Outline of the Thesis

Thesis entitled “Ecological studies on microbial diversity of surface water in Coorg and Wynad districts” contains six chapters.

Chapter I : Introduction
Chapter II : Review of Literature
Chapter III : Materials and Methods
Chapter IV : Results of seasonal study of physico-chemical and biological parameters
Chapter V : Discussion of seasonal study of physico-chemical and biological parameters
Chapter VI: Summary and Conclusion

The thesis concludes with recommendations followed by list of literature cited in the text of the thesis and the papers published arising from this thesis as Appendix.
Preface

Water is one of the most important commodities which man has exploited than any other resources for the sustenance of life. The quality of utilizable water is quite limited on earth. Though water is continuously purified by evaporation and precipitation, the pollution of water has emerged as one of the most significant environmental problems of recent times. There is an increasing concern for the fast depleting quantity of utilizable water. Studies on fresh waterbodies, natural or man made have gained much importance in recent years mainly because of their multiple uses. Several workers have been attempted to study the hydrological profile of varied waterbodies with an intent of assessing the quality of water.

Small waterbodies are found all over the world, although no accurate estimates of their number are available but most likely their number shows in millions. Most small water bodies are built for irrigation, water storage for drinking, livestock and to replenish water tables, decrease the severity of flash-flooding, reduce soil erosion and increase vegetative cover especially trees (Roggeri, 1995). These are lying somewhere in between are likewise intermediate in their amenability to management. Usually these are partially drained and normally small enough to be effectively fertilized water quality can be reliably monitored; caught can be more easily regulated through better controlled access and more accurate mixed species stocking programmes are feasible. In addition to size, other key features of small waterbodies include fluctuating water levels, seasonal thermodeclines and seasonally or permanently flooded marginal vegetation.

Now-a-days due to rapid industrialization, over population and indiscriminate use of chemical fertilizers in agriculture are causing heavy and varied population in aquatic environment leading to deterioration of water quality and depletion of aquatic
biota. To understand the biological phenomenon, the chemistry of water plays a very significant role. Thus, physico-chemical methods are used to detect the effect of pollution on water quality. Moreover, changes in the water quality are reflected in biotic community structures as shown by occurrence of diversity and abundance pattern of species (Cairns, 1997).

On the other hand, water quality is described by its physico-chemical and microbial characteristics. But correlations between various parameters are significantly more useful to indicate the quality of water (Dhembare et al., 1997). The concentration of sodium, potassium, calcium, magnesium, chlorides, sulphates, carbonates and bicarbonates usually decides the quality of water for irrigation, despite amount of minerals also. Therefore, the suitability of water for irrigation should be studied by taking the concentration and composition of salts in irrigated water and the type of crops and nature of soil to be irrigated.

The nature and extent of anthropogenic impacts on dry land lakes are diverse. Of these, salinization, water catchment activities and pollution directly effect the chemical and biological characteristics of lake waters (Williams, 2000). Tropical lakes have been severely impacted by human activities, which not only have degraded the water quality but have deteriorated the aesthetic values (Wade, 1999). In dry tropical waterbodies, where the light and temperature are generally optimal, community structure and ecosystem functioning depend in a major way on external and internal nutrient loading (Pandey and Pandey, 2002).

Present day utilization is exerting unsuitable demand on water which is becoming scarce natural resource day by day. Due to exponential population growth and increased pressure on natural systems, many regions are now subject to water stress bought about any numerous human activities. In the absence of any restriction
on urban immigration, an increase in urban population and slums create definite stress on the existing water resources.

A recent UNESCO report indicates that a vast chunk of population in India has no access to safe drinking water and that about 66 million people still rely on unsafe surface water for consumption and other domestic activities (Sawhney, 2006). Most diseases and deaths occurring globally are linked to lack of adequate water, sanitation and hygiene.

A critical review of the available literature reveals that absolutely no work has been done on Kaveri Nisargadhama (S1), Abbey falls (S2), Bhagamandala (S3) and Talakaveri (S4) in Coorg district of Karnataka state; Iritty river (S5) and Pazhassi dam (S6) in Wynad district of Kerala state were monitored for a period of two years with reference to physico-chemical and biological parameters were compared with the water quality standards of each area. The main aim of this investigation was 1) To study the physico-chemical parameters that evaluate the potability of water, 2) Microbial assessment of water samples to determine potability and know the sanitary quality of surface water, 3) Interrelationship study between the known physico-chemical and biological parameters of water samples and 4) Assessing environmental parameters on the persistence of microorganisms of health and quality significance in water (especially algal biofilms).