E-ISSN: 2347-5129
P-ISSN: 2394-0506
(ICV-Poland) Impact Value: 5.62
(GIF) Impact Factor: 0.549
IJFAS 2017; 5(2): 416-419

www.fisheriesjournal.com
Received: 25-01-2017
Accepted: 26-02-2017

A Gunasekar
P.G. and Research Department of Zoology, St. John's College, Palayamkottai, Tamil Nadu, India

S Suthakar Isaac
P.G. and Research Department of Zoology, St. John's College, Palayamkottai, Tamil Nadu, India

Correspondence
A Gunasekar
P.G. and Research Department of Zoology, St. John's College, Palayamkottai, Tamil Nadu, India

The Biodiversity of fish fauna in Indrapuri Dam Rohtas district, Bihar (India)

A Gunasekar and S Suthakar Isaac

Abstract
Biodiversity specifies the potential of any aquatic system and also represents its trophic status. It is very much necessary to have a sufficient knowledge of the constituent biota especially for the purpose of conservation and management of the inland water resources such as rivers, reservoirs and ponds. The present study deals with the diversity of fish fauna found in Indrapuri Dam of district Rohtas. The diversity of fish fauna has never been studied in the Indrapuri dam of district Rohtas. In this study, the diversity of freshwater fishes of Indrapuri Dam was studied and assessed from August, 2015 to January, 2016.The aim of the paper was to assess the variety and abundance of the important fish fauna inhabiting in this region. We documented and described 25 freshwater fish species of Indrapuri dam that were belonging to the 5 orders and 12 families and 21 genera. Among them, three species were belonging to the family Bagridae, five species were belonging to Schilbeidae, two species were belonging to Siluridae and Cichlidae, six species were belonging to Cyprinidae while the remaining other families i.e., Clariidae, Erethistidae, Heteropneustidae, Pangasiidae, Mastacembelidae, Channidae and Notopteridae were represented by only single species. To save fish diversity and to develop a sustainable fishery practices, proper documentation, leading to diversity information system is an urgent need. The paper also describes the species composition with their relative contributions and a few important findings that may help to better understand the current scenario of ichthyofaunal diversity. Hence, the results of our present study would deliver useful information about the diversity of fish fauna of Indrapuri dam that could be useful later treasured in the systematic, fisheries management and conservation.

Keywords: Aquatic system, Icthyofaunal diversity, Indrapuri dam, conservation

1. Introduction
Indrapuri dam is located at Indrapuri (Latitude: 24°50'3.48" Longitude: 84°8'13.2") in the district Rohtas, Bihar. This dam is also called Sone barrage and it is the fourth longest (1,407 metres) barrage in the world. The storage dam maximum height 147.44 ft and designed as an earth dam. The main resource of water in Indrapuri dam mainly depends on rain fall.
A fish is defined as any member of paraphyletic group of organism that consists of all gill-bearing aquatic animals. They are the keystone species which control the distribution as well as richness of other organisms in the ecosystems. They are good indicators of the water quality and health of the ecosystem [1]. Our country India is sanctified with a very rich and diverse natural water resource in the form of rivers, streams, estuaries, backwaters etc. The country is also gifted with a rich fish genetic biodiversity with approximately 2, 200 fish species and ranks 9th in term of freshwater mega biodiversity [2]. A significant portion of the freshwater fish production in India is still based on the harvest from wild population [3]. About 21,730 species of fishes have been recorded in the world so for listed of which, about 11.7% are found in Indian waters [4]. Valid scientific descriptions exist for about 24,600 living species of fishes 482 families and 57 orders [5]. Systematically, the first assessment which categorized of 46 freshwater fish species as threatened in India [6]. In the second assessment, 320 freshwater fishes were included and 43 freshwater fish species were categorized as critically endangered, 90 as endangered and 81 as vulnerable [7]. Meanwhile, a recent assessment for central India (Madhya Pradesh, Chattisgarh and Rajasthan) reported 168 fish species, of which, 41 species (24.40%) were placed as threatened [8]. Generally freshwater fishes are a poorly studied group. There is no proper documentation and most of the information available is from a few well-studied locations only. Hence there is a fundamental need for taxonomists to describe unknown species in the study of biodiversity especially in these species-rich areas.

Rohtas district of Indrapuri region has not been extensively surveyed for fish diversity. The fish diversity is not only the wealth of the district Rohtas but it also has serious implications in fisheries. The review of literature indicates that very limited information is available. Studies of available literature show that no attempted has been made to document the fish diversity along with their habitat, in this region. Therefore, In the present study, a detailed survey was conducted in the Indrapuri Dam, Rohtas Dist., Bihar to ascertain the present scenario of fish diversity within the dam.

