

“Studies On The Relationship Between Body Weight And Haematocrit In Cirrhinamrigala”

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Abstract :

The relationship between body weight and haematocrit in Cirrhinamrigala – The studies of haematological parameters of fishes is gaining a recognition as a valuable tool for monitoring the health of the fish and to provide the fisheries biologist with the physiological response to environmental stress, Information which is specially relevant when comparing studies of different fish species living in contrasted habitats. The determination of haematological values of fishes are carried out for a variety of purposes. In this study of C. mrigala, I analysed the relationship between haematocrit and blood weight and found that ht value is lowest in the lowest body weight group. This increased as the fish weight increases upto a certain level. In male Cirrhinamrigala haematocrit value increases from mean weight 168.250 ± 9.2896 to 619.367 ± 11.2048 but decreases in fishes in the mean weight 810.775 ± 8.4895 and again increased in the mean weight 1176.324 ± 27.9150 . Male Cirrhinamrigala showed a higher haematocrit value than female Cirrhinamrigala.

Keywords :Haematocrit, Cirrhinamrigala, Body weight, Sex.

Introduction

Haematological studies on fishes have assumed greater significance due to the increasing emphasis on Pisciculture and greater awareness of the pollution of natural fresh water resources in the tropics. A number of haematological indices such as haematocrit (Ht),

Haemoglobin (Hb), Red Blood Cells (RBCs) and so on, are use to assess the functional status of the oxygen carrying capacity of the blood stream and have been used as indicator of metal pollution in the aquatic environment. A good knowledge of haematocrit – weight relationship of fishes are important in ichthyology because they allow the estimation of the average ht value of the fish of a given weight group by establishing a mathematical relation between the two. Weight estimation is an important applications in fish stock assessment. Various studies have been done on the length – weight relationship and food habits of fish species [Mortuza and Rahman 2006, Ayoade and Ikulala 2007, Ayoade et al; 2008, Hosseini et al; 2009, Jud et al; 2010, Lawson 2011]. In the present study the ht value increase with increasing fish weight up-to a certain weight. Male fishes showed a higher ht value than the females.

Materials and Methods :

Live specimens of the *Cirrhinamrigala* were obtained from various ponds such as pond Inai, Rauza pond, Rajendrasarovar and local market in Chapra and transported in aerated containers to the laboratory. The fishes acclimatize to the laboratory conditions for at least 20 days prior to the experiment in a glass aquarium filled with declorinated water. The weight of fish varied from 100 to 1500 gm in weight. Both sexes were used. The blood samples obtained from the coudal circulation with the aid of a heparinised 2cm disposable plastic syringe and a 21 gauge disposable hypodermic needle. Haematocrit (Ht/PCV) was determined by micro-haematocrit centrifugation technique. The haematocrit value or the packed cell volume were estimated by centrifuging it for 5 minutes at 10,000 rotation per minute (rpm). Differences in haematological parameters between male and female fish were statistically analyzed by student’s t – test.

Observations :

Table - 1

Total weight and blood haematocrit value of male *Cirrhinamrigala* : BW. Body weight (in gm); N. (Number of fishes) MW.(Mean weigth in gm ± SE); Ht. Haematocrit value (% ± SE).

BW	N	MW	Ht
100 – 300	40	168.250 ± 9.2896	34.288 ± 0.1212
300 – 500	40	361.575 ± 11.4654	37.618 ± 0.1597
500 – 700	30	619.367 ± 11.2048	39.532 ± 0.0772
700 – 900	40	810.775 ± 8.4895	35.116 ± 0.2468
900 – 1500	34	1176.324 ± 27.9150	37.934 ± 0.3281

Table – 2

Total Weigh and blood haematocrit value of female *Cirrhinamrigala* ; BW Body Weigh (in gm); N.(Number. of fishes), MW. (Mean Weigh (in gm ± SE); Ht. (Haematocrit value (% ± SE).

