Morphometric Study of Fresh Water Carps Fishes of Shahdol Region

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Abstract: **The development of morphometric techniques for taxonomic analysis of fishes has lead to a great increase for proper identification and factualness. These morphometric identification have been used to identify and validate the diversity and differentiation between fishes. These also used in identification of fishes have enabled great advances to be made in recent years in India. However, the molecular sequence analysis and phylogenetic relationships among the pices is unconventional in India. Many workers have been always questioned the validity of Indian species of fishes and emphasized the need to ascertain the status of species from Indian fish. Here we would like to provide additional resolution for the interpretation of use of physical character in study of carp fishes in Shahdol region.**

Keywords: **Fresh Water Carps Fishes of Shahdol Region**

I. INTRODUCTION

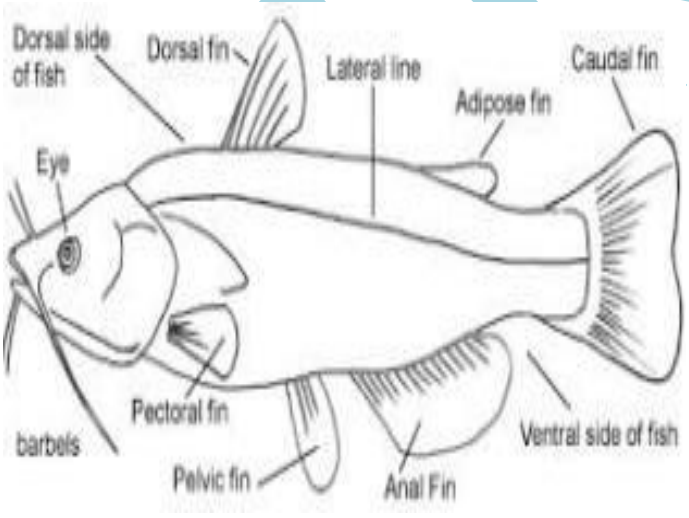
The Indian major carp is the group of fast growing edible fishes cultivated in groups because of their different feeding habit. It includes Catla (*Catla catla*), Rohu (*Labeo rohita*) calbasu (Labeo-calbasu) and Mrigal (*Cirrhinus Mrigal*). Sometimes on the basis of the nature of water reservoir cyprinus carpio and Ctenophregedon idella (Grass Carp) is also cultivated along with major carps. In Shahdol region of Madhya Pradesh usually major carps are cultivated because of its nature i.e. relatively higher growth in shorter period with suitability of easily available cheaper food Aquatic species also well established in India are also used in polyculture along with Indian Major Carps. Highest production per unit area has been obtained in the polyculture of carps in India. Genetic modification occurs inadvertently in a cultured population. Since there is no competition for food and fear for predators, a farmed fish population experiences different kinds of selection regimes unprecedented in natural waters. It becomes domesticated after some generation of breeding and culture, which bring about changes in the gene pool. Changes may also occur in morphology, physiology and/or behavior of the domesticated fishes. Morphometric differences among stocks of a species are recognized as important for evaluating the population structure and as a basis for identifying stocks However, at present it is felt that any further improvement in production may not be possible and the researcher gradually realizing the importance of other aspect such as genetic quality and improvement of the candidate species by fully exploiting their hitherto untapped genetic potentials.. Morphometric and meristic characters of fish are the measurable or countable characters common to all fishes. Landmarks refer to some arbitrarily selected points on a fish's body, and with the help of these points, the individual fish shape can be analyzed. In other words, a landmark is a point of correspondence on an object that matches between and within populations. Truss network systems constructed with the help of landmark points are powerful tools for stock identification. A sufficient degree of isolation may result in notable morphological, meristic, and shape differentiation among stocks of a species which may be recognizable as a basis for identifying the stocks. The characteristics may be more applicable for studying short-term, environmentally induced disparities, and the findings can be effectively used for improved fisheries management. Only limited information is available on morphometry and there have few attempts to evaluate the population structure using different methods based on phonotypical and genetic aspects. The present study deals with the population structure of morphometry from a phonotypical point of view to determine the morphometric among the stocks. Mostly fishes Body compressed and dorsal profile is more convex than that of ventral profile in most fishes. In some fishes i.e. Labeo calbasu bears Single pair of barbell (maxillary) present. Dorsal profile brownish or greenish or blackish and silvery on both sides and beneath. Fins are gray in color with orange margin in larger specimen. Lateral line present on body and complete Scales moderate. India, Pakistan, Nepal, Bhutan, Sri Lanka, Afghanistan and Thailand .The small fish *cyprinus carpio* is a member of the family Cyprinidae, commonly known as "bloch".The conservational status of the fish has been referred to as critically endangered In addition, categorized it as a vulnerable species. It is a tasty, the most popular and favorite table fish among barb species having high nutritional and market value in India as well as other Asian countries. This fish is widely distributed through the Indian sub-continent including Bangladesh. The species has also been reported from Vietnam This small indigenous species (SIS) used to be abundantly available in rivers, streams, ponds, beels, ditches, and floodplains in the past in the Asian countries, but the populations have seriously declined or on the verge of extinction due to over exploitation and various ecological changes in its natural habits which in return, severely affects biodiversity, inhabits standing and running waters, usually in streams, lakes, estuaries, reservoirs, and ponds with hard bottoms or sea grasses. The species usually feeds on plants, shrimps, insects, mollusks, worms, detritus, and phyto and zooplankton generally fishes are

