International Journal of Zoology Studies
ISSN: 2455-7269
Impact Factor: RJIF 5.14
www.zoologyjournals.com
Volume 3; Issue 2; March 2018; Page No. 68-73

Studies on fish diversity of Tighra reservoir Gwalior, Madhya Pradesh, India

Haneef Bhat, RJ Rao
Conservation Biology Unit, School of Studies in Zoology, Jiwaji University, Gwalior, Madhya Pradesh, India

Abstract
The fish species identified from the Tighra reservoir resulted into 40 species, belonging to 6 orders, 10 families and 22 genera. The maximum number of 22 fish species belongs to family Cyprinidea with 55% of share, followed by family Channidea and Begridea having 4 species each with 10% share, followed by family Mastacembelidea and Siluridea having 2 species each with 5% share. The family Ambassidea, Belonidea, Clariidea and Heteropneustidea represented by one species each with a share of 2.5%. According to IUCN (2012) out of 40 species of fishes one species is endangered, one is vulnerable, three are near-threatened, one is data deficient and rest species are least concern.

Keywords: IUCN, conservation status, Tighra reservoir

1. Introduction
Fishes constitute half of the total number of vertebrates in the world 21,723 living species of fish out of 39,900 species of vertebrates are so for recorded [1]. They live in almost all conceivable aquatic habitats. At present nearly 22, 00 fish species are known to man of these 40% are inhabitants of fresh and inland waters. Whereas in India it is estimated that about 25, 00 fish species are found within which around 930 species are freshwater fishes. The freshwater fishes are distributed amongst approximately 20 orders, 100 families and 300 genera [2]. Fish diversity of undivided India and various Indian states has been described by Jerdon [3], Dutta and Majumdar [4], Tilak and Hussain [5], Srivastava [6], Venkateswarlu and Rao [7], Johal and Tondon [8], Kaul *et al*. [9], Lipton [10], Dutta and Malhotra [11], Tilak and Baloni [12], Sen [13], Molur and Walker [14], Johal and Rawal [15], Daniels[16], Meshram and Meshram [17], Hiware [18] and Rao [19].

Day [20] described the fishes and their distribution in India including that of Madhya Pradesh. Though, the formal study of fish fauna in Madhya Pradesh starts with the work of D'Abreu [21], Hora [22], Malviya [23], Dubey and Mehra [24], Dwivedi *et al*. [25], Shukla *et al*. [26], Garg *et al*. [27], Chandra *et al*. [28], Mohar [29], Vyas *et al*. [30] and Paunikar *et al*. [31].

Fish fauna of Gwalior division was described by Agarwal and Saksena [32]. Dubey *et al*. [33], Rao *et al*. [34], Saxena and Srivastava [35], Rao [36], Mahor [37] and Uchchariya *et al*. [38]. Therefore the present study deals with the biodiversity of fish their conservation status and conservation measures.

2. Materials and Methods
Tighra reservoir, constructed on the Saank River in the year 1917 near Tighra village in Gwalior district, Madhya Pradesh, has been selected for the study (Fig.1). Geographically, the Tighra reservoir lies on 78^0 01' 24" E longitude and 26^0 12' 59" N latitude. The Reservoir is a deep water pool, surrounded by sloppy lands, Hillocks and rocky outcrops. The deeper part consists of vegetative as well as muddy substratum and is habitat for numerous fish species. Fishes were collected from the reservoir with the help of local fishermen by using different types of nets including gill net, cast net, and dip net etc. Some fishes were identified at the spot and were recorded. The specimen, which could not be identified, were marked, coded and were preserved in 10% formalin and brought to the laboratory for identification. Identification was made after consulting several literatures, such as Jayaram [1], Talwar and Jhingran [39] and Srivastava [6].

Fig 1: Satellite image of Tighra reservoir (www.google.com)

3. Results
During the study a total of 40 species of fishes, belonging to 6 orders, 10 families and 22 genera were recorded (Table 1). The identified fish species include *Catla catla, Cirrhinus mrigala, Cirrhinus reba, Labeo rohita, Labeo calbasu, Labeo gonius, Labeo boggut, Labeo bata, Labeo fimbriatus, Cyprinus carpio, Puntius sarana, Puntius ticto, Puntius chonchonius, Puntius sophore, Puntius amphibious, Tor putitora, Osteobrama cotio, Salmostoma bacaila, Salmostoma clupeoides, Rasbora daniconius, Laubuca laubuca, Amblypharyngodon mola, Parambassis ranga, Channa marulius, Channa striata, Channa punctata, Channa gachua,*

Xenentodon cancila, Mastacembelus armatus, Mastacembelus pancalus, Sperata seenghala, Sperata aor, Mystus bleekeri, Wallago attu, Ompok bimaculatus, Notopterus chitala, Notopterus notopterus, Clarias batrachus and *Heteropneustes fossilis* (Fig. 5-22).

