# The study of Hydrobiology andZooplanktons in erracheruvu in siddipet district.Telangana state.

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## I.    INTRODUCTION:

Water is a basic ingredient of life. Prosperity of civilization about 80% of the earth's surface is covered by water, yet the inland fresh water availability is account for less than one percent.  The fresh water bodies such as reservoirs, tanks, ponds, rivers are major resources of water for consumption by human beings and live stock, mainlyfor drinking, domestic purposes, and agriculture and aquaculture practices.  Hippocratus (460 to 354 BC) the father of medicine stated that "Water contributes much to health" and asserted that the rain developmental planning and sustainable use of water resources. Water should be boiled and filtered before use; otherwise it would have a bad smell and cause harshness (Borchart and Watton, 1971).Telangana state is well known as the "River state of India" and the state has rich inland water resources. The state is endowed with two major river sub-systems viz. Godavari and Krishna. Inclusive of their tributaries, canals and distribution of the system has a length of 14,500 km. There are about 102 reservoirs having a total water spread area of 2.34 lakhs ha. And average water spread area of 1.63, and 79.7 ha. This is 16.13% of India's total estimated reservoir potential of 1.45 million ha. Out of 102 reservoirs, 7 are major reservoirs (1,24,216.5 ha), medium (31,262.5 ha.) and 69 minor (831.5 ha) reservoirs (Piska, 2003).Nagarjunasagar reservoir built across river Krishna, has a water spread area of 18,430 ha. This is the largest reservoir in the state. 69 species of fishes and two prawn species were reported from the reservoir. Srisailam, Nizamsagar, Kadem and Sriramsagar reservoirs are other important major reservoirs in Andhra Pradesh. The average productivity of the state reservoirs is 36.48 kg/ha/yr. The range extends from 1.7 kg/ha/yr in Pakal reservoir (Warangal) to 1275 kg/ha/yr in Kalbhory (Nellore) reservoir (Murthy, 2000). Kolleru Lake, 30 km from coast line, is a major fresh water ecosystem having total water spread area, of 901.3 sq.km occupying parts of West Godavari and Krishna district of the state. The lake supports a total of 61 species of fishes, and 12 species of prawns (Raju, 2001).

## II.    MATERIALS AND METHODS
**FIELD STUDIES:**
**Collection of Samples**

Water tests were gathered from Erracheruvu at month to month interims for a time of three years June-2015 to May-2018 at four distinctive inspecting stations in Erracheruvu. Water tests were gathered from chosen stations as required for the investigation of compound parameters. Physical information of the Erracheruvu was recorded on the spot. Tests for zooplankton investigation were gathered by plankton net and preserved with suitable preservations.

## HYDROGRAPHY
## Physical parameters

**Temperature:**

Temperature is the most commonplace environmental factor and the most effectively measured. Atmospheric temperature in Warangal locale and water temperature at each station was recorded utilizing conventional mercury thermometer to the nearest $0.1^{°}$ C.Water temperature, however, was recorded at profundity of about 6cm below the surface dimension.

**Electrical conductivity:**

The conductivity was estimated in the field utilizing portable electronic conductivity meter (Elico model CK-710) at $25^{0}$ C the qualities were communicated in µmhos/cm.

**Hydrogen-ion-concentration:**

pH recording was made at four stations utilizing an advanced convenient pH meter (Elico, display LI.120) which gives direct estimation of pH.

**Total Dissolved Solids (TDS):**

A glass measuring beaker was dried at $105^{0}$ C oven temperature and measured, and after that 250ml of the filtrate from TDS experiment was taken in this container and set in to the broiler at the equivalent temperature. After the total evaporation of the filtrate the dry load of the beaker was taken and ascertain for an estimation of weight in one liter of water samples. This gave the estimation of all out broke up solids communicated in mg/l.

## CHEMICAL PARAMETERS
**Dissolved Oxygen (DO):**

Oxygen is the most important elements in water. The content of dissolved oxygen in natural water depends on the physic-chemical and biochemical activity in water.

**Biological Oxygen Demand (BOD):**

Sampling is empirical in determining the relative oxygen demand of natural water. It measures the organic matter used to oxidize inorganic substances, such as sulfides and iron

ions, and the oxygen necessary for the biochemical decomposition of oxygen.

**Phosphates:**
Phosphorus is found in natural waters, such as phosphate. It is one of the most important nutrients needed for the production of nucleic acids, phospholipids and various phosphorylated compounds. The main sources of phosphates in aquatic ecosystems are phytoplankton, phosphorus species, household waste, detergents and agricultural waste. Phosphorus is mainly associated with biological productivity, nutrient enrichment and eutrophication.