Used as culture species in aquaculture. Used as food fish and medicine but widely used in other countries. Fishes always marketed in fresh condition. This species command a good market price and consumer demand.

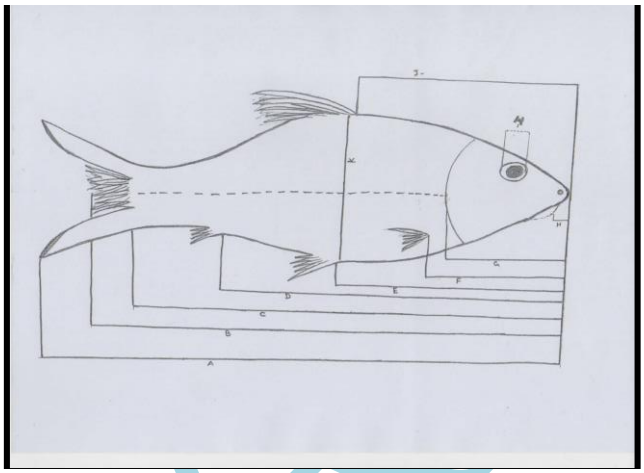
II. MATERIALS AND METHODS

In order to obtain, a sampling programme was introduced by department of zoology were sampled at from ponds and river. All the commercially important fishes, simultaneously, samples for biological work were obtained from the commercial gear, cast nets, long lines and gillnets from fisherman. The length-frequency studies were based on the analysis of about 7 specimens ranging from differ length. The fish measuring total lengths of the fish were recorded in centimeters from the tip of the snout to the longest ray of the caudal fin in all the cases. The same data were also pooled month wise in 2014 to dissect out the age groups by the use of perdurability paper. Principal component analysis was initially applied untransformed morphometric characteristics i.e. measurements not standardized for fish length. There principal components were extracted from the 14 morphometric characteristics. An analysis of the correlation matrix shows that all of the variables were highly correlated with fish length, and their relative character. Live seven specimen of Indian Major carp (Rohu, Catla, Mrigal, carpio and calbasu) and minor carp (Reba and Bata) were taken immediately from fisherman of ponds/river of Sone (Shahdol) on different date and time and after that their morphometric measurement were recorded.

Parameters of morphometric characters



The traditional method of morphometric observation along of Indian major carps and to study its biodiversity. Morphometric measurement in 14 external characters were analyzed and found significance and identify their characters that are followings-



In this figure
A-total length
B-fork length
C-standard length
D-pre anal length
E-pre ventral length
F-pre pectoral length
G-head length
H-snout length
I-eye diameter
K-pre dorsal length
L-body depth

Total length-
It was measured from the tip of the snout to the tip of the caudal fin, i.e. the greatest distance between the most anterior projecting parts of the head to the posterior most tip of the caudal fin. The measurement was a straight line and should not be taken over the curves of the body.

