Building evidence for conservation globally

Journal of Threatened Taxa

10.11609/jott.2022.14.8.21487-21750
www.threatenedtaxa.org

26 August 2022 (Online & Print)
14(8): 21487-21750
ISSN 0974-7907 (Online)
ISSN 0974-7893 (Print)

Open Access

ISSN 0974-7907 (Online); ISSN 0974-7893 (Print)

Publisher
Wildlife Information Liaison Development Society
www.wild.zooreach.org

Host
Zoo Outreach Organization
www.zooreach.org

No. 12, Thiruvannamalai Nagar, Saravanampatti - Kalapatti Road, Saravanampatti,
Coimbatore, Tamil Nadu 641035, India
Ph: +91 9385339863 | www.threatenedtaxa.org
Email: sanjay@threatenedtaxa.org

For Focus, Scope, Aims, and Policies, visit https://threatenedtaxa.org/index.php/JoTT/aims_scope
For Article Submission Guidelines, visit https://threatenedtaxa.org/index.php/JoTT/about/submissions
For Policies against Scientific Misconduct, visit https://threatenedtaxa.org/index.php/JoTT/policies_various

continued on the back inside cover

Cover: Fish species recorded in the Gowthami-Godavari Estuary, Andhra Pradesh: *Lutjanus johnii* (top left), *Triacanthus biaculeatus* (top right), *Acentrogobius cyanomos*, *Elops machnata*, *Trypauchen vagina*, *Oxyurichthys microlepis*. © Paromita Ray.

Journal of Threatened Taxa | www.threatenedtaxa.org | 26 August 2022 | 14(8): 21704–21709
ISSN 0974-7907 (Online) | ISSN 0974-7893 (Print)
https://doi.org/10.11609/jott.7593.14.8.21704-21709
#7593 | Received 27 July 2021 | Final received 27 June 2022 | Finally accepted 03 August 2022
SHORT COMMUNICATION

Conservation status of freshwater fishes reported from Tungabhadra Reservoir, Karnataka, India

C.M. Nagabhushan

Department of Studies in Zoology, Vijayanagara Sri Krishnadevaraya University, Ballari, Karnataka 583105, India.
nagabhushancm@vskub.ac.in

Abstract: Fishes constitute the major biomass of the aquatic ecosystem. The economy of the aquatic habitats is chiefly composed of fishes, crustaceans and molluscs inhabiting the given ecosystem. In the present investigation, an attempt was made to study the conservation status of the fishes that are naturally occurring in the Tungabhadra Reservoir located at Hospet, Vijayanagara district of Karnataka. The survey was spread across 12 months from June 2018 to May 2019. A total of 76 species, belonging to 50 genera and 20 families were recorded. As per the latest IUCN Red List, six Endangered, six Vulnerable, four Near Threatened, five Data Deficient and fifty four Least Concern fishes inhabit in TBR.

Keywords: Aquatic ecosystem, fish diversity, IUCN Red List, peninsular India, survey, Vijayanagara district.

India is endowed with vast aquatic resources possessing ecological heritage and rich biodiversity. Fishes inhabiting freshwater habitat are profoundly affected due to reduction in water flow, over fishing and increased water pollution. In order to maintain a healthy population of reservoir fisheries it is necessary to monitor water quality parameters, lake hydrobiology, periodic bioassay, and other environmental variables influencing the fish community (CIFRI 2008). Although, Tungabhadra Reservoir (TBR) is subjected to comprehensive fisheries studies, yet there is limited information available on fishes in the reservoir (Rao & Govind 1964; David et al. 1969; Govind 1969; Banerjee & Ray 1979). The TBR is located at 76.333^{0}E & 15.300^{0}N on the river Tungabhadra. It is one of the largest contributors of the river Krishna with an annual discharge of approximately 14,700 million m^3 of water at its confluence point, which holds 498m at the full reservoir level. It has an average water spread area of about 23,500 ha. The reservoir is located in northeastern Karnataka state and it supplies water to the neighbouring states. The reservoir produced 24 tonnes of fish in 1954–55 to 4,200 tonnes in 1981–82 to 25,638 metric tonnes in 2004–05. Carp seeds (Catla, Rohu and Fimbriatus) are nursed in the neighbouring fish seed farm and stocked at the rate of 4–5 million/ha until the larvae reach the fingerling size. These 70–80 mm fingerlings are stocked in the reservoir to enhance carp production.

