CAPTURE AND CULTURE FISHERIES..

BACTERIAL AND VIRAL DISEASE

IV SEMESTER MSc ZOOLOGY

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WATER QUALITY MANAGEMENT

STRATEGIES

WATER QUALITY PARAMETERS

Water is a liquid gold.
It is the medium for aquaculture .
The health and growth of the aquatic organisms depend on the water quality .
The quality of water is determined by

- **Physical factors**
- **Chemical factors**
- **Biological factors**
- **Nutrients**

Physical Factors

- Visibility
- Temperature

Visibility

Visibility is due to the penetration of light into the water.
It is also called **Transparency or Turbidity**

Visibility depends upon the suspended particles present on the surface of the water .

These particles prevent the penetration of light .

TURBIDIITY

INDICATES PRESENCE OF SUSPENDED MATERIALS

Passage light through water column affected

Photosynthesis restricted to surface alone

Turbidity may be

- External
- Internal

External = Supply water & Effluents

Intake water – soil particles due to

a) Deforestation, b) Poor soil management in agricultural practice, c) erosion in

Management strategies

- Removal of soil particles – bulk sedimentation – settlement ponds
- Use of perforated pipes
- Storage & sedimentation tanks – filtering after sedimentation – sand beds – finally cartridge pipes (0.32,u) for purification .
- Flocculation of suspended particles using alum –
  Al2(So4)3.14H2O - 22.5 -45 kg/ha

Determination 0f turbidity

- **Secchi disc**
  <30 cm restricts phytoplankton growth
- Secchi disc is a circular metal disc of 20cm in diameter .
- It is painted white and black in opposite quarters .
- It is tied to a rope

Internal –

- Feaces
- Uneaten food
- Algal blooms

Turbidity due to soil particles is undesirable but with phytoplankton , desirable
Turbidity due to silt and clay – inorganic turbidity
Organic debris – Organic acids – yellow brown colour - Undesirable
Effect of suspended particles
@ restrict growth of phytoplankton
@ adsorbs nutrients
@ damage gills by clogging (if more than 4%)

OPTIMUM VALUES

Salmonids -<20 mg / l tilapias ,craps& catfishes – up to 10000 mg/l
Hatcheries -< 5 mg /l

- The disc is lowered into the water gradually until the disc just disappears.
- The depth is noted .
- The disc is then slowly lifted
- The depth is noted when the disc appears
- The average of the two readings is the transparency of water .

Imhoff cone (measures the quantity of settleable solids .

1 liter sample – one liter – cone –graduated
<20 ml/l-rapid silting – decreases water depth .

TEMPERATURE

- Temperature is the intensity aspect of heat
- The surface water temperature is always high and the bottom temperature is low.
- In a pond, the water has three layers ,depending upon the temperature .

They are :

- upper ***epilimnion***
- Lower ***hypolimnion***
- Middle thermocline. This is called ***thermal stratification***
- Metabolic reaction regulator
- Fish – poikilotherms
- Heat readily exchanged
- There is an optimum

- Metabolic oxy-Demand doubles with every 10 C
- O2 Supply declines sharply with further increase in temp.
- Effect : retards growth & live only for a short period
- Tropical waters - # hot epilimnion & cool hypolimnion # thermocline separates the two when temp goes up, fishes seek cooler spaces – overcrowding – space utility minimized

Management strategy

- Temp regulation possible in controlled systems – hatcheries
- Large ponds – thermal stratification is broken by aerators
- Planting trees on banks – but reduces mixing by winds
- Determination of temperature –thermometer.