PREFACE

In the worldwide, aquaculture is one of the most important and pioneering areas. Because of the food scarcity, many countries (Peoples) depend on aquatic animals like fish, prawn and crab etc, for protein source. In these, prawns and crabs are considered as delicious.

One of the most challenging problems in the field of aquaculture technology is that of obtaining mature gametes, because most of the commercially important species are incapable of spontaneous maturation under artificial conditions. The input of research in the fields of Physiology, Biochemistry, Molecular biology, Endocrinology, Nutrition, Pathology and Molecular genetics has resulted in new technological advances that have improved the economic gains of crustacean aquaculture.

One common method of inducing gonadal development and spawning in crustaceans is eyestalk ablation technique. This technique is a traumatic operation because the sinus gland in the eyestalk is the releasing site of several important hormones which includes gonad-inhibiting hormone (GIH). For past two decades many Scientists, Researchers and Aquatic industries concentrated in the endocrinological manipulations, to induce molt and reproduction with out eyestalk ablation.

In view of the above, an elaborate program to induce molting and reproduction in commercially important edible crustacean species was undertaken in our laboratory. The present report aims at examining the role of mandibular organ (MO) in the regulation of molting and reproduction in freshwater field crab, *Oziotelphusa senex senex*. 
Crabs *Oziotelphusa senex senex* have been extensively used in the past three decades as experimental model to study metabolism, growth and reproduction in this laboratory. The reason for such a choice is the year-round availability, easy maintenance and easy handling of crabs. As such the author felt that the *O. senex senex*, would serve as a convenient model to study the physiological alterations that result as a consequence of the administration of methyl farnesoate (MF) also.

MF is the first candidate molecule identified by "reverse endocrinology" in crustaceans. MF is synthesized and secreted from the mandibular organ (MO). MF is unepoxided form of the insect JH III. Based on physiological evidence and structural similarities of MF to insect JH III, MF is regarded as the crustacean JH. Since the discovery of MF in crustaceans (Laufer *et al.*, 1987a), the physiological role of this compound has been subject to debate. It is known to be involved in the regulation of molting, reproduction, morphogenesis and protein synthesis. In the present study, the author studied the secretion and effect of MF in the regulation of molting and reproduction in the crab *O. senex senex*.

This dissertation contains four chapters besides introduction, material and methods, conclusion and bibliography.

The first chapter of the dissertation deals with the proximal changes of the MO in different weight crabs. The dynamics of the MO in the crab *O. senex senex* was also studied as a function of sex, reproduction, molting and eyestalk ablation.
In chapter 2 deals with the *in vitro* culture of MOs and determination of their secretory product (MF) at different physiological conditions.

The third chapter deals with the effect of MF *in vitro* and *in vivo* in the regulation of molt and gonad development in the crab, *O. senex senex*.

The final chapter deals with the isolation and characterization of mandibular organ-inhibiting principle (MO-IP) from the eyestalks of crab using MF secretory rate by MOs as bioassay.

This dissertation presents a humble effort by the author, towards a better understanding of the physiology of the crab, *O. senex senex* during MF treatment. This investigation is by no means an exhaustive one but it nevertheless, serves to understand the basic physiological changes that occur in the animal under MF treatment and opening up new avenues of research in crustacean endocrinology. The author assumes the responsibility for any deficiencies present in the text, which could be due to oversight, and earnestly request condonation.

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