Considering its fish diversity, a study was carried out between June 2018 and May 2019 to document fishes of TBR. The aim of this study is to understand fish diversity and explore their conservation status.

Materials and methods

The Tungabhadra Reservoir has many fish landing centres all along its periphery (Image 1). The fishes are caught using gill nets, cast nets, drag nets and giant alivi

Editor: J.A. Johnson, Wildlife Institute of India, Dehradun, India. **Date of publication:** 26 August 2022 (online & print)

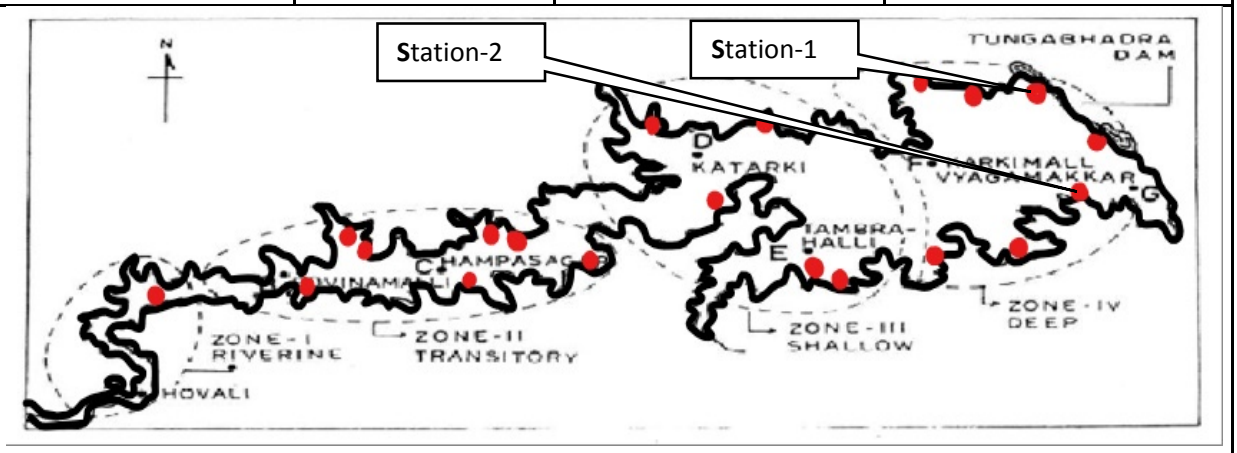
Citation: Nagabhushan, C.M. (2022). Conservation status of freshwater fishes reported from Tungabhadra Reservoir, Karnataka, India. *Journal of Threatened Taxa* 14(8): 21704–21709. https://doi.org/10.11609/jott.7593.14.8.21704-21709

Funding: None.

Competing interests: The author declares no competing interests.

Acknowledgements: Author acknowledges the laboratory facilities provided by Dept. of studies in Zoology, Vijayanagara Sri Krishnadevarya University, Ballari and Department of Applied Zoology, Kuvempu University for carrying out the research work.

a. India map | b. Karnataka state | c. Tungabhadra reservoir | d. Satellite imagery of TBR



e. Tungabhadra reservoir water shed stretch with red dots indicating fish landing centres

Image 1. Map showing the location of Tungabhadra Reservoir (Image courtesy: Google).

seine net. The fish samples hauled during the catch at the two landing centres S-1 and S-2 in the zone-IV deep (Image 1) were collected and identified on site and others were brought to the laboratory for identification using the available taxonomic literatures (Day 1958; Jhingran 1991; Jayaram 2010) and open access fish base website (www.fishbase.org and Eschmeyer's Catalog of Fishes). Local fishermen and the faculty of the Zoology Department, Kuvempu University, Shankaraghatta and Vijayanagara Sri Krishnadevaraya University, Ballari were also consulted for fish species confirmation.

