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Studies on ichthyofaunal diversity of Krishna River in Mahabubnagar district, Telangana, India

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Abstract

The diversity of freshwater fish species of the Krishna River in Mahabubnagar district was studied from January 2012 to December 2014. The study area covered about 250 km from Makthal taluk where the Bhima tributary joins the Krishna River, the state border of Telangana to Kollapur taluk in the district. The survey was mainly focused on Ichthyofaunal diversity. A total of 109 fish species belonging to 7 orders 19 families and 46 genera was recorded during the study. Order Cypriniformes were most dominant group represent by 61 species followed by Siluriformes, Perciformes, Synbranchiformes, Beloniformes, Osteoglossiformes and Anguilliformes. Among the families recorded, Cyprinidae was the most dominant followed by the Bagridae. Results of the present study showed that 59 species common, 31 species scanty and 19 species were found rare in the area. The study also revealed that the river is mostly stressed in nature due to anthropogenic activities and over exploitation of fishes throughout the year. It is suggested that some urgent steps and awareness programmes is needed to educate people about the importance of the Krishna River, its biodiversity and fish productivity in future.

Keywords: Mahabubnagar district, Telangana, Krishna River, Ichthyofaunal diversity, Species.

1. Introduction

The Krishna is one of the longest rivers of India and flows about 1400 km in length. It originates at Mahabaleswar in Maharashtra, flows through the states of Maharashtra, Karnataka, Telangana and Andhra Pradesh and meets the sea in the Bay of Bengal at Hamasaladeevi in Andhra Pradesh. Krishna River is a boon for all these four states and has made possible remarkable agricultural and industrial development. Moreover, it provides food and shelter to a large number of aquatic fauna. In Mahabubnagar, Bheema and Tungabhadra are the two major tributaries joins to the Krishna River at Makthal and Alampur taluks respectively.

Krishna River is most important river as far as Telangana is concerned. Mahabubnagar is the largest district in Telangana state (T.S) in India in terms of the spread, with geographical area of 18,432 sq. km. This district consists of 64 Mandals and 5 Revenue Divisions. The river Krishna enters in to Telangana state in Makthal taluk of Mahabubnagar district. Approximately 300 Km stretch of the river Krishna passes through the district of Mahabubnagar play an important role in ecology and fishery of the district. The Krishna River is one of the most important rivers of Mahabubnagar district of Telangana. The fish diversity of the river is still unexplored and not documented in the district.

India, being a mega-diverse country, harbors many freshwater fish species in the riverine systems. In recent years much interest has developed in the study of the phylogeny and taxonomy of the freshwater fishes in the country. The freshwater fishes are well studied and documented across the country [1]. A lot of information has been accumulated in the field of diversity, density, threats and conservation of freshwater fish fauna of the Krishna river system [2, 3, 4, 5, 6, 7, 8]. Although extensive surveys have been conducted in the Krishna River, most of the studies were concentrated to Western Ghats area. However, data on the fish fauna of Telangana have limitations as of the rivers have not been surveyed extensively and checklists for individual rivers are not available. Therefore, the present work was undertaken to document the fish fauna of the Krishna River in Mahabubnagar district, Telangana (Fig. 1).

2. Materials and Methods

The Krishna River starts from Makthal taluk in the district where the Bhima tributary joins the Krishna (Sangam). The interesting aspect of the river is the several deep pools in its course

