CHAPTER-5

SUMMARY

The North Eastern Region (NER) harbours plenty of excellent verities of ornamental fish species, which are very attractive and fetch a very high price in the overseas markets. At present the ornamental fish trade in NER is based on wild capture from natural habitat. Scientific studies on captive breeding and larval rearing of important indigenous ornamental fish species of NER are very meager and inadequate. Therefore, the present investigation was taken up to study the bionomics and breeding biology of two rheophilic ornamental fish species namely *Danio dangila* and *Puntius cholala*. Due Emphases was given on the following broad aspects viz. graphic of the fish species, behavioural prespective, bionomics profile, length-weight relationship, reproductive biology, laboratory propagation, embryonic and larval development, laboratory rearing of fry and fish malady and restraints.

The graphics of the two test fish species were portrayed separately with the meristic measurements and counts, morphometrics and non-meristic characters of both male and female along with their distributions pattern and characteristics of the habitat. Both the test species were attractive, peaceful in nature, small in size, exhibits brilliant colouration and display graceful movements in the aquarium. These characteristics put *Danio dangila* and *Puntius cholala* as classified ornamental fish species.

Various behavioural perspectives of both the species were intricately explicated. Ingestive behaviour was elucidated during; surface, column and bottom feeding with schematic diagrammatic representation, fin reciprocation and opercular movement were observed and recorded during feeding. Procreate demeanor portrayed the courtship display and spawning behaviour of the test species.

On the bionomics profile of the test species, the victual spectra have been recorded during pre-monsoon, (March-May), monsoon, (June-August), post-monsoon, (September-November) and winter, (December-
February). Lineament of feeding was precisely explained through flow chart. Relative gut length (RLG) was explained in respect of total length. The overall hepato-somatic index (HSI) was recorded. The index of preponderance (PI) was ascertained. The morphology of gill and gill rakers were also been studied and illustrated in the two test species.

The Weight-Length relationship of *Danio dangila* and *Puntius chola* for mixed population as well as for male and female population were studied separately and ascertained. The co-efficient of condition and the well being of the species have been studied separately using Le Cren’s formulae for male and female population of the two test fish species.

The study on the reproductive biology of the species include, In-vitro sexual dimorphism, sex ratio, size at first maturity, maturity stages of ova. Fecundity of the test species was estimated and the relationship between fecundity and other variables were recorded through co-efficient of correlation with t-test and Regression equation after least square method. The GSI trend elucidates the breeding season and periodicity of the test species. The category and trend of spawning period were documented. Spawning habitat of the test species were studied from field data and the trend were been reciprocated in the laboratory experiments.

Laboratory propagation was focused on the technology of induce breeding of the two test species. The general criteria for selection of brooders, maintenance of the brooder stock and stocking density of the brooders were studied. The in-house breeding techniques for mass production under control condition have been elucidated for the test species.

The embryonic and larval developments of *Danio dangila* and *Puntius chola* were studied. Three important phases’ viz (i) embryonic phase (ii) hatchling phase and (iii) larval phase were highlighted with microphotographs and hand drawings.

Details accounts of in-house rearing of the fries were explicated based on present experimental findings under laboratory rearing of fry. The technique of rearing the fries in glass aquariums and advanced fries in
cement cistern and fibre reinforced plastic tubs with suitable stocking densities were presented with special emphasis on survivability of the fries at different stocking rate. The food and feeding schedules of fries of the two test species have also been documented.

Fish malady and restraints of the two test species were studied. The occurrence and causative agents of the diseases have been investigated. A total of seven diseases in *Danio dangila* and six diseases in *Puntius chola* were observed and their prophylactic and treatment measures were discussed.

The findings were thoroughly analyzed statistically, where ever needed, and amalgamated under an explicated discussion. The intra and inter relationship among the different aspects of the two test species were made over the period of three years in the laboratory as well as in the fields.

The present investigation, hitherto remained unattended, depicted a clear scenario on the technology of captive breeding and culture with their bionomics and early life history of the two rheophelic ornamental fish species *Danio dangila* and *Puntius chola*. The developed breeding technology and the larval rearing of ornamental fish species when transferred from lab to land, the OFS trade will flourished unabated in the region and will contribute to the socio economic development of the state.

The treatise consists of 39 tables, 17 figures and 12 plates that amply support the findings incorporated. An elaborated list consisting of all the literatures consulted during the course of the present study have been presented under the Reference section.