SEX COMPOSITION OBSERVATION OF *LABEO DYOCHEILUS (MCCLELLAND)*FROM WESTERN RAMGANGA RIVER, UTTARAKHAND, INDIA.

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Abstract

The present paper studies the sex ratio of *Labeodyocheilus*froma western Ram Ganga River inKumaun hills state of Uttarakhand in India. The *Labeodyocheilus*is a major carp in this region. The sex ratio of *Labeodyocheilus*,was found to bea significant sex ratio of 1.67male:1.00 female.

Key words:*Labeodyocheilus*, Sex –composition, Kumaun Himalaya, India.

Introduction

Fishes of the genus *Labeo*are distributed in some rivers of the Uttarakhand region. Only5 speciesof *Labeo* (*L.dero,L.bata,L.dyocheilus,L.rohita and L.gonius*) arefound in this area. The Indian carp, *Labeodyocheilus* in the Western Ram Ganga River,is a small to medium size fish. Due to lack of biological information of the fish, this species is not considered as commercially important in the Uttarakhand area. Keeping in mind this commercial importance this study is planned to investigate there sex composition. A prior knowledge of sex composition estimation of fishes is essential in the management practices of fishery science. It is important to derive means of ensuring a proportional fishing of the two sexes. It is generally found that in a healthy population the sex ratio should be 1:1.There are several other factors like temperature, water velocity, vulnerability of females to their predators and other ecological hazards, which possibly change the sex composition in streams or rivers. Several workers have worked on the sex composition and other aspects of different species of fishes (Sobhana and Nair, 1976;Gaigher, 1983;Cambray, 1985;van der Merwe et.al., 1988; van Zyl, et.al., 1995; Gonçalves and Almada 1997; Wely and Booth,1999;Dobriyal et al., 2004; Pawar and Mani, 2006; Bahuguna et.al, 2007,09,10;Ikpi and Okey 2010). The present objective of the study is toprovide detailed information on the population sex composition status of *Labeodyocheilus.*This species is being studied from Kumaun Himalaya.

Materials and Methods

Fish sampling tookplace on three stations (Fig.1). The first sampling station, Chaukhutiya of the western RamGanga River, is located along a coarse, rocky zone with swift water current. The second sampling station,Maasiof the western RamGanga River is located in the rocky zone. Mohanais the third sampling station on the plain zones having swift water current.Monthly samples of *Labeodyocheilus* were collected with the help of local fisherman during the months of November 2008 to October 2010. A total of 160 specimenswere collected (101 males and 59 females). The total length (TL) of each specimen was measured to the nearest 0.1cm, while weight was measured to the nearest 0.1gm. After morphometric measurements, the fishes were preserved in 5% formalin for further study. The total length and weight of each fish was recorded in fresh condition. However, the other parameters were measured within a fortnight of collection. Sex-composition was calculated for the entire period of study and its significance

was tested by Chi-square test (χ^2). $\chi^2 = (O - E^2) / E$, where χ^2 is the chi-square, O is the observed value and E is the expected value.

Results

Monthly sex composition was observed and maximum values were found in the month of August (2.671male:1.00female) and minimum ratio was found in the month of March, October (1.33male:1.0female) and December (1.0male:1.33female).The monthly variations in the sex-composition of*Labeodyocheilus* is presented in the table 1. The minimum length of the fish was12.5cm and maximum length 36.7cm respectively. The seasonal and pooled data showed variations in the sex composition of*Labeodyocheilus,*isgiven in the table 2. The seasonal sex composition observations indicated variations which was maximum in monsoon season (2.64♂:1.00♀) and minimum in autumn season (1.0♂:1.0♀). The total pooled data showed average sex composition status 1.71male:1.00female*Labeodyocheilus*during the course of the present study. The estimation of the sex compositionin both male and female showed non-significantly at 5% level of significance in the months andseason.While in the month of May and June there was significant difference observed in the ratio of male and female fish (For May: 2.62male:1.00female; For June:2.67male:1.0female). In the monsoon season (2.64male:1.00female) and overall sex-composition frompooled data (1.71male:1.00female) showed significantly at 5% level of significance.