with a maximum depth up to 40 feet where water stagnates throughout the year. Locally, these pools are known as “Gundalu” which are ideal for fish congregation and regular fishing for local fisher folk. Extensive field survey were conducted to study the fish diversity of Krishna river of Mahabubnagar district in Telangana and the random sampling was carried out in every month from January 2012 to December 2014. The study area was divided into three stretches for convenience i.e., the upper stretch starts from Makthal to Gadwal, the middle stretch from Gadwal to Alampur and down stretch from Alampur to Kollapur. The study area included 15 collection sites. The fish were collected in the Krishna River from Krishna village to Somasila village which is approximately 250 Km length in the district (**Fig. 2**). Survey was conducted in the early morning or evening because those hours all the fishermen and fish landing zone is much more active than in other times of a day. Collections of fish were made with the help of local fishermen by using different mesh sized nets, such as gill nets, cast nets, shore-seine, hook-lines etc (**Fig. 4 to 10**). Alternatively, fish samples were also collected from the fishermen on the spot, fish landing centers and local fish markets of the studied area to ascertain the fish species composition as far as possible, the fish species were identified in the field itself. The samples were photographed, immediately prior to preservation as formalin decolourise the fish colour on long preservation. Unidentified collected specimens were preserved in 10% aqueous formaldehyde solution and were brought to the Science Laboratory, Department of Zoology, MVS Arts and Science College, Mahabubnagar district, Telangana and identified with the help of standard keys mentioned in the taxonomic literature ^[1, 9, 10]. The nomenclatures followed in this context were made according to Talwar and Jhingran (1991) and Jayaram (2010). Secondary data were also collected through observation and interview with fishermen through questionnaires at the studied area.

3. Results and discussion

No information is available till now on the occurrence of freshwater fish diversity of Krishna river of Mahabubnagar district in Telangana and present work in the first attempt in this direction. The list of freshwater fish including their order, family, name of the species and relative abundance are depicted in **Table 1**. During the study a total of 109 species of primary freshwater fishes belonging to 19 families and 46 genera were recorded from the study sites. Out of total fish species observed under study, 59 common, 31 scanty and 19 were found rare in the area.

On the basis of percentage composition and species richness, order Cypriniformes was dominant (61 species) followed by Siluriformes (26 species), Perciformes (13 species), Synbranchiformes (4 species), Beloniformes (3 species), Osteoglossiformes and Anguilliformes (1 species each). During the present investigation the order of dominance is as follows (**Fig. 3**):

Cypriniformes (56%) > Siluriformes (24%) > Perciformes (12%) > Synbranchiformes (3%) > Beloniformes (3%) > Osteoglossiformes (1%) = Anguilliformes (1%).

Out of 7 recorded orders, Siluriformes contributed 7 families followed by Perciformes 6, Beloniformes 2, Cypriniformes, Anguilliformes, Osteoglossiformes and Synbranchiformes each with 1 family. The ichthyofaunal diversity of Krishna

River comprises of 19 families namely, Anguillidae, Hemiramphidae, Belonidae, Cyprinidae, Notopteridae, Ambassidae, Anabantidae, Channidae, Cichlidae, Gobiidae, Mugilidae, Bagridae, Clariidae, Heteropneustidae, Pangasidae, Schilbedae, Siluridae, Sisoridae and Mastacembelidae. The sequence of dominance of encountered families is as follows:

Cyprinidae > Bagridae > Schilbedae > Channidae = Cichlidae = Mastacembelidae > Siluridae > Clariidae = Ambassidae = Hemiramphidae > Gobiidae = Notopteridae = Heteropneustidae = Anguillidae = Pangasidae = Sisoridae

Out of 109 fish species found in the Krishna River, 61 species belong to the carp group. Among the carps, *Catla catla*, *Labeo rohita*, *Labeo calbasu*, *Cirrhinus mrigal*, *Puntius jerdoni*, *Salmostoma bacaila* and *Tor mussullah* have highly commercial as well as economical importance while the other carps are economically less important. Among the catfish group, *Bagarius bagarius*, *Mystus cavasius*, *Mystus vittatus*, *Mystus tengra*, *Hemibagras maydellii*, *Ompok bimaculatus*, *Ompok pabda*, *Clarius batrachus*, *Heteropneustes fossilis* carry high economic value. Among the other group fish, *Channa stiatius*, *Channa marulius*, *Etrophus suratensis* bears high economic importance while others have moderate to less economic importance.