Standard length-
It was measured from the tip of the snout to the base of the caudal fin. It was straight distance from the anterior most part of the head to the end of the vertebral column/caudal peduncle.

Head length-
It was a straight measurement of the distance from the tip of the mouth or snout to the most distant point on the opercular membrane.

Depth of body-
It was measured along the vertical line at the deepest part. It was the vertical measurement from a point on the body of the fish on its back when its height was greatest to a straight line to the ventral most surface or profile. It needs not necessarily to be in the middle of the fish.

Snout length-
It was measured from the tip of the snout or anterior mid point on the snout or the upper lip to the anterior margin of the orbit or to the front hard margin of the orbit.

Pre-dorsal length-
It was measured from the tip of the snout to the origin of the dorsal fin. It was a straight measurement from the mid-point or

tip of the upper lip, or the anterior most part of the head to the structural base of the first dorsal fin..

Eye diameter-

It was the maximum diameter cover by the eye.

Lateral line-

Its was counted on fishes body marks looking like dash(-)which are found just in middle of body. we can count easily and its started from ending edge of head to starting point of caudal fin…

Pre pectoral length-

It was measured from the tip of snout to the origin of origin of pectoral fin.

Pre pelvic or ventral length-

It was counted from tip of snout till to starting of ventral fin rays.

Pre anal length-

It was measured from tip of starting of snout to starting of anal fin.

Pre caudal length-

It was measured from starting of snout tip to origin of caudal fin.

Lateral transverse ratio (L.T.R.)-

It was counted no of scales which are scattered on fish body in opposite direction from lateral lines and reaches on edge of fish body.

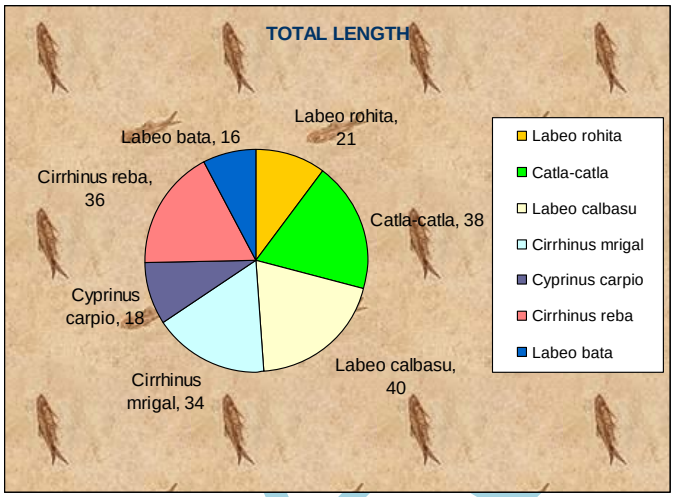
Fork length-

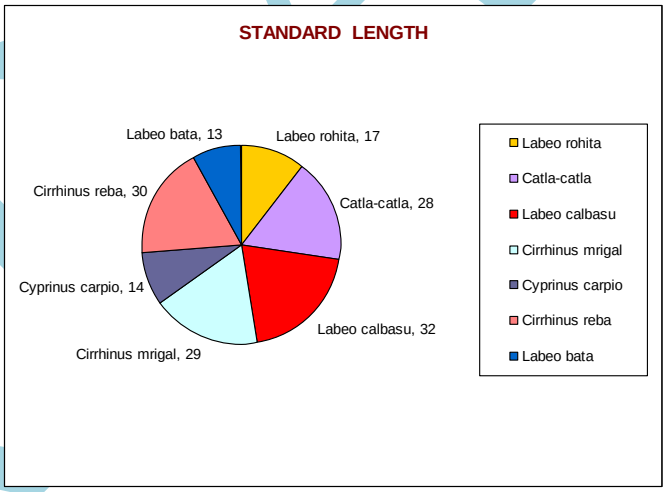
It was measured from tip of snout to end of lower caudal fin rays.