**Nitrates:**
Nitrate is the most highly oxidized state of the element found in the water. It was measured by Brucine method.

**Total Hardness:**
This rigidity is caused by the presence of calcium and magnesium ions in water. Do not exceed 300ppm in fresh water.

**Total Alkalinity:**
Alkalinity of water is the ability to neutralize acids. In natural waters, this depends on the hydrolysis of salts formed by the main components and strong bases such as free hydroxyl ions, carbonates and bicarbonates. It is measure of the general nature of water and can be interpreted in terms of specific materials.

**Chlorides:**
Chloride is also one of the important parameters to know the quality of water. Anthropogenic sources of chloride include fertilizers, road salt and human and animal wastes.

**Free Carbondioxide:**
Samples were collected in a 250 mi vial containing free carbon dioxide reagent and phenolphthalein indicator as immediately added to detect the presence or absence of free carbon dioxide. When the color changes to pink, it is displayed as lost and when present, sodium hydroxide is used to determine free carbon dioxide in a test tube

**Zooplankton:**
Zooplanktons were collected monthly basis from four different sites of Errachruvu from June 2015-May 2018.The plankton samples were collected during morning hours in between 8.00 am to 10.00 a.m. Each sample was collected by filtering 20lit of water through plankton net **made upof nylon blotting silk plankton net**(No.25 mesh size 50μ) filtrate was stored in 20ml plastic bottles and 5% formalin **was added** and brought to laboratory. Zooplankton samples were identified and counted under microscopic using by Sedgwick Rafter cell method. Zooplanktons were identified with the help of standard keys Altaff (2004), Adoni (1985),Battish (1992), Dhanapathi (2000),Edmonson (1959), Michael and Sharma (1988).

## III. RESULTS AND DISCUSSION

**Table: 1. Shows Monthly Variation of Water Temperature (˚C) in Erracheruvu during June 2015 to May 2016**

| S.No | Seasons | Months | Station-I | Station-II | Station-III | Station-IV | Mean | S.D |
|------|---------|--------|-----------|------------|-------------|------------|------|-----|
| I | Monsoon | June | 29.3 | 29.4 | 29.6 | 29.8 | 29.52 | 0.22 |
| | | July | 28.8 | 28.2 | 28.3 | 28.5 | 28.45 | 0.26 |
| | | Aug | 28.3 | 28.7 | 28.0 | 28.5 | 28.37 | 0.29 |
| | | Sep | 27.9 | 27.7 | 28.1 | 27.6 | 27.82 | 0.22 |
| II | Post-Monsoon | Oct | 27.5 | 27.3 | 27.4 | 27.5 | 27.42 | 0.09 |
| | | Nov | 26.7 | 26.5 | 26.0 | 26.6 | 26.45 | 0.31 |
| | | Dec | 25.5 | 25.3 | 25.1 | 25.6 | 25.37 | 0.22 |
| | | Jan | 24.4 | 24.2 | 24.6 | 24.8 | 24.50 | 0.25 |
| III | Pre-Monsoon | Feb | 27.8 | 27.6 | 27.4 | 27.5 | 27.57 | 0.17 |
| | | March | 28.6 | 28.4 | 28.9 | 28.5 | 28.60 | 0.21 |
| | | April | 30.0 | 29.9 | 29.7 | 29.6 | 29.80 | 0.18 |
| | | May | 30.7 | 30.1 | 30.3 | 30.8 | 30.47 | 0.33 |

**Table: 2. Shows Monthly Variation of Water Temperature (˚C) in Erracheruvu during June 2016 to May 2017**

| S. No | Seasons | Months | Station-I | Station-II | Station-III | Station-IV | Mean | S.D |
|-------|---------|--------|-----------|-----------|-------------|------------|------|-----|
| I | Monsoon | June | 28.2 | 28.6 | 28.4 | 28.6 | 28.45 | 0.19 |
| | | July | 27.6 | 27.8 | 27.4 | 27.9 | 27.65 | 0.22 |
| | | Aug | 27.5 | 27.3 | 27.7 | 27.2 | 27.42 | 0.22 |
| | | Sep | 27.1 | 27.6 | 27.4 | 27.1 | 27.30 | 0.24 |
| II | Post-Monsoon | Oct | 26.6 | 26.4 | 26.8 | 26.5 | 26.57 | 0.17 |
| | | Nov | 25.6 | 25.2 | 25.3 | 25.7 | 25.45 | 0.23 |
| | | Dec | 23.1 | 23.7 | 23.5 | 23.5 | 23.45 | 0.25 |
| | | Jan | 22.6 | 22.2 | 22.8 | 22.4 | 22.50 | 0.25 |
| III | Pre-Monsoon | Feb | 27.2 | 27.9 | 27.5 | 27.4 | 27.50 | 0.29 |
| | | March | 28.3 | 28.7 | 28.2 | 28.4 | 28.40 | 0.21 |
| | | April | 29.5 | 29.4 | 29.5 | 29.2 | 29.40 | 0.14 |
| | | May | 30.0 | 30.4 | 30.2 | 29.9 | 30.12 | 0.22 |

