

HISTOPATHOLOGICAL EFFECTS OF AN AGRO – CHEMICAL METACID 50 IN THE OLIGOCHAETE *TUBIFEX*

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Exposure of the specimens of *Tubifex* in the media contaminated with LC50 concentration of the pesticide, Metacid 50 caused several structural deformities in their internal organs. The main organs affected were epidermis, coelomic epithelium, pharyngeal glands (showing disorganized condition) gut wall (revealing disintegrated internal epithelial lining in some positions) and also in nephridial structures. Nevertheless, structural deformities occurred also in the gonads and their associated structures, as there was loss of consistency in the pattern of digital ovarian lobes and in the cytoplasmic contents of the ova as well as of the spermatogonia, showing some sort of debacle in the reproductive potentiality.

Key words : Histopathological, Metacid 50, *Tubifex*.

INTRODUCTION

Indiscriminate use of pesticides is regarded as a major source of water pollution. It affects the ecosystem of the confined water areas with the result that the aquatic fauna in general and benthic organisms in particular often sustain heavy losses. Because of this sort of stipulated adversity, the population of the tiny benthic organisms such as oligochaetes, aquatic insects and their larvae and also crustaceans and mollusks all of which belong to the food chain organisms of fishes, get reduced numerically (Konar, 1975; Maziarka, 1975; Ghosh & Konar, 1979; Konar & Ghosh 1981; Bulkema *et al.*, 1987; Alam & Shafi, 1989). However, there was paucity of information about the effects of pesticidal chemicals on oligochaetes, though some useful contributions have been made by the present another to determine toxicity of some pesticides to *Tubifex* (Alam & Shafi, 1988).

In the present study, hazardous effects of an organophosphate pesticide, Metacid 50 in the body tissue of *Tubifex* have been demonstrated and significance of the findings explained.

MATERIALS AND METHODS

The specimens of *Tubifex* were collected from local shallow ponds and brought to the laboratory in polythene bags with minimum disturbance. They were acclimatized to the laboratory condition for a period of 7 days and fed with organic debris. Selected healthy specimens were given exposure in predetermined LC₅₀ dose of the agro - chemical, metacid in large petridishes. After 96 hours of intoxication, those specimens which exhibited signs of distress or agonistic movement, were picked up and were transferred to Bousin's fixative and paraffin blocks were prepared. The microtomed thin sections were stained with haematoxylin eosin stains. The selected slides were used in microscopical studies and photomicrographs of the slides were taken.

RESULTS AND DISCUSSION

On exposure of the specimens of the worm, *Tubifex* to the sublethal concentration of metacid, it was observed that large number of specimens developed structural deformities in various organs and in varying degrees. The main organs affected were epidermal structure, coelomic epithelial layer, pharyngeal glands, gut wall, chloragogen cells, excretory cells, gonads and their associated structures. The most spectacular finding in respect to damages was the rupture in epidermis due to disintegration of cells in some positions (Figs. 1-3). The concern of the epidermis with the protection of the internal organs and active participation in the gaseous exchange system is a well known fact. The adverse impact of this deformity in the epidermis on the breathing activities, and, thereby, on the functional activities of the vital organs is evident in view of some earlier records of investigation explaining significance of breathing activities (Subbarao *et al.*, 1987).

Disorganised condition of the pharyngeal glands, internal epithelial lining of the gut tube and depleted condition of the epithelial cells adorning mucosa were also observed in the exposed specimens (Fig. 2). These deformities were indicative of the fact that the affected specimens had maximally lost the capacity of digestion of the ingested food particles. Reportings by Dales (1967), and Barrington (1975) on the internal anatomy and physiology of oligochaetes provide evidence to this view.

Instances of impairment were also discernable in the excretory tissue, *i.e.* nephridial structures. The normal specimens contained yellow granules in their cells and which located surrounding the intestine. In some of the exposed specimens it was found that there was proliferation of cells depicting appearance of small sized cells hugged together around the intestinal wall (Figs. 1 & 3). Nevertheless, some of the cells were scattered in the coelomic space as free cells (eleocytes). All these alterations gave evidence to the likelihood of adverse impact on the capacity of the exposed worm to carry on excretory and osmoregulatory role.