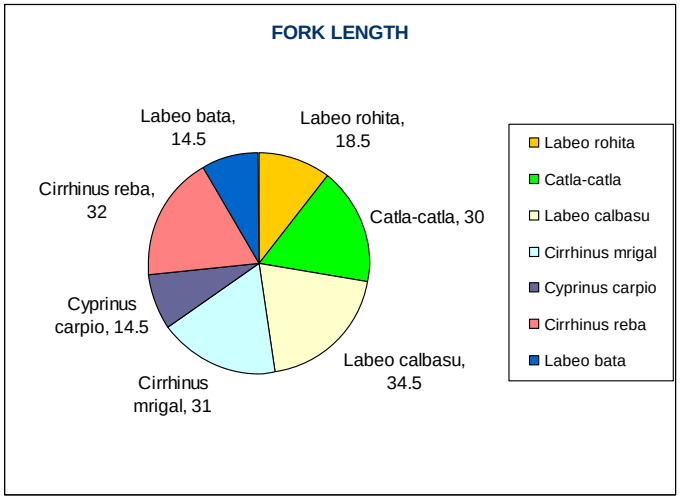
III. OBSERVATION-

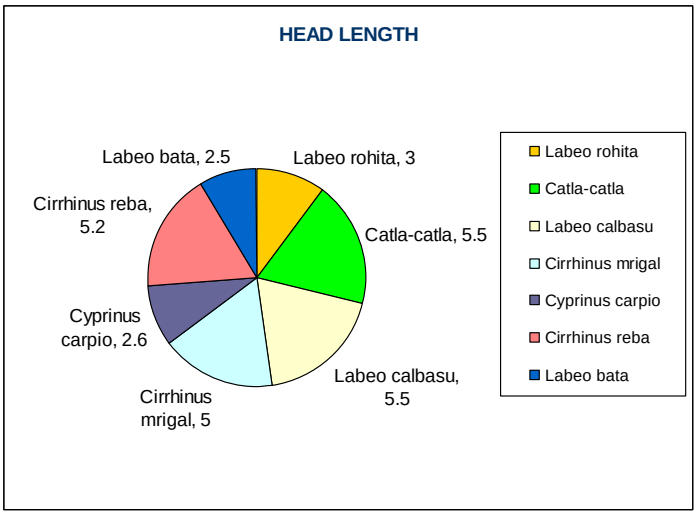
The average values of various external morphological characters studied in seven of composite species of Indian major carps; *Rohu* (*Labeo rohita*), Catla (*Catla. catla*), Mrigal (*Chirrhinus-mrigala*) Carpio(cyprinus carpio) and calbasu(Labeo calbasu) and minor carps Reba(cirrhinus reba) and Bata (labeo bata) from experimental fish which are collected from Shahdol are shown in Table 1 And total of 15 morphometric characters were recorded and their relative morphometry were calculated based on the total length of the respective specimen.Simultaneously observations of the above species were recorded their external character… Their relative readings were shown in Table 1-

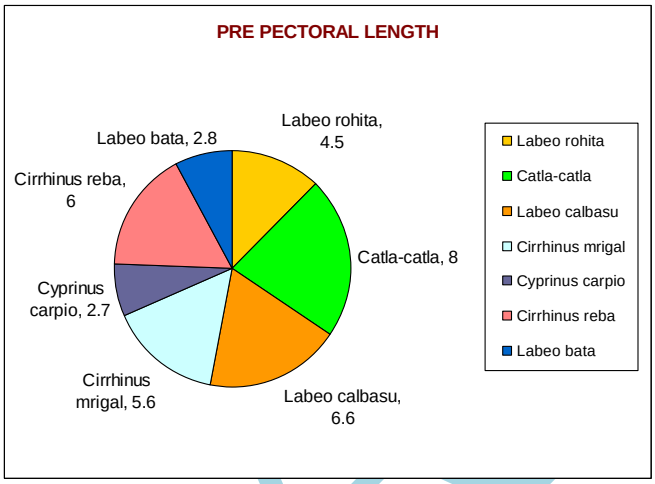
Among most of the morphometric characters studied in Seven fresh water species. Even though some of the characters can be identified by simple external appearance,

