

Invader Potential and Population Structure of Non-Native Fish Species, *Cyprinus carpio* with Respect of Climate from the Vindhya Region, India

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Abstract

Cyprinus carpio is a non-native fish species in the India. Studies were undertaken during January 2015 to February 2016 from the Ken river (Vindhyan region), India. 505 fish specimens (247 males and 258 females) were examined of *Cyprinus carpio* for determination of population structure. Age composition ranged from 0+ to 10+ years with powerfully invaded in the river. The 1+ and 2+ age group was most exploited (20.65% each) population in case of male while in case of female 2+ age group was most exploited with 21.70%. After 2+ age group exploitation was decreased with increasing of the age of fishes. Male population was dominated in 0+, 1+ and 3+ age groups compared to female fishes. In stock, female population was more exploited than male. The 9+ and 10+ age groups of fishes were shared very minute proportion.

Keywords: Invader potential; Population structure; Vindhyan region; Ken river; Age group; *Cyprinus carpio*

Introduction

Cyprinus carpio, commonly known as common carp, is a non-native major carp which is widely distributed in the inland waters of India [1]. *C. carpio* has a long history of domestication [2,3]. It is the only fish which has perhaps a globally distribution since the current century [4,5]. It is a hardy fish that is well suited for aquaculture and fast growing fish [6]. It dwells in lower reaches of rivers and shallow confined waters with slow flowing or standing water and soft bottom sediments [7,8]. Common carp are frequently cultured and are of great commercial value as a fish for food, both over their native and introduced range [1,9]. It forms most productive fishery (riverine) in Central India with *Oreochromis niloticus* [10-14]. Their ability to thrive in new water bodies has caused many ecosystem management problems [15-17]. Common carp makes the most acceptable warm-water fish for commercial fish culture [15]. It can be cultivated under tropical condition up to an altitude of 1000 m above sea level. The common carp is cultured alone or along with Indian major carps [2].

The present study was thus undertaken to estimate the invader potential and population structure of *C. carpio* with respect of climate from the Ken river, India. This study will help in formulation the fishery management policies of *C. carpio* and Indian major carp in the Ken river (Vindhyan region).

Materials and Methods

The fish samples were collected during months of January 2015 to February 2016 from the Ken river. The Ken river is a major right bank tributary of the Yamuna river, India. For collection of data, Banda and Chilla fish markets were visited. Fishes were fished by a variety of methods including drag netting, cast netting, gill netting and hook and line. Samples of scales from 505 specimens, total length ranging

between 10.7-76.6 cm were examined for age determination of the fishes.

Total length was measured from the tip of caudal fin to snout of the fish. The key scales were collected from the region just below the dorsal fin (3-4 rows) and above the lateral line and were thoroughly washed in tap water until all extra matter got completely removed and mounted intact in between two glass plates. The ring formation was determined according to the criterion suggested [6,7,18,19]. Almost all the annuli, except the one, appeared as light relatively transparent bands, concentrically arranged around the whole of the anterior sculptured part of the scales. The recording of age was done with the help of scales collected. Number of fishes in each age group was converted into percentage to obtain population structure.

Results and Discussion

Age composition varied from 0+ to 10+ years from the Ken river, India. Ecological condition of the Ken river is very disturbed due to sand mining. Poor water quality of the river also helpful for powerfully invaded *C. carpio* in the river. Population structure was determined with the help of males and females. The 505 fish specimens (247 males and 258 females) were examined of *C. carpio* for determination of population structure.

The 2+ age group was most exploited population and this age group more attracted to fishermen for exploitation. The 2+ age group also had good price value for these region consumers. After 2+ age group exploitation was decreased with increase of the age of fishes. Male population was dominated in 0+, 1+ and 3+ age groups compared to female from the Ken river (Table 1). In stock, female population was more exploited than male. The 9+ and 10+ age groups of fishes were shared very minute proportion.

The 11+ age group of *C. carpio* was recorded from the Ganga river with small proportion of higher age group in the stock [7]. The poor water quality of the Ken river is most suitable for *C. carpio* at Banda and Chilla sites.

Age classes	Male	Percentage	Female	Percentage
0+	29	11.74	27	10.46
1+	51	20.65	49	18.99
2+	51	20.65	56	21.70
3+	44	17.81	44	17.05
4+	26	10.53	29	11.24
5+	16	6.48	17	6.58
6+	11	4.45	12	4.65
7+	08	3.24	10	3.87
8+	06	2.43	07	2.71
9+	03	1.21	04	1.55
10+	02	0.81	03	1.16
Stock	247	-	258	-

Table 1: Population structure of *Cyprinus carpio* from the Ken river, India.

The DO level was recorded in the Ken River below 6 mg/l throughout year. The Indian riverine sector (especially central India) presently dense by *C. carpio* due to poor water quality [1]. Population structure of the large size fishes are mostly varying from habitat to habitat and region to region [20].

It may be concluded that the *C. carpio* well stable from the Yamuna river. The age group 2+ is most dominated in the river.

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