Order Cypriniformes consists of 11 genera (50%) under 1 family (10%),Siluriformes consists of 6 genera (27.27%) under 4 families (40%), Perciformes consist of 2 genera (9.09%) under 2 families (20%), Beloniformes consists of 1 genera (4.55%) under 1 family (10%), Synbranchiformes consists of 1 genera (4.55%) under 1 family (10%) and Osteoglossiformes consists of 1 genera (4.55%) under 1 family (10%) (Fig. 2 and 3).

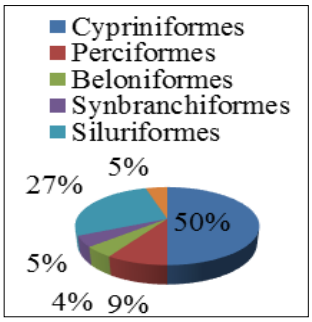

Fig 2: Percent contribution of genera in an order

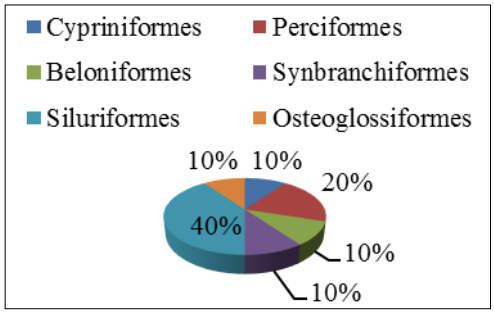

Fig 3: Percent contribution of families in an order

Table 1

Order	Families	Genera	Species	% contribution of families in an order	% contribution of genera in an order
Cypriniformes	1	11	22	10%	50%
Perciformes	2	2	5	20%	9.09%
Beloniformes	1	1	1	10%	4.55%
Synbranchiformes	1	1	2	10%	4.55%
Siluriformes	4	6	8	40%	27.27%
Osteoglossiformes	1	1	2	10%	4.55%

The maximum number of 22 fish species belongs to family Cyprinidea with 55% of share, followed by family Channidea and Begridea having 4 species each with 10% share, followed by family Mastacembelidea and Siluridea having 2 species each with 5% share. The family Ambassidea, Belonidea, Clariidea and Heteropneustidea represented by one species each with a share of 2.5% (Fig. 4).

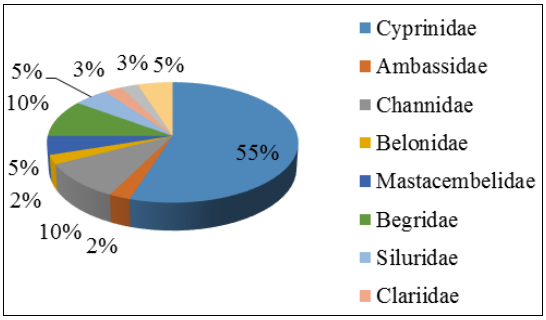

Fig 4: Percent contribution of fish species to different fami

Fig 5: *Mastacembelus armatus*

Fig 6: *Labeo calbasu*

Fig 7: *Sperata seenghala*

Fig 8: *Xenentodon cancila*

Fig 9: *Rasbora daniconius*

Fig 10: *Osteobrama cotio*

Fig 11: *Parambassis ranga*

Fig 12: *Heteropneustes fossilis*

Fig 13: *Puntius amphibious*

Fig 14: *Clarias batrachus*

Fig 15: *Labeo gonius*

Fig 16: *Cirrhinus reba*

Fig 17: *Channa marulius*

Fig18: *Wallago attu*

Fig 19: *Ompok bimaculatus*

Fig 20: *Salmostoma clupeoides*

Fig 21: *Notopterus notopterus*

Fig 22: *Labeo rohita*

4. Conservation status

Conservation status of fishes in the Tighra reservoir of Gwalior have been assessed as per criteria of International Union for Conservation of Nature (IUCN) under five categories as EN (Endangered), VU (Vulnerable), NT (Near-threatened), LC (Least concern) and DD (Data deficient). Among 40 species of fishes one (*Tor putitora*) is endangered, one (*Cyprinus carpio*) is vulnerable, three (*Wallago attu*, *Ompok bimaculatus*, *Notopterus chitala*) are near-threatened, one (*Puntius amphibious*) is data deficient and rest species are least concern (Table 1).