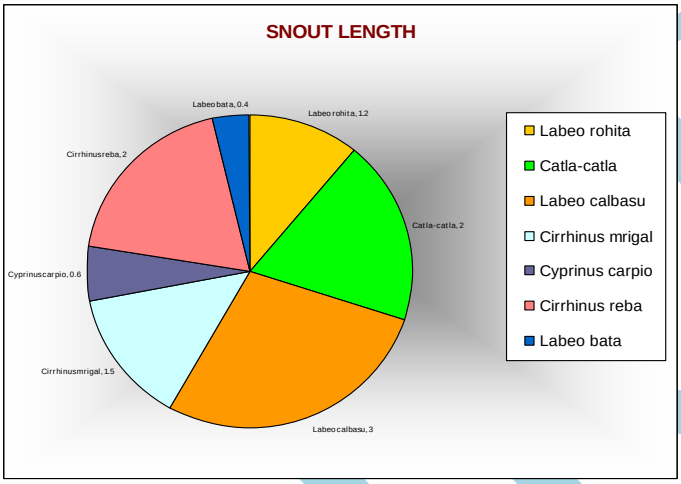


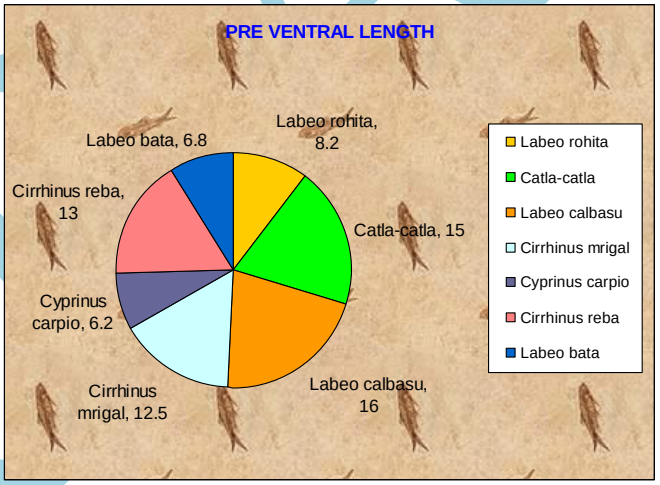


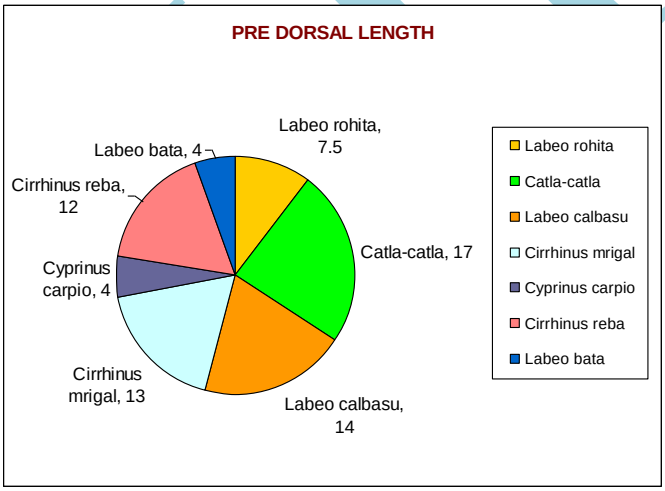


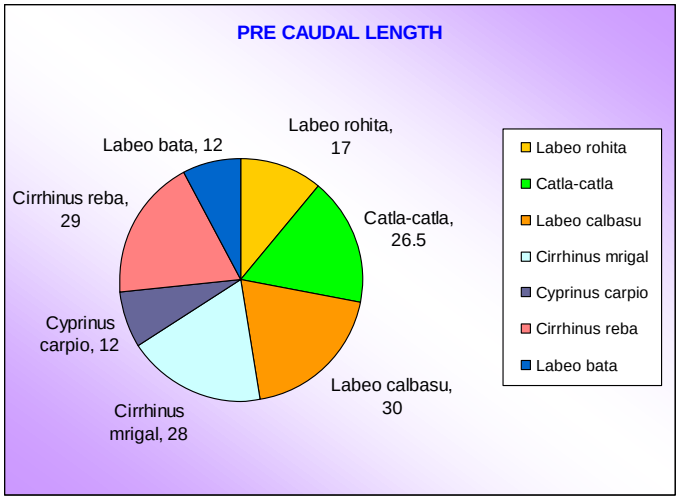


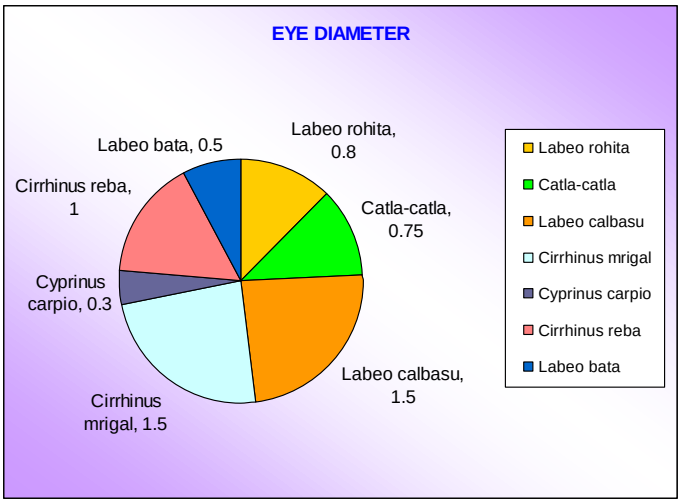






