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β-GLUCOSIDASE ACTIVITY IN THE SPINNING GLAND CELLS AND MID GUT OF *DIACRISIA OBLIQUA* (ARCTIIDAE: LEPIDOPTERA)

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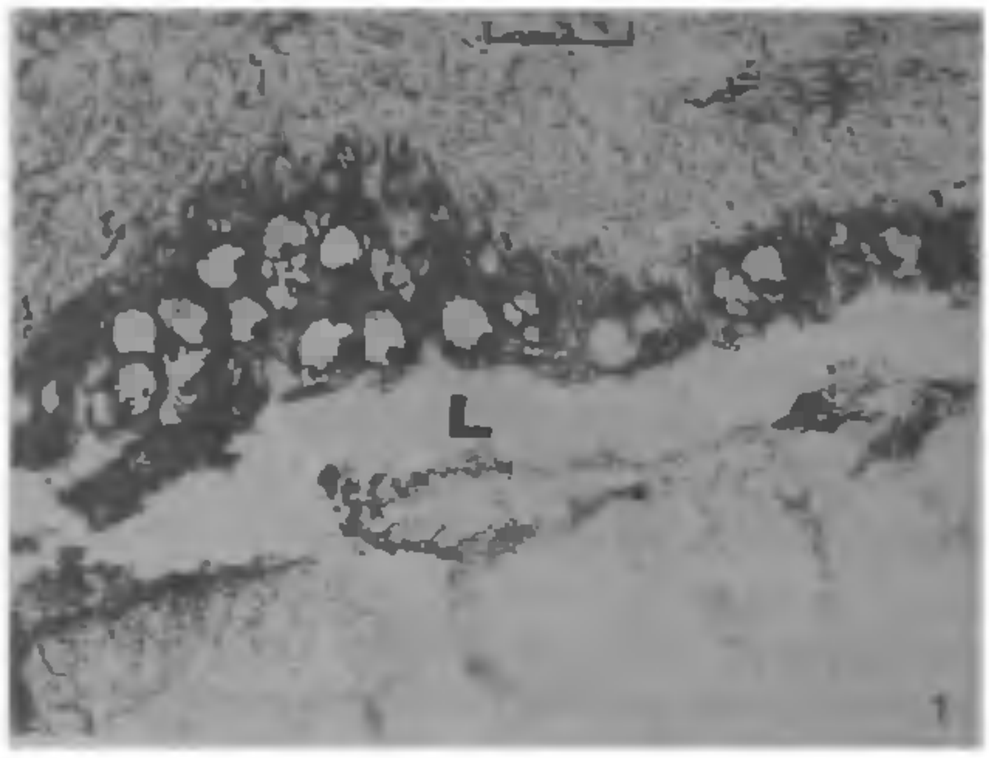
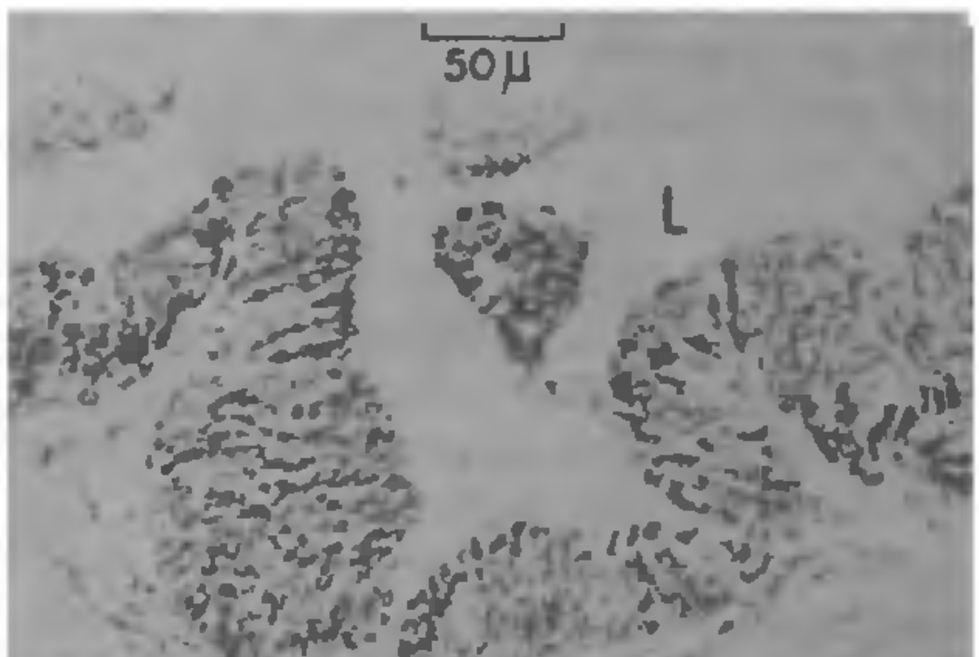
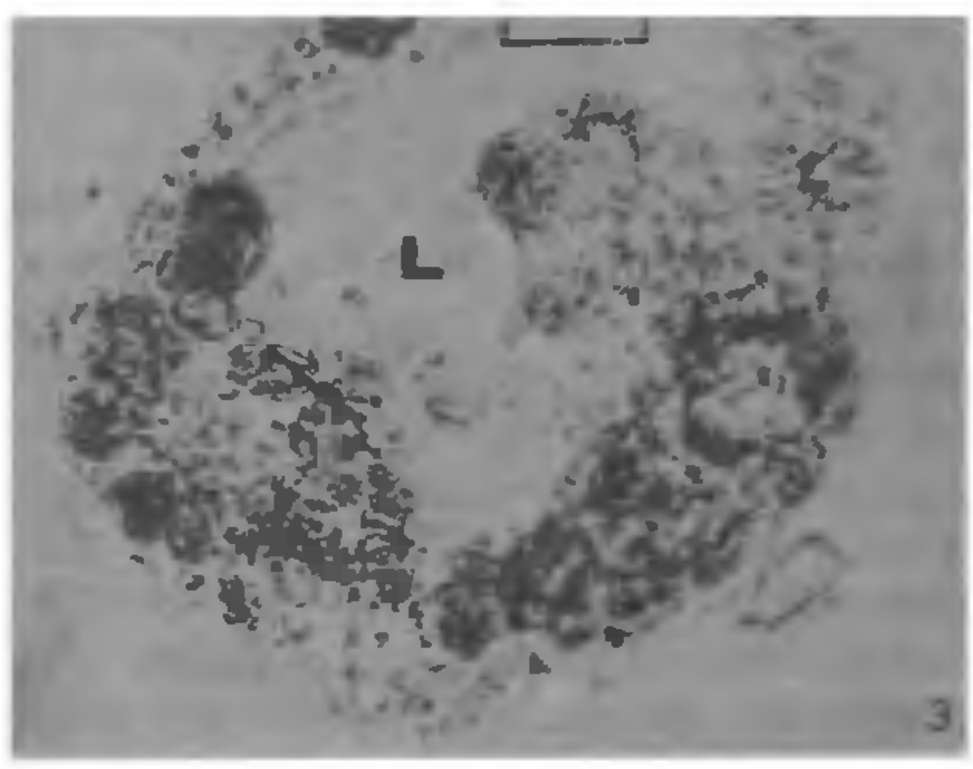
INTRACELLULAR localization of the enzyme β-glucosidase has been reported by a number of workers[1–5] in the mid-gut cells of various insects but has been contradicted by others. Spinning glands have received very little attention with regard to this important enzyme during different developmental stages. Regarding the role of carbohydrases also in differentiation, growth or histolysis during metamorphosis, investigators hold conflicting opinions[5,7–11]. For a better understanding on this score, the present study has been carried out in the cells of the spinning glands and mid-gut of *Diacrisia obliqua* in prefunctional, functional and degenerative phases.

