

ABSTRACT OF THE PROJECT

Water quality is the first most important limiting factor in fish culture which is normally governed by a number of parameters including color, odor, temperature, pH, DO, BOD, TDS, EC, transparency, acidity, alkalinity and hardness. Each of these parameters has a standard value for fish culture. A guiding principle of fish culture is that water quality and hence efficient production are a direct consequence of good water chemistry. Therefore, the maintenance of good water quality is essential for healthy fish culture. The majority of fish culture throughout the world is conducted in ponds.

Study area

The experiment was conducted in a commercial fish farm of AVANIGADDA REAGION ,Krishna dt, AP state. The farms contain concrete and earthen ponds. The farm has a water channel constructed through it which serves the purpose of controlling flood and depends largely on water from reservoir for fish production. Water sample used for this study were collected from two earthen ponds on the farm.



Pond 1



Pond 2

Fig 1:- Images of studied ponds

Study period

Water samples were collected for physicochemical analysis from Different area sampling ponds from 15/05/2022 to 16/07/2022 at weekly interval.

1. INTRODUCTION

Water quality is a term that reflects the overall ability of culture water to provide optimal growth conditions for the species of interest. Water source is the most critical consideration when determining a facility location and the production capacity of the system. Inadequate water quality and quantity will cause major issues in terms of production yields, fish health, and profit. While water quality can be remediated with filters and other treatment techniques, these options increase production costs. The following considerations should guide the decision to establish an aquaculture operation at a given location.

Aquaculture can be defined as the high-density production of fish, shellfish and plant forms in a controlled environment. Stocking rates for high-density aquaculture are typically thousand fold greater than wild environments. Modern fish culturists employ both open and close systems to raise fish. Open systems, such as, the raceways (used in hatcheries of both finfish and shellfish and also in eel, trout culture) are characterized by rapid turnover of water. Closed systems are commonplace in pond culture of carps, catfishes, tilapia, sea bass, prawn and shrimp among others. Closed aquaculture systems do not have rapid turnover of water, but do not have a high surface to volume ratio facilitating exchange of gases, nutrients, energy etc. with the surroundings. Such closed system, intensified, high-density aquaculture forms the basis of concern.

The different forms of high density, intensive aquaculture is quite similar because they all obey the same set of physical and chemical principles. These principles compose the subject of water chemistry and its net result i.e. the water quality. Poor water chemistry leads to deteriorate water quality, which causes stress to the organisms being raised. Efficient feed conversion, growth and marketability of the final product cannot occur unless the pond system is balanced or in harmony with nature. Therefore the overriding concern of the fish culturist is to maintain, 'balance' or 'equilibrium conditions' with respect to water chemistry and its natural consequence, good water quality. Water quality for aqua culturists refers to the quality of water that enables successful propagation of the desired organisms. The required water quality is determined by the specific organisms to be cultured and has many components that are interwoven. Sometimes a component can be dealt with separately, but because of the complex interaction between components, the composition of the total array must be addressed.

Growth and survival, which together determine the ultimate yield, are influenced by a number of ecological parameters and managerial practices. High stocking density of fish or crustaceans in ponds usually exacerbates problems with water quality and sediment deterioration. There is a strong relationship between the quality of the water in the pond and that in the water-surrounding environment. Degradation of surrounding water quality will be faster unless proper water quality management techniques are not implemented in the ever-increasing aquaculture system.

It is important to establish a standardized water quality testing protocol for your particular situation. Know the tolerance range for your culture species, establish critical levels and be prepared to act if a problem occur. The chart below indicates the water quality preferences for some commonly cultured species. For more information about a particular parameter.

Table 1 Water Quality Tolerance by Species

Species	Temp °C	Dissolved Oxygen mg/l	pH	Alkalinity mg/l	Ammonia %	Nitrite mg/l.
Bairfish	60-75	4-10	6-8	50-250	0-0.03	0-0.6
Catfish/Carp	65-80	3-10	6-8	50-250	0-0.03	0-0.6
Hybrid Striped Bass	70-85	4-10	6-8	50-250	0-0.03	0-0.6
Perch/Walleye	50-65	5-10	6-8	50-250	0-0.03	0-0.6
Salmon/Trout	45-68	5-12	6-8	50-250	0-0.03	0-0.6
Tilapia	75-94	3-10	6-8	50-250	0-0.03	0-0.6
Tropical Ornamentals	68-84	4-10	6-8	50-250	0-0.03	0-0.5

CHAPTER 1:- MATERIALS AND METHODS

Water samples were collected for physicochemical analysis from two sampling ponds from 15 Aug 2018 to 15 Feb 2019 interval. Simple random sampling method is used for the primary data collection. Three different points from each pond were identified for random sampling. Samples were analyzed for some parameters namely temperature, pH, salinity, dissolved oxygen (DO), transparency, alkalinity and hardness. Water temperature, pH, salinity and transparency of pond water were measured by thermometer, pH meter, salinity meter and Secchi disc respectively, where titration methods were used for the measurement of alkalinity and hardness and D.O.. After the laboratory analysis, all the findings were integrated and presented in tables and charts and put in the report.

