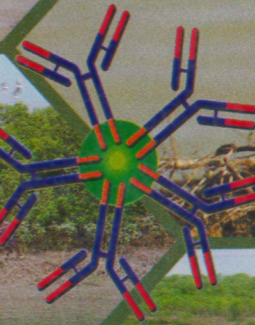


# 29<sup>th</sup> All India Congress of Zoology

*International Symposium on  
Culture Based Fisheries in Inland Open Waters  
&  
Satellite Symposium on  
Fish Immunology*

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## Book of Abstracts



9-11 June, 2017



**ICAR- Central Inland Fisheries Research Institute**  
(Indian Council of Agricultural Research)  
Barrackpore, West Bengal, India



EPT-5

## ABIOTIC AND BIOTIC STRESSES IN INLAND OPEN WATERS AND THEIR MITIGATION STRATEGIES

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Considering the enormous resource size and untapped production potential, the reservoirs and floodplain wetlands have become the focus of future fisheries development and fish production enhancement to meet nutritional requirement in India. However, inland water bodies are gradually becoming polluted with the wastes generated through industries and domestic sewage resulting in less useful for fish culture. The fish yield of the water body is determined by its abiotic and biotic characteristics. Edaphic stressors such as nitrogenous contaminants, excessive nutrients, high organic load, PBTs, heavy metals, POPs, pesticides, atmospheric stressors such as extreme climate events, biotic stressors such as pathogens, aquatic weeds pose to be important concerns for culture based reservoir and wetland fisheries. The concern factors are urban sewage, agricultural wastes, food processing wastes, distillery wastes, paper-pulp mill wastes, organic discharges from the chemical industry and oil spillages. In the present paper, various abiotic and biotic stresses of anthropogenic, geogenic and xenobiotic nature and their mitigation strategies through improved technology interventions in environmental enhancement, stock enhancement, environmentally viable enclosure culture technologies, culture based fisheries, integrated agri-aquaculture, integrated multi-trophic aquaculture, biostimulation, bioaugmentation and application of multi-omics have been discussed as yet another bioremediation strategies for enhancing fish production in inland open waters.

**Keywords:** Abiotic, biotic, inland open waters, fish production

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## IMMUNOGLOBULIN M (IGM) RESPONSE OF TILAPIA, *Oreochromis mossambicus* TO ACUTE THERMAL STRESS

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Fish is continuously exposed to changing environmental conditions diurnally and seasonally. Climate variability affects the fish habitat with rise in water temperatures. Higher temperatures make the fish susceptible to various diseases. Immunoglobulin M (IgM) is the component of specific humoral immune response in fishes which respond to change in environmental factors, such as temperature, DO, pH, salinity etc. Following study attempts to understand the expression of IgM which fights against infections. Tilapia, *Oreochromis mossambicus* of average length  $6.5 \pm 0.5$  cm and average weight  $6.4 \pm 0.7$  g were exposed to acute thermal stress. The water temperature was raised to  $40^{\circ}\text{C}$  at the rate of  $0.3^{\circ}\text{C}/\text{min}$ . At this temperature the fish attained loss of equilibrium (LOE) representing the critical thermal maxima (CT<sub>max</sub>) of the fish. All fishes survived the acute thermal stress. Fish recovered after water temperature reached  $25-27^{\circ}\text{C}$  which represented the initial zero hour sampling. The fish were sampled at 0, 2, 6, 24, 48 hours and were analyzed for impact of acute thermal stress on the expression of Immunoglobulin gene IgM. It is observed that IgM expression in the fish skin tissue declines rapidly from zero hours to 48 hours. The IgM expression decreased due to acute thermal stress and could not attain the normal expression levels even after 48 hours after onset of stress. The thermal stress suppresses the expression of IgM gene. High temperature acclimation results in decrease in IGM concentration indicating that the fish possess an optimal thermal range for synthesis of immunoglobulins. The above result suggests that specific immune system of *Oreochromis mossambicus* gets altered due to abiotic stress of temperature in the aquatic environment. This makes the fish susceptible to infectious disease in the event of sudden and drastic changes in the climatic conditions.

**Keywords:** *Oreochromis mossambicus*, critical thermal maxima, immunoglobulins, humoral immune