A Study on the Piscifauna of Gandhisagar Reservoir with Particular Reference to the Abundance of Commercial Varieties of Fish*

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A study of the piscifauna of Gandhisagar reservoir, Chambal river, Madhya Pradesh, during 1985-86, has revealed the presence of 41 fish species belonging to 5 orders, 14 families and 28 genera. Commercially important species were *Catla catla, Labeo rohita, Cirrhinus mrigala,* followed by *Labeo calbasu, Aorichthys aor, A. seenghala, Wallago attu, Ompok bimaculatus* and *Silonia silondia.* Relative dominance of exotic species, *Catla catla* and *Labeo rohita,* in the landings contributing nearly 98% (1985-86) has confirmed that these species have successfully established themselves in the ecosystem of Gandhisagar. Comparison with the results of preimpoundment surveys has indicated a reduction in the species diversity, with the establishment of reservoir.

The impoundment on rivers brings about an ecological transformation from riverine to lacustrine habitat with accompanying changes in the physical, chemical and biological factors (Anon, 1976). Results of a postimpoundment faunistic survey conducted to study the diversity of fish species in Gandhisagar reservoir(GSR) Chambal river, Madhya Pradesh with particular reference to the abundance of commercial varities of fish is reported in this paper. A similar study was carried out in Idukki reservoir in Kerala by Gopinath & Jayakrishnan (1984) on changes in species diversity after the reservoir came in to existence

Materials and Methods

Kartha & Rao (1987) and Rao *et al.* (1988) have given details of topography and morphometric features of Gandhisagar reservoir. The materials for the present study were obtained from the collection sites as per details given in Table 1. Besides this, the fish from major landing centres like Gandhisagar, Rampura, Sanjit, Basai, Chandwasa and Kohala and the fish arriving in local markets were also examined. Soon after collection, the fishes were cleaned and preserved in 4% formaldehyde and glycerine, for identification. The general classification adopted in the study is that followed by Day (1958) and Jhingran (1982).

Table 1. *List of major fish collection sites at Gandhisagar reservoir*

Sl. No.	Name of Area	Type of fishing	Depth range, m
1.	Nanor	Bottom trawling	5-15
2.	Ansar	"	5-10
3.	Karanpura	"	30-40
4.	Chourasigarh	"	20-30
5.	Modi	Midwater trawling	25-30
6.	Rupniya	Bottom trawling	5-10
7.	Dhabla	"	10-20
8.	Nimod	Midwater trawling	20-25
9.	Jullod	Bottom trawling	5-15
10.	Shikarow	Gill netting	10-20
11.	Malasary	"	5-10

300 wooden boats (Bengal type "dinghies") of size 4.88 m length and 0.75 m width were in operation in Gandhisagar reservoir. The motorised boats consisted of four boats of size 6.00 - 7.60 m OAL and

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seven boats of 9.20 m OAL fitted with 24-27 hp inboard diesel engines. These powered boats were used as collecting vessels for quick transportation of fish catch from the fishing ground to the landing centre.

The main fishing gear used in this reservoir is gill nets of mesh size ranging from 25-225 mm bar. Each gill net unit has 3.0 m length and 3.0 m depth and at a time an average of 20 nets are operated by each boat. Nylon twines of 210d/1/3, 210d/2/3 and 210d/3/3 are used for the main webbing which is hung to the head rope and foot rope (nylon 210 d/6/3) at a hanging coefficient of 0.5. Generally large meshed nets of 100-225 mm bar are used for the capture of large sized catla and mahaseer during winter months and small meshed nets of 25-100 mm bar during summer for the large scale harvesting of mrigal, rohu, calbasu, cat fishes and other commercial and non-commercial varieties. Other fishing gears in use are cast nets and hand lines.

Madhya Pradesh State Fisheries Development Corporation, Gandhisagar, is the only agency engaged in the exploitation of fishery resources from the reservoir. The data on fish landings recorded by them were used for estimation of annual landings of 1984-85 and 1985-86.