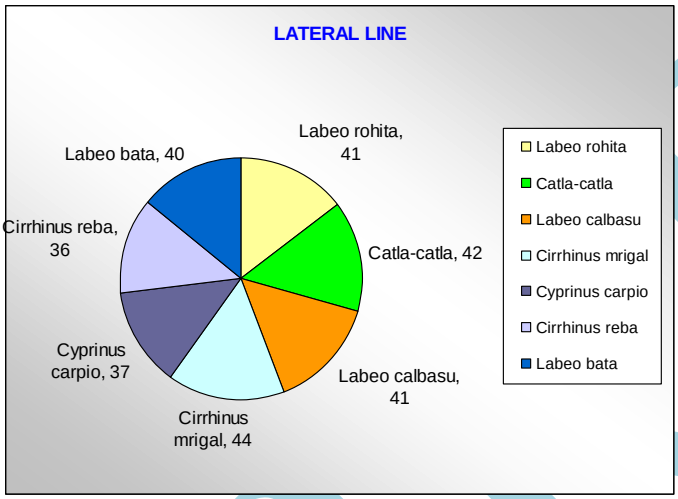






Catla-catla

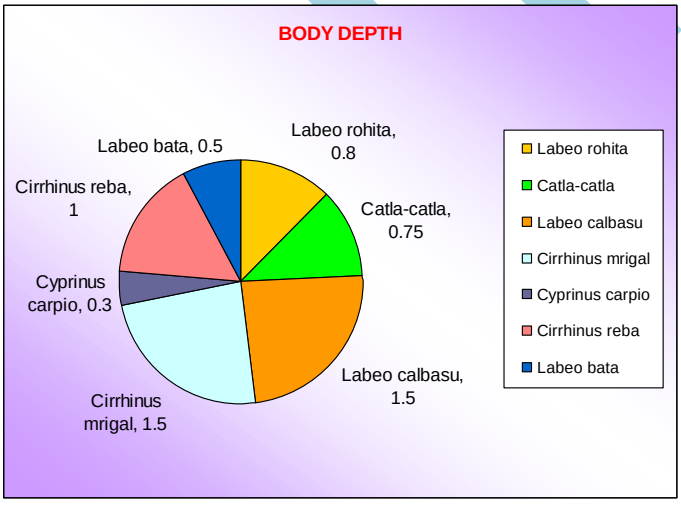
Fin formula- D- 19(3/15/16) P- 20 V-8 A- 8(3/5) C- 18-20 L.I.- 43 Lt.r.- 7 ½ /6 ½