The moth pest *D.obliqua* was collected from castor gardens in the surroundings of Bakewar and reared in the laboratory at 25–27°C. The spinning glands and mid-gut were dissected out from the larvae, pupae and adults of varying age groups, cut into very small pieces of about 1 mm size and sectioned (6–8 μ thick) with cryostat. The post-coupling method of Rutenberg *et al* as described by Pearse[12] was employed to detect β-glucosidase activity using 6-bromo-2 naphthyl-β-d-glucopyranoside (β-glucoside) as the substrate.

The cells of the mid-gut of different instars during development show weak enzyme activity. In the fifth larval instar the enzyme sites are localized greatly in the basal region of the cells. In prepupa the larval mid-gut epithelium begins to degenerate and is finally replaced by the regenerative cells during pupation. The cells of the degenerating layer show moderate β-glucosidase activity (figure 1). The cells of the replacing layer, on the contrary, yield weak reaction. Hydrolase activity in the







Figures 1–3. 1. Enteric epithelial cells of one-day-old pupa showing intense β-glucosidase activity in the degenerating cells; **2.** β-glucosidase activity in the one-day-old adult mid-gut epithelial cells of *D. obliqua*, and **3.** Degenerating spinning gland cells of 2-day-old pupa of *D. obliqua* showing dense deposits of β-glucosidase reaction product [L = Lumen].

enteric cells in late pupal stages remains unchanged. The adult mid-gut epithelial cells show weak β-glucosidase activity in the apical region bordering the lumen of the gut (figure 2). The cells of the spinning gland in larval period reveal no β-glucosidase activity. In prepupal period also, when the cells are actively engaged in silk secretion, β-glucosidase activity is undetectable. With the onset of pupation when the gland begins to degenerate, the enzymatic reaction product is formed in appreciable amounts in all the gland cells (figure 3). The activity is scattered throughout the cytoplasm and not restricted to specific areas. β-glucosidase activity, although weak, persists up to the final phase of degeneration (3-day-old pupa).

β-glucosidase is one of the carbohydrases, which hydrolyses specific (β) bond in the sugar residues of cellobiose, gentiobiose, phenylglucosides, methyl-β-glucosides, salicin, arbutin etc, the specificity depending on the nature of the bond and the form of linkage. Like acid phosphatase and β-glucuronidase, β-glucosidase is also lysosome attached hydrolase involved in tissue breakdown[8–11]. The present investigations on the β-glucosidase activity in the mid-gut epithelial cells of growing instars of *D. obliqua* have revealed that in the functional phase it is low and confined to the basal cytoplasm only.

In degenerating cells the activity increases considerably and is found in the entire cytoplasm. In the regenerative cells the activity is low and remains as such in the mid-gut epithelium of the adult. It is thus seen that the greater β-glucosidase activity in the degenerating cells coincides with increased acid phosphatase activity during early pupal stages[13]. There is reason to believe that β-glucosidase reaction as obtained in the mid-gut cells of the prepupa and pupa of *D. obliqua* is associated with the process of cellular degradation, which occurs with the increased lysosomal activity in the cells. It is also in agreement with Young's[10] observation that enzymatic activity varies during development of *Spodoptera eridania*. The presence of carbohydrase activity in functional cells, although weak, has nothing to do with lytic events, as in histolytic phenomena, but is possibly concerned with the breakdown of sugar substrate received from the food of the animal. As during larval instars, no significant variation in activity and localization of the enzyme under reference is noticed, there appears little involvement of the enzyme in differentiation and growth. Absence of β-glucosidase activity in the silk gland cells in sequential instars of *D.obliqua* further confirms the above viewpoint.

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KARYOLOGY OF THE PIGMY SHREW, *SUNCUS ETRUSCUS PERROTTETI* (SAVI) (SORICIDAE: INSECTIVORA)

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THE pigmy shrew, *Suncus etruscus*, is perhaps the smallest extant eutherian mammal with an average length of 6 cm. In India it is distributed in peninsular India and northwards to Punjab, Orissa and Assam[1]. Meylan[2] reported in this species a chromosome number of 42 in a specimen collected from S. France. Later the preliminary study by Satya-Prakash[3] confirmed the chromosome number but with some architectural differences. Since other details of the chromosomes are lacking, a greater number of animals of both sexes were analysed. The present communication describes the details of the