**Table: 3. Shows Monthly Variation of Water Temperature (˚C) in Erracheruvu during June 2017 to May 2018**

| S.No | Seasons | Months | Station-I | Station-II | Station-III | Station-IV | Mean | S.D |
|------|---------|--------|-----------|-----------|-------------|------------|------|-----|
| I | Monsoon | June | 29.9 | 29.5 | 29.7 | 29.8 | 29.72 | 0.17 |
| | | July | 28.7 | 28.9 | 28.5 | 28.6 | 28.67 | 0.17 |
| | | Aug | 28.4 | 28.2 | 28.6 | 28.0 | 28.30 | 0.25 |
| | | Sep | 29.5 | 29.4 | 29.9 | 29.7 | 29.62 | 0.22 |
| II | Post-Monsoon | Oct | 28.5 | 28.2 | 28.7 | 28.9 | 28.57 | 0.29 |
| | | Nov | 27.2 | 27.5 | 27.0 | 27.9 | 27.40 | 0.39 |
| | | Dec | 26.0 | 26.9 | 26.8 | 26.7 | 26.60 | 0.40 |
| | | Jan | 25.5 | 25.1 | 25.7 | 25.3 | 25.40 | 0.25 |
| III | Pre-Monsoon | Feb | 28.8 | 28.2 | 28.0 | 28.1 | 28.27 | 0.35 |
| | | March | 29.7 | 29.3 | 29.9 | 29.6 | 29.62 | 0.25 |
| | | April | 30.7 | 30.3 | 30.5 | 30.6 | 30.52 | 0.17 |
| | | May | 31.5 | 31.4 | 31.2 | 31.8 | 31.47 | 0.25 |

**Table No: 4. Seasonal Variation in Water Temperature (˚C) of Erracheruvu  (June 2015 to May 2018)**

| Year | Seasons | Station-I | Station-II | Station-III | Station-IV |
|------|---------|-----------|------------|-------------|------------|
| | | Mean ± S.D | Mean ± S.D | Mean ± S.D | Mean ± S.D |
| 2015 to 2016 | Monsoon | 28.57 ± 0.60 | 28.50±0.72 | 28.50±0.74 | 28.60±0.90 |
| | Post-Monsoon | 26.02 ± 1.35 | 25.82±1.35 | 25.77±1.22 | 26.12±1.17 |
| | Pre-Monsoon | 29.27 ± 1.31 | 29.00±1.20 | 29.07±1.25 | 29.10±1.42 |
| | **Mean ± S.D** | **27.95 ± 1.71** | **27.77±1.71** | **27.78±1.76** | **27.94±1.59** |
| 2016 to 2017 | Monsoon | 27.60 ± 0.45 | 27.82±0.55 | 27.72±0.47 | 27.70±0.69 |
| | Post-Monsoon | 24.47 ± 1.93 | 24.37±1.82 | 24.60±1.80 | 24.52±1.90 |
| | Pre-Monsoon | 28.75 ± 1.25 | 29.10±1.06 | 28.85±1.22 | 28.72±1.07 |
| | **Mean ± S.D** | **26.94 ± 2.21** | **27.09±2.44** | **27.05±2.20** | **26.98±2.19** |
| 2017 to 2018 | Monsoon | 29.12 ± 0.69 | 29.00±0.59 | 29.17±0.72 | 29.02±0.87 |
| | Post-Monsoon | 26.80 ± 1.33 | 29.92±1.32 | 27.05±1.23 | 27.20±1.55 |
| | Pre-Monsoon | 30.17 ± 1.17 | 29.80±1.36 | 29.90±1.37 | 30.02±1.56 |

| Mean ± S.D | 28.69 ± 1.72 | 29.57±0.50 | 28.70±1.48 | 28.74±1.42 |
|---|---|---|---|---|

**Temperature ($^{o}$C):**

The information acquired on the temperature substance of water tests from Erracheruvuthroughout the year from June 2015 to May 2018 are introduced in the table-4.

