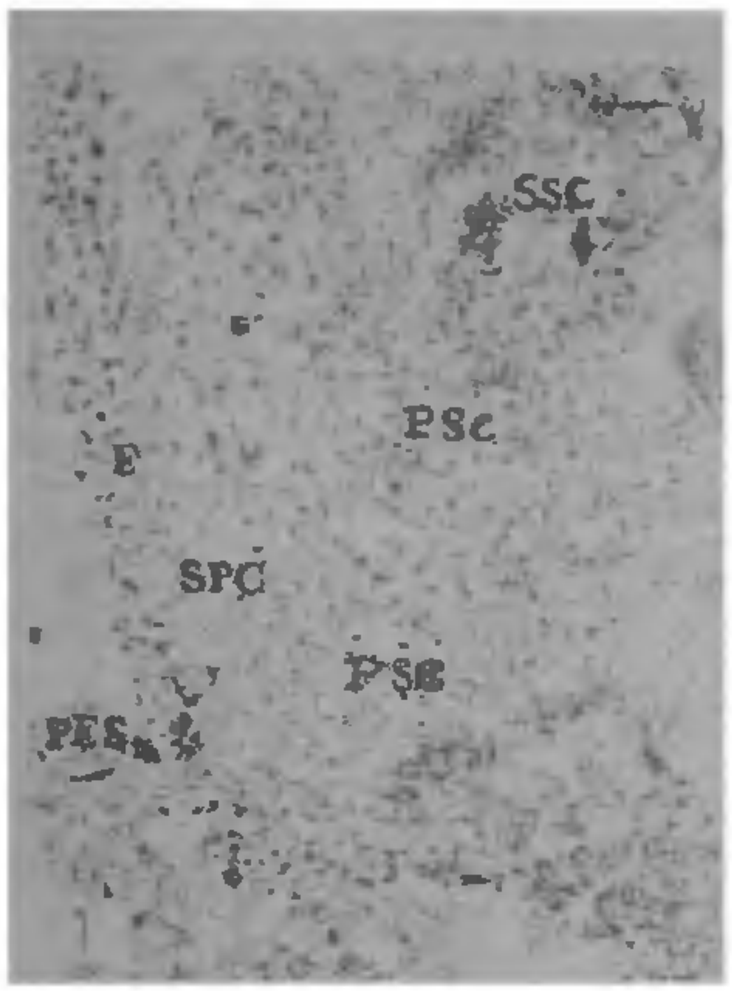
ACID phosphatase is known to provide phosphate to the tissues having high energy requirements especially during development, growth and maturation[1]. Acid phosphatase activity has been reported in the testis of a few species of insects[2–4]. The present work deals with the distribution of acid phosphatase activity in various components of the testis of larva, pupa and adult *Philosamia ricini*

Eri silkworms reared in the laboratory were used in the present work. The fresh frozen sections of the testis, from IV and V instar larva, pupa and adult, were fixed in cold acetone, incubated in freshly prepared incubation medium for 2 hr and mounted in glycerol jelly. Naphthol As-phosphate azo dye method of Burstone (1962) was followed[5]. The substrate used was naphthol AS-TR, obtained from Sigma Chemical Company, USA. The sections incubated in the medium lacking the substrate served as controls.

Acid phosphatase activity in the cells was indicated by AS-TR positive red deposits in the form of granules or needle-like crystals or both. The enzyme activity was observed in the cytoplasm of peritoneal sheath cells, epithelial cells, apical cells and spermatogonial cells of the testis of IV and V instar larva, pupa and adult. The enzyme activity was extended to the primary and secondary spermatocytes in the testis of V instar larva (figure 1) (spermatogenesis progressed only up to these stages in V instar larva) and to the primary and secondary spermatocytes, spermatids and spermatozoan bundles in the testis of pupa and adult (figure 2). The enzyme activity was not observed in the nuclei of these cells. The sections incubated in the medium lacking the substrate did not show any reaction.