BW	N	MW	Ht
100 – 300	36	168.861 ± 10.8678	32.895 ± 0.1378
300 – 500	30	390.567 ± 11.2713	35.867 ± 0.1362
500 – 700	32	600.094 ± 12.1313	38.290 ± 0.1048
700 – 900	40	809.250 ± 8.6101	33.462 ± 0.2311
900 – 1500	40	1167.750 ± 26.0934	36.074 ± 0.2945

Table – 3

Blood haematocrit value of *Cirrhinamrigala* of different sexes and different body weight groups: BW.Body Weight (in gm.); t test, Ht. Haematocrit value (% ± SE); N. Number of fishes; M. Male; F. female.

BL	N		Ht		t. test	P	df
	M	F	M	F			
20.00-29.75	40	36	34.288 ± 0.1212	32.895± 0.1378	7.5913	< 0.05	72
29.75-33.60	40	30	37.618 ± 0.1597	35.867 ±0.1362	8.3443	< 0.05	68
33.60-37.95	30	32	39.532 ± 0.0772	38.290 ± 0.1048	9.5410	< 0.05	56
37.95-41.90	40	40	35.116 ± 0.2468	33.462 ± 0.2311	4.8923	< 0.05	78
41.90-50.00	34	40	37.934 ± 0.3281	36.074 ± 0.2945	4.2184	< 0.05	69

Result & Discussion

In the present study the haematocrit value in male *Cirrhinamrigala* in different weight group viz., 100-300gm, 300-500gm, 500-700gm, 700-900gm, 900-1500gm were found to be 34.288 ± 0.1212 , 37.618 ± 0.1597 , 39.532 ± 0.0722 , 35.116 ± 0.2468 , 37.934 ± 0.3281 respectively (Table-1).

The haematocrit value in female *Cirrhinamrigala* in different weight group viz, 100-300gm, 300-500gm, 500-700gm, 700-900gm, 900-1500gm were found to be 32.895 ± 0.378 , 35.687 ± 0.1362 , 38.290 ± 0.1048 , 33.462 ± 0.2311 , 36.074 ± 0.2945 respectively (Table-2).

In male *Cirrhinamrigala* the haematocrit value increased with increasing weight, The haematocrit value increased from mean weight 168.250 ± 9.2896 , $6.19.367 \pm 11.2048$ but decreased in fishes in the mean weight 810.775 ± 8.4895 and again increased in the mean weight 1176.324 ± 27.9150 .

In female *Cirrhinamrigala* the haematocrit value increased with increasing weight, The haematocrit value increased from mean weight 168.61 ± 10.8678 (Table-2) to 600.94 ± 12.1313 (Table-2) but decreased in fishes in the mean weight 809.250 ± 8.6101 and again increased in the mean weight 1167.750 ± 26.0934 .

In male *Cirrhinamrigala* it was observed that fish in the lowest body weight group (100-300) had the lowest values for haematocrit (34.288 ± 0.1212). This increased as the fish weight increased up to a certain level, so that the fish in the weight group (500-700gm) showed the highest haematocrit values (39.532 ± 0.0772) after which further increase in haematocrit values was not observed.

In female *Cirrhinamrigala* it was observed that fish in the lowest body weight group (100-300) had the lowest values for haematocrit (32.895 ± 0.1378). This increased as the fish weight increased up to a certain level, so that the fish in the weight group (500-700gm) showed the highest haematocrit values (38.290 ± 0.1048) after which further increase in haematocrit values was not observed.

In the present study high haematocrit value in the above mentioned weight group of fish was due to high physical activity. This is in agreement with results from other fish species. *Tilapia zilli*, Ezzat et al, (1973) ; *Cyprinus carpio*, Fourie and Hatting (1976);

Cyprinionmacrostomus, Al Mehdi and Khan (1984); Amphiprouscuchi, Banarjee (1986);Barbusxanthoptrus, Hameed et al (1985); Anguilla Anguilla, Johnson et al (1974); Clariusbatrachus, Joshi et al (1977); Sarotheriodonmossambica, chaudhary et al (1986).

Comparative ht value in male and female sex of *Cirrhinamrigala* in Table – 3 clearly showed higher ht value in male as compare to female.

The difference in haematocrit value between the two sexes might be genetically determined and also due to the higher metabolic rates of males compare to female. My finding was as per finding of Fourie and Hatting (1976); Raizada et al (1983); Chaudhary et al. (1986), and Jawed et al (2004).

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