2. Materials and Methods

2.1 Fish samples collection

Fish samples were collected randomly from the different regions of Indrapuri dam (Latitude: 24°50'12.84"N, Longitude: 84°8'3.84"E) i.e., middle, northern and southern banks, eastern and western bank by using small meshed cast nets, scoop nets and hooks. Samples were collected August, 2015 to January, 2016 in the study area. After collection, all samples were preserved in ice and later transferred into the laboratory. In the laboratory, the specimens were preserved in 10% with maximum care to avoid disgorgement or defecation of fishes due to stress during immediate transfer to formalin. Identification of fishes was done on the basis of Morphometric characters, Descriptive characters and Fin formula. Morphometric characters includes Total length of the body standard, Length of the body, Length and depth of the head, Position and diameter of the eye, Length of snout, Maximum and minimum girth, Length of Pre dorsal fin, Pre pectoral fin, Pre anal fin and Pre caudal fin. Descriptive Characters includes Profile and Shape of the body, Skin texture and coloration, Position and shape of the mouth, lips and snout, Barbels and jaws, Scales and lateral line system, Origin, shape, size and type of median, paired and caudal fins, Fin rays and fin formula, Tail and special marking. Fishes are classified and arranged based on the work of Mirza (1990) [9], Mirza and Sandhu, (2007) [10] and Jayaram (1999) [11], Talwar and Jhingran (1999-1981). Then each sample was placed in a separate labelled plastic jar and preserved in 10% formalin solution for long term preservation. A field kit, containing measuring tape, rope, buckets, preservative, enamel trays, digital camera, etc. was prepared for regular use. A boat was engaged and the station was visited in the sequence, which was carefully followed throughout the investigation period.

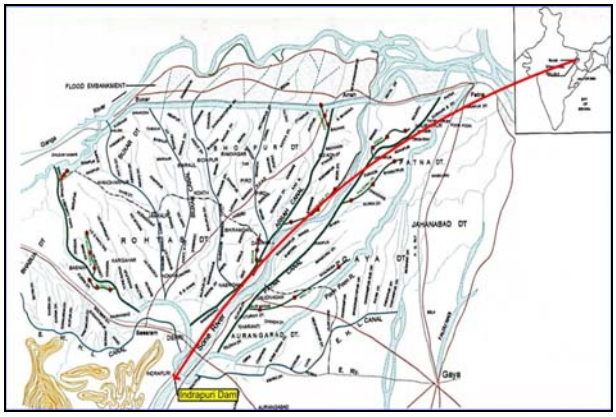

Fig I: Map shows Indrapuri dam location in District Rohtas.

3. Results and Discussion

The present study was carried out to dermine the current status of freshwater fish biodiversity found in Indrapuri dam of Rohtas district in Bihar. We have reported 25 freshwater fish species in Indrapuri dam. During the survey of Indrapuri dam, the diversity of fishes comprised of 21 genera and 25 species belonging to 12 different families viz., Bagridae, Schilbeidae, Siluridae, Cichlidae, Cyprinidae, Clariidae, Erethistidae, Heteropneustidae, Pangasiidae, Mastacembelidae, Channidae, Notopteridae of 5 orders (Table 1 & 2). Similarly Sakhare (2001) [13] has reported 23 species from Jawalgaon reservoir Solapur district in Maharashtra. Battul *et al*. (2007) [14] have reported 18 species from Ekruckh lake Solapur district in Maharashtra, Khedkar and Gynanath (2005) [15] has reported 37 species from Issapur dam district in Maharashtra. Ubarhande *et al*. (2011) [16] have found 27 species from Ambadi dam district of Aurangabad in Maharashtra (India).