Results and Discussion

In the present investigation seventy six fishes belonging to 20 families were recorded from the reservoir. Among the recorded species, 40 species of fishes were represented from Cyprinidae family, five from Bagridae, four from Danionidae, three each from Ailiidae & Channidae, two species each belonged to Ambassidae, Balitoridae, Cobitidae, Mastacembellidae, Siluridae, & Sisoridae, and one each representative species from Anguillidae, Aplochelidae, Belonidae, Gobidae, Horabagridae, Nemachilidae, Notopteridae, Osphronemidae, & Pangassidae are depicted in Figure 1. David et al. (1974) reported that *Labeo fimbriatus, L. catla*, and *L. rohita* were part of the major fish composition in the TBR. A similar trend was observed in the present findings. It is attributed to the carp seed stocking in the reservoir on seasonal basis at the rate of 2–3 million fingerlings per hectare.

Among the species, *Cyprinus carpio* was exotic; *Labeo catla, L. fimbriatus, L. calbasu* were non-native to TBR, whereas native species such as *Cirrhinus cirrhosus, Hypselobarus jerdoni, Systomus sarana, Pethia ticto, Opsarius bendelisis, Devario aequipinnatus, Silonia childreni, Proeutropiichthys taakree, Wallago*

Table 1. IUCN Red List status of fishes encountered in Tungabhadra Reservoir during the study period.