The presence of acid phosphatase activity has been histochemically demonstrated in the cytoplasm and nucleus of the testicular cells of the larva and pupa of *Phormia regina*[2] and biochemically shown in the testis of pupa and adult *Bombyx mori* and *Samia cynthia*[4]. In the present study acid phosphatase activity is



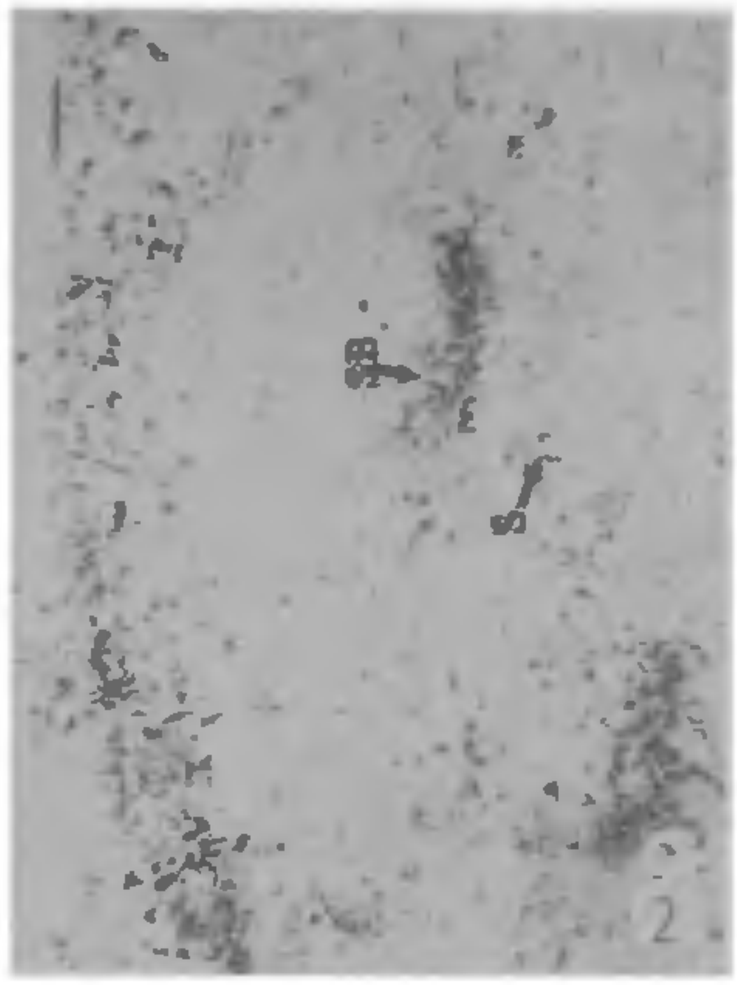


Figure 1, 2. 1. Fresh frozen section of the testis of V instar larva of *P. ricini* showing acid phosphatase activity in the cells of peritoneal sheath (PES) and epithelium (E) and spermatogoneal cysts (SPC), primary spermatocytes (PSC), and secondary spermatocytes (SSC) **2.** Fresh frozen section of the testis of adult *P. ricini* showing acid phosphatase activity in spermatids (S) and spermatozoan bundle (SB). The scale line in the photomicrograph indicate 40 μm.

demonstrated in the cytoplasm of all the testicular cells of IV and V instar larva, pupa and adult. However, the enzyme activity was not observed in the nucleus of any of the cells in the testis. The reaction observed in the nucleus of the testicular cells of *P. regina* might be due to the non-specific reaction.

It has been suggested that the walls of the testicular tissues serve as trophic intermediaries between the blood surrounding the gonads and the germ cells within them[6] and it has also been suggested that the peritoneal sheath of the testis of *Porthetria dispar* contain fat droplets[7]. The peritoneal sheath cells and epithelial cells of the testis of *P. ricini* contain lipid droplets[8]. The presence of acid phosphatase activity in the cells of these two layers might suggest the transfer of metabolites from these cells to the lumen of testicular follicles, since the phosphatases are implicated in the transfer of metabolites from the intra- to the extra-cellular fluid and *vice versa*[9] or it may merely indicate the presence of lysosomes since this enzyme has been widely accepted as the primary marker of lysosomal localization[10]. The apical cells of testicular follicles are also considered to supply nourishment to the spermatogonial cells[6] and it is shown that the apical cells in the testis of *Tenebrio molitor* show some kind of secretory activity[11]. Acid phosphatase activity present in the apical cells might be involved in the transfer of metabolites from the apical cells to the germ cells in *P. ricini*. Acid phosphatase activity present in the spermatogonial cells, primary and secondary spermatocytes, spermatids and spermatozoan bundles may readily provide phosphate to meet their high energy requirements[1].

