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1. The thesis embodies the studies on the morphology, life history, taxonomy, seasonal incidence and pathogenicity of fourteen species of myxozoan and one species of urceolariid ciliophoran parasites from the common food fishes of the fresh and sewage-fed culture ponds in the three districts of West Bengal.

2. Altogether 27 species of fishes have been examined for the protozoan parasites. Of these 8 species have been found to be infected with the myxozoan and ciliophoran parasites.

3. A comprehensive Historical Résumé detailing the work done outside India and in India by various investigators on different aspects of Myxozoa and the urceolariid ciliophorans has been done.

4. In PART I, descriptions of eight new species have been presented and seven redescribed. The parasites are placed under five different genera, viz., Phlogospora Quadri, 1962; Myxobolus Bütschli, 1882; Henneuguya Thélohan, 1892; Thelohanellus Kudo, 1933 and Tripartiella Lom, 1959. The new species have been named as Phlogospora sp. I n. sp and so on in accordance with the Article Nos. 7, 8 and 9 of the International Rules of Zoological Nomenclature.

5. The redescribed species are Myxobolus bengalensis Chakravarty and Basu, 1948; Myxobolus indicum Tripathi, 1952; Myxobolus chakravartyi Haldar, Das and Sharma, 1983; Myxobolus rohitae Haldar, Das and Sharma, 1983; Thelohanellus catlae Chakravarty and Basu, 1948; Thelohanellus rohitae Southwell and Prasad, 1918, and Tripartiella bulbosa (Davis, 1947) Lom, 1959.

6. The pathogenicity and affinities of the parasites have also been discussed.

7. A comprehensive discussion has been made on the observations in PART I. This has covered the notable aspects of extrusion of polar filaments in Myxozoa, nature of the iodinophilous vacuoles as well as its role in myxozoan taxonomy and taxonomy and distribution of urceolariid ciliophorans.
8. In **PART II**, a link has been established between water quality deterioration, environmental stressors, physiological performance of fishes and protozoan infections.

9. A comprehensive Historical Résumé detailing the work done outside in India and in India by various investigators on different aspects of the concept of stress has been made.

10. The physiological systems of fishes are continuously stressed by a variety of physical, chemical and biological factors. As a result the various stressors elicit a compensatory response to cope with the adverse situation and when the physiological tolerance of fishes exceed the tolerance limit, adaptation to stress does not occur and there is fish mortality.

11. The various stress sensitive biological parameters at three levels of stress response of fishes have been measured: Primary level (plasma cortisol), secondary level (plasma glucose, plasma chloride, plasma cholesterol, plasma protein and plasma lactic acid) and tertiary level (condition factor). Histological and ultrastructural changes of fish gills have also been detected.

12. Assessments of physico-chemical stressors in three ecosystems of fish culture viz., Naihati pond (N), Habibpur semi-intensive fish farming pond (H) and Kantatala sewage-fed bheri (K) have been done. It is revealed that the water quality of Naihati and Habibpur is within the optimum range and congenial for fish culture, but in Kantatala sub-optimal water quality is recorded where high diurnal fluctuations in dissolved oxygen and carbon dioxide are found with high levels of ammonia throughout the year. Physiological responses in fishes reared in the sewage-fed water of Kantatala has revealed the presence of high plasma cortisol level, low chloride level and reduced weight of fishes in comparison to the values obtained in fishes reared in an optimum water quality pond in Kulia (K1).

13. The normal ranges of various stress sensitive parameters of *Labeo rohita* fingerlings reared under optimum conditions have been determined. The range of parameters like haemoglobin, haematocrit, leucocrit, plasma cortisol, plasma glucose, plasma chloride,
plasma cholesterol, plasma protein, plasma lactic acid and condition factors might serve as reference for fish health monitoring in various culture bodies.

14. Fingerlings of *Labeo rohita* are subjected to stress of capture, crowding and confinement. These stressors evoke physiological responses like elevation in plasma cortisol, glucose and lactic acid levels and reduction in plasma chloride levels. If these stressors continue for long, these can reduce the fitness of fishes as these practices are often followed by fish farmers during culture.

15. Fishes subjected to high unionised ammonia level for 48 and 72 hours show alterations in the various physiological parameters like haemoglobin, haematocrit, leucocrit, plasma cortisol, plasma glucose, plasma chloride, plasma cholesterol, plasma protein, and plasma lactic acid. Gill structure of ammonia treated fishes exhibit changes like hyperplasia, fusion of secondary lamellae and hypertrophy. Scanning Electron Microscopy study reveals the presence of extrusion material and rough surface of gill lamellae of ammonia exposed fishes.

16. Month-wise seasonal incidences of Myxozoan and urceolariid ciliophoran parasites during the period of January, 2000 to December, 2002 have been recorded. The protozoan parasites studied are *Thelohanellus catlae*, *Myxobolus bengalensis*, *Myxobolus chakravartyi* and *Tripartiella bulbosa* from *Catla catla*; *Thelohanellus rohitae*, *Myxobolus rohita* and *Tripartiella bulbosa* from *Labeo rohita*, *Myxobolus sphincum*, *Myxobolus indicum* and *Tripartiella bulbosa* from *Cirrhinus mrigala*; *Tripartiella* sp. from *Hypophthalmichthys molitrix* and *Tripartiella* sp. from *Ctenopharyngodon idella*.

17. The presence of high average number of urceolariid ciliophorans per 0.05 ml. of mucus from the gills of fishes reared in Kantatala bheri in comparison to fishes reared in two experimental ponds in Naihati and Habibpur indicate the poor water quality of sewage water and fishes to be under stressed conditions.

18. The histological alterations of gills of fishes reared in the three experimental water bodies, viz., Naihati pond, Habibpur pond and Kantatala bheri show maximum changes in the gills of fishes grown in the sewage water of Kantatala. The changes in the gills
range from hypertrophy, hyperplasia of gill epithelium to formation of haematomma. Fishes grown under poor water quality of sewage water of Kantatala exhibit maximum alterations in gill structure indicating that sub-optimal quality of sewage water could create a stress on fishes. Deteriorations in water quality considerably stress the fishes which are manifested in their physiological changes. These changes reduce the competence of fish to tolerate further stress and the performance capacity of fish is diminished. Actually, there are many situations in which the fish pathogens are a constant and ubiquitous component of the aquatic environment but cause disease only when some weakening of the host has occurred by other factors like water quality deterioration.

19 The presence of intra- and inter-lamellar plasmodia of the genera *Myxobolus* and *Thelohanellus* in the gills of *Catla catla*, *Cirrhinus mrigala* and *Labeo rohita* exhibit alterations in the gill structure like hyperplastic epithelium of secondary lamellae and their consequent fusion.

20 The presence of *Tripartella bulbosa* in the gills of fishes alters the structure of gills. The alteration include hypertrophy, hyperplasia to fusion of lamellae affecting the respiratory functions of gills and decreased oxygen uptake capacity.