International Journal of Zoology Studies
www.zoologyjournals.com
ISSN: 2455-7269
Received: 06-02-2022, Accepted: 21-02-2022, Published: 09-03-2022
Volume 7, Issue 1, 2022, Page No. 29-34

Assessment of fish's heterogeneity from Panchganga River, Ichalkaranji area, M.S. India

Sunil Prakash Kamble, Asha Avinash Kengar
Department of Zoology, S. M. Dr Bapuji Salunkhe Mahavidyalaya Miraj, Maharashtra, India

Abstract
Present study aimed at assessing the diversity of fishes from Panchganga River, Ichalkaranji. As Ichalkaranji is well known for cotton industry and due to that the river is polluted, even though during the study total 16 species of freshwater fishes belonging to 4 orders, 10 families and 17 genera were recorded from the sampling sites i.e. Ichalkaranji Bridge, Shiradwad, and Abdul Lat, near Pancha ganga river in Ichalkaranji. Site wise populations and diversity of fish were observed. Among the studied fish species Cyprinidae were found to be 36%, Schilbeidae 11.7% Bagridae 11.7 % and family Ambassidae, Clarridae, Channidae, Gobiidae, Mastacembelidae, Cichlidae and Siluridae showed 5.8 %. Therefore proper scientific management of the aquatic resource for further study regarding the activities affecting the diversity should be carried out.

Keywords: fish diversity, affect of pollution, Panchganga River

Introduction
Fish being a valuable and easily assessable source of food, rich in protein content can be used to overcome the food problem to a certain extent. India has vast and varied inland fishery resources and now a day's it is being Monumental in fish fauna and also occupies 9th position in terms of freshwater diversity Wani and Gupta, (2015) [32]. Fishes from freshwater are one of the most threatened taxonomic group (Darwell and vie, 2005). Species diversity plays an important role in complexity and health of ecological communities, providing information concerning the richness of interspecific interactions, ecosystem stability and quality of environmental conditions. Raveendar *et al*, (2018).
Besides favorable atmosphere fishes are also facing the changing environmental conditions and interference resulting from human activity. In particular, overharvesting, habitat destruction, pollution, and the introduction of non-native species have led to a global decline in marine and freshwater fish bio- diversity (Leidy & Moyle, 1998; Pauly & Zeller, 2016, Martinez *et al*., 2018) [17, 23].
Biodiversity of fish fauna and their identification is one of the interesting field of biological research, which gives us an idea about the morphological variations and population diversity of fauna in polluted and non-polluted site of any particular habitat (Napit, 2013) [19]. Some studies have been undertaken for documentation of fish diversity and assemblage structure (Johnson, 1999; Bhats, 2003, 2004; Sreekantha *et al*., 2007; Shahnawaz *et al*., 2010, Gupta and Choudhari, 2015,) [30, 24, 32].

Materials and Methods
Study area
The study area selected was Ichalkaranji in Kolhapur district in Maharashtra. The city of Kolhapur is the district head quarter. The total area of the district is approximately 7,685 km2, and the Ichalkaranji city is known as Manchester of India for its export of textile goods and textile manufacturing industry. It is located at 16.70 74.470E. The city lies in the Panchaganga valley about 29km east of Kolhapur and 1km north of the river.

Collection Sites
Three sampling collection sites were selected from Panchaganga river *i.e.* Site 1 Ichalkaranji Bridge, Site 2 Shiradwad, and Site 3 Abdul Lat. Panchaganga river is one of the important rivers of Maharashtra and in english the name translates as "Five Rivers". It is the major tributary of Krishna river with which it joins at Narsobawadi.
The Panchaganga river flows through the borders of Kolhapur. The origin of river is from Prayag Sangam *i.e.* Chikhli, Taluka Karveer Dist. Kolhapur. The Panchaganga river is formed by four streams, Kasari, Kumbhi, Tulsi and Bhogawati. Jayanti and Gomati join the river near Kolhapur (Figure 1).