	Family	Common name	Scientific name	Population trend	IUCN Red List (2019)
1	Ailiidae	Goongwaree Vacha	*Eutropiichthys goongwaree* Sykes, 1839	--	DD 2010
2	Ailiidae	Indian Taakree	*Proeutropiichthys taakree* (Sykes, 1839)	Decreasing	LC 2011
3	Ailiidae	White Cat Fish	*Silonia childreni* (Sykes, 1839)	Decreasing	EN 2010
4	Ambassidae	Elongate Glass Perchlet	*Chanda nama* Hamilton, 1822	Decreasing	LC 2010
5	Ambassidae	Indian Glassy Fish	*Parambassis ranga* (Hamilton, 1822)	Stable	LC 2011
6	Anguillidae	Indian Mottled Eel	*Anguilla bengalensis* (Grey, 1834)	--	NT 2019
7	Aplocheilidae	Striped Panchax	*Aplocheilus lineatus* (Valenciennes, 1846)	--	LC 2009
8	Bagridae	Giant River Cat Fish	*Sperata seenghala* (Sykes, 1839)	--	LC 2010
9	Bagridae	Giant Cat Fish	*Hemibagrus maydelli* (Rossel, 1964)	--	LC
10	Bagridae	Long-whiskered Catfish	*Sperata aor* (Hamilton, 1822)	--	LC 2011
11	Bagridae	Gangetic Mystus	*Mystus cavasius* (Hamilton, 1822)	Decreasing	LC 2009
12	Bagridae	Gogra rita	*Rita gogra* (Sykes, 1839)	Decreasing	LC2010
13	Balitoridae	Slender Stone Loach	*Balitora mysorensis* Hora, 1941	--	VU
14	Balitoridae	Dotted Loach	*Nemacheilus semiarmatus* (Day, 1867)	Stable	LC 2010
15	Belonidae	Gar Fish	*Xenentodon cancila* (Hamilton, 1822)	--	LC 2019
16	Channidae	Great Snake Head	*Channa marulius* (Hamilton, 1822)	--	LC 2009
17	Channidae	Snake-headed Murrel	*Channa striata* (Bloch, 1793)	Stable	LC 2019
18	Channidae	Spotted Snakehead	*Channa punctata* (Bloch, 1793)	Stable	LC 2019
19	Cobitidae	Zebra Loach	*Botia striata* Rao, 1920	--	EN 2011
20	Cobitidae	Common Spiny Loach	*Lepidocephalichthys thermalis* (Valenciennes, 1846)	Stable	LC 2019
21	Cyprinidae	Mola Carpet	*Amblypharyngodon mola* (Hamilton, 1822)	Stable	LC 2009
22	Cyprinidae	Catla	*Labeo catla* (Hamilton, 1822)	--	LC 2010
23	Cyprinidae	Mrigal Carp	*Cirrhinus cirrhosus* (Bloch, 1795)	Decreasing	VU 2011
24	Cyprinidae	Deccan White Carp	*Gymnostomus fulungee* (Sykes, 1839)	--	LC 2010
25	Cyprinidae	Mrigal	*Cirrhinus mrigal* (Hamilton, 1822)	Stable	LC 2010
26	Cyprinidae	Reba Carp	*Cirrhinus reba* (Hamilton, 1822)	Stable	LC 2010
27	Cyprinidae	Grass Carp	*Ctenopharyngodon idella* (Valenciennes, 1844)	--	Exotic and Not evaluated
28	Cyprinidae	Common Carp	*Cyprinus carpio* Linnaeus, 1758	--	Exotic, but globally VU 2008
29	Cyprinidae	Mullya Garra	*Garra mullya* (Skyes, 1839)	Stable	LC 2010
30	Cyprinidae	Minor Carp	*Labeo bata* (Hamilton, 1822)	--	LC 2011
31	Cyprinidae	Boga Labeo	*Labeo boga* (Hamilton, 1822)	--	LC 2010
32	Cyprinidae	Boggut Labeo	*Labeo boggut* (Sykes, 1839)	Stable	LC 2010
33	Cyprinidae	Calbasu	*Labeo calbasu* (Hamilton, 1822)	--	LC 2010
34	Cyprinidae	Finger Lipped Peninsula Carp	*Labeo fimbriatus* (Bloch, 1795)	--	LC 2011
35	Cyprinidae	Plymouth Carp	*Labeo kontius* (Jordon, 1849)	Decreasing	LC 2010
36	Cyprinidae	Pangusia Labeo	*Labeo pangusia* (Hamilton, 1822)	Decreasing	NT 2010
37	Cyprinidae	Bombay Labeo	*Labeo porcellus* (Haeckel, 1844)	Decreasing	LC 2010
38	Cyprinidae	Deccan Labeo	*Labeo potail* (Sykes, 1839)	Decreasing	EN 2011
39	Cyprinidae	Rohu	*Labeo rohita* (Hamilton, 1822)	--	LC 2010

