



## A Historical Review and Recent Updates on Ichthyofaunal Diversity of Ahilyanagar District, Maharashtra

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### Abstract

A comprehensive and updated inventory of fish species in Ahilyanagar District is crucial for sustainable fisheries, aquaculture, and conservation efforts. This study systematically reviews existing literature, author-collected specimens, and records from the Zoological Survey of India, Pune, documenting 81 fish species across 12 orders and 26 families. Cypriniformes is the dominant order, comprising 43 species (53%). As per the IUCN Red List of Threatened Species, 57 species are assessed as Least Concern, while 2 as Data Deficient, 3 Near Threatened, 3 Vulnerable, and 3 Endangered. Additionally, the inventory identifies 3 transplanted and 10 exotic species. The inventory also updates previous records by eliminating 25 sp. due to taxonomic issues and/or distribution mismatch. This updated dataset serves as a vital reference for researchers, policymakers, and conservationists, aiding in the sustainable management of ichthyofaunal resources and supporting future biodiversity conservation initiatives in the district.

### Keywords:

Ahilyanagar, Ichthyofauna,  
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### Introduction

The Ahilyanagar (prior to 31 May 2023 known as Ahmednagar) is the largest district in Maharashtra in terms of area, spans approximately 17,480 km<sup>2</sup>, accounting for 5.54% of the state's total geographical extent. It is located between (18°25'01''–19°59'01'') N latitude and (73°15'01''–75°52'01'') E longitude, in the northwestern region of Maharashtra (Dongre *et al.*, 2024). Physiographically, Ahilyanagar is categorized into three major divisions: the Western Hilly Region, the Central Plateau Region, and the Northern and Southern Plains. Hydrologically, it falls under two major river basins—the Godavari in the north and the Bhima in the south—along with several tributaries, including the Pravara, Mula, Sina, and Dhora rivers, which predominantly flow south-eastward. Ahilyanagar falls within the "Rain Shadow" zone of the Western Ghats, making it prone to frequent drought conditions (CGWB, 2014). Due to the limited scope of extensive taxonomic studies, the northern Western Ghats were historically considered species-poor, a pattern that also extends to the aquatic ecosystems of Ahilyanagar district.

Despite the ecological significance of Ahilyanagar District, studies on its ichthyofaunal diversity have been limited. The earliest documented record dates back to the Gazetteer of Ahmednagar District (1976), which reported only 13 fish species. A substantial research gap followed, with no available literature between 1976 and 2008. The first major study after this period was conducted by Shinde *et al.* (2009),

reporting 41 fish species from the Pravara River at Pravara Sangam, encompassing seven orders, 14 families, and 26 genera. Around the same time, Pawar (2009) documented 24 fish species from Sadatpur Lake, covering 17 genera and two orders, alongside an assessment of water quality. Subsequent studies have provided scattered insights into the ichthyofauna of Ahilyanagar. Pawar et al. (2011) recorded 17 species from the Pravara River in relation to pisciculture, while MPCB & CIFE (2011) assessed water quality and fisheries along the Godavari River, documenting nine species from Kopergaon and Pravara Sangam. Karmakar et al. (2012) identified only five peculiar species in the district. Rathod (2012) contributed to the understanding of ichthyofaunal diversity by documenting 31 species from Kopergaon and Newasa in the Godavari Basin. Similarly, Khedkar et al. (2014) investigated the impact of dams on fish diversity, reporting 30 species from Pachegaon and Newasa.

Additional studies continued to highlight the ichthyofaunal diversity across various water bodies in the district. Aher & Sonwane (2015) identified 19 species from the Mula Dam Reservoir in Rahuri. Khobragade & Lipokrenba (2016) reported 21 species at the Pravara-Godavari confluence in Toka, Newasa. Tapase (2016) documented 18 species from Pravara Sangam, whereas Kale et al. (2018) recorded 11 species from Lonimavla Reservoir. In the same year, Khumbhar et al. (2018) reported 26 species from the Bhima River at Pedgaon. Kawade & Pandarkar (2019) contributed a species-specific record of *Labeo boggut* from Kalu Dam. More recently, Tapase & Patole (2020) recorded 31 species from Pravara Sangam, while Thorat et al. (2022) documented 23 species from the Mula Reservoir, including seasonal variations. The

most recent study by Jadhav et al. (2024) identified six species from sampling stations along the Godavari River in Ahilyanagar District. Despite these efforts, a comprehensive and updated ichthyofaunal inventory for Ahilyanagar District remains lacking.