Fig 1: Map showing the flow of Panchganga river in Kolhapur district.

Sampling

The survey of fishes from the three different sites June 2018 to May 2019 for one year of various seasons i.e. rainy, winter and summer season were carried out. These sites were selected on the basis of varied ecological conditions and industrial wastes. Site 1 Ichalkaranji Bridge was selected on the right side of bank of river Panchaganga where industrial wastes flow from the up streams from Kolhapur areas. Site 2 i.e. Shiradwad receives sewages and effluents from Ichalkaranji due to nearby textile mills areas and Site 3 Abdul lat receives domestic sewage and wastes.

Results and discussions

The diversity of fishes observed at the mentioned sites of Panchganga River includes 16 genus belonging to 4 orders and 10 families. Percent composition of fishes shown that family Cypronidae 36%, two species each belonging to family Schilbeidae 11.7%, Bagridae 11.7% and one species each in family Ambassidae 5.8%, Clarridae5.8%, Channidae5.8%,, Gobiidae 5.8%, Mastacembelidae 5.8%, Cichlidae 5.8% and Siluridae 5.8%.

The composition of species and their percent under various orders has shown Perciformes 3 genus (17.6%), Cypriniformes 6 genus (35.29%), Siluriniformes 6 genus (35.29%), Synbranchiformes 1 genus (5.8%), Cichliformes 1 genus (5.8%). Among the total enlisted sspecies, order of dominance was as follows: Cypriniformes > Siluriniformes > Perciformes > Synbranchiformis > Cichliformes

Table 1: List of observed fishes with classification

Sr.no.	Scientific name	Local name	Class	Order	Family
1.	*Labeo rohita*	Tabada / Rohu	Actinoptrygii	Cypriniformes	Cyprinidae

2.	*Catla catla*	Catla	Actinoptrygii	Cypriniformes	Cyprinidae
3.	*Cyprinus carpio*	Cyprinus	Actinoptrygii	Cypriniformes	Cyprinidae
4.	*Cirrihinus mrigala*	Mrigal	Actinoptrygii	Cypriniformes	Cyprinidae
5.	*Channa Maralius*	Marul	Actinoptrygii	Anabantiformes	Channidae
6.	*Eutropiichthys Vach.*	Muni	Actinoptrygii	Siluriformes	Schilbeidae
7.	*Glassogobius giuris*	Kharpy	Actinoptrygii	Perciformes	Gobiidae
8.	*Mystus seenghal*	Seenghala	Actinoptrygii	Siluriformes	Bagridae
9.	*Mastacemballas armatus*	Wam	Actinoptrygii	Synbranchiformes	Mastacembelidaes
10.	*Neotripius khavalchor*	Khawal – Chor	Actinoptrygii	Siluriformes	Schilbeidae
11.	*Oxygaster bacalia (Hams)*	Ambali	Actinoptrygii	Cypriniformes	Cyprinidae
12.	*Punitus kolus*	Khawli	Actinoptrygii	Cypriniformes	Cyprinidae
13.	*Rita rita*	Ghoghary	Actinoptrygii	Siluriformes	Bagridae
14.	*Tilapia mossambica*	Tilap	Actinoptrygii	Cichliformes	Cichlidae
15.	*Waltago attu*	Mully	Actinoptrygii	Siluriformes	Siluridae
16.	*Ambassis elongates*	Elongate glassfish	Actinoptrygii	Perciformes	Ambassidae

