Studies on Limnological Statistical Parameters of Vishar Ponds Gaya

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Abstract:

The Present investigation was carried out on Statistical Parameters of relationship (Physicochemical Studies Atmospheric-Temperature, Relativ Humidity and physicochemical parameter, Algal Population and Physicochemical Parameters and correlation between rainfall & Physicochemical parameters.

Keywords: Perennial Ponds, relation, correlation & Inter-correlation.

Introduction:

The recent trend is toward the development of applied limnology Focussed towards environment biotechnology in management of polluted water and the preservation of aquatic resources. This Sociology dimension of ecological science has attracted the nation world wide. However these concept are about one country older but more relevant in the present scenario. Depleted fish stock, fish control, sewage pollution, extinction of various green genera, retardation in Productivity is matter of concern for the present day limnologist and justified the importance of limnological researches.

Keeping the presentation in consideration, level of aquatic biological organisation is focused toward and the analytical as well as a statistical model of ecosystem. Seasonal and annual average response of highly aggregated properties such as phytoplankton biodiversity, Biomass, photosynthetic efficiency productivity dynamics. Physicochemical features, climatology, morphometry are important, It is apparent that many limnologists believe the only way to understand aquatic system is through assembling detailed mechanists studies of genera/species, but there is wide disagreement as to likehood that the resulting ecosystem level models, will never have predictive power (walters, 1998). This study will help in the proper management it of the ecosystem & will comprise of statistical studies. i.e. the year 2018.

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Material & Methods

In order to understand most representative values, variation Spectrum, extent of difference and relationship of some of the environmental factors. Standards statistical methods were applied which are as follows:

1.　Average

This was calculated with a view to find out a typical representative of all the help of following formula:-

Airthmetic mean = sum of all values/no of all total values= x/n

2.　Mean Deviation

Mean Devation, an arithmetical mean of the deviation of values from mean of the sample, was calculated as follows:-

Mean Deviation = $\Sigma(x-x)/x$

3.　Variance

Variance (s^2), the arithmetical mean of the square of the deviarion of the values from the mean of the date was calculated as follows:-

Variances (s^2)=$(\Sigma x2)(\Sigma x)2/n(n-1)$

4.　Standard Deviation (S)

Standard Deviation, the degree of spread of distribution, which was acquired by taking by taking the square root of variance which is as follows:-

Variance (S^2) = $(\Sigma x2 \, (\Sigma x)2/n/(n-1)$

5.　Standard Error (Sm)

The measure of reliability of data, standard error was obtained by following formula:

Variance = $\Sigma S2/\Sigma n$

6.　Correlation

Correlation, the extent of strength of relationship between two inter dependent variables was obtained by plotting a graph and the index, (Correlation coefficients, r was determined by following formula)

Correlation coefficient (r) = $(\Sigma xy/n-xy)/dx.dy$

Results & Discussions

Statistical studies on the collected data have been established between atmospheric temperature and physicochemical parameters of water Vishar pond in 2018. It revealed vey high significant with turbidity, water temperature and magnesium. It appeared high significant (H.S.) with nitrate and with VAC hardness. It was significant(s) with T.D.S., T.S., Calcium, PH, alkalinity, phosphate, D.O. and free CO2, it was

non-significant (N.S.) with T.S.S. and chloride. It was very high significant (VHS) with salinity.

Statistical correlation between rainfall and physicochemical parameters appear very high significance (VHS) with total suspended solids. Magnesium, Alkalinity, Chloride, and D.O.. It was high significant (VHS) with S.D.T. Turbidity, T.S., T.D.S. PH, nitrate. It appeared significant (s) with conductivity, calcium, free CO_2. This was not significant with water temp. PH and phosphate.

Correlation between relative humidity and physicochemical parameters appeared very high significant (VHS) with T.S.S., Salinity, Magnesium, Alkalinity, Chloride, & D.O. . It was high significant (HS) with Chloride, Turbidity, T.D.S. & Nitrate.

It appeared significant (s) with conductivity and calcium. It was non-significant with PH and phosphate turbidity, water temp., Correlationship between meteorological data and algal population was also worded out. A high significant state was obsereved between relative humidity and algal population.

Correlationship between algal population and physicchemical parameters of Vishra Pond, Gaya has been computed. It was very high significant (HS) with temperature, Calcium, Magnesium and D.O. . It was significant (s) with conductivity (VHS) and CO_2 . It was non-significant (NS) with turbidity, PH, Phosphorous & nitrate.

Intra correlationship between important physic-chemical parameters of water, phytoplankton and producitivity was presented, A very high significant correlation was established between water temp. atm. Temperature, and D.O.- phytoplankton. A significant correlation was established between water temp.- D.O., water temperature-magnesium, alkalinity- pH, alkalinity- D.O., pH- D.O., pH and D.O.- productivity.

Statistical Studies on Collected Information 2018
Relationship between Atmospheric temp. and Physico-chemical parameters of water

Eutrophic status with a trend towards hypertrophy of Vishar Pond. Gaya have been predicated on considering the following points:
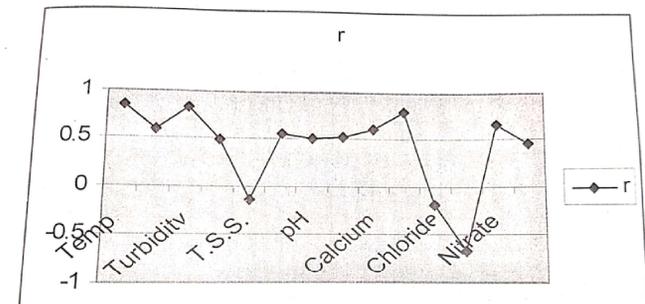
1. Physicochemical arguments:
   (i) Low transparency and high total dissolved >100 is sign of eutrophy, Rawson (1960) Vishar Pond, Gaya has 185.37 mg. L-1 total dissolved solids.
   (ii) Deplition of oxygen in the hypolimnion is indicator of eutrophy Thienemann (1928). We have reported average D.O. value as 6.81.