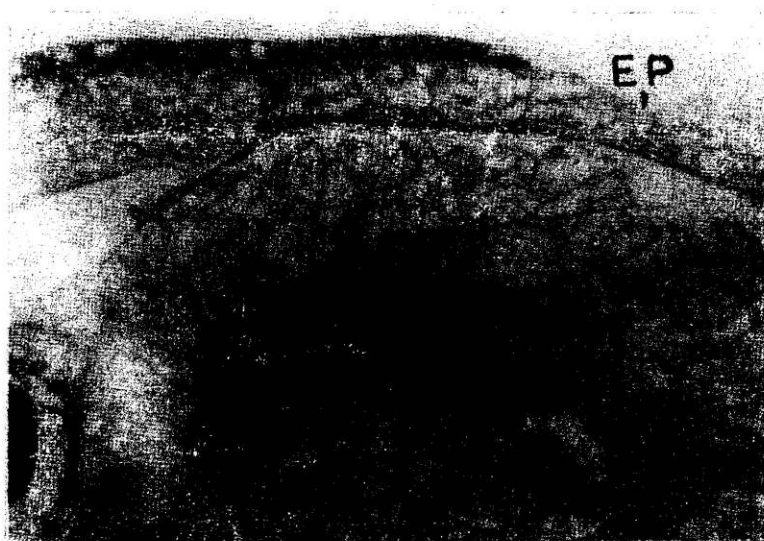


Fig. 1 : Photomicrograph of T.S. of whole body of the worm, *Tubifex* exposed to sub lethal concentration of Metacid showing damage to the epidermis (EP).

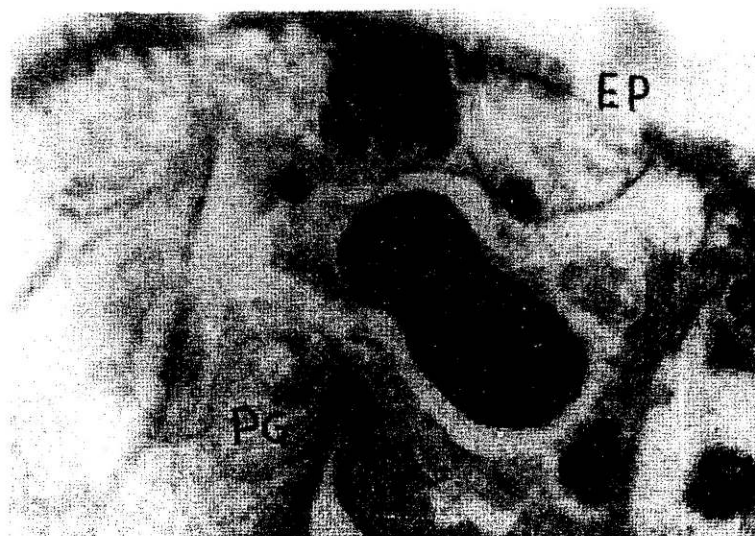


Fig. 2 : Photomicrograph of T.S. of whole body of the worm. *Tubifex* exposed to sub lethal concentration of Metacid showing damage to the epidermis (EP) and pharyngeal gland (PG).

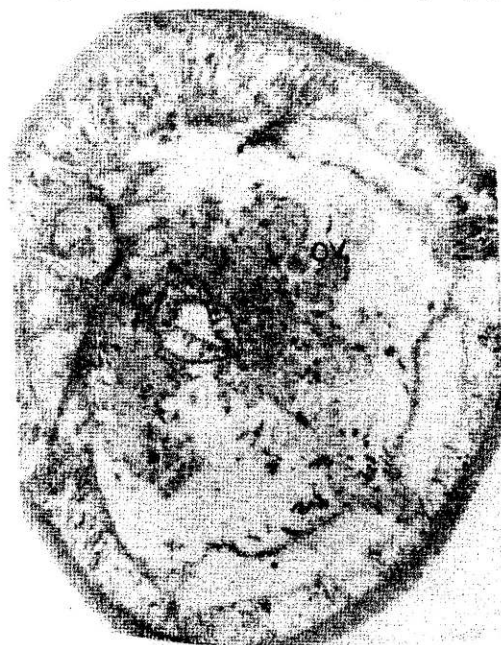


Fig. 3 : Photomicrograph of T.S. of whole body of the worm. *Tubifex* exposed to sub lethal concentration of Metacid showing damage to the ovary, gut wall and epidermis. and pharyngeal gland (PG).

Structural deformities occurred also in the gonads and their associated structures after exposure to the metacid media (Fig. 3). The disorganized condition of the ovary was depicted in the form of disintegrated condition of the contents of ovaries, loss of consistency in the digital ovarian lobes and depletion in the cytoplasmic content of ova, giving indication of great setback in the potentiality for carrying reproductive function. Likewise the component cells of testis exhibited disorganized condition and, therefore, debacle in the reproductive potentiality.

All these signs of impairment of tissues in the exposed specimens of *Tubifex* indicated that the Metacid media was so much obnoxious in nature that the chance of survival of other tiny organisms was threatened to a great extent, as observed earlier also by some research workers (Alam & Shafi, 1988). The incumbent loss of the population of oligochaetes on exposure to the pesticidal media was indirectly liable to affect the fish population in consideration to the fact that the oligochaetes were choiced food organisms for fishes.

ACKNOWLEDGMENT

The authors are thankful to Dr. D.N. Sadhu, Head Department of Zoology, Vinoba Bhave University, Hazaribag for encouragement.

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