In the present study, 5 exotic species were recorded. Among these, *Oreochromis mossambicus* and *O. niloticus* are quiet common and more abundant in the entire study site. Emergence of *Clarias gariepinus* which is voracious and carnivorous feeding habit established itself in this river and become serious threat to the smaller indigenous ichthyo species.

The present study reveals that river Krishna exhibit a unique combination of ichthyo species compared to the different water bodies in other region of the state and recorded highest number of fish species from this particular river of Telangana. The distribution of fish along the Krishna river system may be due to the slow and steady state water movement and its width that ensure the continuous availability of food.

The fish diversity has been studied by different researchers in the country. For example, there are 33 species in Gour river of Jabalpur district, Madhya Pradesh ^[7]; 26 species in Godavari River at Mudgal Taluq of Pathri district ^[11]; 37 freshwater fishes in Pranhita River at Sironcha district, Maharashtra ^[12] and 62 species in Kuttanad River in Kerala, India ^[13]. Few studies are available on diversity and conservation of freshwater fish fauna of Krishna River system. Reported 57 fish species from Indrayani River, a tributary of Bhima River ^[3]; 58 fish species from Koyna tributary which is a major tributary of Krishna, which joins it at Karad City ^[5] and 51 fish species from Krishna River at Wai and Dhom reservoir in Maharashtra ^[6]. These studies also support the present study.

In the present context of study, it is noticed that indiscriminate harvesting of fish species from their natural habitat is regularly done by the rural people, which may lead to serious decline of fish population. About 46% of fish species availability was scanty to rare in the river. Through interviewing the local people, it is clear that some commercial and economically important fishes which are high market value are at present in very threatened condition. Unfortunately, the important riverine fishery of Indian Major Carps has either collapsed or it is at the threshold of collapse.

Besides the above factor, overfishing, dynamiting, rampant

killing of brood fishes, spawn, fry, fingerlings and juveniles violating Fishery Laws and Act, were assessed to be responsible for declining trend of fishery in the Krishna River. Pesticides washing from agricultural, sand mining have also been created detrimental environment for fish life in the river. Therefore, the present study indicates that to save this diversity, there is an urgent need for conservation of the fish denizens to conserve the productivity potential of the river through promulgation of fisheries legislation in future. Thus, some steps and awareness programme is needed to educate people about the importance of the river, its biodiversity and fish productivity.



Fig 1: Location of Krishna River in Mahabubnagar district, Telangana state of India

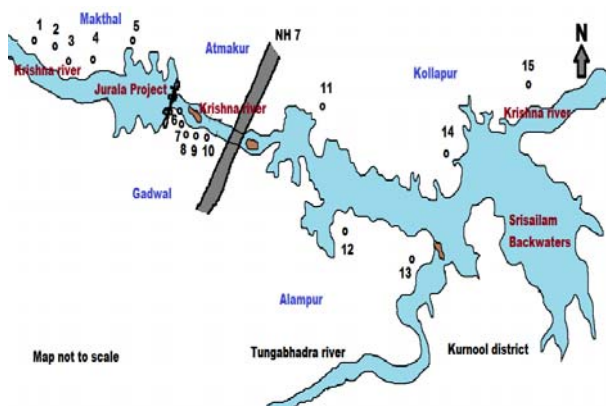


Fig 2: Study area in the Krishna River in Mahabubnagar district- 1.Krishna, 2.Mudumal, 3.Pachadevpadu, 4.Mustipally, 5.Peddakadumur, 6.Revulapally, 7.Rekulapally, 8.Chenugonipally, 9.Nadiagram, 10.Bearol, 11.Yaparla, 12.Kyathur, 13.Gondimalla, 14.Chellepad and 15.Somasila.