(iii) Other physic chemical valueshowed sign of eutrophy.

| Parameter	r	Significance	P
Temp	0.850	VHS	>0.05
Conductivity	0.591	S	>0.05
Turbidity	0.821	VHS	>0.001
TDS	0.485	S	>0.005
T.S.S.	-0.141	NS	<0.05
T.S.	0.550	S	>0.05
Ph	0.511	S	>0.05
Alkalinity	0.525	S	>0.05
Calcium	0.612	S	>0.05
Magnesium	0.797	VHS	>0.001
Chloride	-0.200	NS	<0.05
Phosphate	-0.675	S	>0.05
Nitrate	0.650	HS	>0.01
D.O.	0.455	S	>0.05

Relationship between Almospheric temp. and Physico Chemical Parameters of water.

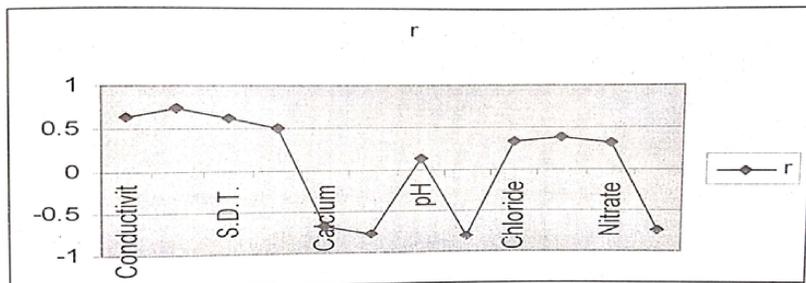
Correlation between Rainfall & Physicochemical Parameters of Water
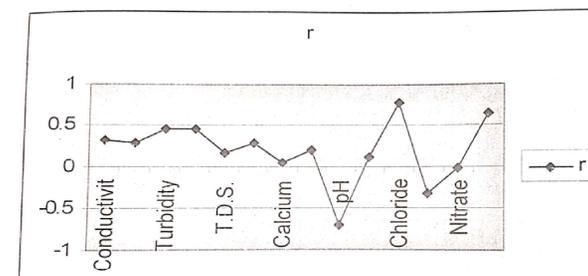
Relationship between Relative Humidity & Physicochemical Paramters of Water
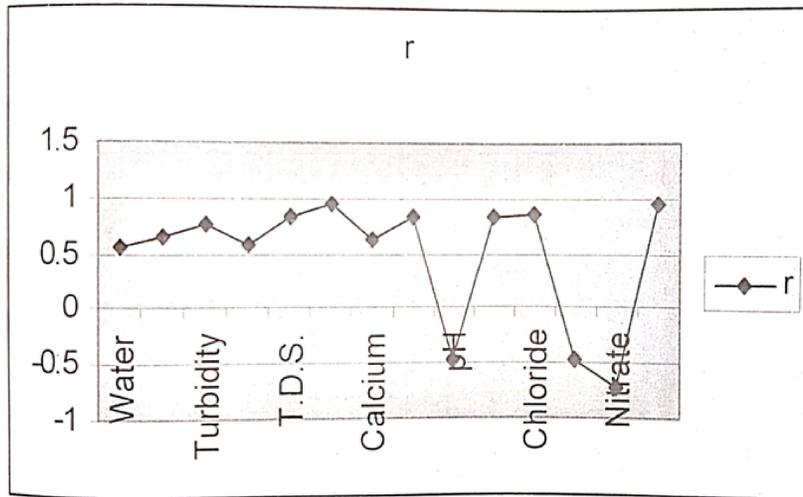
Relationship between Algal Population & Physicochemical Paramters of Water

2. **Biological arguments:**
   (i) Planktonic evidence: Lakes and ponds have been classified on the basis of plankton abundance by Welch (1952). In our finding luxuriant abundance is indicative of eutrophy. Some controversy remains on this point.
   Microcystis and Rivularia are dominant eutrophic forms according to Rawson (1956) and Teiling (1955).
   (ii) Productivity arguments: Rodhe (1969) classified lakes and ponds on the basis of primary productivity as follows: Oligotrophic- pp- 7.0-25.0 gm Cm-2 yr-1, Mesotrophic- pp-

75-250 gm. Cm-2 yrs, Eutrophic- pp- 360-700 gm Cm-2 yr-1, our values are on this line GPP- 187.12 gm Cm-2yr-1 However, Vollenweider et al. 1947 gave a different scale Oligotrophic-pp-<100 gm cm-2 yr-1, Mesotrophic- pp-100-200 gm Cm-2 yr-1, Eutrophic- pp -> 200 gm Cm-2 yr-1.

Conclusion:

The collected data were subjected to statistical correlation between parameters of one section and also with two other section relevant correlation have been achieved in 2018. On the basis of which the data may be authenticated.

Following suggestions will help in managing the ecosystem and minimizing the problem of pollution.

1. Excessive use, misuse and abuse of resources should be avoided.
2. There is need of boundary wall to safeguard the pond ecosystem, shoreline development is also suggested.
3. Distilling, Deweeding, bioremediation approached are recommended.
4. International & National legislation regarding preservation of resources should be followe.
5. N.G.O.s should come forward & project for clearing be approved.

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