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1. Blum, M. S., Invertebrate testis: In: *The testis* (eds) A. D. Johanson, W. R. Gomes and N. L. Vandemark, Academic Press, New York, London, Vol. II, 1970, p. 393.
2. Stay, B., *J. Morphol.*, 1959, **105**, 457.
3. Sridhara, S. and Bhat, J. V., *J. Insect Physiol.*, 1963, **9**, 693.
4. Gilbert, L. I. and Huddleston, C. J., *J. Insect Physiol.*, 1965, **11**, 177.
5. Pearse, A. G. E., *Histochemistry: Theoretical and Applied*, Vol. I. Churchill and Livingstone Ltd. London, 1968.
6. Snodgrass, R. E., *Principles of insect morphology*, McGraw Hill New York, 1935, p. 550.

7. Salama, H S., *Z. Angew Entomol.*, 1976, **81**, 102.
8. Hurkadli, H. K., Ph.D. thesis, Karnataka University, Dharwad, 1982.
9. Fruton, J. S. and Simmond, S., *General biochemistry*, 2nd edn, John Wiley, New York, 1961, p 580.
10. de Duve, C., In: *Lysosomes* (eds) A. V. S. De Reuck and M. P. Camerson, Little Brown, Boston, 1963, p. 1.
11. Menon, M., *J. Morphol.*, 1968, **127**, 409.

SUCCINATE-DEHYDROGENASE IN THE TISSUES OF ALBINO RATS INFECTED WITH *TRYPANOSOMA EVANSI*

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THE growth of trypanosomes in the tissues of host damages the connective tissues[1]. Most of the studies on *Trypanosoma evansi*, a member of brucei-group trypanosomes[2], are confined to pathogenecity and morphology[3] and less emphasis has been given on pathological physiology and oxidative function during trypanosomiasis. Reports on other parasitic protozoa, particularly of malaria, indicate impairment of respiration and oxidative phosphorylation in the host tissues[4-6]. The present investigation was undertaken to study whether or not *T. evansi* altered the activity of oxidative enzymes. Succinate-dehydrogenase, an important enzyme of TCA cycle, was selected for the study. The enzyme activity in relation to the severity of infection was studied in various tissues like liver, kidney, spleen, brain and muscle of albino rats infected with *T. evansi*.

A bovine strain of *T. evansi* was maintained in albino rats through syringe passage. The male albino rats were divided into 4 groups containing 10 each. One of these groups was used as control and the remaining 3 groups were intraperitoneally infected with 10^6 trypanosomes. Thereafter, the blood obtained from the tail of the rats was daily examined for the presence of parasites. After the onset of infection, the parasitemia was counted on haemocytometer. The animals were killed by decapitation and tissues like liver, kidney, muscle, spleen and brain were isolated in ice-jacketed containers from 1–3 groups of rats on the first, second and third day of infection respectively. The tissues from control were also collected on the last day of the experiment. Tissue samples were homogenized in 0.25 M sucrose solution and centrifuged at 2500 rpm for 15 min. The supernatant was used to assay the enzyme activity. The activity of succinate-dehydrogenase (SDH) was assayed by the modified method of Nachlas *et al* as described by Pramelamma *et al*[7]. The protein content was measured by the method of Lowry *et al*[8].

Literature survey showed only a single report on lowered SDH activity in the liver tissue of *T. cruzi* infected mice. The decrease was attributed to cellular necrosis[9]. The present investigation reveals a significant decrease in SDH activity in various tissues of *T. evansi* infected rats (table 1) which is associated with severity of infection. Brucei-group of trypanosomes cause necrosis of hosts connective

Table 1 *Activity levels of SDH in different tissues of albino rats infected with Trypanosoma evansi.*

Tissues	Control	Days of infection		
		1st day	2nd day	3rd day
Liver	0.17 ± 0.005	0.12 ± 0.005 *(−29)	0.05 ± 0.003 *(−71)	0.05 ± 0.001 *(−71)
Kidney	0.2 ± 0.008	017 ± 0 02 *(−15)	0.14 ± 0.004 *(−30)	0.12 ± 0.001 *(−40)
Muscle	0.25 ± 0.04	0.24 ± 0.01 **(−4)	0.08 ± 0 001 *(−68)	0.04 ± 0.003 *(−84)
Spleen	0.1 ± 0.002	0.04 ± 0.005 *(−60)	0.03 ± 0.001 *(−70)	0.03 + 0.003 *(−70)
Brain	0 12 ± 0.01	0.12 ± 0.01	0.12 ± 0 01	0.07 ± 0.002) *(−42)

(Values are expressed (mean of 10 samples ± SE) in μmoles of formazan formed/mg protein/hr). Figures in parantheses indicate the % decrease $^*P < 0.001$ $^{**}P > 0.05$.