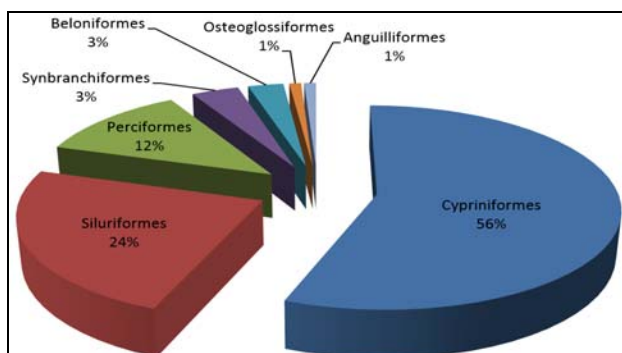


Fig 3: Order-wise fish species composition percentage of Krishna River



Fig 4: Krishna River in full spate during rainy season.



Fig 5a: A scene of common water pool in Krishna River during summer season.



Fig 5b: A scene of deep water pool in Krishna River during summer season.



Fig 6: Gill net operation in Krishna River.



Fig 7: Cast net operation in Krishna River.



Fig 9: All sizes of fish caught during shore-seine net operation in Krishna River.



Fig 8: Shore-seine net operation in Krishna River.



Fig 10: Fisherman caught fish with hook & line in Krishna River.

Table 1: List of fish species diversity, abundance and distribution recorded from the Krishna River in Mahabubnagar District

Sl. No.	Species	Order & Family	Abundance	Distribution		
				Upper stretch	Middle stretch	Lower stretch
I	ANGUILLIFORMES					
1	<i>Anguilla bengalensis</i> (Gray, 1831)	Anguillidae	S	P	P	P
II	BELONIFORMES					
2	<i>Hemirhamphus limbatus</i> (Valenciennes, 1847)	Hemiramphidae	C	P	P	P
3	<i>Hemirhamphus georgii</i> (Valenciennes, 1847)	Hemiramphidae	S	P	P	P
4	<i>Xenentodon cancila</i> (Hamilton, 1822)	Belonidae	C	P	P	P
III	CYPRINIFORMES					
5	<i>Amblypharyngodon microlepis</i> (Bleeker, 1853)	Cyprinidae	C	P	P	P
6	<i>Amblypharyngodon mola</i> (Hamilton, 1822)	Cyprinidae	C	P	P	P
7	<i>Barilius bakeri</i> (Day, 1865)	Cyprinidae	S	P	P	P
8	<i>Barilius barila</i> (Hamilton, 1822)	Cyprinidae	S	P	P	P
9	<i>Catla catla</i> (Hamilton, 1822)	Cyprinidae	C	P	P	P
10	<i>Chela laubuca</i> (Hamilton, 1822)	Cyprinidae	C	P	P	P
11	<i>Cirrhinus cirrhosus</i> (Bloch, 1795)	Cyprinidae	C	P	P	P
12	<i>Cirrhinus fulungee</i> (Sykes, 1839)	Cyprinidae	S	P	P	P
13	<i>Cirrhinus mrigala</i> (Hamilton, 1822)	Cyprinidae	C	P	P	P
14	<i>Cirrhinus reba</i> (Hamilton, 1822)	Cyprinidae	C	P	P	P
15	<i>Crossocheilus latius</i> (Hamilton, 1822)	Cyprinidae	C	P	P	P
16	<i>Ctenopharyngodon idella</i> (Valenciennes, 1842) *	Cyprinidae	R	P	P	P
17	<i>Cyprinus carpio</i> (Linnaeus, 1758) *	Cyprinidae	R	P	P	P
18	<i>Garra lamta</i> (Hamilton, 1822)	Cyprinidae	S	P	P	P
19	<i>Garra mulya</i> (Sykes, 1839)	Cyprinidae	C	P	P	P
20	<i>Labeo ariza</i> (Hamilton, 1822)	Cyprinidae	R	P	P	P
21	<i>Labeo bata</i> (Hamilton, 1822)	Cyprinidae	C	P	P	P
22	<i>Labeo boga</i> (Hamilton, 1822)	Cyprinidae	C	P	P	P
23	<i>Labeo boggut</i> (Sykes, 1839)	Cyprinidae	C	P	P	P
24	<i>Labeo calbasu</i> (Hamilton, 1822)	Cyprinidae	C	P	P	P
25	<i>Labeo caeruleus</i> (Day, 1865)	Cyprinidae	R	P	P	P
26	<i>Labeo dussumieri</i> (Valenciennes, 1842)	Cyprinidae	R	P	P	P
27	<i>Labeo dyocheilus</i> (McClelland, 1839)	Cyprinidae	R	P	P	P
28	<i>Labeo fimbriatus</i> (Bloch, 1795)	Cyprinidae	C	P	P	P
29	<i>Labeo gonious</i> (Hamilton, 1822)	Cyprinidae	C	P	P	P
30	<i>Labeo kawrus</i> (Sykes, 1839)	Cyprinidae	S	P	P	P
31	<i>Labeo kontius</i> (Jerdon, 1849)	Cyprinidae	S	P	P	P

