Morphometric and meristic characters with age of Indian major carp (*Labeo rohita* Ham) in alkaline pond soil

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SUMMARY

In the present study some changes in morphometric and meristic characters (Body traits) with age on *Labeo rohita* (Ham) "Rohu" was made at age of six, eighteen, thirtysix, and sixty months old fishes in alkaline soil pond having pH more than 9.5. Study was also compared with fishes grown in five year old pond of normal soil pH (7.0) in complete randomized design (CRD).In both type of test fishes total length, head length, muscular body length, caudal peduncle, total tail length, and body weight percentage *viz.,* fin, scale, viscera, gills and head percentage were studied. Highest total length, maximum head length and other body traits were higher in sixty month old fishes but posses lower value in alkaline soil pond as compared to normal soil pond fishes. All parameters varied significantly among themselves. In weight percentage of some body parts viz, scales and head percentage though varied significantly but fins, gills and viscera did not differ significantly in both pond fishes. The corresponding higher value of total body length in experimental fishes was recorded for fishes of same age group grown in normal soil pond. An increasing pattern in fins, scales and head percentage was reported with age whereas decreasing pattern was observed in gills percentage.

Key words :
Labeo rohita Ham, Alkaline soil pond, pH, Body traits, Morphometric and meristic etc.

Morphometric and meristic characters are important parameter to distinguish one fish to other on the basis of body traits. In addition, taxonomy study of fishes also require characteristics and traits of the body including meristic details. Morphomertic and meristic characters though ranged from genetic variability but wide influences with rearing environmental parameters (Benguil *et al.*, 1995). Determination of age and growth contribute significantly to assess the yield potential of fishes in a water body and its characteristics. Hormonic development of important tissues results from simulation and retention of chemical components such as protein, lipids etc. require continuous acclimatization to the environment which basically occur due to alterations in water quality and also to maintain growth and health of fishes. Since pond bottoms acts as laboratory where process of minerization of organic matter takes and nutrients are released to overlying water columns hence growth,health and productivity of fish ponds depend upon physical, chemical and biological properties of pond soil.Chemical properties like pH, organic carbon, available nitrogen and potash are essential for effective pond management. Slightly acidic to neutral soil is congenial for good body growth of fishes but higher acidity or alkanity of pond water causes adverse effect not only on growth and body traits but also on biochemical constituents.

Labeo rohita Ham *"Rohu"* is one of Indian major carps due to best in protein quality and is supposed to tastiest fish but very little in formations is available on variability of body traits with age in alkaline soil pond as shown in Fig. 1.

Fig. 1 : *Labeo rohita* Ham

MATERIALS AND METHODS

Indian major carps *Labeo rohita (Ham)* of following age groups were used for study

Sr. No.	Fish group	Approximate age (in month)
1.	Below one year	6
2.	Above one and below two years	18
3.	Above two and below three years	36
4.	Above four and below five years	60

No. of samples -12
No. of replications-3

Experimental site:

Samples of fishes of different age groups were collected from fish ponds of the college of fisheries N.D.University of Agriculture Faizabad from newly constructed ponds of soil pH 9.5 and another lime activated 5 years old pond of soil pH 7.0. Biochemical analysis of muscles and body traits were conducted in laboratories of department of fisheries and Agriculture Biochemistry of the University.

Morphomertic characteristics:

Experimental fish Rohu of different age groups were collected from the various ponds and brought to the fisheries laboratory and washed thoroughly with tap water. The length was measured in centimeters by the measuring scale and divider and total weight was recorded in gms with the help of top pan balance. Scale and fins of the fishes were cut down carefully with the help of scalper and sharp knife. The abdomen of the fishes was cut open and gut was removed. Head and gills were also removed with the help of sharp knife and their weight was taken separately.

Age determination:

Age of the experimental fishes was determined as given by Tandon and Johal (1996). Few scales of the fishes were removed from the caudal peduncle region with the help of scalper. Scales were put into the water to remove the dryness. One scale was taken out from the water and studied under the compound microscope. Several circuli were seen on the scale. After many condense cerculi one detoured and spaced cerculiu was present known as annulus which represented on year of age. In this way age was determined.

RESULTS AND DISCUSSION

Length of various body parts viz., total length,muscular body length, caudal peduncle length and head length were studied and recorded in all age group of experimental fishes which have been given in Table 1.

The data pertaining to changes in length of fish samples as shown in table revealed that the minimum total length 11.3 cm were recorded in the six months old fishes and maximum 54.1 cm in sixty months of age in saline pond of pH 7.0. Head length varied in the range of 2.5 to 11.7 cm. Maximum muscular body length was 39.8cm in sixty months of age and minimum 7.8 cm in six months old fish. Maximum length of caudal peduncle was 6.9 cm in sixty months followed by 4.8,2.5and 1.6cmn in thirty six, eighteen and six months and maximum 14.8cm in sixty months of age. All the treatments were varied significantly among themselves, but lower magnitude at higher pH of soil pond.

Changes in weight of different body parts in experimental fishes:

In the experimental fish, weight of different body parts viz., fins, scales, viscera, gills and head were recorded in per cent in all the ages groups of fishes of soil ponds of pH 7.0 and 9.5 were depicted in Table 2.