Discussion

Observation on the sex composition estimation have their own significanceis helpful in detecting differential fishing, in different periods of the year and in the various size-groups. Thus we can get information about the abundance of the sex at a particular time or throughout the year (Chacko and Ganapati, 1949). Holcik et.al, (1988) stated theoretically,that the expected composition of males to females should be 1:1.The overall present study showed 1.71male:1.00female sex composition in *Labeodyocheilus*from the western Ram Ganga River which issignificant.Sobhana and Nair (1976),calculated the sex composition to be 1:2during the course of their study in *Puntiussaranasubnasutus*. The sex-composition of*Labeocylindricus* was found female dominated at 1male:1.63females in the Lake of Chicamba, a hydroelectric dam in central Mozambique, South Africa.(Wely and Booth, 1999).

Rutaisire (2003) studied the sex composition of ninu*Labeovictorianus* from Kagera and Sio River, Uganda.Sex ratios in the months of February (2Male:1.00Female), May(1.84Male:1.00Female) and August (2.67Male:1.00Female) samples from the Kagera River were male dominated, and rest of the year did not deviate significantly. In the Sio River population, there were no male or female biased sex ratios. The significantly higher male sex ratio in February and August in Kagera River suggests that a sex specific upstream migration of males ahead of females prior to spawning occurred. No difference in sex ratio (1.15Male:1.00Female) was observed in Sio River population, which might imply no sex specific upstream migration.

Dobriyalet. al, (2004) found the sex ratio of 1.00male : 1.028 female during their study on *Crossocheiluslatiuslatius* from the river Mandakiniwhich is very close to naturalpopulation ratio. The sex ratio of *Puntiusvittatus was* 1male: 2 female reported by JameelaBeevi and Ramachandran (2005) from Ernakulam district (Kerala). The male: female ratio (1:1.15) in *Cirrihinareba*was calculated by Shendge and Mani (2009).Bahugunaet. al. (2009) reported the sex ratio of 1.29 Male: 1.00 Female during their study in *Bariliusvagra*from river of Mandal. The 1.00 male: 1.24 female sex compositionin *Garralamta*from theKalapani spring fed stream was observed by Bahuguna et. al., (2010).

Ikipi and Okey (2010), estimated the sex ratio of African Carp, *Labeocoubie*, Cross River, Nigeria.The sex ratio of the fish showed highly significant monthly variations from the expected male: female ratio. The pooled observations for the overall sex ratio also varied significantly from the expected ratio P>0.001. A total of 123 males and 205 females were observed. Within the months, males were dominant only in September (1:0.67) and November (1:0.83).Montchowuiet.al., (2010) reported in the fish *Labeosenegalensis*the sex ratio (1:0.96) was not significantly different from unity.

The sex-composition estimation presented in the paper is on the basis of month, season and pooled data.Variation in the male and female fishes is also dependent on its locality and fishing gear. From the present work and on the basis of earlier observation it is concluded that the sex composition of the *Labeodyocheilus*, from almost all the localities male fishes were founddominated. The sex population was observed to be significantly1.71 male: 1.00 female. The chi-square value also showed 3.84 which are significant at 5% level. Allison et.al.,(1999) suggested that the sex ratio divergence might also be explained by partial segregation of ripe forms either through preference school formation, hence rendering one sex more vulnerable to capture. Although the preponderance of males have also been reported for some other fish species such as*Parailiapellucida*(Allison et.al.,2008).

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Table 1: Monthly variations in the sex composition of *Labeodyocheilus*during November 2008 to October 2010.

Month	Total No. of fish	No. of Male	No. of Female	% of Male	% of Female	Ratio		χ^2	Remark
						M	F		
Nov	12	08	04	66.67	33.33	2.00	1.00	1.333	NS
Dec	11	07	04	63.64	36.36	1.75	1.00	0.818	NS
Jan	07	04	03	57.14	42.86	1.33	1.00	0.142	NS
Feb	08	05	03	62.50	37.50	1.67	1.00	0.500	NS
Mar	10	06	04	60.00	40.00	1.50	1.00	0.400	NS
Apr	23	16	07	69.56	30.40	2.28	1.00	3.521	NS
May	29	21	08	72.41	27.59	2.62	1.00	5.827	S*
Jun	22	16	06	72.73	27.27	2.67	1.00	4.545	S*
Jul	09	05	04	55.56	44.44	1.25	1.00	0.111	NS
Aug	07	04	03	57.14	42.86	1.33	1.00	0.142	NS
Sep	08	03	05	37.50	62.50	1.00	1.67	0.500	NS
Oct	14	06	08	42.86	57.14	1.00	1.33	0.285	NS

χ^2= Values are not significant at either level (d.f.1.on p= 0.05 in 3.84); M=Male, F=Female, S*=Significant, NS= Non significant

Table 2: Season and Pooled data wise variations in the sex composition of *Labeodyocheilus* during November 2008 to October 2010.