5. Discussion

Quantifying biodiversity is one of the most complicated aspects of biodiversity [40]. In India, 2,246 indigenous fin-fishes have been described of which 765 belongs to freshwater [41]. In and around Gwalior, the interest in fish fauna has been quite old. Dubey and Mehra [24] studied fish fauna of Chambal River and reported 71 species of fishes from the river. In all 48 species belonging to the 9 different orders, 17 families and 34 genera were identified from Gwalior region with maximum contribution is of family Cyprinidae which is up to 45.71% [32]. A total of 71 fish species were recorded from Chambal division with maximum contribution is of family Cyprinidae which is up to 39.58% [33]. Saxena and Shrivastava [35] recorded 46 species of fishes from Kunwari river of Chambal division with maximum contribution of family Cyprinidae which is up to 47.82%. Rao *et al*. [34] reported 41 species from Gandhi Sagar reservoir out of which the family Cyprinidae alone contributed 53.65%. In Gambhir dam, Ujjain, a total of 30 species of fishes were recorded which belonged to 6 orders, 10 families and 17 genera [26]. Garg *et al*. [27] have studied fish and fisheries Ramsagar reservoir, Datia and recorded 42 fish species belonging to 6 orders, 15 families and 28 genera; fish fauna of this reservoir is also dominated by order Cypriniformes with 52.38% contribution. Paunikar *et al*. [31] reported 33 fish species belonging to 5 orders viz., Cypriniformes, Siliriformes, Synbranchiformes, Perciformes and beloniformes with a dominance of fish of order Cypriniformes in Gour River Jabalpur. A total of 60 species of fishes recorded from Betwa River, with Cyprinidae family was also found most dominant with a contribution of 48% followed by Bagridae contributing 10% of the total fish species [30]. Uchchariya *et al*. [38] reported 40 species of fishes belonging to 8 orders, 12 families and 23 genera, from Tighra reservoir out of which the order Cypriniformes was found to be a major order with percent contribution of 55.0%, followed by Siluri-formes with 20.0%, Perciformes with 15.0%, Synbranchiformes with 5.0% and Osteoglossiformes and Beloniformes each with 1.5%. The present study recorded 40 species of fishes from the Tighra Reservior belonging to 6 orders, 10 families and 22 genera, the maximum number of 22 fish species belongs to family Cyprinidea with 55% of share, followed by family Channidea and Begridea having 4 species each with 10% share, followed by family Mastacembelidea and Siluridea having 2 species each with 5% share. The family Ambassidea, Belonidea, Clariidea and Heteropneustidea represented by one species each with a share of 2.5%. Sreekantha *et al*. [42] reported 9 fish species as endangered, 12 species of fish vulnerable, 21 species lower risk near threatened and 1 species as a critically endangered in the region of Western Ghats of India. while (Uchchariya *et al.* [38] reported 2 fish species as endangered, 8 species vulnerable, 22 species lower risk near threatened, 3 species lower risk least concern, 4 species data deficient and 1 species exotic in the Tighra reservoir. Out of 40 species of fishes recorded during present study one species is endangered, one is vulnerable, three are near-threatened, one is data deficient and rest species are least concern.

6. Acknowledgement

I express my profound sense of reverence to my supervisor Prof. R.J. Rao for his constant guidance, support, motivation. I would like to convey my sincere regards to honorable Prof. Sangeeta Shukla. Head, S.O.S. in zoology, Jiwaji University, Gwalior. I also would like to acknowledge Mr. R.C. Sharma., Sub Divisional Officer, Ghatigaon Bustard Sanctuary for providing me necessary facilities and permission to carry out the present study in the Ghatigaon Bustard Sanctuary

Table 2: List of fishes recorded in the Tighra reservoir

S. No.	Order	Family	Local Name	Scientific Name	IUCN Status
1	Cypriniformes	Cyprinidae	Catla	Catla catla	LC
2			Mrigal	Cirrhinus mrigala	LC
3			Naren	Cirrhinus reba	LC
4			Rohu	Labeo rohita	LC
5			Calbasu/ kriya	Labeo calbasu	LC
6			Kursa	Labeo gonius	LC
7			Boga	Labeo boggut	LC
8			Bata	Labeo bata	LC
9			Cut Rohu	Labeo fimbriatus	LC
10			Common carp	Cyprinus carpio	VU
11			Puthia	Puntius sarana	LC
12			Khadia	Puntius ticto	LC
13			Khadia	Puntius chonchonius	LC
14			Khadia	Puntius sophore	LC
15			Khadia	Puntius amphibious	DD
16			Mahasheer	Tor putitora	EN
17			Gudgudi	Osteobrama cotio	LC