	Family	Common name	Scientific name	Population trend	IUCN Red List (2019)
40	Cyprinidae	Ray-finned Fish	*Osteobrama peninsularis* Silas, 1952	--	DD 2011
41	Cyprinidae	Finescale Razorbelly Minnow	*Salmostoma phulo* (Hamilton, 1822)	--	LC 2009
42	Cyprinidae	Ray-finned Fish	*Osteobrama vigorsii* (Sykes, 1839)	Stable	LC 2011
43	Cyprinidae	Konti Barb	*Osteochilichthys thomassi* (Day, 1877)	--	LC 2011
44	Cyprinidae	Ray-finned Fish	*Puntius ambassis* (Day, 1869)	--	DD 2010
45	Cyprinidae	Scarlet Banded Barb	*Puntius amphibius* (Valenciennes, 1842)	--	DD 2010
46	Cyprinidae	Chola Barb	*Puntius chola* (Hamilton, 1822)	--	LC 2010
47	Cyprinidae	Jakkali	*Hypselobarbus jerdoni* (Day, 1870)	Decreasing	LC 2010
48	Cyprinidae	Long-snouted Barb	*Puntius dorsalis* (Jordon, 1849)	--	LC 2019
49	Cyprinidae	Kolus Barb	*Hypselobarbus kolus* (Sykes, 1839)	Decreasing	VU 2010
50	Cyprinidae	Narayan Barb	*Pethia narayani* (Hora, 1937)	--	LC 2010
51	Cyprinidae	Red Side Barb	*Puntius bimaculatus* (Bleeker, 1863)	Stable	LC 2019
52	Cyprinidae	Olive Barb	*Systomus sarana* (Hamilton, 1822)	--	LC 2010
53	Cyprinidae	Spot Fin Swamp Barb	*Puntius sophore* (Hamilton, 1822)	--	LC 2010
54	Cyprinidae	Ticto Barb	*Pethia ticto* (Hamilton, 1822)	--	LC 2010
55	Cyprinidae	Vatani Rohtee	*Rohtee ogilbii* Sykes, 1839	--	LC 2010
56	Cyprinidae	Salmostoma Phulo	*Salmophasia phulo* (Hamilton, 1822)	--	LC 2009
57	Cyprinidae	Nukta	*Schismatorhynchos nukta* (Sykes, 1839)	Decreasing	EN 2010
58	Cyprinidae	Sandkhol Carp	*Thynnichthys sandkhol* (Sykes, 1839)	Decreasing	EN 2010
59	Cyprinidae	Black Mahseer	*Tor khudree* (Sykes, 1839)	increasing	LC 2019
60	Cyprinidae	Musulla Barb	*Hypselobarbus mussullah* (Sykes, 1839)	Decreasing	EN 2010
61	Danionidae	Baril	*Opsarius bendelisis* (Hamilton, 1822)	--	LC
62	Danionidae	Silver Harchet Chela	*Chela cachius* (Hamilton, 1822)	--	LC 2010
63	Danionidae	Giant Danio	*Devario aequipinnatus* (McClelland, 1839)	--	LC 2010
64	Danionidae	Flying Barb	*Esomus danrica* (Hamilton, 1822)	Stable	LC 2007
65	Gobidae	Tank Gobi	*Glossogobius giuris* (Hamilton, 1822)	--	LC 2019
66	Horabagridae	Khavalchor Catfish	*Pachypterus khavalchor* (Kulkarni, 1952)	--	DD 2010
67	Mastacembellidae	Spiny Eel	*Mastacembelus armatus* (Lacepede, 1800)	Stable	LC 2019
68	Mastacembellidae	Barrel Spiny Eel	*Macrognathus pancalus* Hamilton, 1822	--	LC 2010
69	Nemacheilidae	Ray-finned Fish	*Indoreonectes evezardi* (Day, 1872)	--	LC 2010
70	Notopteridae	Bronze Featherback	*Notopterus notopterus* (Pallas, 1769)	Stable	LC 2019
71	Osphronemidae	Spiketail Paradise Fish	*Pseudosphromenus cupanus* (Cuvier, 1831)	Stable	LC 2019
72	Pangassidae	Pangas Cat Fish	*Pangassius pangassius* (Hamilton, 1822)	--	LC 2009
73	Siluridae	Butter Cat Fish	*Ompok bimaculatus* Bloch, 1794	--	NT 2009
74	Siluridae	Cat Fish	*Wallago attu* (Bloch & Schneider, 1801)	Decreasing	VU 2019
75	Sisoridae	Devil Cat Fish	*Bagarius bagarius* (Hamilton, 1822)	Decreasing	NT 2009
76	Sisoridae	Sucker Cat Fish	*Gagata itchkeea* (Sykes, 1839)	Decreasing	VU 2011

LC—Least Concern | EN—Endangered | NT—Near Threatened | VU—Vulnerable | DD—Data Deficient

