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Reproductive Profile of Cyprinus carpio (L. 1758) with Restoration from the Ghaghra River, India

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Abstract

Study was undertaken the period from June 2016 to May 2017 from the Ghaghra river. The sex ratio of male was higher in 101-150 mm, 151-200 mm, 201-250 mm, 501-550 mm, 701-750 mm and 751-800 mm size groups. The sex ratio values were varied from 1:0.50 to 1:1.40. Higher proportion of female was observed in the stock, sex ratio of male and female was 1:1.01.

Keywords: *Reproductive profile, Cyprinus carpio, sex ratio, Ghaghra river*

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1. INTRODUCTION

Cyprinus carpio (Common carp) is a freshwater fish globally distributed [1-5]. It is commercially exploited in the Ganga basin, India [6] but struggle with catfishes [7]. The Ganga river system water quality is most suitable for common carp [8-9] and muscle tissue is safe for human consumption in respect of metal concentration [10]. Common carp are one of the most damaging aquatic invasive species globally [11, 12]. Their feeding disrupts shallowly rooted plants muddying the water and zooplankton [13-15]. It can reduce the growth of aquatic plants and increase the biomass of algae [16, 17]. The nonstop impacts of introduced common carp in the natural ecosystems include stock depletion and even local extinctions of native species [18-21].

The knowledge of sex ratio is considered essential for the management and restoration of the riverine fishery [22, 23]. Sex ratio is an important population feature as it contributes to the rate of recruitment [5, 24]. The sex ratio is influenced by several factors, including mortality, longevity and growth rate, these in turn lead to differences in the catch rate [25]. The aim of this study was to investigate the sex ratio and sex structure of *C. carpio* from the Ghaghra River, India.

2. MATERIAL AND METHODS

Study was undertaken the period from June 2016 to May 2017 from the Ghaghra river. During the course of study 566 specimens of *C. carpio* (282 male and 284 female) were considered for the estimation of sex ratio and sex structure. The female sex (fish) was determined by microscopic examination of the ovary as they show sexual dimorphism only in the breeding season. The numbers of fish samples were segregated on the basis of their sex (male and female) to determine the percentage composition of each sex in different age groups. This helped to understand the distribution of sexes in different age groups. Their ratio (M: F) was computed for each age group.

3. RESULT AND DISCUSSION

The sex ratio of male was higher in 101-150 mm, 151-200 mm, 201-250 mm, 501-550 mm, 701-750 mm and 751-800 mm size groups. The study was indicated that the male proportion was higher in lower and higher size groups. The sex ratio values were varied from 1:0.50 to 1:1.40. In the stock, expected sex ratio of male and female was very close. Higher proportion of female was observed in the stock, sex ratio of male and female was 1:1.01.

In general, the sex ratio of female was dominant in the stock due to female survival [26]. The sex ratio of common carp was recorded 1:0.93 (male female) in Mogan Lake by [27]. [28] reported that the female ratio was dominated in *Labeo calbasu* from the Ghaghra

river. The overall sex ratio is close to 1.0:1.0 in various fish species in the stock, but it may be far from this in particular age and size groups, males usually predominating in the younger groups, because they mature earlier but live less long [29-34]. Water flow and depth of rivers are also responsible for altering the sex ratio especially in maturity stage and breeding season [35].

Table 1. Sex ratio of *Cyprinus carpio* from the Ghaghra river, India

Size groups (mm)	No. of Male	No. of Female	Sex ratio (M:F)
101-150	16	14	1:0.87
151-200	23	19	1:0.83
201-250	24	22	1:0.92
251-300	41	44	1:1.07
301-350	42	44	1:1.05
351-400	38	40	1:1.05
401-450	24	25	1:1.04
451-500	20	22	1:1.1
501-550	17	15	1:0.88
551-600	22	23	1:1.04
601-650	5	7	1:1.40
651-700	4	5	1:1.25
701-750	4	3	1:0.75
751-800	2	1	1:0.50
Stock	282	284	1:1.01

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