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SURVEY OF HIGHLY DEMAND EDIBLE FISH DIVERSITY ACROSS THE FISH MARKET IN JABALPUR, MADHYA PRADESH

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ABSTRACT
Fishes are one of the most important vertebrate group provide rich protein source in human diet and other animals. The domestic fish markets play a significant role in the livelihood of the rural population and people consumed variety of fishes for their taste and protein requirements. To investigate the edible fish diversity of freshwater across the major fish markets of Jabalpur city, Madhya Pradesh, Central India. There is not any information regarding variety of freshwater fishes found in fish markets of Jabalpur city. The study has been conducted from August 2023 to December 2023 from different fish markets of Jabalpur city, Madhya Pradesh, Central India. The information on the fish diversity of the market were collected and identified from the different fish vendor's along with some question regarding local name of fish, source of fish. The different freshwater fish specimens were observed, collected and identified from the available literature. During the study period it has been observed and identified of 34 fishes species belonging to 10 orders under 17 families and 25 genera. Among these, 28 freshwater fish species are indigenous and 6 freshwater fishes are exotic species in the fish markets those surveyed in different areas of Jabalpur city. The IUCN status, price in kg of different fishes and demand of the fishes, various problems facing by fish vendors was also discussed in the paper.

Keywords:
Fish diversity, fish market, freshwater, Jabalpur, Madhya Pradesh.

INTRODUCTION

Fishes are significant role in the socioeconomic development of the country, as it is a valuable source of livelihood for a huge section of economically backward population, gainful employment, alternate income and stimulates the growth of new subsidiary industries.Fish are at present in soaring require in food markets, they are widely consumed in many parts of the world because they possess maximum of protein, vitamins, low saturated fat and also contain omega fatty acids known to support good health (Peter et al., 2013; Barik, 2017) .
Fish and other products and finally market play significant role in economy and livelihood in the different country (FAO, 2020).In the fish market variety of fishes are available for the different consumers (Chourey et al., 2014).Fish mostly remain in acceptable quality till the end of this chain but in conditions like high temperature and high relative humidity the spoilage of fish accelerates with greater economic losses to the seller (Alam, et al., 2010).The maintenance of fish from spoilage requires good handling practices that involve regulation of the temperature in such a way that accelerate fish preservation so that the quality and quantity of the fish remain undamaged (Kumar et al 2008.Madhya Pradesh is one of most important state of the country and recognized as a tiger state and its forest areas.Jabalpur or Sanskardhani is the one of the important city of Central India and traditionally known as Mahakousahal region of Madhya Pradesh state.It is situated almost in the centre of India.Jabalpur has a network of rivers, streams, dams, ponds and lakes and found rich fish faunal diversity in the area.
The important rivers flow from Jabalpur town, Narmada, Gour Rivers, Bargi, Khandari and Pariyat reservoirs make them rich and diverse fish and other fauna of Jabalpur district (Malviya, 1961; Sharma, 2008; Chandra et al., 2010; Paunikar et al., 2012) [10, 13, 3, 11]. The place is nationally and internationally renowned due to Ordnance factories, several Central Government and State Research Institute and other several Governments and NGO offices within the Jabalpur city.The largest railway network in the Jabalpur city, several trains are passing through from the city (North-South and West-East).The different religions peoples live in the city for different jobs and are always come here from different states.
Due to their different culture their food preference and cultural practices is also different.The fish marketing survey is revealed to describe fish diversity of different market places of Jabalpur preference for the city

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dwellers and socio-economic status of market associated people. Jabalpur is situated at heart of India.The Jabalpur city is well connected to other big cities of Central India and passing through several national and state highways.

The live and dead fishes are to transport small and over larger distances from Bargi, Parityat and Khandari reservoirs, Gour-Rivers adjoining area and other states are also well connected by road and railways, like Andhra Pradesh, Gujarat, Maharashtra and West Bengal.Very few studies on species diversity of edible freshwater fishes of the fish market in different states of the country, but no information about species diversity of edible freshwater fishes in Jabalpur fish market.The present paper reports the preliminary list of edible fresh water fishes across the Jabalpur fish market.

MATERIALS AND METHODS

STUDY AREA

This study was conduct in Jabalpur district in month of Mid of August 2023 to December 2023. Jabalpur is a oldest district of Madhya Pradesh. This is district is famous for its traditional culture, Rani durgavati fort and famous waterfall 'Dhuadhar'.

Location & Geographical Area:-

Jabalpur is located at 23.1686°N 79.9339°E. It has an average elevation of 412 metres (1,1348 feet). It is located on the centre of Madhya Pradesh. It is sharing border with Damoh district to the North, Katni district to the North, Mandla district to the South, Narsinghpur district to the West. The climate is humid subtropical. The cold weather starts early in the first week of November and the hot weather begin towards the end of March and the rain from the later part of June.