Table 2 *List of freshwater fish species collected from Gandhisagar reservoir*

Order *CYPRINIFORMES*
Family CYPRINIDAE
Subfamily Cyprininae
Catla catla (Hamilton-Buchanan)
Cirrhinus mrigala (Hamilton-Buchanan)
Cirrhinus reba (Hamilton-Buchanan)
Labeo rohita (Hamilton-Buchanan)
Labeo calbasu (Hamilton-Buchanan)
Labeo gonius (Hamilton-Buchanan)
Labeo boggut (Hamilton-Buchanan)
Labeo beta (Hamilton-Buchanan)
Crossocheilus latius (Hamilton-Buchanan)
Garra gotyla (Gray)
Puntius sarana (Hamilton-Buchanan)
Puntius guganio (Hamilton-Buchanan)
Osteobrama cotio (Hamilton-Buchanan)
Salmostoma bacaila (Hamilton-Buchanan)
Salmostoma clupeoides (Bloch)
Subfamily Rasborinae
Barilius barila (Hamilton-Buchanan)
Barilius bendelisis (Hamilton-Buchanan)
Barilius bola (Hamilton-Buchanan)
Danio devario (Hamilton-Buchanan)
Rasbora daniconius (Hamilton-Buchanan)
Subfamily Schizothoracinae
Tor tor (Hamilton-Buchanan)
Family COBITIIDAE
Nemacheilus botia (Hamilton-Buchanan)
Order *PERCIFORMES*
Family CENTROPOMIDAE
Chanda nama (Hamilton-Buchanan)
Chanda ranga (Hamilton-Buchanan)
Family CHANNIDAE
Channa marulius (Hamilton-Buchanan)
Channa striatus (Bloch)
Channa punctatus (Bloch)
Family MUGILIDAE
Mugil corsula (Hamilton-Buchanan)
Family MASTACEMBELIDAE
Mastacembelus armatus (Lacepede)
Family NANDIDAE
Nandus nandus (Hamilton-Buchanan)
Family GOBIINAE
Glossogobius giuris (Hamilton-Buchanan)
Order *ATHERINIFORMES*
Family BELONIDAE
Xenentodon cancila (Hamilton-Buchanan)
Order *SILURIFORMES*
Family SILURIDAE
Ompok bimaculatus (Bloch)
Wallago attu (Schneider)
Family BAGRIDAE
Aorichthys seenghala (Sykes)
Aorichthys aor (Hamilton-Buchanan)
Rita rita (Hamilton-Buchanan)
Family SISORIDAE
Bagarius bagarius (Hamilton-Buchanan)
Family SCHILBEIDAE
Eutropiicthys vacha (Hamilton-Buchanan)
Silonia silondia (Hamilton-Buchanan)
Order *OSTEOGLOSSIFORMES*
Family NOTOPTERIDAE
Notopterus notopterus (Pallas)

Results and Discussions

The fish species collected and identified from the collection sites, landing centres and other sources during post-impoundment survey are presented in Table 2. 41 species belonging to 5 orders, 14 families and 28 genera were present in Gandhisagar reservoir. This differs from the preimpoundment survey of Dubey & Mehra (1959) in which 54 species were reported from Chambal river. Dubey & Chatterjee (1977) and Choudhary (1977) have reported 39 species of fishes. It can be seen that during the transformation from lotic to lacustrine environment the species diversity has decreased and 15 species of fish recorded in the preimpoundment survey could not be seen during the present study in Gandhisagar reservoir. The dominant fishery of exotic species, *Catla catla* and *Labeo rohita* found in the present study was not reported during the preimpoundment surveys. About 5.5% of 742 species of freshwater fishes including exotic species reported from India (Jayaram, 1981), is available in GSR.

Table 3. *Details of fish landings from Gandhisagar reservoir during 1984-85 and 1985-86*

Name of fish	1984-85		1985-86	
	Catch Kg	Per-cent-age	Catch Kg	Per-cent-age
Major Carps				
Catla catla	1451393	58.67	1035308	77.12
Cirrhinus mrigala	548602	22.18	27007	2.01
Labeo rohita	424023	17.14	279674	20.83
Sub total	2424018	97.99	1341989	99.96
Local Major				
Labeo calbasu	11212		150	
Aorichthys aor	10340		22	
Aorichthys seenghala	8215		34	
Wallago attu	5375		45	
Ompok bimaculatus	4127		65	
Silonia silondia	8540		50	
Sub total	47809	1.93	366	0.03
Local minor				
Labeo gonius	1214		26	
Labeo bata	130		24	
Labeo boggut	460		12	
Cirrhinus reba	234		38	
Sub total	2038	0.08	100	0.01

The species-wise annual commercial landings of GSR during 1984-85 and 1985-86 is given in Table 3. The main fishery of this reservoir is constituted by 9 species which are grouped according to their economic importance into three major categories. These are major carps (*Catla catla, Cirrhinus mrigala* and *Labeo rohita*) and local major (*Tor tor, Labeo calbasu, Wallago attu, Silonia silondia, Aorichthys seenghala, Aorichthys aor, Ompok bimaculatus*). The other non-commercial varieties are grouped under local minor (*Labeo gonius, Labeo bata, Labeo boggut, Cirrhinus reba*). The percentage composition of total landings constitute an important aspect of the reservoir fishery as it reflects on the trend of fishery. *Catla catla* contributed 58.67% of the landings in 1984-85 and this has increased upto 77.12% in 1985-86. The percentage contribution of *Labeo rohita* has increased from 17.14% in 1984-85 to 20.83% in 1985-86. *Cirrhinus mrigala* contributed 55% and 29.30% respectively of the total landings during 1963-64 and 1964-65 (Choudhary, 1977). It formed 22.18% of the total landings in 1984- 85 and in 1985-86 its percentage contribution drastically reduced to 2.01%.

Catla catla and *Labeo rohita* were nonexistent in GSR and they appeared in the commercial landings in 1964-65 after five years of stocking, contributing 2-3% and 0.26% respectively (Dubey & Chatterjee,

1977). Choudhary (1977) reported that the percentage of catla grew very rapidly and reached upto 77% where as rohu has not made any impact on the catch composition, not exceeding 2% of the catch in any year, and could not thrive well in GSR inspite of regular stocking of the species. In the present study the percentage contribution of rohu has been significant (>17%) during both the years. The relative abundance of exotic species like catla and rohu in GSR, compared to endemic species indicated that the introduced species have accomodated themselves succussfully in the GSR ecosystem.

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