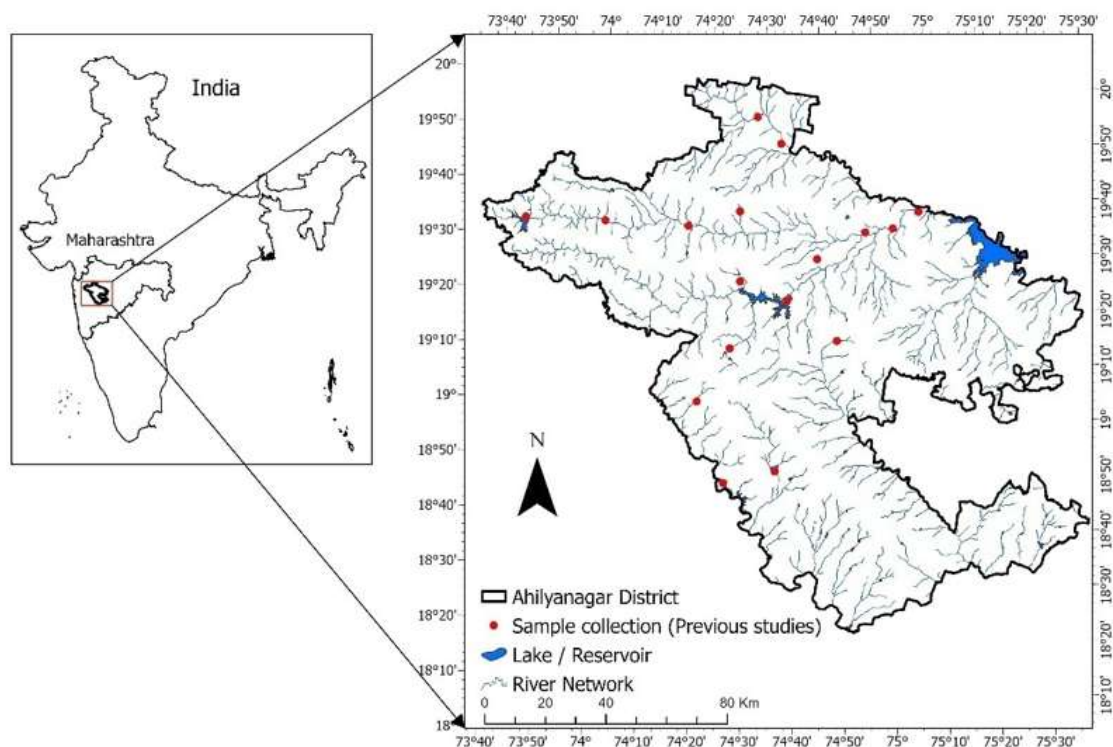
A review of the literature highlights five major interacting threats to freshwater biodiversity: invasion by exotic species, overexploitation, water pollution, flow modification, and habitat destruction or degradation (Dudgeon et al., 2006). These threats, varying in severity, have been documented in the freshwater systems of Maharashtra (Molur et al., 2011). Similar challenges were reported within the Godavari River Basin by Khedkar et al. (2014). Since Ahilyanagar is located within this basin, it is also subject to these threats.

In addition, several invalid species names continue to be considered valid, while certain specific names remain unscientifically accepted due to their description without adherence to taxonomic codes, thus constituting *nomina nuda* (Molur et al., 2011). Furthermore, some earlier studies have erroneously listed species without a defined geographical distributional range.

This study aims to address these gaps by compiling a detailed and updated checklist of the freshwater fish diversity within the Ahilyanagar district.

### Materials and Methods

To prepare the present inventory of the ichthyofauna of Ahilyanagar District (Fig. 1), a comprehensive review of available literature from 1976 to 2024 was conducted, alongside collections made by the authors and those available at the Zoological Survey of India,



**Fig. 1** Location map of Ahilyanagar District, highlighting sample collection points from prior research.

Pune. A review of both peer-reviewed and non-peer-reviewed published literature was performed. The taxonomic status was systematically revised according to the nomenclature for family, genus, and species names based on Van der Laan & Fricke (2024), as well as Fricke et al., (2024). The threat status and distributional range of the fish species were assessed based on the IUCN. Notably, the threat status of transplanted and exotic species was not included in this review. A discussion of taxa previously recorded in the literature, along with explanations for their removal, is also provided to prevent repetition.