Market detail

S.No	Market Area	Time	Day
1	Adhartal	04:00 - 09:00 PM	Daily
2	Civil line	08:00AM - 10:00PM	Daily
3	Gurandi	07:00am - 08:00 PM	Daily
4	Madan mahal	03:00 - 08:00 PM	Daily
5	Sadar	04:00 - 09:00 PM	Daily
6	Ranjhi	04:00 - 08:00 PM	Daily
7	OFK west land	04:00 - 08:00 PM	Mon,Thurs
8	Hanumantal	03:00 - 07:00 PM	Daily
9	Chunginaka	05:00 - 08:00 PM	Daily
10	Garha	03:00 - 07:00 PM	Daily
11	Maharajpur	03:00 - 07:00 PM	Daily
12	Gokalpur	05:00 - 08:00 PM	Daily

Table-1-Weekly retail open sale fish market

Results and Discussion

The present study recorded 34 species of fishes belonging 10 orders under 17 families and 25 genera from the fish market of Jabalpur city.Among these, 28 species of fishes are indigenous and 6 fishes are exotic fish species in seven fish markets those surveyed in different areas of Jabalpur city.The IUCN status, price/kg and demand of the fishes were presented in (Table-2).During the study it has been observed and recorded that 28 species of indigenous freshwater fish belongs to 10 orders and 17 families and 6 freshwater exotic fish species belongs to 3 orders and 3 families from different fish markets of Jabalpur city (Table 2).

The results of the present study show order Siluriformes dominant group in the assemblage composition contributing (12 species, 35.29%), Cypriniformes contribute (7 species, 20.58%) followed by Perciformes (4 species, 11.76%), Mastaba formed, Cichliformes, Osteoglossiformes, Beloniformes (2 species, 5.88%, each) and Synbranchiformes, Gobiiformes and Mugiliformes (1 species, 2.94%, each) respectively.The total indigenous fish species are contributing 82.35%, whereas exotic fishes are contributing 17.64% to total fishes in the fish market of Jabalpur. Similarly, order Cypriniformes among the identified exotic fishes are only 3 species (8.82%) followed by Order Cichliformes contributing 2 species (5.88%) and Siluriformes 1 species (2.94%) (Table 2 and

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Fig 1, 2). The Order Siluriformes, Cypriniformes and Perciformes are maximum group of fish identified a total 22 species and contributing 64.70% in different fish markets at Jabalpur city (Table 2).

The survey also indicated that the 15 (44.11%) species have high demand whereas, 19 55.82%) species medium or low demand during the study (Table 2). Among the, exotic fish species has medium or low demand as per the our study.

The rates of these fishes are also low, so poor peoples of the society purchased and consumed these types of fishes. The Indian Major Carps (IMC) fishes are high demand in the Jabalpur city as compared to other fishes and prices ranges are 140-180/ kg, indigenous Clarius magur, Channa striatus, and Mastacembelus armatus are Rs. 600-700, 340-380 and 300- 340/ kg as per fish size and availability.

The other fresh water fishes Heteropneustes fossilis, Clarius magur, Channa striatus, Wallago attu and Mastacembelus armatus (Singhi, magur, Shol, attu, bam) has higher rate than other fishes. The most of the fishes are Least Concerned as per IUCN database, (2019) , whereas some fishes are near threatened (NT) and few fishes are not evaluated (NE) yet. It was observed that there are two types of fishes brought in the Jabalpur fish market as ice preserved fish and live fish. The Indian Major Carps (IMC), Rohu (Labeo rohita), Mrigal (Cirrhinus mrigala) and Labeo catla (Catla) and other carps like Common carps (Cyprinus carpio), Grass carp (Ctenopharyngodon idella) etc. Tilapia (Oreochromis mossambica), Shol (Channa striatus), Pangus (Pangasius pangasius), Notopterus notopterus, Indian freshwater Sharks (Wallago attu), Shingi (Heteropneustes fossilis), Magur (Clarias batrachs) and Bam (Mastacembelus armatus) etc. are transported here as live from the Gour River, Khandari and Bargi reservoir and nearby districts.

The other fishes brought in the Jabalpur market from the other states. The preserved freshwater fishes are transported to the market in different size ice box or cages but live fish by different types of drum or tray. The price rate of the fishes depends upon the production/catch, availability, supply and demand of fishes to the people. According to market survey, the daily supply of fish in Jabalpur fish markets relies on transport, cold storage, agents, traders etc. It has been found out that in the fish market about 60% is supplied from local sources and about 40% is supplied from outside Jabalpur and its surroundings areas.