Fins percentage of alkaline soil ponds fishes in six, eighteen, and thirty six and sixty months old were 0.9, 1.63, 1.72, and 23.0, respectively. Minimum 4.0 per cent scales were recorded in six months of fish and maximum7.96 per cent in sixty months of old fishes. There were significant change in weight per cent in scales observed in all age groups of fish's. Highest 4.90 and 4.75 weight percentage of gills was recorded in six months

Months	Body Length (cm)				
	Total length	Head length	Muscular body length	Caudal peduncle length	Tail length
6 months	11.3(12.4)	2.5(2.7)	7.8(9.5)	1.6(1.6)	4.1(4.2)
18 months	23.6(26.5)	4.8(5.4)	17.8(21.2)	2.5(2.7)	7.9(8.2)
36 months	40.4(44.2)	8.3(9.4)	27.9(36.7)	4.8(5.1)	12.6(14.7)
60 months	54.1(57.0)	11.7(11.8)	39.8(48.7)	6.9(7.1)	14.8(16.5)
C.D. (P=0.05)	4.3(5.3)	1.35(1.7)	32.5(37.5)	1.5(1.7)	2.5(2.5)

Table 1 : Variation in length (cm)of different body parts of experimental fish Rohu at different age groups

(Figures in parenthesis represent corresponding value in soil pond of pH 7.0.)

Age	Weight per cent				
	Scales	Fins	Head	Gills	Viscera
6 months	4.07(4.03)	0.96(0.91)	16.02(15.89)	4.02(4.75)	5.03(5.02)
18 months	5.64(5.51)	1.78(1.63)	18.62(17.75)	4.26(4.12)	7.19(7.21)
36 months	6.08(5.82)	1.90(1.72)	19.64(18.94)	3.10(3.01)	8.24(8.01)
60 months	8.22(7.96)	2.40(2.30)	21.64(20.71)	2.90(2.47)	8.92(8.89)
C.D. (P=0.05)	1.91	NS	2.52	NS	NS

Table 2 : Variation in weight of different body parts (%) of experimental fish Rohu at different age groups

(Figures in parenthesis represent corresponding value in soil pond of pH 7.0)   NS – Non significant

of fish where as lowest was 2.90 and 2.77 in 9.5 and 7.0 pH soil pond respectively in sixty months old fish. Maximum weight percentage of fish head was recorded 20.17 in sixty months old fish, followed by 18.94, 17.75, and 15.89 per cent in thirty six, eighteen and six months old fishes, respectively. Maximum viscera percentage recorded 5.0 in six months of fish in saline soil pond and was non-significant with neutral soil pond.

The purpose of present investigation entitled "Effect of Alkalinity of pond soil on Body traits with age of Indian major carp (*Labeo rohita* Ham)." was to effect of age on biochemical composition of flesh and various body traits of fishes grown in saline soil pond as compare to normal soil pond. The result of investigation given in preceding chapters have been discussed, elucidated and interpreted in the light of accepted principles of fisheries and biochemistry and supported by the available literatures on the topic in the following heads:

Body trait:

The total length in experimental fishes (in alkaline soil pond) was ranged from 11.3to 54.1cm. head length 2.5to 11.7cm, muscular length 7.8to 39.8cm, caudal peduncle length 1.60to 6.9cm and tail length 4.1 to 14.8 cm in six months old fishes in saline soil pond:

A non –significant, corresponding higher value was recorded for fishes of same age groups grown in normal soil pond. Increasing trends were observed in length with age. Total length and other lengths of the body were increased due to the increase of FCR ratio, accumulation of fat in ht body, increase in protein content as a result of both recruitment of new muscles cells and an increase in the diameter of existing cells, enlargement of bones and muscles with aging.

Body weight per cent:

Scale percentage in experimental fishes grown in alkaline soil pond were ranged from 4.0to 7.96, fins 0.9to head 15.89to 20.17 and gills from 5.0to 8.89 per cent. An increasing pattern in scales fins and head percentage was seen with aging whereas a decreasing pattern was observed in gills percentage. Increase in thickness and size of the scales with the age and size may be due to the increase in calcium content of the skin with age. Phillips *et al.* (1953) were also observed similar pattern in fish *Salvelineus fontinalis.* The weight of the other body was increased due to increase in feed demand with the age. Increase in body weight and other parts *i.e.* fins and head percentage are also associated with an increase in fat content. Decrease in gills percentage with age was noticed but the reason behind it was not clear. Viscera percentage in the experimental fishes were increased with the age. Since the present experiment was not conducted in controlled conditions, samples were collected from ponds, therefore the viscera of the fishes either empty or filled were not be exactly judged. Therefore, no conclusion could be drawn on viscera in context with age. *Geri et al.* (1995) also obtained similar results in *Cyprinus carpio*. Variation in weight of different body parts of test fishes of saline soil ponds were of same nature but non-significant reduction in magnitude were observed may be due to the reason of decrease in Ca and fat contents as compared to normal soil pond fishes.

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