## Results and discussion

A total of 81 fish species, belonging to 12 orders, 26 families, and 46 genera, have been reported from Ahilyanagar District (Table 1). The dominant order is *Cypriniformes*, with 43 species, followed by *Siluriformes* (17 species), *Anabantiformes* (6 species), and *Synbranchiformes* and *Mugiliformes* (3 species each). *Beloniformes* and *Cichliformes* each include two species, while *Osteoglossiformes*, *Anguilliformes*, *Characiformes*, *Gobiiformes*, and *Cyprinodontiformes* each represent one species. The family *Cyprinidae* is the most diverse, comprising 28 species, followed by *Danionidae* with 10 species (Fig. 2).

According to the IUCN Red List of Threatened Species (2024), 57 species are assessed as Least Concern, while two species as Data Deficient. Three species are

listed as Near Threatened (*Anguilla bengalensis*, *Ompok bimaculatus*, and *Ompok pabo*), one as Vulnerable (*Wallago attu*), and three as Endangered (*Puntius fraseri*, *Thynnichthys sandkhol*, and *Clarias magur*). Additionally, three species have been transplanted, and ten exotic species have been reported.

The three transplanted species, introduced for culture purposes in Maharashtra's reservoirs (Sugunan, 1995), include *Labeo catla*, *Labeo rohita*, and *Cirrhinus mrigala*, all of which are also found in Ahilyanagar District. The ten exotic species identified are *Cyprinus carpio*, *Hypophthalmichthys molitrix*, *Ctenopharyngodon idella*, *Piaractus brachypomus*, *Pterygoplichthys pardalis*, *Pangasianodon hypophthalmus*, *Clarias gariepinus*, *Gambusia affinis*, *Oreochromis mossambicus*, and *Oreochromis niloticus*. Among these, three species—*Cyprinus carpio*, *Gambusia affinis*, and *Oreochromis mossambicus*—are listed in the Global Invasive Species Database (GISD, 2024), suggesting their potential invasion in the district's reservoirs and river systems.

*Clarias gariepinus*, *Pangasianodon hypophthalmus*, and *Oreochromis niloticus*, though restricted for culture purposes, have been reported in the catches of local fishermen. The presence of highly invasive species such as *Piaractus brachypomus* and *Pterygoplichthys pardalis* is an alarming indicator of growing threats to the riverine biodiversity of the region.