The maximum fish is supplied from different places like from Gour River, Khandari and Bargi reservoirs and adjoining areas of Jabalpur city as well as from states like Andhra Pradesh, Gujarat, Maharashtra and Madhya Pradesh. The trains, trucks vans and others are used for transport of fish to wholesalers in Jabalpur city. A total of 03 big fish market and 7 small vendors fish markets are present in Jabalpur city and few markets are also present nearby areas. Fishes are the valuable source of protein for humans. It was found that in the Jabalpur fish market variety of freshwater fishes are available. The different peoples of the society purchased and consumed the various fishes as per availability and price of the fishes are different from the fish market within areas.

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S.No	Order/Family	Scientific name	Common name	Rs/Kg	Demand
1	Cypriniformes Cyprinidae	*Labeo catla* (Hamilton, 1822)	Catla	160-180	High
2		*Labeo rohita* (Hamilton, 1822)	Rohu	160-180	High
3		*Cirrhinus mrigala* (Hamilton, 1822)	Mrigal	160-180	High
4		*Ctenopharyngodon idellus* (Valenciennes, 1844)	Grass carp	100-120	Low
5		*Cyprinus carpio* (Linnaeus, 1758)	Common carp	120-140	High
6		*Hypophthalmichthys molitrix* (Valenciennes, 1844)	Silver carp	80-120	Low
7		*Amblypharyngodon mola* (Hamilton, 1822)	Indian carplet	120-140	High
8	Siluriformes Bagridae	*Mystus vittatus* (Bloch, 1794)	Striped dawf catfish	160-180	Low
9		*Mystus tengara* (Hamilton, 1822)	Tengra	160-180	High
10		*Mystus cavasius* (Hamilton, 1822)		160-180	High
11		*Sperata seenghala* (Sykes, 1839)	Giant river catfish	160-180	High
12	Siluridae	*Ompok bimaculatus* (Bloch, 1794)	Butter catfish	160-180	Low
13		*Ompok pabda* (Hamilton, 1822)	Butter catfish	160-180	Low
14		*Wallago attu* (Bloch and Schneider, 1801)	Freshwater shark (Boal)	160-180	High
15	Sisoridae	*Bagarius bagarius* (Hamilton, 1822)	bagariusl(Bagari)	150-170	High
16	Pangasidae	*Pangasius pangasius* (Hamilton, 1822)	Pangas(Pankaj)	120-160	High
17	Clariidae	*Clarias magur* (batrachus) (Hamilton, 1822)	Air breathing catfish	600-700	Medium
18		*Clarias gariepinus* (Burchell, 1822)	African catfish(Thai magur)	140-180	High
19	heteropneutsidae	*Heteropneustes fossilis* (Bloch, 1794)	Stinging catfish(Singhi)	180-200	High
20	Mastacembeliformes Mastacembelidae	*Mastacembelus armatus* (Lacepede, 1800)	Bam	300-350	Low
21		*Mastacembelus aculeatus* (Bloch,1786)	Goichi	250-300	High
22	Cichliformes Cichlidae	*Oreochromis mossambica* (Peters, 1852)	Tilapia	140-160	High
23		*Oreochromis niloticus* (Linnaeus, 1758)	Nile tilapia	140-160	High
24	Synbranchiformes Synbranchidae	*Monopterus cuchia* (Hamilton, 1822)	Swamp eel(Kuchia)	140-180	Medium
25	Gobiiformes Gobiidae	*Glossogobius giuris* (Hamilton, 1822)	Tank goby	80-120	Medium
26	Anabantiformes Channidae	*Channa marulius* (Hamilton, 1822)	Saur	300-340	High
27		*Channa punctata* (Bloch, 1893)	Green Snake-head Murrel (Lata)	300-340	High
28		*Channa striatus* (Bloch, 1793)	Striped snake-head (Saur)	300-340	Medium
29	Anabantidae	*Anabas testudineus* (Bloch, 1793)	Koi	200-240	Medium
30	Mugiliformes Mugilidae	*Mugil cephalus* (Linnaeus, 1758)	Mullet	140-180	Medium
31	Beloniformes Belonidae	*Xenentodon cancila* (Hamilton, 1822)	Freshwater Garfish(suiya)	120-140	Low
32	Hemiramphidae	*Hyporhamphus limbatus* (Valenciennes, 1847)	Congaturi Halfbeak	200-240	Low
33	Osteoglossiformes Notopteridae	*Notopterus chitala* (Hamilton, 1822)	Chitala	160-200	Low
34		*Notopterus notopterus* (Lacepede, 1800)	Bronze Feather Back	160-200	Low

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CONCLUSION

Fish market reflects the preference of fish food of local inhabitants. Jabalpur fish markets reflect the existence of good number species of freshwater fishes which indicate that a large number of peoples prefer the variety of species of fishes for their protein requirements. Marketing influences socio-economy and livelihood of people related to marketing activities in the areas. Fish markets of Jabalpur influence the livelihood of a good number population associated through fish marketing business. The Government intervention and public private intervention is necessary for commercial implementation and improvement.

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