The information relating to temperature ($^{o}$C) of Erracheruvu throughout the year 2015 to2016 was a lowest 24.50$^{o}$C to a highest of 30.47$^{o}$C. The mean temperature ($^{o}$C) content recorded throughout Monsoon season at a four distinctive chose stations of the lake were 28.57, 28.50, 28.50and 28.60 at St-I, St-II, St-III and St-IV respectively. The lowest temperature value was 27.6$^{o}$C recorded at St-IV during September and the highest was 29.8$^{o}$C at St-IV. The mean temperature ($^{o}$C) content recorded throughout the Post-Monsoon season at four distinctive chose stations of the lake were 26.02, 25.82, 25.77 and26.12 at St-I, St-II, St-III and St-IV respectively. The lowest temperature value was 24.2$^{o}$C recorded at St-II during January and highest was 27.5$^{o}$C recorded at St-I and St-IV. The mean temperature ($^{o}$C) content recorded throughout Pre-Monsoon season at a four distinctive chose stations of the lake were 29.27, 27.77, 27.78 and 27.94 at St-I, St-II, St-III and St-IV respectively. The lowest temperature value was 27.2$^{o}$C recorded at St-I during February and the highest was 30.04$^{o}$C at St-II. The mean estimation of the temperature content recorded throughout the three seasons at a four distinctive chose stations of the lake were 27.95,27.77,27.78 and27.94 at St-I, St-II, St-III and St-IV respectively. The mean estimation of the temperature content recorded throughout the three seasons was a lowest temperature value was27.77$^{o}$C recorded at St-II and the highest was27.95$^{o}$C recorded at St-I.

The information relating to temperature ($^{o}$C) of Erracheruvu throughout the year 2016 to2017 was a lowest 22.50$^{o}$C to a highest of 30.12$^{o}$C. The mean temperature ($^{o}$C) content recorded throughout Monsoon season at a four distinctive chose stations of Erracheruvu was 27.60, 27.82, 27.72 and 27.70 at St-I, St-II, St-III and St-IV respectively. The lowest temperature value was 27.1$^{o}$C recorded at St-I and St-IV during September and the highest was 28.6$^{o}$C at St-II and St-IV. The mean temperature ($^{o}$C) content recorded throughout the Post-Monsoon season at four distinctive chose stations of Erracheruvu was 24.47, 24.37, 24.60 and 24.52 at St-I, St-II, St-III and St-IV respectively. The lowest temperature

value was 22.2$^{o}$C recorded at St-II during January and highest was 26.8$^{o}$C recorded at St-III during October. The mean temperature ($^{o}$C) content recorded throughout Pre-Monsoon season at a four distinctive chose stations of Erracheruvu was 28.75, 29.10, 28.85 and 28.72 at St-I, St-II, St-III and St-IV respectively. The lowest temperature value was 27.2$^{o}$C recorded at St-I during February and the highest was 30.04$^{o}$C at St-II during May. The mean estimation of the temperature content recorded throughout the three seasons at a four distinctive chose stations of Erracheruvu was26.94,27.09,27.05 and26.98 at St-I, St-II, St-III and St-IV respectively. The mean estimation of the temperature content recorded throughout the three seasons was a lowest temperature value was26.94$^{o}$C recorded at St-I and the highest was27.09$^{o}$C recorded at St-II.

The information relating to temperature ($^{o}$C) of Erracheruvu throughout the year 2017 to2018 was a lowest 25.40$^{o}$C to a highest of 31.47$^{o}$C. The mean temperature ($^{o}$C) content recorded throughout Monsoon season at a four distinctive chose stations of Erracheruvu was 29.12, 29.00, 29.17and 29.02 at St-I, St-II, St-III and St-IV respectively. The lowest temperature value was 28.0$^{o}$C recorded at St-IV during August and the highest was 29.9$^{o}$C at St-I during June. The mean temperature content recorded throughout the Post-Monsoon season at four distinctive chose stations of Erracheruvu was 26.80, 29.92, 27.05 and 27.20 at St-I, St-II, St-III and St-IV respectively. The lowest temperature value was 25.1$^{o}$C recorded at St-II during January and highest was 28.9$^{o}$C recorded at St-IV during October. The mean temperature ($^{o}$C) content recorded throughout Pre-Monsoon season at a four distinctive chose stations of Erracheruvu was 30.17, 29.80, 29.90 and 30.02 at St-I, St-II, St-III and St-IV respectively. The lowest temperature value was 28.0$^{o}$C recorded at St-III during February and the highest was 31.8$^{o}$C at St-IV during May. The mean estimation of the temperature content recorded throughout the three seasons at a four distinctive chose stations of Erracheruvu was 28.69,29.57,28.70 and28.74 at St-I, St-II, St-III and St-IV respectively. The mean estimation of the temperature content recorded throughout the three seasons was a lowest temperature value was28.69$^{o}$C recorded at St-I and the highest was29.57$^{o}$C recorded at St-II.