32	<i>Labeo microphthalmus</i> (Day, 1865)	Cyprinidae	S	P	P	P
33	<i>Labeo porcellus</i> (Heckel, 1844)	Cyprinidae	S	P	P	P
34	<i>Labeo potail</i> (Sykes, 1839)	Cyprinidae	R	A	A	P
35	<i>Labeo pangasia</i> (Hamilton, 1822)	Cyprinidae	S	P	P	P
36	<i>Labeo rohita</i> (Hamilton, 1822)	Cyprinidae	C	P	P	P
37	<i>Osteobrama belangeri</i> (Valenciennes, 1842)	Cyprinidae	C	P	P	P
38	<i>Osteobrama cotio cunna</i> (Day, 1869)	Cyprinidae	C	P	P	P
39	<i>Osteobrama vigorsii</i> (Sykes, 1839)	Cyprinidae	C	P	P	P
40	<i>Osteochilus thomassi</i> (Day, 1869)	Cyprinidae	S	P	P	P
41	<i>Osteochilus vittatus</i> (Valenciennes, 1842)	Cyprinidae	S	P	P	P
42	<i>Puntius amphibius</i> (Valenciennes, 1842)	Cyprinidae	C	P	P	P
43	<i>Puntius carnaticus</i> (Jerdon, 1849)	Cyprinidae	C	P	P	P
44	<i>Puntius chola</i> (Hamilton, 1822)	Cyprinidae	C	P	P	P
45	<i>Puntius curmuca</i> (Hamilton, 1822)	Cyprinidae	S	P	P	P
46	<i>Puntius dobsoni</i> (Day, 1869)	Cyprinidae	S	P	P	P
47	<i>Puntius dorsalis</i> (Jerdon, 1849)	Cyprinidae	S	P	P	P
48	<i>Puntius jerdoni</i> (Jerdon, 1849)	Cyprinidae	S	P	P	P
49	<i>Puntius kolus</i> (Sykes, 1839)	Cyprinidae	C	P	P	P
50	<i>Puntius parrah</i> Day, 1865	Cyprinidae	C	P	P	P
51	<i>Puntius sarana</i> (Hamilton, 1822)	Cyprinidae	S	P	P	P
52	<i>Puntius sophore</i> (Hamilton, 1822)	Cyprinidae	C	P	P	P
53	<i>Puntius terio</i> (Hamilton, 1822)	Cyprinidae	C	P	P	P
54	<i>Puntius ticto</i> (Hamilton, 1822)	Cyprinidae	C	P	P	P
55	<i>Rasbora daniconius</i> (Hamilton, 1822)	Cyprinidae	C	P	P	P
56	<i>Rohtee ogilbii</i> (Sykes, 1839)	Cyprinidae	C	P	P	P
57	<i>Salmostoma acinaces</i> (Valenciennes, 1842)	Cyprinidae	C	P	P	P
58	<i>Salmostoma bacaila</i> (Hamilton, 1822)	Cyprinidae	C	P	P	P
59	<i>Salmostoma boopis</i> (Day, 1874)	Cyprinidae	C	P	P	P
60	<i>Salmostoma horai</i> (Silas, 1951)	Cyprinidae	R	P	P	P
61	<i>Salmostoma phulo</i> (Hamilton, 1822)	Cyprinidae	C	P	P	P
62	<i>Salmostoma untrahi</i> (Day, 1869)	Cyprinidae	C	P	P	P
63	<i>Schismatorhynchus nukta</i> (Sykes, 1839)	Cyprinidae	R	A	A	P
64	<i>Tor khudree</i> (Sykes, 1839)	Cyprinidae	R	P	P	A
65	<i>Tor mussullah</i> (Sykes, 1839)	Cyprinidae	R	P	P	A
IV	OSTEOGLOSSIFORMES					
66	<i>Notopterus notopterus</i> (Pallas, 1769)	Notopteridae	C	P	P	P
V	PERCIFORMES					
67	<i>Chanda nama</i> Hamilton, 1822	Ambassidae	C	P	P	P
68	<i>Chanda ranga</i> (Hamilton, 1822)	Ambassidae	C	P	P	P
69	<i>Anabas testudineus</i> (Bloch, 1792)	Anabantidae	S	P	P	P
70	<i>Channa gachua</i> (Hamilton, 1822)	Channidae	S	P	P	P
71	<i>Channa marulius</i> (Hamilton, 1822)	Channidae	C	P	P	P
72	<i>Channa punctata</i> (Bloch, 1793)	Channidae	S	P	P	P
73	<i>Channa striata</i> (Bloch, 1793)	Channidae	C	P	P	P
74	<i>Etroplus maculatus</i> (Bloch, 1795)	Cichlidae	R	P	P	P
75	<i>Etroplus suratensis</i> (Bloch, 1790)	Cichlidae	C	P	P	P
76	<i>Oreochromis mossambicus</i> (Peters 1852) *	Cichlidae	C	P	P	P
77	<i>Oreochromis niloticus</i> (Linnaeus, 1758) *	Cichlidae	C	P	P	P
78	<i>Glossogobius giuris</i> (Hamilton, 1822)	Gobiidae	C	P	P	P
79	<i>Rhinomugil corsula</i> (Hamilton, 1822)	Mugilidae	C	P	P	P
VI	SILURIFORMES					
80	<i>Hemibagrus maydelli</i> (Rössel, 1964)	Bagridae	R	P	P	A
81	<i>Hemibagrus microphthalmus</i> (Day, 1869)	Bagridae	R	P	P	A
82	<i>Mystus bleekeri</i> (Day, 1869)	Bagridae	C	P	P	P
83	<i>Mystus cavasius</i> (Hamilton, 1822)	Bagridae	C	P	P	P
84	<i>Mystus horai</i> Jayaram, 1954	Bagridae	R	P	P	P
85	<i>Mystus tengra</i> (Hamilton, 1822)	Bagridae	S	P	P	P
86	<i>Mystus vittatus</i> (Bloch, 1794)	Bagridae	C	P	P	P
87	<i>Rita chrysea</i> (Day, 1869)	Bagridae	S	P	P	P
88	<i>Rita gogra</i> (Sykes, 1839)	Bagridae	S	P	P	P
89	<i>Rita kuturnee</i> (Sykes, 1839)	Bagridae	C	P	P	P
90	<i>Sperata aor</i> (Hamilton, 1822)	Bagridae	C	P	P	P
91	<i>Sperata seenghala</i> (Sykes, 1839)	Bagridae	C	P	P	P
92	<i>Clarias batrachus</i> (Linnaeus, 1758)	Clariidae	R	P	P	P
93	<i>Clarias gariepinus</i> (Burchell, 1822) *	Clariidae	R	P	P	A
94	<i>Heteropneustes fossilis</i> (Bloch, 1794)	Heteropneustidae	S	P	P	P
95	<i>Pangasius pangasius</i> (Hamilton, 1822)	Pangasiidae	S	P	P	P
96	<i>Eutropiichthys goongwaree</i> (Sykes, 1839)	Schilbeidae	C	P	P	P