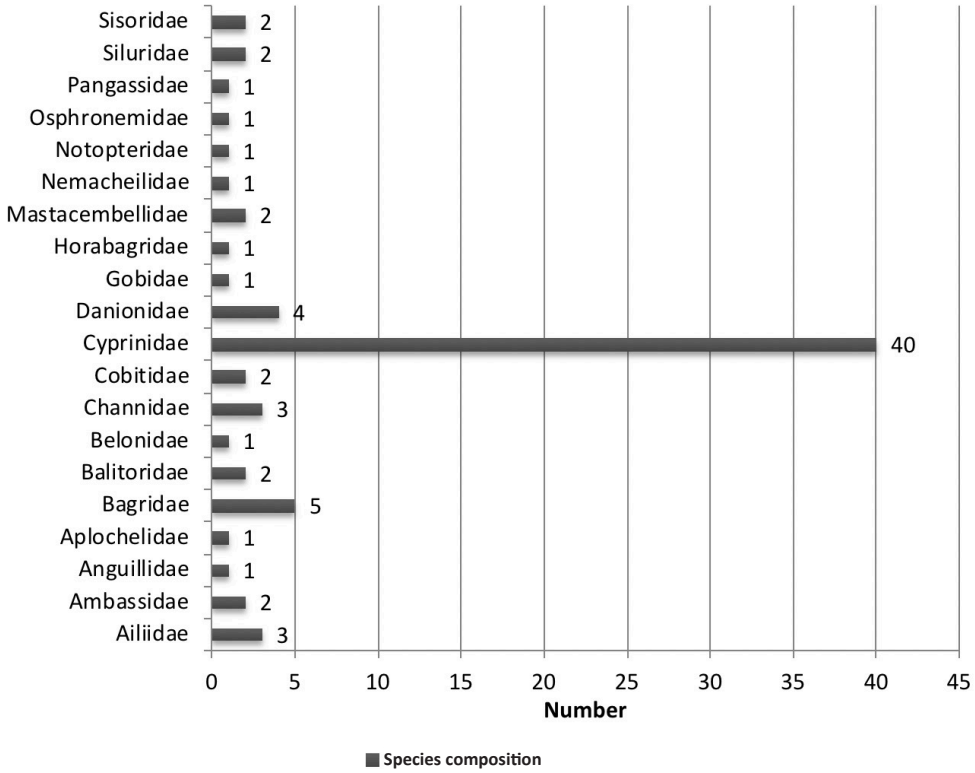


Figure 1. Family-wise species composition of fishes from Tungabhadra Reservoir.

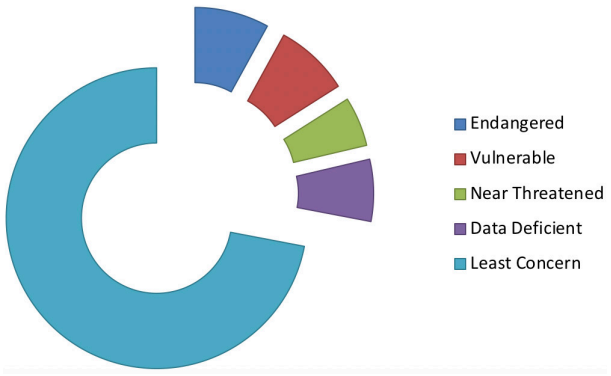


Figure 2. IUCN Red List status of fishes in Tungabhadra Reservoir during 2018–19.

attu, *Mastacembelus armatus*, *Bagarius bagarius*, *Osteobrama vigorsii*, and *Sperata seenghala* were recorded from all landing centers across the study period. The order of abundance of fishes was major carps > minor carps > cat fishes > small fishes. Kumar et al. (2006) observed a similar fish abundance trend in Geralsud Reservoir, Ranchi. As per the latest IUCN Red List, six Endangered, six Vulnerable, four Near Threatened, five Data Deficient, and 54 Least Concern (Figure 2). It also includes exotic species which are not evaluated. Details of the present conservation status of fishes inhabiting TBR are given in Table 1.

