7. Statistical Analysis
STATISTICAL ANALYSIS

The data obtained in the present study used for statistical analysis to find out the correlation among various physico-chemical parameters, with percent occurrence and seasonal distribution of aquatic and extra-aquatic fungi in Tunga river subjected to statistical analysis.

Methods employed to study the relationship between different variables

Correlation analysis was employed to study the relationship between different variables. The variables are identified for the study are as follows.

1. Correlation among various physico chemical parameters.
2. Correlation between various physico chemical parameters v/s percent occurrence of aquatic fungi.
3. Correlation between various physico chemical parameters v/s percent occurrence of extra aquatic fungi.
4. Season wise comparison of aquatic fungi and extra aquatic fungi with reference to all the six stations.

Assessment of correlation among various physico-chemical parameters and v/s both aquatic fungi, extra aquatic fungi was done by Karl Pearson’s correlation co-efficient. The mean comparison between the stations was done by using the Fishers F-test. P value more than 0.05 was considered for statistical significance.
To measure the nature and degree of relationship among various physico-chemical parameters vs both aquatic and extra aquatic fungi was determined by using the following formula

**Pearson’s correlation coefficient**

\[
\begin{align*}
    r_{xy} &= \frac{1}{n} \sum (x - \bar{x}) (y - \bar{y}) \\
    &= \frac{\sum (x - \bar{x})^2 \sum (y - \bar{y})^2}{\sqrt{\sum (x - \bar{x})^2} \sqrt{\sum (y - \bar{y})^2}} \\
    &= \frac{t}{\sqrt{n-2}} \text{ and } \sqrt{1 - r^2}
\end{align*}
\]

where
- \( x \) and \( y \): two variables
- \( \bar{x} \) and \( \bar{y} \): Means

Mean, \( X = \sum x / n \)

Significance of Pearson’s correlation co-efficient ‘\( r \)’ was tested by t-test for correlation.

\[
    t = \frac{r \sqrt{n-2}}{\sqrt{1 - r^2}}
\]

Std. Deviation (SD) = \[
    \sqrt{\frac{\sum (x - \bar{x})^2}{(n-1)}},
\]
**F-test**

$\text{Calculated 'F' } = \frac{\text{Larger variance}}{\text{Smaller variance}} = \frac{\text{Mean sum of squares due to treatment}}{\text{Mean sum of squares due to error}}$

Statistical analysis of all the six stations, regarding variation in the average values among physico chemical parameters and intern against the diversity of both aquatic and extra aquatic fungi are given in the correlation pooled matrix from Table 7 to 24. Air temperature has shown positive significant correlation with all the parameters expect dissolved oxygen (DO) and total hardness has showed a positive significant correlation with carbonates, bicarbonates, sulphate, phosphate, chlorides, calcium and magnesium. Increase in concentration of total hardness, chloride and sulphate has significantly increased the concentration of total dissolved solids. All the physico chemical parameters has a positive correlation with each other, except the dissolved oxygen. Variation in the percent occurrence of aquatic fungi and extra aquatic fungi, corresponding to the variation of physico-chemical properties are given in correlation pooled matrix from Table 13 to 24 for all the six stations. All the parameters viz., Air temperature, water temperature, pH, electrical conductivity, total hardness, carbonates, bicarbonates, biological oxygen demand (BOD), chemical oxygen demand (COD), sulphate, chloride, phosphate, sodium, potassium, calcium, magnesium and TDS have shown negative correlation at 5% with the percentage occurrence of both aquatic and extra aquatic fungi. On the contrary, dissolved oxygen (DO) has shown a positive
significant correlation at 5% with the percentage occurrence of both aquatic and extra aquatic fungi

2. **Station-wise comparison of seasonal occurrence of both aquatic and extra aquatic fungi**

One way ANOVA F-test was used to assess the significance of difference between all the stations with reference to the seasons. The result reveals that, Table 27 and 28 gives the information about seasonal occurrence of aquatic fungi, differ in all the stations. Seasonal occurrence of aquatic fungi was found to be more during monsoon (30.53) in Station-I, during the year 2008-2009, where the F value was 0.64 and p value varied about 0.63 and it was found to be less during pre-monsoon (20.15) where the F value was found to be 0.49 and p 0.61 in Station-V, during the year 2007-2008. Similar observations were seen, in case of extra aquatic fungi, in which seasonal occurrence of extra aquatic fungi was found to be more during monsoon (36.89), where F value was found to be 1.45 and p-value about 0.25 in Station-I, for the year 2008-2009 and it was found to be less during pre-monsoon (19.29), where, the F value was 0.93 and p value was 0.40 in Station-V, in the year 2008-2009.