97	<i>Neotropius atherinoides</i> (Bloch, 1794)	Schilbeidae	C	P	P	P
98	<i>Neotropius khavalchor</i> Kulkarni, 1952	Schilbeidae	R	P	P	P
99	<i>Proeutropiichthys taakree</i> (Sykes, 1839)	Schilbeidae	C	P	P	P
100	<i>Pseudeutropius atherinoides</i> (Bloch, 1794)	Schilbeidae	C	P	P	P
101	<i>Silonia childreni</i> (Sykes, 1839)	Schilbeidae	S	P	P	P
102	<i>Ompok bimaculatus</i> (Bloch, 1794)	Siluridae	C	P	P	P
103	<i>Ompok pabda</i> (Hamilton, 1822)	Siluridae	S	P	P	P
104	<i>Wallago attu</i> (Bloch & Schneider, 1801)	Siluridae	C	P	P	P
105	<i>Bagarius bagarius</i> (Hamilton, 1822)	Sisoridae	R	P	P	A
VII	SYNBRANCHIFORMES					
106	<i>Macrogathus aral</i> (Bloch & Schneider, 1801)	Mastacembelidae	S	P	P	P
107	<i>Macrogathus guentheri</i> (Day, 1865)	Mastacembelidae	S	P	P	P
108	<i>Mastacembelus armatus</i> (Lacepède, 1800)	Mastacembelidae	C	P	P	P
109	<i>Mastacembelus pacalus</i> (Hamilton, 1822)	Mastacembelidae	S	P	P	P