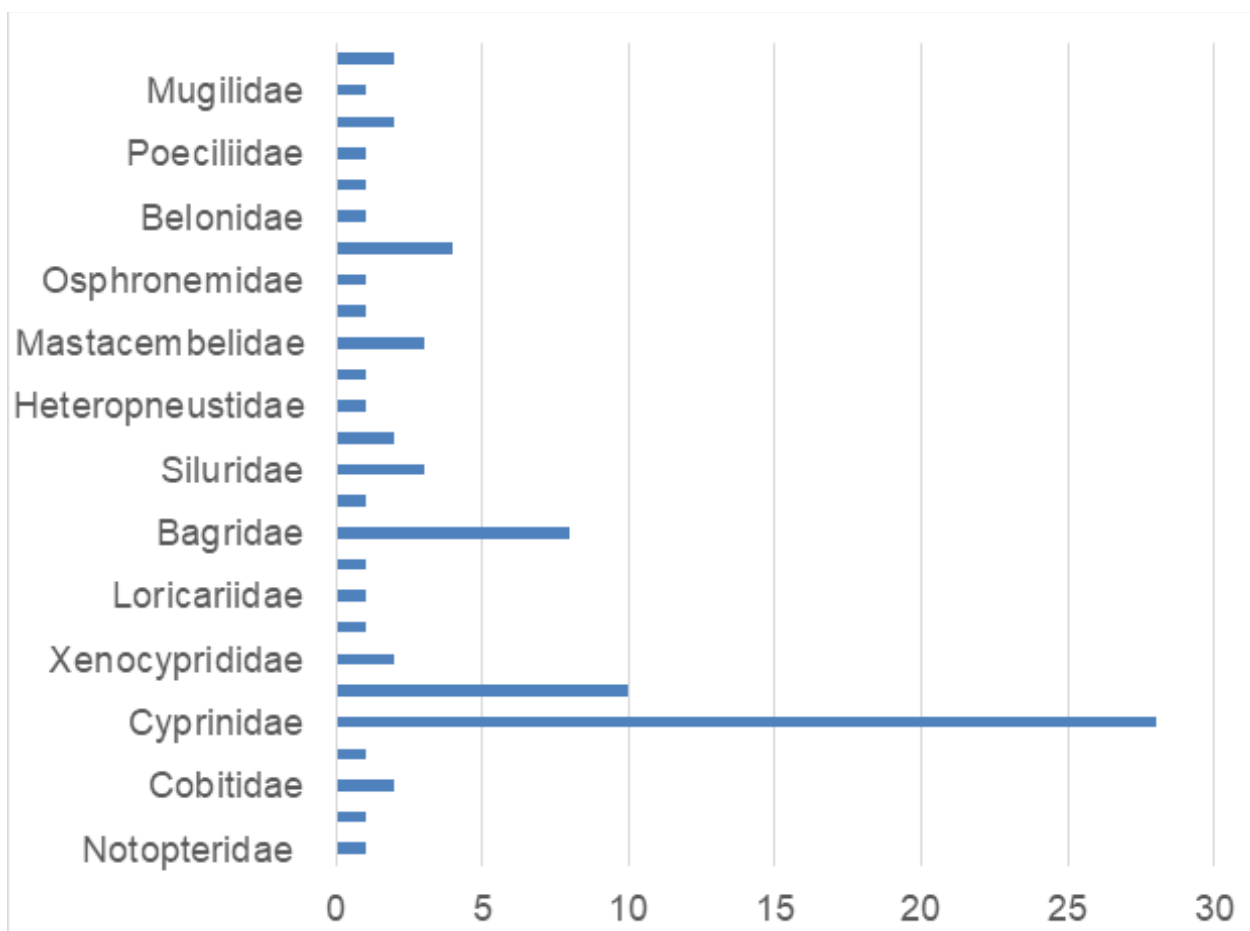


Fig. 2 Family wise species distribution

**Table 1** Checklist of Fishes of Ahilyanagar

Order	Family	Species	IUCN Status
<b>Osteoglossiformes</b>	<b>Notopteridae</b>	<i>Notopterus synurus</i> (Bloch & Schneider 1801)	LC
<b>Anguilliformes</b>	<b>Anguillidae</b>	<i>Anguilla bengalensis</i> (Gray 1831)	NT
<b>Cypriniformes</b>	<b>Cobitidae</b>	<i>Lepidocephalichthys guntea</i> (Hamilton, 1822)	LC
		<i>Lepidocephalichthys thermalis</i> (Valenciennes, 1846)	LC
	<b>Nemacheilidae</b>	<i>Paracanthocobitis botia</i> (Hamilton, 1822)	LC
	<b>Cyprinidae</b>	<i>Bhava vittata</i> Day, 1865	LC
		<i>Cirrhinus cirrhosus</i> (Bloch, 1795)	VU
		<i>Cirrhinus mrigala</i> (Hamilton, 1822)	Transplanted
		<i>Cirrhinus reba</i> (Hamilton, 1822)	LC
		<i>Cyprinus carpio</i> Linnaeus, 1758	Exotic
		<i>Garra mullya</i> (Sykes, 1839)	LC
		<i>Gymnostomus ariza</i> (Hamilton 1807)	LC
		<i>Hypselobarbus jerdoni</i> (Day, 1870)	LC
		<i>Hypselobarbus kolus</i> (Sykes, 1839)	VU
		<i>Labeo bata</i> (Hamilton, 1822)	LC
		<i>Labeo boga</i> (Hamilton, 1822)	LC
		<i>Labeo boggut</i> (Sykes, 1839)	LC
		<i>Labeo calbasu</i> (Hamilton, 1822)	LC
		<i>Labeo catla</i> (Hamilton, 1822)	Transplanted
		<i>Labeo fimbriatus</i> (Bloch, 1795)	LC
		<i>Labeo rohita</i> (Hamilton, 1822)	Transplanted
		<i>Osteobrama peninsularis</i> Silas 1952	LC
		<i>Osteobrama vigorsii</i> (Sykes 1839)	LC
		<i>Pethia conchonius</i> (Hamilton, 1822)	LC
		<i>Pethia phutunio</i> (Hamilton 1822)	LC
		<i>Pethia ticto</i> (Hamilton, 1822)	LC
		<i>Puntius amphibius</i> (Valenciennes 1842)	DD
		<i>Puntius chola</i> (Hamilton, 1822)	LC
		<i>Puntius dorsalis</i> (Jerdon 1849)	LC
		<i>Puntius fraseri</i> (Hora & Misra 1938)	EN
		<i>Puntius sophore</i> (Hamilton, 1822)	LC
		<i>Systemus sarana</i> (Hamilton, 1822)	LC
	<i>Thynnichthys sandkhol</i> (Sykes 1839)	EN	
	<b>Danionidae</b>	<i>Amblypharyngodon mola</i> (Hamilton, 1822)	LC
		<i>Barilius evezardi</i> Day, 1872	DD
<i>Devario aequipinnatus</i> (McClelland, 1839)		LC	
<i>Laubuka laubuca</i> (Hamilton, 1822)		LC	
<i>Rasbora daniconius</i> (Hamilton, 1822)		LC	
<i>Salmostoma novacula</i> (Valenciennes 1838)		LC	
<i>Salmostoma bacaila</i> (Hamilton, 1822)		LC	
<i>Salmostoma phulo</i> (Hamilton, 1822)		LC	
<i>Salmostoma boopis</i> (Day, 1874)		LC	
<i>Salmostoma untrahi</i> (Day 1869)		LC	
<b>Xenocyprididae</b>		<i>Hypophthalmichthys molitrix</i> (Valenciennes, 1844)	Exotic
	<i>Ctenopharyngodon idella</i> (Valenciennes, 1844)	Exotic	
<b>Characiformes</b>	<b>Serrasalminidae</b>	<i>Piaractus brachypomus</i> (Cuvier, 1818)	Exotic
<b>Siluriformes</b>	<b>Loricariidae</b>	<i>Pterygoplichthys pardalis</i> (Castelnau, 1855)	Exotic
	<b>Ailiidae</b>	<i>Eutropiichthys vacha</i> (Hamilton 1822)	LC