Conclusion

In the present study 76 species of freshwater fishes were recorded. As per the recent IUCN Red List, the conservation status of the fishes showed six Endangered, five Vulnerable, four Near Threatened, and five Data Deficient. Commercially important species were being reduced in certain landing centers along left flank of TBR and alien species were occupying the native species niches. To monitor the continuous potential fish yield of the reservoir, adequate release of carp seeds, utilizing the other vacant niches, monitoring the illegal fishing activities along the reservoir and continuous annual documentation of fish catches is necessary.

References

Banerjee, R.K. & P. Ray (1979). Soil and water quality of Tungabhadra Reservoir as Indices of Biological productivity, pp. 46–53. Lecture delivered at the Summer Institute on Culture and Capture Fisheries of Man-made Lakes in India, July–Aug 1979. Central Inland Fisheries Research Institute, Barrackpore, West Bengal, India.

David, A., P. Ray, B.V. Govind, K.V. Rajagopal & R.K. Banerjee (1969). Limnology and fisheries of Tungabhadra reservoir, Bulletin 13. Central Inland Fisheries Research Institute, Barrackpore, 188 pp.

David, A., N.G.S. Rao & P. Ray (1974). Tank fishery resources of Karnataka, pp. 20–87. Central Inland Fisheries Research Institute,

Barrackpore.

Day, F. (1958). *The Fishes of India. Vol. I and II*. William Dawson and Sons Ltd., London.

Fricke, R., W.N. Eschmeyer & R. van der Laan (eds.) (2022). Eschmeyer's Catalog of Fishes: genera, species, references: electronic version. Accessed on 08 Aug 2019. http://researcharchive.calacademy.org/reserach/ichthyology/catalog/fishcatmain.asp)

Govind, B.V. (1969). Planktonological studies in the Tungabhadra Reservoir and its comparison with other storage Reservoir in India, pp. 72–98. In: *Proceedings of the seminar on the Ecology and Fisheries of Freshwater Reservoirs,* 27–29 November 1969. Central Inland Fisheries Research Institute, Barrackpore.

Jayaram, K.C. (2010). *The Freshwater Fishes of the Indian Region. 2nd ed.* Narendra Publishing House, Delhi, 616 pp.

Jhingran, V.G. (1991). *Fish and Fisheries of India*. Hindustan Publishing Corporation, Delhi, India, 727 pp.

Kumar, A., H.N. Tiwary & G. Lakra (2006). Study of fish diversity in Getalsud reservoir, Ranchi of Jharkhand. *Himalayan Environmental Zoology* 20(1): 111–113.

Rao, D.S. & B.V. Govind (1964). Hydrology of Tungabhadra reservoir. *Indian Journal of Fisheries* 11: 321–344.

Journal of Threatened Taxa is indexed/abstracted in Bibliography of Systematic Mycology, Biological Abstracts, BIOSIS Previews, CAB Abstracts, EBSCO, Google Scholar, Index Copernicus, Index Fungorum, JournalSeek, National Academy of Agricultural Sciences, NewJour, OCLC WorldCat, SCOPUS, Stanford University Libraries, Virtual Library of Biology, Zoological Records.

NAAS rating (India) 5.64

Print copies of the Journal are available at cost. Write to:
The Managing Editor, JoTT,
c/o Wildlife Information Liaison Development Society,
No. 12, Thiruvannamalai Nagar, Saravanampatti - Kalapatti Road,
Saravanampatti, Coimbatore, Tamil Nadu 641035, India
ravi@threatenedtaxa.org

Journal of Threatened Taxa

www.threatenedtaxa.org

ISSN 0974-7907 (Online) | ISSN 0974-7893 (Print)

August 2022 | Vol. 14 | No. 8 | Pages: 21487–21750
Date of Publication: 26 August 2022 (Online & Print)
DOI: 10.11609/jott.2022.14.8.21487-21750

Publisher & Host

WILD ZOOREACH
Threatened Taxa