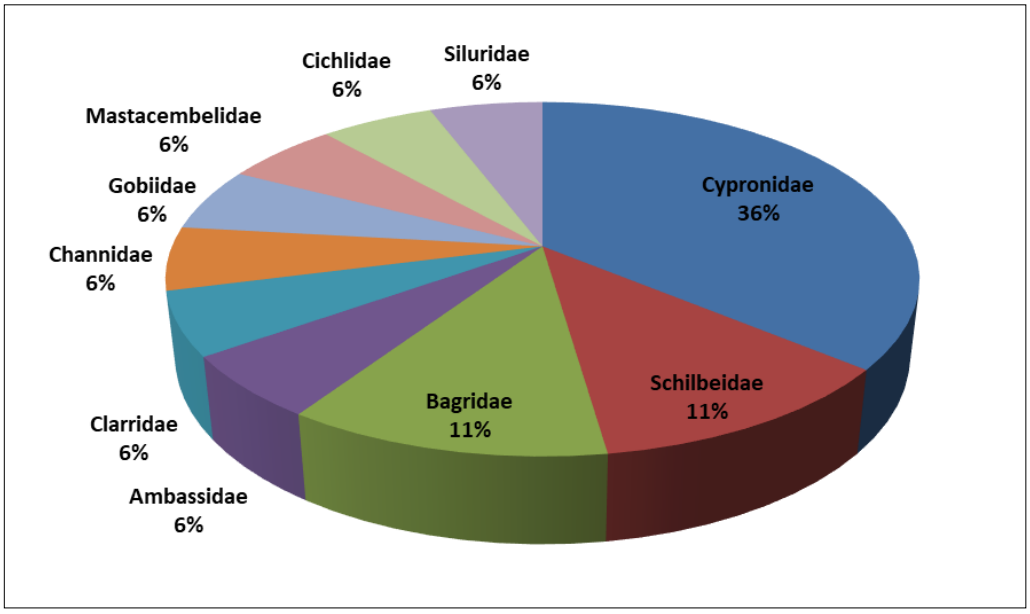

Fig 2: Percentage composition of families towards ichtyofaunal diversity

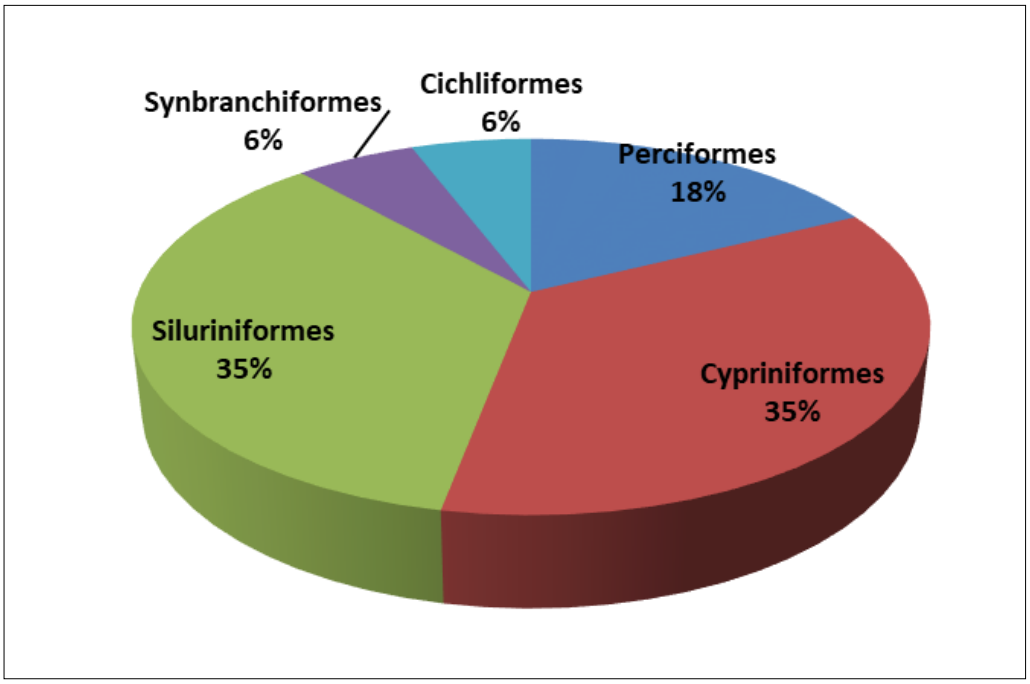

Fig 3: Percentage composition of order towards ichtyofaunal diversity

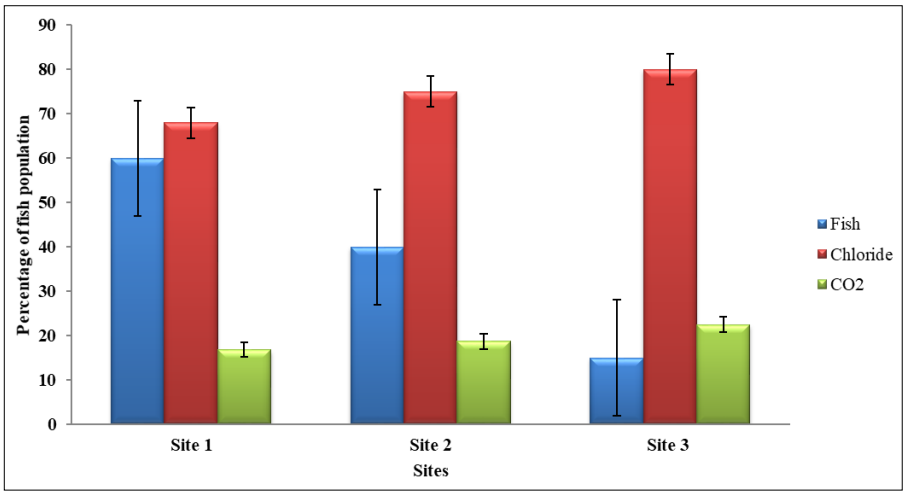

Fig 4: Sitewise comparison of fish population based on pollution level

Plate 1: Fig.1 *Ambassis elongates* (Kanchaki), Fig.2 *Clarius batrachus* (Magur), Fig.3 *Eutropiichthys Vach* (Muni), Fig.4 *Labeo rohita* (Tabada), Fig.5 *Catla catla* (Catla), Fig.6 *Glassogobius guiris* (Kharpy), Fig.7 *Cirrhinus mrigala* (Mrigala), Fig.8 *Mystus Seenghala* (Seenghala),Fig.9 *Mastacemballus Armatus* (Wam), Fig.10 *Oxygaster bacaila* (Ambali), Fig.11 *Chana marulius* (Marul), Fig.12 *Punitus Kolus* (Khawali), Fig.13 *Cyprinus carpio* Cyprinus, Fig.14 *Tilapia Mossambica* (Tilap) Fig.15 *Rita rita* (Ghoghrya), Fig.16 *Wallago atto* (Mully).

Discussion

Cypriniformes and Siluriniformes are found to be dominant in Panchganga River According to Nelson (2006) [20] the greatest freshwater diversity in Cypriniformes and Siluriformes in the freshwater habitat. Majority have high commercial importance as food and ornamental fishes. Similar observations have also been made by Singh (2001) [29] and Basavaraja *et al*., (2014) [9]. Vyas, (2014) studied species diversity and assemblage fish fauna of Jamner River recorded 17 species of Cyprinidae family and 1 species each from Ambassidae, Bagridae, Gobiidae and Siluridae. Jancy and Jobiraj (2017) [15] observed 40 species of fishes belonging to 7 order, 17 families from Karamana river, Kerela out of which Cyprinidae was the most dominant (41.55%), the above observation shows similar results as observed in the present analysis. The family Cyprinidae is dominant among other families as they are fast growing, pollution tolerant, hardy fishes and have faster growth rate as also said by various workers Patra *et al*., (2011) [22].