Table 1: Systematic list of fishes of Indrapuri dam in district Rohtas, Bihar

Class	Order	Family	S.No.	Name of Fish	Englsih Name	Local Name
ACTINOPTERYGII	Siluriformes	Bagridae	1.	*Mystus bleekeri*	Day's mystus	Tengara
			2.	*Mystus tengara*	Tengara mystus	Singora
			3.	*Rita rita*	Rita	Ritha
		Clariidae	4.	*Clarias batrachus*	Cat fish	Mangur
		Erethistidae	5.	*Hara jerdoni*	Sylhet hara	Sylhet hara
		Heteropneustidae	6.	*Heteropneustes fossilis*	Stinging catfish	Singhil
		Pangasiidae	7.	*Pangasius pangasius*	Pungas	Pariasi
		Schilbeidae	8.	*Ailia colia*	Gangetic ailia	Batasi
			9.	*Clupisoma garua*	Guarchcha	Garua bachcha
			10.	*Clupisoma montana*	Kocha garua	Kocha garua
			11.	*Eutropiichthys vacha*	Batchwa Bacha	Bachawa
			12.	*Silonia silondia*	Silondia vacha	Silondbacha
		Siluridae	13.	*Ompok bimaculatus*	Butter cat fish	Chechera
			14.	*Wallago attu*	Boal	Boyari
	Synbranchiformes	Mastacembelidae	15.	Mastacemelus *pancalus*	Dwarf gourami	Gongi
	Perciformes	Channidae	16.	*Channa punctatus*	Great Snakehead	Garae
		Cichlidae	17.	*Oreochromis mossambicus*	Tilapia	Kala Tilapia
			18.	*Oreochromis niloticus*	Tilapia	Gora Tilapia
		Cyprinidae	19.	*Amblypharyngodon microlepis*	Indian carplet	Potia

	Cypriniformes		20.	*Chagunius chagunio*	Chaguni	Puti
			21.	*Esomus danricus*	Flying barb	Dendu
			22.	*Labeo angra*	Angra labeo	Kharsa
			23.	*Labeo bata*	Bata labeo	Rohili
			24.	*Megarasbora elanga*	Bengala barb	Bhagna
	Osteoglossiformes	Notopteridae	25.	*Notopterus notopterus*	Feather back	Moh

Table 2: Fish fauna diversity of Indrapuri dam.

S. No.	Order	Families	Genera	Species
1	Siluriformes	7	12	14
2	Synbranchiformes	1	1	1
3	Perciformes	2	2	3
4	Cypriniformes	1	5	6
5	Osteoglossiformes	1	1	1
Total	5	12	21	25

Percentage Contribution of Family, Genera and Species under 5 orders is given in the Table 3. As far as the genera and families to different orders are concerned, order Siluriformes consists of 12 genera under 7 families, Cypriniformes of 5 genera under 1 families, Perciformes of 2 genera under 2 families, Synbranchiformes, Osteoglossiformes of single genus under single family each (Graph 1 and Graph 2).

Order Siluriformes has been found to be a major order with 14 species and percent contribution of 56% (Graph 3). The fourteen species of Siluriformes include *Mystus bleekeri, Mystus tengara, Rita rita, Clarias batrachus, Hara jerdoni, Heteropneustes fossilis, Pangasius pangasius, Ailia colia, Clupisoma garua, Clupisoma montana, Eutropiichthys vacha, Silonia silondia, Ompok bimaculatus* and *Wallago attu*. Cypriniformes with 6 species an percent contribution of 24%. The six species of Cypriniformes include *Amblypharyngodon microlepis, Chagunius chagunio, Esomus danricus, Labeo angra, Labeo bata* and *Megarasbora elanga*. Followed by Perciformes with 3 species and percent contribution of 12%, The three species of Perciformes include *Channa punctatus, Oreochromis mossambicus, Oreochromis niloticus* and Synbranchiformes, Osteoglossiformes with 1 species and percent contribution of 4% which include *Mastacemelus pancalus, Notopterus notopterus* respectively.

Table 3: Persentage contributuion of Number of Families, Genera and Species under various orders.

S. No.	Order	Families (%)	Genera (%)	Species (%)
1	Siluriformes	58.33	57.14	56
2	Synbranchiformes	8.33	4.76	4
3	Perciformes	16.67	9.52	12
4	Cypriniformes	8.33	23.81	24
5	Osteoglossiformes	8.33	4.76	4
Total	5	99.99	99.99	100

Thus, the result of the present study revealed that the large number of species in Indrapuri dam were belong to the Siluriformes and Cypriniformes which the fish species composition belongs to the other i.e., Sybranchiformes, Perciformes and Osteoglossiformes was found to be least. Hence, the members of the family Schilbeidae and Cyprinidae were found to be highly abundant in Indrapuri dam of Rohtas district. Such wide-ranging distribution might be associated to substrate of the dam that could afford appropriate habitat for nest building or geological and glacial history of study area.

Climatic factor such as droughts could also affect on the distribution of cyprinid fishes as described by Lachner and Jenkins (1971) [17].

