PREFACE

Over the last two decades, intense interest has been generated in India to develop aquaculture in the coastal waters. This growing awareness has stemmed in the context of ever increasing demand for protein food, increasing fishing pressure on certain marine fish resources particularly the prawns to meet the demand from foreign markets and consequent stagnation and/or declining trend in the fish catch. Besides, it is realised that coastal aquaculture would help considerably towards integrated rural development of coastal areas, providing employment opportunities and the use of the underutilised or unutilised coastal derelict waters. In view of these, coastal aquaculture is now assigned high priority in the national fishery development programmes.

Among the extensively cultivated species of fish and shellfish in the coastal waters of India, penaeid prawns occupy the foremost place. A traditional practice of aquaculture of prawns and fishes in the brackishwaters is prevalent in the country since ancient times. The basic technology of prawn farming in this practice entails stocking of the field by the seeds brought in by the incoming tide, growing them for a short period by feeding on the natural food available in the field and harvesting of the stock. The quality and quantity of production from this farming system however, are found to be low due to indiscriminate and uncontrolled stocking of the seed, short time allowed to grow the seed before harvesting and little managerial procedures involved by the way of eradication of predatory and competitive species and control of water quality. This
system during past decade is improvised through eradication of undesirable organisms from the field and its preparation, stocking with species of prawns that grow fast and command good price and demand, and growing them to marketable size with supplementary feeding and water supply management. The yield as well as the quality of prawns harvested by this system is found to be of higher unit value. This semi-intensive practice is now rapidly spreading and gaining importance in the country.

In the development of aquaculture of prawns in the country, one of the major constraints encountered by the farmer is the non-availability of quality seeds of desirable species as and when required for culture. To meet the ever increasing demand for seed, the technology of seed production of penaeid prawns has recently been developed and several commercial scale hatcheries are now being established in different maritime states.

One of the major factors which influences the production and quality of seed in the hatchery and their subsequent culture in the grow-out system is the diseases and parasites affecting the stock. Under certain unfavourable conditions, diseases due to biotic and abiotic factors affect the larvae and postlarvae of penaeid prawns. Further, these developing stages are found to be more susceptible to diseases than the adult. From the published literature on the subject, it is apparent that most of the informations on diseases of prawns relate to the adult and studies on the pathology of larvae and postlarvae are limited to a few description of
parasites and reports on their incidence. It is in this context and in the
dearover of providing reliable information on the diseases encountered in
the hatcheries, the present investigation on the pathobiology of larvae and
postlarvae of penaeid prawns of India is taken up.

The Thesis is presented in nine chapters. Chapter 1 surveys the
literature on the diseases of penaeid larvae, postlarvae and adult prawns
from India and abroad. This is followed by a chapter on the material and
methods employed during the present investigation. In the third chapter,
seven cases of diseases and abnormalities encountered in the larvae and
postlarvae of Penaeus indicus and P. semisulcatus during the survey carried
out in the hatcheries located at different centres of Central Marine
Fisheries Research Institute are presented and discussed. The clinical
signs, seasonal occurrence and incidence of each of the seven cases are
provided along with the information on environmental factors such as
salinity, dissolved oxygen, temperature and pH of the rearing medium. The
fourth chapter contains the results of the studies on normal heterotrophic
bacterial flora associated with eggs, larvae and postlarvae of P. indicus.
The fifth chapter deals with the review of the literature on the pathogenic
vibrios from the available informations. Morphological, biological,
physiological and biochemical characters of the new isolate of Vibrio
isolated from the diseased larvae of P. indicus are studied and discussed in
the sixth chapter. In the seventh chapter, the pathogenicity of the new
isolate of Vibrio on the larvae and postlarvae of P. indicus, P.
semisulcatus, P. monodon and adult P. indicus is studied. The eighth
The chapter presents the result of histopathological observations made on the various vital organs of uninfected and infected larvae and adult P. indicus, and postlarvae of P. monodon. Finally in the ninth chapter, eleven antimicrobial agents were tested against the new isolate of Vibrio and the results discussed.

The disease syndromes such as *Nitzschia closterium* infestation, parasitic protozoan infection, parasitic dinoflagellate infection and appendage necrosis encountered in the larval and postlarval stages of *P. indicus* are reported for the first time from India. *N. closterium* was proved harmful to the larvae of *P. indicus* experimentally. Detailed studies on a bacterium responsible for appendage necrosis in larvae of *P. indicus*, which is found to be different from the known vibrios in the literature on the basis of its morphological, biological, physiological and biochemical characters; pathogenic mechanism of the new isolate of Vibrio; histopathological observations on the vital organs of the infected larvae, postlarvae and adult prawns, and control of Vibrio - infection by antibiotics constitute original contributions in the thesis. The information gathered and the results presented would not only add to the present knowledge on the pathology of penaeid prawns of India, but also would greatly help in the management of hatcheries to produce quality seeds averting severe losses attributable to diseases.
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