Fish diversity abundance and percentage contribution at different sites i.e. site S1, S2 and S3 are as follows, Site1 shows high fish diversity as compared to Site 2 and Site 3. Lowest diversity was observed at Site 3 as Site 3 is found to be polluted as compared to other sites i.e. Site1 and Site 2. Pollution is one of the factors affecting the growth rate of the fishes at Site 3. Similarly Nickolsky (1969) suggested that water pollution by various substances might have **s**erious adverse effects on fish especially in the destruction of fish reproduction and the disruption of the fish's metabolic activities. The physicochemical parameters such as Chloride, Dissolved Oxygen, Carbodioxide, and Total dissolved Solids etc affects the water quality and thus affects the quality and quantity of living biota. In the present study the polluted site i.e. Site 3 shows affect of Dissolved oxygen, chloride phosphorus etc on fish diversity. Similar conclusions have been given by Ahmed A.K. *et al*., (2011). Eklov et. al., (1998) [14] also reported that dissolved oxygen content and total phosphorous concentration were responsible for ichthyo faunal changes. In the present study the polluted ssite site 3 shows affect of Dissolved oxygen, chloride phosphorus etc on fish diversity. DO generally effect the survival of fishes especially juvenile and fry. Maes *et al*. (2004) [18] mentioned disssolved oxygen is one of the most important factors for fish abundance and distribution

The minimum pH value was 6.64 which was recorded at Site 3 during summer and the maximum pH value was 7.94 was recorded at Site 2. The pH Factors such as pH and dissolved nutrients would influence dissolved oxygen level. An increase in nutrient level and the concentration of chemical compounds with high chemical oxygen demand (COD) will use up the oxygen, hence reducing the dissolved oxygen content, Abrams, 1993 [1], Whitefield, 1999; Blaber, 2000 [12].

Hence the diversity and abundance of fishes is observed at Site 1 as compared to Site 2 and 3. As many physicochemical, biotic and abiotic factors affect the fishes.

Conclusion

The Panchganga River starts from Prayag Sangam. The Panchganga is formed by four streams, the Kasari, the Kumbhi, the Tulsi and the Bhogawati. So three sites from river selected as site Site 1 Site 2 and Site 3 and fish diversity was observed and studied. The river has considering amount of freshwater fishes and the fish availability depends on different time and season of the year. Due to favourable conditions diversity and abundance of fishes were observed at site 1 and 2, were as, site 3 showed the affect of pollution on fish diversity. The study suggests that there is need to take care of Panchganga river as a fish conservation reserve to maintain habitats for spawning, feeding and migration of threatened fish species. The river has 6. Sharker, M.R., S. Mahmud, M.A.B. Sddik, M.J. Alam, considering amount of freshwater fishes and the fish M.R. Alam, 2015. Livelihood Status of Hilsha availability depends on different time and season of the Fishers around Mohipur Fish Land

References

1. Abrams PA. Effects of Increased Productivity in the Abundance of Trophic Levels. The American Naturalist,1993:141:3:351-371.
2. Ahmad AK Mohd SO Shukor MN Aweng EHR and Shuhaimi OO. Ecological factors affecting fish diversiity and density in sungkai wildlife reserve, Perak, Malaysia The Zoologist,2011:9:78-84.
3. Ahmad AK, Mohd Sham O, Shukor MN, Aweng, EH-R.3 and
4. Ahmad AK, Mohd Sham O, Shukor MN, Aweng, EH-R.3 and
5. Ahmad AK, Mohd Sham O, Shukor MN, Aweng, EH-R.3 and
6. Ahmad AK, Mohd Sham O, Shukor MN, Aweng, EH-R.3 and
7. Alexander SM Janna RW and Mark RC. Genetic diversity in fishes is influenced by habitat type and life-history variations Ecology and Evolution,2018:8:12022–12031.
8. Banothu R, Sharma AP, Udai RG, Gugulothu R and Mishra A. Assessment the present status of fish diversity in relation to physicochemical characteristics of Nanaksagar reservoir of Uttrakhand. Journal of Entomology and Zoology Studies,2018:6(2):477-484.
9. Basavaraja D, Narayana J, Puttaiah K. Fish diversity and abundance in relation to water quality of Anjanapura reservoir, Karnataka, India. International Journal of Current Microbiology and Applied Sciences,2014:3(3):47-757.
10. Bhat A. Diversity and composition of freshwater fishes in river systems of Central Western Ghats, India. Environ. Biol. Fish.,2003:68:25-38.

