

EFFECT OF CHRONIC TREATMENT OF ORGANOPHOSPHOROUS PESTICIDE QUINOLPHOS ON MALE GONADS OF FRESH WATER MOLLUSCS LAMELLIDENSE CORRIANUS FOUND IN DOUGHT PRONE REGION SANGOLA OF MAHARASHTRA STATE, (INDIA)

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ABSTRACT

They are widely distributed from freshwater tanks, pools, rivers. This phylum comprises animals like gastropods and lamellibranch which are of high quality of edibility and of commercial importance. The direct discharge of industrial effluents and runoff exert their toxic effect on the living beings, by changing physic-chemical parameters finally, affecting the life cycle of the animals. Freshwater molluscs are filter feeder exposed to the drastic variation in surrounding aquatic media which affect the physiology and cytoarchitecture. Present study is an attempt to study effect of pesticide on gonads of the fresh water mollusk *Lamellidens corrianus* found in Chincholi tank near Sangola of Solapur district. (M.S.) India. During three seasons namely,

monsoon, summer and winter. The present study showed severe damage to the male gonads, with increasing exposure time.

KEYWORDS: Physico-chemical, Lamellibranch, Gastropods *L. corrianus*. *Effluents*.

INTRODUCTION

The industrialization, urbanization, technical advances and anthropogenic activities are bring about rapid degradation of water superiority affecting the vast freshwater sources. The freshwater tanks, lake and rivers are being over burden by various releases from human

actions. These elements as concerns of rain water runoff from agricultural lands, high concentration of many injurious chemicals often lead to the decline of aquatic biota. If this trend continued, large quantity of hazardous chemicals pollute the drinking water and affect the freshwater biota. Molluscs are important since they have morphological diversity, possesses well calcified skeleton and having excellent fossil record. The body contains elongated structure and has bilateral symmetry. The calcium carbonate for the manufacturing of the shell secreted by the mantle. They utilize either aragonite or calcite or mixture of both. The phylum mollusca is one of the largest groups of living animals. Unionideae species are under the great threat of extinction due to wide spread of pollution The direct discharge of industrial effluents and runoff comprising versatile chemicals exert their lethal effect on the alive beings, reducing the dissolved oxygen altering pH, changing the CO₂ content and finally affecting the life cycle of the animals (Dehadri, 1990).

Mahajan and Kamble (2015), studied effect of sewage water on histopathology of different organs of fresh water fish *Tilapia mossambica* noticed sever damage to the important organs like gills and liver. They also studied mortality of fishes due to exposure to different concentrations of sewage water for 96 hrs Akarate *et al.*, (1983) have studied the acute toxicity impact of Cythion-malathion on the histopathology of cerebral and visceral ganglia, hepatopancreas and gonads from estuarine clam, *Katelysia opima*. Muley and Mane (1986) studied the histopathological changes due to endosulfan from *Lamellidens corrianus* and *Lamellidens marginalis* in hepatopancreas during three different seasons. Muley and Mane (1986) studied the Histopathological changes from hepatopancreas visceral ganglia and gonad of marine water edible clam, *Katelysia opima* Muley and Mane (1987) studied the histopathological changes induced by Cythion-malathion from *Lamellidens corrianus* and *Lamellidens marginalis* in the gonads during different seasons. Cope (1996) reported a sublethal effect of herbicide caused degenerative changes in liver and testis. Nagbhusanam *et al.*; (1983) observed the acute exposure of Malathion and Demacron and Monochrotophos caused pronounced changes in gonad of the freshwater prawn *Macrobrachium lamerii*. Muley and Mane (1988), studied the variations in gonad due to endosulfan toxicity from *Lamellidens corrianus* and *Lamellidens marginalis* during three seasons. Tilak *et al.*, (2005) studied the histopathological changes in gills from freshwater fish *Channa punctatus* exposed to sublethal concentrations of Butachlor and Machete (herbicide). Muley and Mane (1987) observed, histopathological changes by cythion – Malathion from lamellibranch mollusc, *Lamellidens corrianus* and *Lamellidens marginalis* from Godavari river, Paithan. They have

observed that the severity of effect of pesticide of both the species was more at LC₅₀ than LC₀ from gonads.

MATERIAL AND METHODS

The freshwater bivalve mollusc, *Lamellidense corrianus* measuring about 65-70 mm in length were collected from Chincholi tank nearby Sangola, Dist. Solapur, Maharashtra (India). Collected fresh water bivalve lamellibranch molluscs *L. corrianus* were exposed to chronic treatment of 1/10th of LC₅₀ concentration of Ekalux (Quinolphos 25 % EC) during all three seasons. For histopathological study male gonads were pooled out from 5 animals from each group and fixed in to Bovine fluid from the entire experimental group along with control for all the seasons chronic treatment. The tissues of the bivalves belongs to control LC₅₀ groups were fixed into aqueous Bovines solution for overnight and washing was done for 24 hr after fixation. The tissue were dehydrated using different alcoholic grades and cleared in xylene. Then the tissues were transferred to cold embedding followed by hot embedding at 58⁰C for 1 hr. The paraffin block of the tissues was made. The trimmed blocks were used for sectioning. The section of six micron was thickness selected for staining. Double staining was done by using Delafield's hematoxylene and eosin. Stained sections were used for microphotography.

