

M.S.118.ANNEY K. MATHEW—Studies on some aspects of biology of two estuarine fishes *Megalops cyprinoides* and *Scatophagus argus*—1989—Dr. A. Antony

Megalops cyprinoides and *Scatophagus argus* are the only representatives of

the family Megalopidae and Scatophagidae in Indian waters. They inhabit Vembanad lake with varying salinities throughout the year. Both are favoured as edible fishes rich in nutrients. Besides, Megalops is high ranked as sport fish and scatophagus as aquarium fish due to their unique body structure and appearance.

The basic biological aspects necessarily to be known, while culturing an organism, such as food and feeding habits, proximate composition and the deleterious effects of chemicals unavoidable in culture farms on the physiological systems of the exposed animals are considered for the present study. Significance of the various parameters selected for investigation can be summarised as follows.

For the successful culturing of an organism, a deep knowledge about the food and feeding habits of the organism at different stages of growth and the food preferences in different habitats is inevitable. So fishes of different size groups were collected from different habitats and their gut contents were analysed. Before recommending a species to be cultured as food fish, their nutrient status and calori content should be estimated. Taking this aspect into consideration, an assessment of the biochemical composition of the edible tissues namely muscle and liver was made.

Copper sulphate is the most popularly used chemical in culture farms for therapeutic purposes. Though copper is metabolically essential and therapeutically inevitable, it becomes toxic to the exposed animal beyond safe limits. Considering this point of view, fishes were exposed to two sublethal concentrations of copper i.e. 0.1 ppm and 0.15 ppm and its effect on selected physiological systems were investigated.

Since blood is a very efficient connective tissue providing access to each and every cell of the body, can reflect the stress experienced by the animal even in minute level. So the variations caused by Cu^{++} on the normal concentration of the various entities such as haemoglobin content, erythrocyte content and leucocyte content was studied.

Variations induced by Cu^{++} on the activity of few important enzymes were also analysed. Of them, two are acid phosphatase and alkaline phosphatase which are hydrolytic in nature and so considered as indicators of stress by fishery biologists. Moreover acid phosphatase is bound to lysosomes which are the subcellular structure to concentrate, disintegrate and eliminate toxicants while alkaline phosphatase is bound to cell membrane which is the subcellular unit first to encounter an external challenge. Two other enzymes studied are Glutamic pyruvate transaminase (GPT) and Glutamic oxaloacetic transaminase (GOT) which catalyse biological transamination - the prime mechanism involved in the synthesis of amino acids and keto acids which are responsible for the overall flavour of fish. Besides transaminases also have a key role in the detoxification of ammonia in teleosts and also autolytic degradation of muscle protein. So variations in their activity is used as yard sticks of stress. The tissues used for analysis are liver which is assigned with the detoxification of toxicants and kidney with the function of physiological elimination.

Cu^{++} when toxic may create hypoxic or anoxic conditions compelling the animal to switch over to anaerobic metabolism. As glycolysis is the pathway for anaerobic metabolism, accumulation of lactic acid, the end product of glycolysis is the immediate manifestation of hypoxia in animals. Since muscle and liver glycogen are the sudden substrates for glycolysis, an estimation of glycogen

and lactic acid content of the muscle and liver tissue will provide an idea about the hypoxic stress caused by the copper ions.

It is hoped that the results of the present study will be helpful in formulating suitable schemes for the successful culture and exploitation of quality fishes in general and the two fishes selected for study in special since very little studies has been made of the two fishes so far.