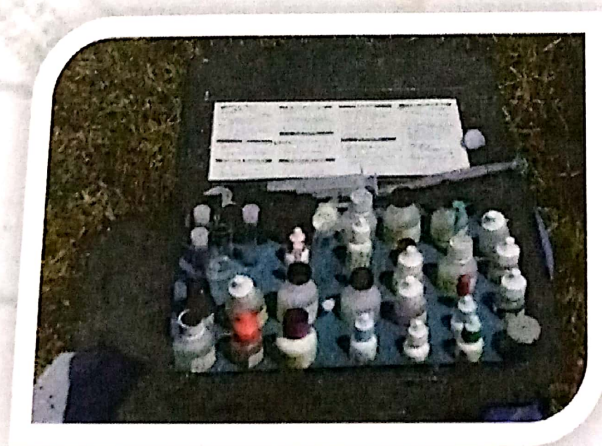


Fig 2:-Water quality testing kit

CHAPTER 4:-BIOLOGICAL PARAMETERS OF WATER

PLANKTON ANALYSIS:

The physical and chemical characteristics of water affect the abundance, species composition, stability and productivity of the indigenous populations of aquatic organisms. The biological methods used for assessing water quality includes collection, counting and identification of aquatic organisms; biomass measurements; measurements of metabolic activity rates; toxicity tests; bioaccumulation; biomagnification of pollutants; and processing and interpretation of biological data. The work involving plankton analysis would help in:

1. Explaining the cause of colour and turbidity and the presence of objectionable odour, tastes and visible particles in waters.
2. The interpretation of chemical analyses.
3. Identifying the nature, extent and biological effects of pollution.
4. Providing data on the status of an aquatic system on a regular basis.

Plankton: A microscopic community of plants (phytoplankton) and animals (zooplankton), found usually free floating, swimming with little or no resistance to water currents, suspended in water, non-motile or insufficiently motile to overcome transport by currents, are called "Plankton".

Phytoplankton (microscopic algae) usually occurs as unicellular, colonial or filamentous forms and is mostly photosynthetic and is grazed upon by the zooplankton and other organisms occurring in the same environment.

Zooplankton principally comprise of microscopic protozoans, rotifers, cladocerans and copepods. The species assemblage of zooplankton also may be useful in assessing water quality.

The structure of photosynthetic populations in the aquatic ecosystems is dynamic and constantly changing in species composition and biomass distribution. An understanding of the community structure is dependent on the ability to understand the temporal distribution of the different species. Changes in species composition and biomass may affect photosynthetic rates, assimilation efficiencies, rates of nutrient utilization, grazing, etc.

Plankton, particularly phytoplankton, has long been used as indicators of water quality. Because of their short life spans, planktons respond quickly to environmental changes. They flourish both in highly eutrophic waters while a few others are very sensitive to organic and/or chemical wastes. Some species have also been associated with noxious blooms causing toxic conditions apart from the tastes and odour problems.

Plankton net: The plankton net is a field-equipment used to trap plankton. It has a polyethylene filter of a defined mesh size and a graduated measuring jar attached to the other end. A handle holds the net. The mesh size of the net determines the size range of the plankton trapped. The mesh number 30 of size 60 mm was used for collecting samples.

COLOR AND ODOR

The color of the investigated pond water was observed visually. The color of study pond 1 and 2 were found to vary from light to deep green. The deep green color represents higher planktons and light green color represents lower planktons. According to Das (1997), a well and phytoplankton enriched water body appears to be dark greenish blue, red or brown. The odor of the investigated pond water was smelt by nose. The odor of pond 1 was not fishy and odor of pond 2 fishy. The odor of an ideal pond water is not fishy or odorless (Das, 1997).

TRANSPARENCY

Transparency of the studied ponds is determined by using secchi disc and the results were observed as 22cm and 20 cm for pond 1 and pond 2 respectively. A slight variations in the transparency were observed during study period due to cloudy weather in those months but in remaining months the variation quite negligible.

BIOLOGICAL PARAMETERS:

The sample water is tested for the presence of various phytoplankton and zooplankton to learn about the planktonic growth with in the pond and also to form an idea about the amount of feed to be given to the culture organisms or amount of fertilizers to be added to the pond. The observations of the present study are as follows.

Zooplankton:

1. In the sample 1 the following zooplankton has been observed.
 - Rotifers: *Brachionus species*, *Filinia species* etc.
 - Cladocerans: *Daphnia sp.*, *Moina sp.*, *Diaphanosoma sp.* Etc.
 - Copepods: Cyclopoids and Calanoids were found.

2. In the sample 2 the following zooplankton have been observed.
 - Rotifers: *Brachionus species*, *Filinia species* etc.
 - Cladocerans: *Daphnia sp.*, *Moina sp.* Etc.
 - Copepods: Cyclopoids and Calanoids were found.

No	Date	Sl. No.	Description	Remarks
1.	25/5/22	1	went to A. Ambika home located out kamepalli	Ambika
2.	26/5/22	2	went to B. kalf home located out vellalacheruvu	B. kalf
3.	27/5/22	3	went to M. mariya babu home located out kamepalli	M. mariya babu
4.	28/5/22	4	went to M. srinu home located out kamepalli	M. srinu
5.	29/5/22	5	went to G. babu home located out kamepalli	Babu
6.	30/5/22	6	went to k. Syam home located out santhamaguluru	Syam
7.	31/5/22	7	went to s. balaji home located out santhamaguluru	S. balaji