18			Chilua	Salmostoma bacaila	LC
19			Silhani	S. clupeoides	LC
20			Zhan zara	Rasbora daniconius	LC
21			Dhawai	Amblypharyngodon mola	LC
22				Laubuca laubuca	LC
23	Perciformes	Ambassidae	Chanda	Parambassis ranga	LC
24		Chanidae	Sol	Channa marulius	LC
25			Sol	Channa gachua	LC
26			Durkasol	Channa striata	LC
27			Gilgonch	Channa punctata	LC
28	Beloniformes	Belonidae	Suja	Xenentodon cancila	LC
29	Synbranchiformes	Mastacembelidae	Baam	Mastacembelus armatus	LC
30			Baam	Mastacembelus pancalus	LC
31	Siluriformes	Bagridae	Singhara	Sperata seenghala	LC
32			Tengra	Sperata aor	LC
33			Kitua	Mystus cavasius	LC
34			Kirua	Mystus bleekeri	LC
35		Siluridae	Lonch	Wallago attu	NT
36			Pauda	Ompok bimaculatus	NT
37		Clariidae	Mangur	Clarias batrachus	LC
38		Heteropneustidae	Singhi	Heteropneustes fossilis	LC
39	Osteoglossiformes	Notopteridae	Chital/ Moy	Notopterus chitala	NT
40			Patola	Notopterus notopterus	LC

LC = Least Concern, NT = Near-threatened, VU = vulnerable, DD = Data Deficient, EN = Endangered

References

1. Jayaram KC. The fresh water fishes of Indian region. Narendra Publishing House Delhi, 557, 1999.
2. Daniels RJR. Project Lifescape 6. Freshwater Fishes: Cat-fishes. Resonance. 2000; 5(4):95-107.
3. Jerdon TC. On the freshwater fishes of southern India. Madras Journal of Literature and Science. 1889; 15:302-346.
4. Dutta AK, Majumdar M. Fauna of Rajasthan, India. Part-7, Fishes. Records of Zoological Survey of India. 1970; 62(1and2):63-100.
5. Tilak R, Hussain A. A checklist of the fishes of Himachal Pradesh. Zoologisher Jharbuch. 1977; 104(5):265-301.
6. Srivastava GJ, Fishes of Uttar Pradesh and Bihar. Vishwavidyalaya Prakashan, Varanasi, 207, 1980.
7. Vankateswarlu Y, Rao KVR. Scientific, Oriyya and common names of commercial fishes of Orissa state. Indian Journal of Zoology. 1980; 21(1-3):135-142.
8. Johal MS. Tandon KK. Fishes of Punjab. Research Bullet in (Science) Punjab University, 1981; 32:143-154.
9. Kaul M, Rishi KK, Shah KL. A preliminary survey of the fish fauna of Haryana. Punjab Fisheries Bulletin. 1982; 6(12):24-27.
10. Lipton AP. Fish fauna of Tripura. Matsya. 1983-84; 9(10):110-118.
11. Dutta SPS, Malhotra YR. An up-to-date check list and key to the identification of fishesof Jammu. University Review. 1984; 2:65-92.
12. Tilak R, Baloni SP. On the fish fauna of Tehri-Gharwal, Uttar Pradesh. Records of Zoological Survey of India. 1984; 81(3/4):255-272.
13. Sen TK. The fish fauna of Assam and neighbouring north-eastern states of India.Records of Zoological Survey of India 64: 216. Molur, S. and Walker, S. (1998). Report of the Conservation Assessment and Management Plan.Workshop on freshwater fishes of India. Zoo Outreach Organisation / CBSG, Coimbatore, India, pp. 156.
14. Molur S, Walker S. Report of the Conservation Assessment and Management Plan.Workshop on freshwater fishes of India. Zoo Outreach Organisation / CBSG, Coimbatore, India, 156, 1998.
15. Johal MS, Rawal YK. Status of Haryana fish diversity and its conservation. Proceedings of National Workshop 'Rational Use of Water Resources for Aquacalture' (eds. S.K. Gargeand K.L. Jain). March, 18-19, 2004. HAU, Hissar, Haryana, 2000, 150-160.
16. Daniels RJR. Endemic fishes of Western Ghats and the Satpura Hypothesis. Current Science, 2001; 81(3):240-244.
17. Meshram CB, Meshram V. Ichthyofauna of some wetlands in and around Amravati, Maharashtra. Journal of Aquatic Biology, 2005; 20(2):77-78.
18. Hiware CJ. Ichthyo-fauna of four Districts of Marathwara region, Maharashtra, India. Zoos' Print Journal. 2006; 21(1):2137-2139.
19. Rao RJ. Biological resources of the Ganga River, India. Hydrobiologia, 2001; 458:159-168.
20. Day F. The Fauna of British India, including Ceylon and Burma. Fishes-London, 1889; 2:509.
21. Abrue DEA. Records of Nagpur museum No. 9, 1925.
22. Hora SL. On a collection of fish from the head waters of the Mahanadi River, Raipur District, Central Province. Records of India Museum, 1940; 42:365-375.
23. Malaviya RB. A list of fishes from Jabalpur India. Proceedings of National Academy of Sciences India. 1961; 31(3):349-354.
24. Dubey GP, Mehra RK. Fish and Fisheries of Chambal River. Proceedings of Ist All India Congress of Zoology, 1962; 1(2):647-665.
25. Dwivedi RK, Khan MA, Singh HP, Singh DN, Tyagi RK. Production dynamics and fisheries development in

