ABSTRACT OF THE THESIS

The thesis outlines the findings of fluctuations in population densities of fresh water flagellates and ciliates in relation to various physico-chemical parameters from the three selected sampling stations in the vicinity of Aurangabad in Maharashtra State. The study was carried out simultaneously at the three sampling stations over a period of two years i.e. February 1982 to January 1984.

This study represents first ever attempts from these sampling stations of Marathwada region to record the fresh-water flagellate and ciliate fauna.

The thesis is presented in four parts.

PART I

This part deals with the topography of the three selected sampling stations namely -

(i) Panchakkri water fall - A constantly flowing fresh water source of water supply.

(ii) Delhigate lake - A stagnant water, accumulated during monsoon.

(iii) University campus well - A stretch of perennial water.
PART I: II

The details of physico-chemical parameters studied at the three selected sampling stations are given in this part. The parameters studied include atmospheric temperature, water temperature, humidity, rainfall, pH, alkalinity, acidity, hardness, chlorides, dissolved oxygen, biochemical oxygen demand, chemical oxygen demand, nitrogen and solids. An analysis of various physico-chemical parameters is carried out season-wise, station-wise and year-wise.

PART I: III

This part outlines the fluctuation in population densities of flagellates and ciliates at three selected sampling stations over a period of two years. A detailed study is carried out season-wise, station-wise and year-wise of the total population of flagellates and ciliates, their composition, the relative proportions of classes, subclasses and seasonal variations in subclasses, orders and species.
The salient features of the findings are:

The pattern of population density of flagellates (a) station 2 > station 1 > station 3.
(b) Summer > Winter > Monsoon
(c) Phytomastigophorea > Zoomastigophorea

(4 species) (2 species)

(ii) Station 1 and 2 had maximum variety of species and station 3 the minimum.

(iii) The seasonal variations are more pronounced at station 1 and 2 than 3.

The pattern of population density of ciliates was:

(a) Station 2 > station 1 > station 3
(b) Summer > Winter > Monsoon
(c) Kinetofragminophorea > Oligohymenophorea

(6 species) (5 species)

Polymenophorea
(3 species)

PART IV

This part deals with the inter-relationship of physico-chemical variables and the population of flagellates and ciliates. An attempt is made to
correlate the population of flagellates and ciliates with the ecological conditions of various sampling stations. The discussions outline the correlation of the total population of flagellates and ciliates. The composition of flagellates and ciliates, the relative densities of classes of both the groups, the relative densities of subclasses of ciliates, and the seasonal variations of orders and species of flagellates and ciliates.

The salient features of the study are -

(i) The flagellates were represented by both the classes, Phytomastigophorea and zoomastigophorea, (ii) The representatives of phytomastigophorea were Cryptomonas reflexa, Euglena deses, Trachelomonas volvocina and Paranema trichophorum. While zoomastigophorea was represented by Monosiga varians and Bodo caudatus. (iii) Euglena deses, Monosiga varians and Bodo caudatus were consistently present at all the sampling station during all the seasons of both the years. Cryptomonas reflexa, Trachelomonas volvocina and Paranema trichophorum were absent at the third station during all the seasons of both the years, of which Trachelomonas volvocina was not present at the first station as well during all the seasons of both the years.
iv) The second station was rich in population as well as in variety and was represented by six species of flagellates.

The second and third stations were represented by five and three species of flagellates respectively.

v) The ciliates were represented by all the three classes, kinetofragminophorea, oligohymenophorea, and polymenophorea.

vi) Kinetofragminophorea was represented by *Coleps hirtus*, *Urotricha farcta*, *Didinium nasutum*, *Litonotus fasciola*, *Chilodonella cucullulus* and *Podophrya fixa*.

The representatives of oligohymenophorea were, *Colpidium colpoda*, *Glaucoma scintillans*, *Frontonia acuminata*, *Paramecium caudatum*, *Paramecium bursaria* and *Vorticella, campanula*.

Polymenophorea was represented by *Halteria grandinella*, *Euplotes patella*, *Euplotes affinis* and *Oxytricha fallax*.

vii) *Litonotus fasciola*, *Podophrya fixa* and *Glaucoma scintillans* were absent at the first and third stations during all the seasons of both the years.
Frontonia acuminata was absent at the first station, Vorticella complana and Oxytricha fallax, at the third station during all the seasons of both the years.

Other ciliates showed an inconsistent pattern of absence at different stations during the various seasons.

viii) Generally the concentration of pH, and quantities of total alkalinity were more in monsoons. The dissolved oxygen, Bio-chemical oxygen demand and the quantities of nitrogen were more in summers. CO₂ was absent at all the stations throughout the period of study.

Taking into account, the pattern of fluctuation of pH, total alkalinity, total hardness, chlorides, dissolved oxygen, Biochemical oxygen demand, Chemical oxygen demand and nitrogen, the population densities of flagellates and ciliates are discussed and depicted in the form of correlative models.

The availability of the food, nature of various physico-chemical variables and ultimately the environmental set up of the sampling station influence the density of flagellates and ciliates.