11. Bhat A. Patterns in the distribution of freshwater fishes in rivers of Central Western Ghats, India and their associations with environmental gradients. Hydrobiologia,2004:529:83-97.
12. Blaber SJM. Tropical Estuarine Fishes: Ecology, Exploitation and Conservation. Blackwell Science, Oxford, 2000, 372.
13. Darwall WRT, Vie JC. Identifying important sites for conservation of freshwater biodiversity: extending the species based approach. Fisheries management ecology, 2005.
14. Eklov AG Greenberg LA Bronmark C Larsson P. and Berglund, O. Response of Stream Fish to Improved Water Quality: A Comparison between the 1960s and 1990s.Freshwater Biology,1998:40(4):771-782.
15. Jancy Rani AK, Jobiraj. Fish fauna diversity of Karamana River, Kerala, India. International Scholars Journals,2017:4(2):280-285.
16. Johnson J, Arunachalam M. Diversity distribution and assemblage structure of fishes in streams of Southern Western Ghats, India. J. Threatened Taxa,2009:1:507-513.
17. Leidy RA, Moyle PB. Conservation status of the World's Fish Fauna: An overview. In P. L. Fiedler, & P. M. Kareiva (Eds.), Conservation biology, 1998, 187- 227.
18. Maes JS, Damme VP, Meire FO. Statistical modeling of seasonal and environmental influences on the population dynamics of an estuarine fish community. Marine Biology,2004:145:103342.
19. Napit MK. Study of fish fauna of Bundelkhand region with special reference to Damoh district. International journal of advance research,2013:4:24-30.
20. Nelson JS. Fishes of the World. 4th ed, John Willy & Sons, Hoboken (New Jersey), 2006, 601.
21. Nikolsky GV Theory of fish population dynamics as the biological background for rational exploitation and management of fishery resources. Oliver and Boyd. Edinburgh, 1969, 323.
22. Patra AK, Sengupta S, Datta T. Physico-chemical properties and Ichthyofauna diversity in Karala river, a tributary of Teesta river at Jalpaiguri district of West Bengal, India. IJABPT,2011:2(3):47-58.
23. Pauly D, Zeller D. Catch reconstructions reveal that global marine fisheries catches are higher than reported and declining. Nature Communications,2016:7:10244.
24. Shahnawaz AM, Venkateshwarlu DS, Somashekar and Santosh K.. Fish diversity with relation to water quality of Bhadra river of Western Ghats (India). Environ. Monit. Assess., Volume 161, 2010, Pages 83-91.
25. Shuhaimi-Othman, O.1
26. Shuhaimi-Othman, O.1
27. Shuhaimi-Othman, O.1
28. Shuhaimi-Othman, O.1
29. Singh G. Status of development of fisheries of Pong reservoir, Himachal Pradesh, Fishing Chimes,2001:21(1):88-90.
30. Sreekantha MDS, Chandran DK, Mesta GR, Rao KV Gururaja and Ramachandra TV. Fish diversity in relation to landscape and vegetation in Central Western Ghats, India. Curr. Sci.,2007:92:1592-1603.
31. Vyas V. Limnological studies of river Narmada. J. Chem. Bio. Phy. Sci.2013:3(4):2722-2730.
32. Wani and Gupta**.** A study on ichthyo faunal diversity of sagar lake, MadhyaPradesh India. International journal of Biodiversity and Conservation,2015:7(3):126–129.
33. Whitfield AK. Ichthyofaunal assemblages in estuaries: a South African case study. Review of Fish Biology and Fisheries,1999:9:15186.