Naktara reservoir, Madhya Pradesh, India. Journal of Inland Fisheries Society of India. 1985; 32(2): 81-86.
26. Shukla AN, Pandey A, Shrivastava S. Observations on fish biodiversity variation in Gambhirdam, Ujjain (M.P.), India. Aquaculture. 2003; 4(1):15-21.
27. Garg RK, Rao RJ, Saksena DN. Checklist of fishes of Ramsagar reservoir, Datia district, Madhya Pradesh, India. Zoos' Print Journal. 2007; 22(8):2801-2803.
28. Chandra, Kailash, Sharma RM, Praveen O. A Compendium on the faunal resources of Narmada River Basin in Madhya Pradesh. Records in Zoological Survey of India, Occasiona, 2010; 310: 1-52.
29. Mahor RK. A survey of fish and fisheries of the freshwater reservoir Tighra, Gwalior, Madhya Pradesh. International Referred Research Journal, 2011; 2(25).
30. Vyas V, Damde D, Parashar V. Fish biodiversity of Betwa River in Madhya Pradesh, India with special reference to a sacred ghat. International Journal of Biodiversity and Conservation. 2012; 4(2):71-77.
31. Paunikar S, Tiple A, Jadhav SS, Talmale SS. Studies on Ichthyofaunal diversity of Gour River, Jabalpur, Madhya Pradesh, Central India. World Journal of Fish and Marine Sciences. 2012; 4(4):356-359.
32. Agarwal SS, Saksena DN. Check list of fishes from Gwalior, Madhya Pradesh. Journal of Jiwaji University. 1977; 5(2):164-169
33. Dubey PK, Maheshwari LP, Jain AK. Ichthyo-Geographical Survey of Chambal Division Madhya Pradesh. Journal of Jiwaji University. 1980; 8(2):113-122.
34. Rao KS, Kartha KN, Srivastava S, Pandya SS, Choubey U. Studies on the commercial fisheries and its fluctuations in Gandhi Sagar Reservoir. Proceedings of National Symposium on Past, Present and Future of Bhopal Lake, 1988, 55-65.
35. Saxena R, Shrivastava P. A check list of fish fauna of Kunwari River, North Madhya Pradesh. Journal of Inland Fisheries Society of India. 1989; 21(1):41-45.
36. Rao RJ. Status and conservation of aquatic species diversity in certain water bodies of Madhya Pradesh. Proceedings of Taal 2007: The 12th World Conference, 2008, 416-423.
37. Mohar RK, A Survey of Fish and Fisheries of the freshwater reservoir Tighra, Gwalior, Madhya Pradesh. International Referred Journal, 2011; 2:1-25.
38. Uchchariya DK, Saxena M, Saksena DN. Fish biodiversity of Tighra reservoir of Gwalior, Madhya Pradesh, India. Journal of Fisheries and Aquaculture. 2012; 3(1):37-43.
39. Talwar PK, Jhingran AG, Inland fishes of India and adjacent countries. Vol I and II. Oxford and IBH Publ. Co., New Delhi, India. 1158, 1991.
40. Gaston KJ, Spicer JI. Biodiversity: An Introduction. Oxford: Blackwell Science Ltd, 1998.
41. Lakra WS, Singh AK, Mahanta PC. Fish genetic resources. Narendra publishers, New Delhi, 2009.
42. Sreekantha MD, Chandran S, Mesta DK, Rao GR, Gururaja KV, Ramachandra TV. Fish diversity in relation to landscape and vegetation in central Western Ghats, India. Current Science, 2007, 92, 11.