According to Araoye (2009) [18], some other physical factors such as temperature, floods during the rainy season, change in water level of dam, size of dam and feeding habits of fish could also impact largely the species composition and their distribution. However, the temperature is the major factor that could influence directly or indirectly on the species composition, as it can easily produced changes in some other parameters such as transparency, viscosity, dissolved oxygen and other gases, pH, total dissolve solids and conductivity, as all of these are constituting very important limnological parameters that provide the basis for fisheries and water resources management. Thus, the abundance Schilbeidae and Cyprinid species throughout the study period was indicating that the habitats and environmental condition of Indrapuri dam of Rohtas district was more suitable for the growth of these Schilbeidae and Cyprinid species. Hence, like many other fishes, Schilbeidae and Cyprinid fishes have more ability to adapt themselves according to the changing in the environmental conditions in which they lived.

According to Rafique and Khan (2012) [19] and Sarkar *et al.* (2012) [20], significant debility in distribution of some fish species might be as result of pollution, habitat loss, changes in environmental conditions, illegal fishing, water abstraction, siltation and invasion of exotic species, eutrophication, overexploitation and overharvesting as food fish, ornamental trade and as sport also. A rapid decline in the population of species might be expected due to its hybridisation with closely related and rapidly spreading newly introduces species. All these factors can cause substantial declines in inland fish species. As a result, the distributional ranges of some species have shrunk tremendously over the last decades and restricted only to localised areas.

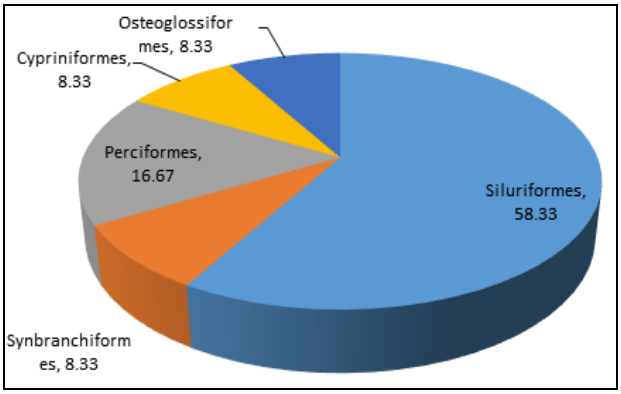

Fig 2: Showing percent contribution of families to the order

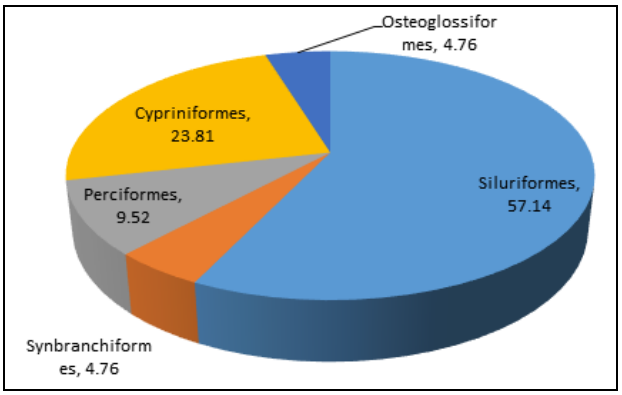

Fig 3: Showing percent contribution of genera to the order

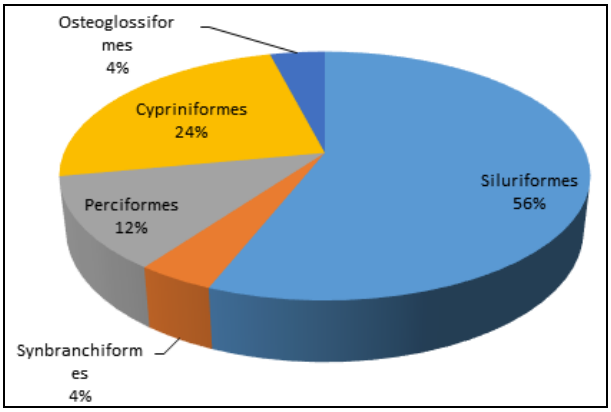

Fig 4: Showing percent contribution of Species to the order

4. Conclusion

During the period of investigation (August, 2015 to January, 2016) 25 fish species belonging to 12 families and 21 genera were recorded. The results of the present study revealed that, Indrapuri dam being a freshwater resource supports a rich and diversified fish fauna. However, fish diversity of this reservoir is in declining mode due to several anthropogenic threats. Decline of fish population is also marked due to pollution, urbanization, scarcity of food, shelter and habitat destructions and progressive eutrophication of the water body. In order to conserve these valuable resources, a holistic approach, integrating the concept of sustainable development and conservation measures should be adopted. Present study provides a comprehensive data on biodiversity, conservation status of ichthyofauna of this dam.