**Fig: 1. Shows Monthly Variation of Water Temperature (°C) in Erracheruvu during June 2015 to May 2016**
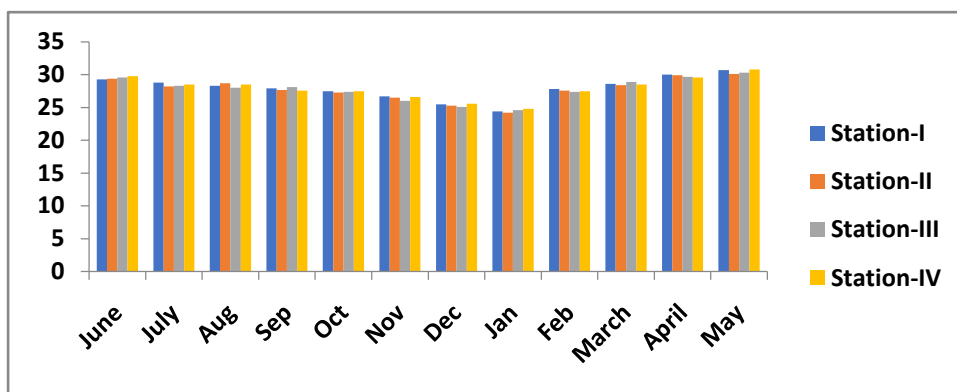


**Fig: 2. Shows Monthly Variation of Water Temperature (°C) in Erracheruvu during June 2016 to May 2017**
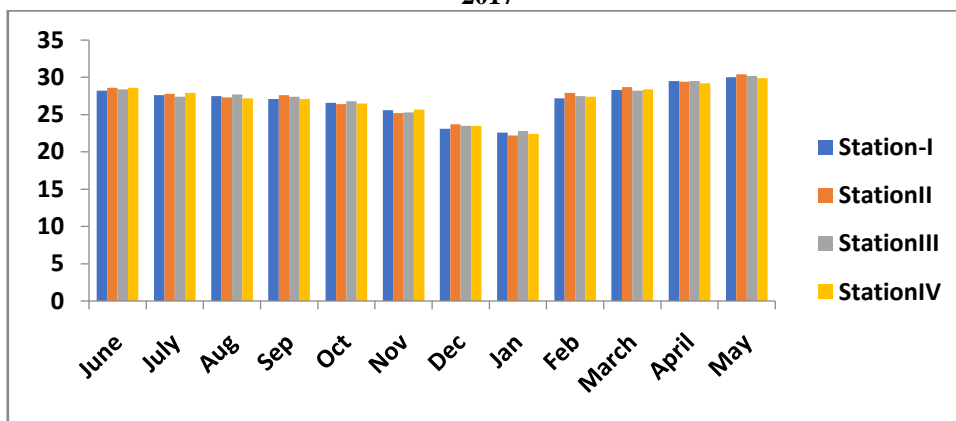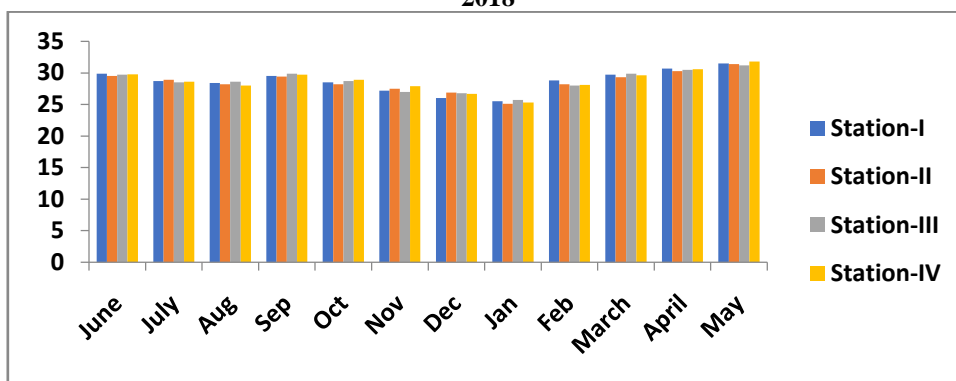


**Fig: 3. Shows Monthly Variation of Water Temperature (°C) in Erracheruvu during June 2017 to May 2018**

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