RESULTS AND DISCUSSION

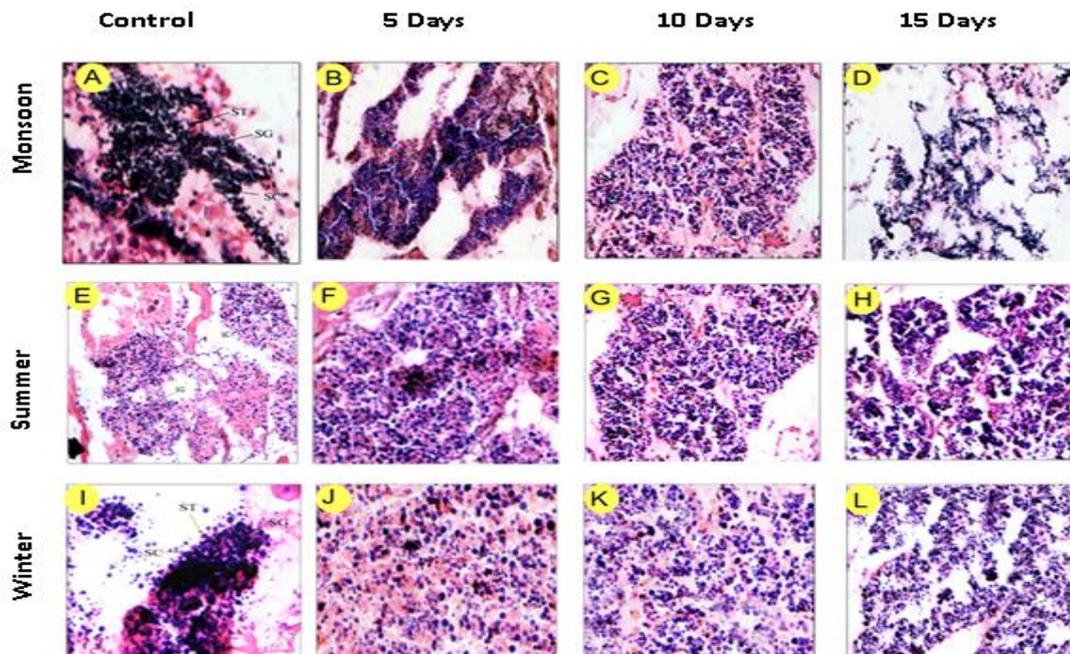


Fig.1: Chronic treatment of Organophosphorous pesticide quinolphos 25% EC on gonads of *L. corrianus* during three seasons.

The chronic treatment of $1/10^{\text{th}}$ of LC 50 concentration of Ekalux (Quinolphos 25 % EC) showed sever damage to the male gonads during all three seasons (**Fig. 1**). During monsoon considerable damage to male gonad was noticed. As in monsoon male follicle showed development of spermatogonia, spermatocyte and few spermatids got damaged severely. The follicle were disrupt at places. The spermatogonia lost the continuity in developmental sequence and get clumped at places. The spermatocyte and spermatid lost the continuity in development and got detached. During winter season considerable damage to male gonad was noticed. As in winter male follicle showed few spermatogonia and spermatocyte and showed many spermatids got damaged severely. The follicle were disrupt at places. The spermatogonia lost the continuity in developmental sequence and get clumped at places. The spermatocyte and spermatid lost the continuity in development and got detached. The components were not stained properly. During summer male follicle showed many spermatogonia and, spermatocyte and few spermatid got damaged severely. The follicle were disrupt at places. The spermatogonia lost the continuity in developmental sequence and get clumped at places. The spermatocyte and spermatid lost the continuity in development and got detached. Muley and Mane (1987) while studying histopathological changes in gonad due to cythion malathion from freshwater bivalves, *Lamellidens marginalis* and *Lamellidens corrianus* observed similar changes and stated that, the pesticide stress affect the reproductive stress during all the three seasons. In male, follicle damage was little due to the Ekalux toxicity from *Lamellidens corrianus*. Kamble and Mahajan (2013), studied effect of sublethal treatment of organochlorine pesticide Thiodan on histopathology of hepato pancreas of fresh water molluscs *L. corrianus* during winter and observed pronounced damage to basement membrane, parenchyma, hyperplasia and necrosis. Nagbhusanam *et al*; (1983) observed that exposure of Malathion, Demacron and Monochrotophos caused pronounced changes in the gonads of freshwater clam, *Macrobrachium lamerii*. They also noticed, in the control cluster developing sex product in gonads during summer, maturation of sex organs in monsoon and partial spread gonads during winter. They have also noticed severe damage of the gonads, particularly, in summer and monsoon and finally concluded that pesticide was more toxic to the bivalves because of rapid penetrations in to the gonad tissue which affect pre mature gametes in the lumen of follicle and appears to stop the growth of germ cell and development of sex cell. In present study similar observations were noticed where clumping of spermatogonia and shrinkage to gonad was more prominent during monsoon, but severity of damage to gonad due to Ekalux (quinolphos 25% EC) was more pronounced during summer season than in monsoon then in winter.

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