5. Acknowledgement

We are grateful to God Almighty for the strength, knowledge and wisdom in researching and writing this article. Highly acknowledge the support and help from the Dept of Biology – GEMS English School, Dehri-on-Sone, Bihar. We also thank our, family members, numerous scholars, friends whose names are too numerous to mention here due to space but contributed immensely to the success of this work.

6. References

1. Bijukumar A. Exotic fishes and freshwater fish diversity. Zoos' Print J. 2000; 15(11):363-367.
2. Qureshi TA. Status of Finfish Diversity of Madhya Pradesh. In: Proceeding of the Workshop on Conservation Assessment of Freshwater Fish Diversity for Central India. Eds.: W.S. Lakra and U.K. Sarkar, 2007.
3. Sugunan VV. Fisheries management of small water bodies in seven cuntries in Africa, Asia and Latin America. FAO Fisheries Circular No. 933. Rome FAO. 1997, 149.
4. International Consultation on Biological Diversity (ICBD) (SAARC, Asean and Other Regional Countries), Country Paper: India, Ministry of Environment and Forests, Government of India and United Nations Environment Programme, Bangalore, India. 1994; 3:22-23.
5. Nelson JS. Fishes of the World. Fourth Edition, John Wiley & Sons, Inc. 2006, 1-601.
6. Anonymous. Annual report. National Bureau of Fish Genetic Resources, Lucknow, Uttar Pradesh, India. 1992-1993.
7. CAMP Report of the workshop on Conservation Assessment and Management Plan. Zoos Outreach Organization and National Bureau of Fish Genetic Resources, (NBFGR). 1998, 156.
8. Sarkar UK, Lakra WS. Freshwater Fish Diversity of Central India. Published by NBFGR, Lucknow (U.P.), India. 2007, 1-200.
9. Mirza MR. Pakistan ki Taazapaniki Machlian, (in urdu), urdu Science board. 1990, 31-35.
10. Mirza MR, Sandu AA. Fishes of the Punjab Pakistan, Polymer Publication, Urdu Bazar, Lahore. National Bureau of Fish Genetic Resources (NBFGR), Lucknow (U.P.), India. 2007, 07-18.
11. Jayaram KC. The freshwater fishes of the Indian Region. Narendra Publishing House, Delhi. 1999; 6:551.
12. Talwar PK, Jhingran AG. Inland fishes of India and Adjacent countries. Oxford and IBH Publishing Company Pvt. Ltd. New Delhi, India. 1991; 1(2):541-1158.
13. Sakhare VB. Ichthyofauna of Jawalgoan reservoir. Maharastra, Fishing Chimes. 2001; 19(8):45-47.
14. Battul PN, Rao RA, Navale KR, Bagale MB, Shah NV. Fish Diversity from Ekrukh Lake Near Solapur Maharashtra. J. Aqua. Biol. 2007; 22(2):68-72.
15. Khedkar GD, Gynanath G. Biodi-versity and distribution of the fishes from the back waters of Issapur Reservoir, District Yeotmal of Maharashtra State, India. Trends in Life Sci. (India). 2005; 20(2):117-126.
16. Ubarhande SB, Jagtap JT, Sonawane SR. Ichthyofanal Diversity from Ambadi Dam, Taluka Kannad, District, Aurangabad (M.S.). Recent Res. Sci. Technology. 2011; 3(6):34-37.
17. Ernest Lachner A, Robert Jenkins E. Systematic distribution and Evolution of the Nocomis biguttatus species group (family Cyprinidae: Pisces) with a Description of a new species from the Ozark Upland. Smithson Contrib Zool. 1971; 91:1-27.
18. Araoye PA. Physical factors and their influence on fish species composition in As a Lake, Ilorin, Nigeria. Rev. Biol. Trop. 2009; 57(1-2):167-175.
19. Rafique M, Khan NUH. Distribution and Status of Significant Freshwater Fishes of Pakistan. Rec. Zool. Surv. Pakistan. 2012; 21:90-95.
20. Sarkar UK, Pathak AK, Sinha RK, Sivakumar K, Pandian AK, Pandey A *et al.* Freshwater fish biodiversity in the River Ganga (India): changing pattern, threats and conservation perspectives. Rev Fish Biol Fisher. 2012; 22(1):251-272.