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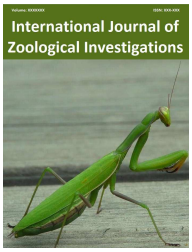

Toxic Effects of Copper on the Testis of *Hetropneustes fossilis*

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Abstract: Live and mature specimens of male *Hetropneustes fossilis* were obtained from local fish market and acclimatized to the laboratory conditions for four weeks. After acclimatization fish were exposed to 30ppm cupric chloride. Fish were sacrificed on 15th day and testes were extirpated. Histological preparations were made by routine paraffin method and sections were stained with AF and OFG method. In treated fish swollen testicular wall, intermittent disorganization due to over contraction of testicular substance and irregular hyperplasia of the seminiferous tubules were noticed.

Key Word: - Copper, *Hetropneustes fossilis*, Testis

Introduction

The aquatic environment receives heavy metals from various sources which accumulate in various tissues of organisms. Such heavy metals under permissible limits are not lethal to fish but accumulation of high contents of these heavy metals cause serious hazards to human beings who feed on these contaminated fishes (Shalaby and Abd-El Migeed, 2012).

Heavy metals like copper is a group 1B metal commonly used in industries like electroplating, iron and steel works, electrical works, industries like organic chemicals, anti-fouling paints, pesticides, fungicides and as a molluscicide (Alarape et al., 2013, Kumar et al., 2014). There exists few reports regarding the toxicity of copper on – carbohydrate metabolism in freshwater mussel (Satyaparmeshwar et al., 2011), osmoregulation in gibel carp (Boeck, 2010), alteration in protein of fish (Saraf-Eldeen and Abdel-Hamid, 2011), protein content of gill, liver, kidney and gonads of *Clarias batrachus* (Kumar et al., 2014), The present study deals with the effects of cupric chloride on the histological structure of testis of catfish, *Hetropneustes fossilis.*

Material and Methods

Live specimens of male *Hetropneustes fossilis* were obtained from local fish market and acclimatized to the laboratory condition for four weeks. Aquarium containing 20 L of water was used for maintaining the fish (10 fish per aquarium). The acclimatized fish were exposed to 30ppm of cupric chloride for 15 days. After 15 days following the

treatment, the fish were dissected and testes were fixed for histological preparations. Tissues thus fixed were routinely processed and embedded in paraffin. Sections were cut at 6 µm and stained with AF and OFG (Drury et al., 1967).

Results

Histological examination of testis of control *Hetropneustes fossilis* showed that it is lobular in shape containing many seminiferous tubules. Each seminiferous tubule contains the germ cells which are arranged in clusters at several places along the length of tubule.

The testis of copper treated catfish, *Hetropneustes fossilis* exhibits severe testicular atrophy (Figs. 1 and 2). There has been noticed marked inhibition in the process of spermatogenesis. Testicular wall is swollen (Fig. 2) and clumping of spermatozoa within seminiferous tubules has been noticed. At some places testis is highly degenerated and it is difficult to recognize it as testicular tissue.

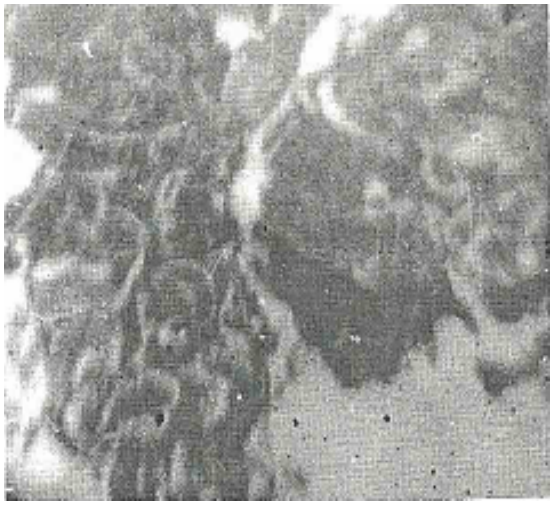

Fig: 1 Photomicrograph of cross-section of testis of *Hetropneustes fossilis* exposed to 30 ppm Copper. X 100.

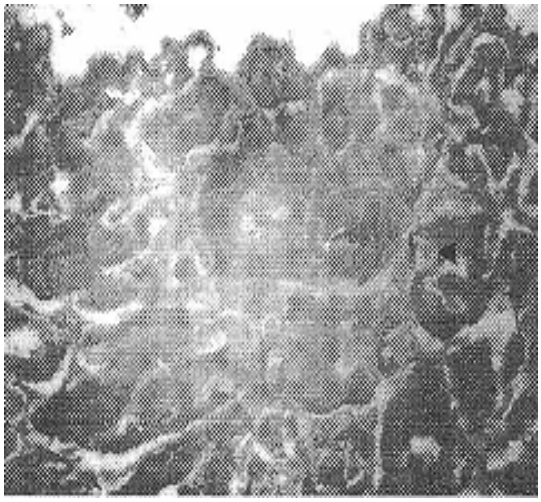

Fig. 2 Photomicrograph of a part of cross section of a testis of *Hetropneustes fossilis* exposed to copper (reduced interstitial spaces, much thickened wall spermatogenetic tubule and dark stained spermatogonia). X100

Discussion

In the present study we have noticed severe atrophy and degeneration of seminiferous tubules after treatment of fish with copper. Severe degenerative necrosis of testis has been noticed in African catfish after copper treatment (Alarape et al., 2013). Reduced nucleic acid content has been noticed in testis of copper exposed *Notopterus notopterus* (Ravikiran and Kulkarni, 2015). Decrease in spermatogenesis and disruption of spermatogenic cells have been reported by Shalaby and Abd-El Migeed (2012) due to heavy metal exposure. Koizumi and Li (1992) have reported severe testicular atrophy, necrotic spermatogenic cells and vacuolization in the interstitial cells after cadmium and lead pollution. Animals which were exposed to high doses of cadmium and lead have shown testicular atrophy (Saygi et al., 1991; Stohs and Bagchi, 1995).

The results of present study showed that copper exerts anti-testicular activity. The changes in testis histology as a result of copper exposure give an alarm how the toxic heavy metals could alter the ability of fish to

produce offsprings. Thus histopathology could be used as a biomarker to provide information on the effects of heavy metals on fish health.

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