M.S.95. SURESH, K. – Haematology of some Marine and Estuarine molluscs of commercial importance–1988– Dr. A. Mohandas.

In recent years there is increased awareness regarding the potentiality of molluscan fishery as a good resource to provide protein and mineral-rich food. In intensive molluscan culture programmes, now adopted, set-backs because of bacterial, viral, protozoan and metazoan parasitic out-breaks are not uncommon. Bivalves are also peculiar in the sense that they have the capacity to accumulate potentially toxic heavy metals and micro-organisms in their bodies from the environments in which they habits, serving as vehicles for the transmission of diseas to man. A knowledge about the mechanisms involved in these processes will answer seveal problems of public health importance. Yet another important aspect that needs emphasis is the utilization of marine organisms as models for research directed at understading the basic bio-medical problems that remain unresolved. In the past, in studies dealing with the effect of stress factors, particular attention was given to specific organs such as mantle, gills, kidney, digestive gland, gonad etc., but haemolymph was seldom considered as an organ system.

In the present study, two species of clams, *Sunetta scripta* and *Villorita cyprinoides* var. *cochinensis* were used. The haemolymph parameters like total and differential haemocyte counts, total carbohydrate, glycogen, total protein, acid and alkaline phosphatase in different size groups and also when these clams are subjected to abiotic (by employing different concentrations of copper) and biotic (by giving injections of 1×10^8 cells/0.02 ml of *Vibrio alginolyticus*) stress were studied. The levels of lactic acid in the haemolymph in *S. scripta* when subjected to sublethal concentrations of mercury and copper were also studied. The thesis is divided into eight chapters.

In the first chapter, opinions of different workers on the various aspects of bivalve haemolymph and haemocytes and their functional role including the part they play in defense mechanisms are brought together in the form of a review.

In the second chapter, the study of total and differential haemocyte count is included. In copper-dosed *S.scripta* no significant difference in the haemocyte number was observed between the experimentals and controls, whereas the experimentals of *V. cyprinoides* var. *cochinensis* showed significant drop. In *Vibrio*-injected *S. scripta,* a significant increase in the number of haemocytes started at 48 hrs and continued till 96 hrs whereas in *V. cyprinoides* var *cochinensis,* it started at 3 hrs and continued upto 12 hrs. The reasons for this are explained in this chapter.

In the third chapter, study of haemolymph glycogen and total carbohydrate is described. In copper-stressed *V. cyprinoides* var. *cohinensis,* the glycogen level was lower in the experimentals than in the controls whereas the total carbohydrate values were significantly higher in copper-dosed clams than in the controls in both the clam species. In *Vibrio*-injected *S. scripta,* the haemolymph glycogen values were found to be significantly higher at 3 hrs and in *V. cyprinoides* var. *cochinensis* at 24 hrs than the values of untempered controls. In *S. scripta* following *Vibrio-injection,* total carbohydrate showed significantly higher values upto 12 hrs whereas *V. cyprinoides* var. *cochinensis* showed higher

values than the controls at all the time periods. The possible reasons and the probable mechanisms operating are explained to interpret the observed hyperglycemia in the haemolymph when the clams are under abiotic and biotic stresses.

In the fourth chapter, study of haemolymph protein is presented. In *S. scripted* and *V. cyprinoides* var. *cochinensis*, the pattern of protein values shown by the copper-dosed clams was different depending on the concentration of copper employed. From the results, it is evident that the protein values in the haemolymph compartment in copper-dosed condition is a matter of balance between entry and exit of protein into and out of the haemolymph ccmpartment. *Vibrio*-injected ones of both the species of clams did not show any significant difference in protein values when compared with the controls. This is discussed in this chapter.

In the fifth chapter, study of haemolymph acid phosphatase is reported. In copper-dosed experiments with *S. scripta* and *V. cyprinoides* var. *cochinensis*, the results indicated that in synthesis, its release into the haemolymph compartment and its final loss. In *S. scripta*, the *Vibrio*-injected ones showed significantly higher acid phosphatase activity from 3 hrs upto 24 hrs whereas *Vibrio*-injected *V. cyprinoides* var. *cochinensis* showed higher acid phosphatase activity from 3 hrs upto 12 hrs. This is interpreted as the release of this enzyme from the lysosomes in response to the biotic challenge.

In the sixth chapter, study of haemolymph alkaline phsphatase is presented. Copper-dosed *S. scripta* showed significantly higher haemolymph alkaline phosphatase activity whereas copperdosed *V. cyuprinoides* var. *cochinensis* showed no significant difference. In *S. scripta* and *V. cyprinoides* var. *cochinensis*, *Vibrio*-injected clams showed significantly higher activity at 72 and 96 hrs and 72, 96 and 120 hrs respectively. The probable reasons are discussed in this chapter.

In the seventh chapter, study of haemolymph lactic acid in *S. scripta* is presented with emphasis on two aspects: (a) whether lactic acid could be one of the end products if not the major one in bivalves under environmental hypoxic conditions prevailing within the shell and (b) whether haemolymph could be taken as an organ system in studies related to end product accumulation in specific tissues of bivalves. For both, the answer is positive and the reason for this conclusion are discussed in this chapter.

The eighth chapter formed the summary of the thesis.