Note: *Exotic, C-Common, S-Scanty, R-Rare, P-Present, A-Absent

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5. References

- Jayaram KC. The fresh water fishes of Indian region. Narendra Publishing House, Delhi, 2010.
- David A. Fish and fisheries of the Godavari and Krishna river system. Part 1 and 2. Proceedings of National Academy of Sciences B 1963; 33(2):263-93.
- Dahanukar N, Paingankar M, Raut RN, Kharat SS. Fish fauna of Indrayani River, northern Western Ghats, India. Journal of Threatened Taxa 2012; 4(1):2310-2317.
- Jayaram KC. The Krishna River System: A Bioresources Study. Occasional papers No.160 Records of Zoological Society of India, 1995, 167.
- Jadhav BV, Kharat SS, Rupesh N, Raut R, Paingankar N, Dahanukar N. Fresh water Fish Fauna of Koyna River, Northern Western Ghats, India. Journal of Threatened Taxa 2011; 3(1):1449-1455.
- Kharat SS, Paingankar M, Dahanukar N. Freshwater fish fauna of Krishna River at Wai, northern Western Ghats, India. Journal of Threatened Taxa 2012; 4(6):2644-2652.
- Sanjay Paunikar, Ashish Tiple, 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.
- Vijaylaxmi C, Rajshekhar M, Vijaykumar K. Freshwater fishes distribution and diversity status of Mullameri River, a minor tributary of Bheema River of Gulbarga District, Karnataka. International Journal of Systems Biology 2010; 2:1-9.
- Day F. The Fishes of India, Vol. I and II, William Dawson & Sons Ltd, London, 1958.
- Talwar PK, Jhingran AG. Inland Fishes of India and adjacent countries. Vols. I and II. Oxford and IBH Publishing Co. Pvt. Ltd., New Delhi, 1991.
- Rankhamb SV. Ichthyofaunal diversity of Godavari River at Mudgal Tq. Pathri, Dist. Parbhani. Recent Research in Science and Technology 2011, 3(12):11-13.
- Sheikh SR. Studies on Ichthyofaunal diversity of Pranhita River, Sironcha, Dist: Gadchiroli, Maharashtra, India. International Journal of Fisheries and Aquatic Studies 2014, 1(5):144-147
- Vijayasree TS, Radhakrishnan MV. Fish Diversity of Kuttanad River, Kerala State, India International Journal of Fisheries and Aquatic Studies 2014, 1(6):55-58.