

6. Summary

Reservoir is an impoundment constructed by obstructing the surface flow of river or stream in other words it called 'the man-made lakes' which are primarily constructed for hydroelectricity, irrigation, industries etc. and secondary use of it for fisheries is becoming an important activity due to its untapped fish production potential. Vallabhsagar reservoir popularly known as Ukai reservoir was constructed in 1971 and situated on river Tapi in Tapi district of Gujarat at 21° 15 'N Latitude and 73° 35 'E Longitude. This multi-purpose reservoir has a catchment area of 62,255 km² and a water spread area of 52,000 ha at full reservoir level of 105.10 m above mean sea level with a mean depth of 11.8 m. The total fish production of Vallabhsagar was 11243677 kg during 2013, 10003920 kg during 2014 and 10477982 kg during 2015 whereas the contribution of Indian major carps in this total fish production was 47 %, 50 % and 47 % respectively. The fish production of this reservoir can enhance by adapting scientific and sustainable fisheries management practices. Hence present study "Growth performance of Indian major carps, *Catla catla*, *Labeo rohita* and *Cirrhinus mrigala* in Vallabhsagar reservoir, Ukai (Gujarat) was under taken. Present research work was aimed to evaluate the different

physicochemical parameters, growth performance and scale study of Indian major carps in Vallabhsagar reservoir which provide the useful information on growth performance of fish and conduciveness of reservoir for fish survival.

To ascertain water quality and fish growth in Vallabhsagar reservoir water samples and fish specimen of catla, rohu and mrigal were collected at every month during 2013-14 and 2014-15 from pre-selected sampling stations (Serula, Ukai, Chacharbunda, Thuthi, Jamli and Parchuli).

Physicochemical parameters like water temperature, turbidity, total solids, total dissolved solids, total suspended solids, total hardness, dissolved oxygen, nitrate, nitrite, ammonia, Kjeldahl nitrogen, organic nitrogen, phosphate, silicate, chlorophyll-a and plankton study were selected to evaluate the water quality of water body.

The results of water quality shows that the average temperature was 26 °C during 2013-14 and 25 °C during 2014-15 where it was maximum 29 °C during pre-breeding season and minimum 25 °C during post breeding season. Wide range in the turbidity was observed but annual mean turbidity remains 11.43 NTU during 2013-14 and 15.84 NTU during 2014-15 whereas seasonal fluctuation was recorded minimum 3.66 NTU during pre-breeding season while maximum 20.95 NTU during breeding season. Annual mean value for total solid, total dissolve solid and total suspended

solid were observed 193.81 mg/L, 155.51 mg/L and 79.42 mg/L during 2013-14 whereas it was recorded 208.25 mg/L, 132 mg/L and 84.15 mg/L during 2014-15 respectively. Seasonal fluctuation in these parameters was maximum (259.16 mg/L, 190.83 mg/L and 121.40 mg/L) during breeding season and minimum (154.16 mg/L, 114.66 mg/L and 42.63 mg/L) during pre-breeding seasons. The average value of dissolved oxygen was 8.66 mg/L and 7.94 mg/L for 2013-14 and 2014-15 respectively whereas seasonal variation was not observed in dissolved oxygen. Hardness remained 66.69 mg/L and 61.15 mg/L during 2013-14 and 2014-15 whereas seasonal variation did not follow the particular trend. Nitrate-N and Nitrite-N were also within the permissible range <3.00 mg/L and 0.10 mg/L with no specific seasonal variation whereas the annual as well as seasonal mean value of Kjeldahl nitrogen, ammonia and organic nitrogen indicate the suitability of water for aquatic fauna. Phosphate level in reservoir water was recorded 0.93 mg/L and 0.90 mg/L during 2013-14 and 2014-15 respectively however it was recorded maximum 1.62 mg/L during breeding season and minimum 0.30 mg/L during pre-breeding season. Annual and seasonal silica level was less than the desirable range (15-20 mg/L). Chlorophyll-a and number of plankton are interdependent parameters and in present study both parameters were under desirable range for fishery purpose. Seasonal variation in chlorophyll-a and plankton was prominent and these were

recorded minimum during breeding season while maximum during post breeding season.

Different physical, chemical and biological factors directly and indirectly affect the quality and suitability of water for the survival, growth, distribution and production of fish. Results obtained from present study concluded that all physicochemical parameters were within the desirable range along with seasonal variation which ultimately favour the fish survival and growth in water body.

Fish biological parameters comprise length weight relationship, scale study and gut content analysis which were used to analyse the growth and condition of fish. Length weight relationship of catla, rohu and mrigal were calculated for pooled, different length groups and for different season which shows that the correlation coefficient (r) was highly positive. Regression coefficient or exponent (b) was laid between (2.43-4.36) which indicate the allometric growth of fishes. Annual and seasonal condition factor and relative condition factor were observed more than 1 indicate the food availability and suitability of water body for fish. Based on different growth parameter it can be conclude that growth of fishes was maximum during initial years whereas decreases as the age of fishes advanced. The growth constant shows that catla and rohu comprises three life spans while

mrigal two life span which indicat growth before sexual maturity and growth after sexual maturity.

Gut contains analysis shows that phytoplankton, plant material and decay matter was dominated in gut of catla, rohu and mrigal respectively which reveals that catla is planktivorous, rohu is herbivorous and mrigal is omnivorous in feeding habit.

The gastrosomatic index study determine the feeding intensity and in present study less feeding intensity was observed during breeding season due to gonadal maturity which increases afterwards.