Cyprinus-carpio

Fin formula-

D- 3-4/14-19 P- 16-18 V-1/8-9 A- 2/5 C- 18-20 L.I.- 30-41 LTr- 7 ½ /6 ½



Labeo-rohita
Fin formula-
D- 16(3/13) P- 17 V-9 A- 7(2/5) C- 19 L.I.- 40-42 LTr- 6 ½ / 7 ½ /9

Cirrhinus–mrigal
Fin formula-
D- 15-16(3/12) P- 18-19 V-9 A- 8(3/5) C- 19 L.I.- 40-45 l.t.r.- 7 ½ /8 ½

Labeo-calbasu
Fin formula-
D- 16-18 P- 19 V-9 A- 7(2/5) C- 19 L.I.- 40-44 LTr- 7 ½ /8 one pair of barbal present

Cirrhinus-reba
Fin formula-
D- 10-11(2/9) P- 16 V-9 A- 8(2/6) C- 19 L.I.- 35-38 LTr- 7 /5

Labeo-bata
Fin formula-
D- 11-12(2/10) P- 18 V-9 A- 7(3/5) C- 19-20 Lateral line- 37- 40 L.t.r. - 7 /16-17

RESULT:

The observations of morph metric study of teleost carp fishes reveal the fact that economically important carp fishes must be kept in good and healthy ecologic niche. The viable aquatic environment allows fishes to grow fast and rapid. The fast and rapid growth of such culturable fishes enables fish farmers for better economic gain. The hygienic physical and chemical conditions of the dwelling water are very important factors for fish growth. The fish culturist must take care of it.

Besides, the normal growth of the carp fishes add an important role in maintaining the natural aquatic environment. The fishes stand as important primary consumers in any aquatic ecosystem, which also act as important trophic level in food chain as well as food web. In any ecosystem the persistence of food chain and food web are very important factors.

This region is highly suitable for the development and growth of the carp fishes as it is very important source of livelihood for the tribal of this area.

DISCUSSION

The examination of morphological characters are especially desirable as two perspectives with which to test phylogenetic hypothesis. The analysis of morphological characters which include the multivariate analysis of external anatomical characteristics as well as the study of scales and otholiths have been used as a means of stock identification for many years. when attempted to evaluate some meristic and morphometric characters of taxonomic significance in differentiating and revealed fin length as characters of diagnostic significance between the two species.

Under present investigation subjecting morphologic and their relativity it has been found to have the level of significance in all the morphometric characters. Thus, a critical analysis of the morphometric characters by length-wise comparison was conducted and the level of significant difference between the species was observed in some characters. As the current investigation was undergone in order to observe the diversity between the population of seven composite species of Indian major carp and minor carp which belong to different genus even though of the same family, the significant difference in their morphometry was evident. The composite species of Indian major carp and minor carp forms the backbone of Indian aquaculture, even though the later was brought to India which now has been well adapted to the local conditions and forms an integral part of the freshwater genetic diversity. It has been seen recently that the aquaculture production come to a standstill and simultaneously capture fishery of these species are also declining at a faster rate. This may be due to the fact that the breeding programme in most of the hatchery uses limited stock and there is little or no precaution for the genetic variability of the brooders.The wanton destruction of both adult and juvenile fish, ecological degradation, impact of river valley projects, pollution, introduction of competitive and fast growing exotics are some of the causes in natural fisheries. Fish sample were collected from ponds and rivers of shahdol (m.p.),and their morphometric characters were recorded.The relative morphometric studies conducted in 21 external characters analyzed by Bindu Pandey shows significant difference and their critical difference were evaluated which shows significant differences in some specific behaviour, characters, habits and habitats.Thus, it is concluded that the species investigated being of the same family possess very close relationship with respect to the morphology and their polymorphic loci along with DNA based markers with large number of sample size for better understanding and sustainable utilization of the genetic diversity of this economically important contents.

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