Season	Total No.of fish	No. of Male	No. of Female	% of Male	% of Female	Ratio		χ^2	Remark
						M	F		
Winter (Dec-Feb)	37	21	16	56.76	43.24	1.31	1.00	0.676	NS
Spring (May-Apr)	15	09	06	60.00	40.00	1.50	1.00	0.600	NS
Summer (May-Jun)	33	22	11	66.66	33.33	2.00	1.00	3.667	NS
Monsoon (Jul-Aug)	51	37	14	72.55	27.45	2.64	1.00	10.372	S*
Autumn (Sep-Nov)	24	12	12	50.00	50.00	1.00	1.00	0.000	NS
Pooled Data	160	101	59	63.12	36.88	1.71	1.00	11.025	S*

χ^2= Values are not significant at either level (d.f.1.on p= 0.05 in 3.84); M=Male, F=Female, S*= Significant, NS= Non significant.

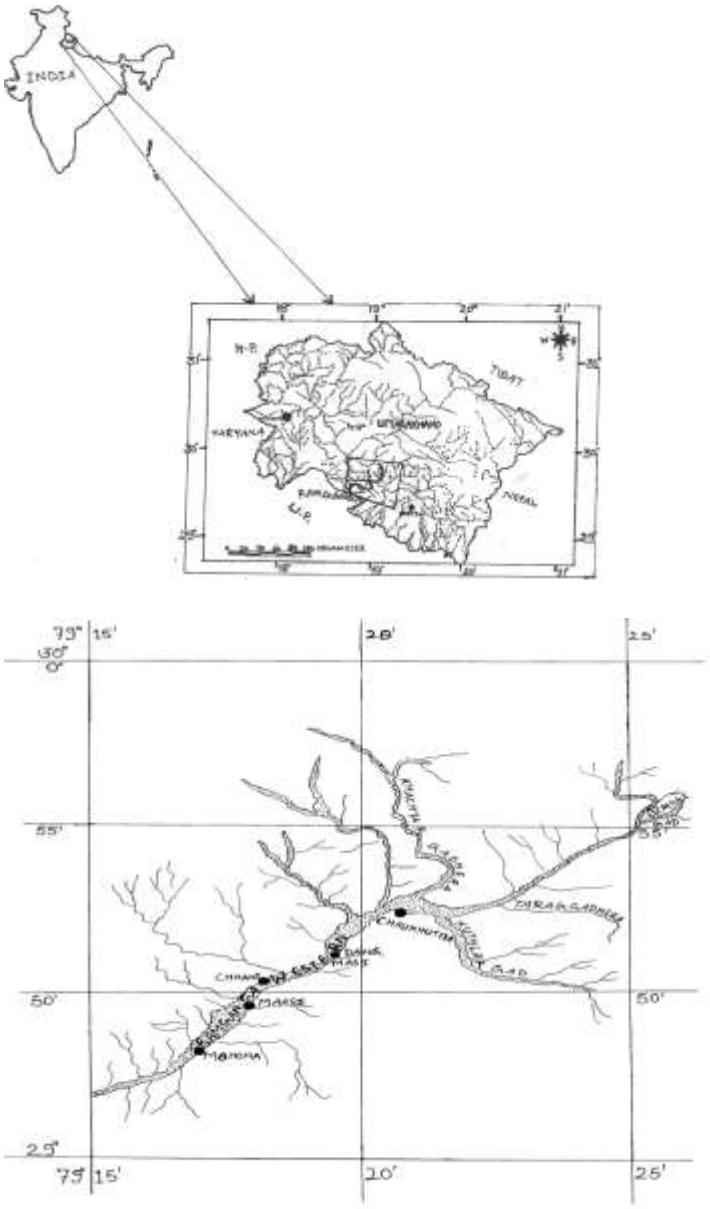

Fig.1: Location map of the study area (Western Ram Ganga River System).