	<b>Bagridae</b>	<i>Mystus bleekeri</i> (Day, 1877)	LC
		<i>Mystus cavasius</i> (Hamilton, 1822)	LC
		<i>Mystus gulio</i> (Hamilton, 1822)	LC
		<i>Mystus seengtee</i> (Hamilton, 1822)	LC
		<i>Mystus tengara</i> (Hamilton, 1822)	LC
		<i>Mystus vittatus</i> (Bloch, 1794)	LC
		<i>Sperata aor</i> (Hamilton, 1822)	LC
		<i>Sperata seenghala</i> (Sykes, 1839)	LC
	<b>Pangasiidae</b>	<i>Pangasianodon hypophthalmus</i> (Sauvage, 1878)	Exotic
	<b>Siluridae</b>	<i>Ompok bimaculatus</i> (Bloch, 1794)	NT
		<i>Ompok pabo</i> (Hamilton 1822)	NT
		<i>Wallago attu</i> (Bloch & Schneider, 1801)	VU
	<b>Clariidae</b>	<i>Clarias magur</i> (Hamilton, 1822)	EN
		<i>Clarias gariepinus</i> (Burchell, 1822)	Exotic
	<b>Heteropneustidae</b>	<i>Heteropneustes fossilis</i> (Bloch, 1794)	LC
<b>Gobiiformes</b>	<b>Gobiidae</b>	<i>Glossogobius giuris</i> (Hamilton, 1822)	LC
<b>Synbranchiformes</b>	<b>Mastacembelidae</b>	<i>Mastacembelus armatus</i> (Lacepède, 1800)	LC
		<i>Macrognathus aral</i> (Bloch & Schneider, 1801)	LC
		<i>Macrognathus pancalus</i> Hamilton, 1822	LC
<b>Anabantiformes</b>	<b>Anabantidae</b>	<i>Anabas testudineus</i> (Bloch, 1792)	LC
	<b>Osphronemidae</b>	<i>Trichogaster fasciata</i> Bloch & Schneider, 1801	LC
	<b>Channidae</b>	<i>Channa marulius</i> (Hamilton, 1822)	LC
		<i>Channa gachua</i> (Hamilton, 1822)	LC
		<i>Channa punctata</i> (Bloch, 1793)	LC
		<i>Channa striata</i> (Bloch, 1793)	LC
<b>Beloniformes</b>	<b>Belonidae</b>	<i>Xenentodon cancila</i> (Hamilton, 1822)	LC
	<b>Adrianichthyidae</b>	<i>Oryzias dancena</i> (Hamilton, 1822)	LC
<b>Cyprinodontiformes</b>	<b>Poeciliidae</b>	<i>Gambusia affinis</i> (Baird and Girard, 1853)	Exotic
<b>Cichliformes</b>	<b>Cichlidae</b>	<i>Oreochromis mossambicus</i> (Peters, 1852)	Exotic
		<i>Oreochromis niloticus</i> (Linnaeus, 1758)	Exotic
<b>Mugiliformes</b>	<b>Mugilidae</b>	<i>Rhinomugil corsula</i> (Hamilton, 1822)	LC
	<b>Ambassidae</b>	<i>Chanda nama</i> Hamilton, 1822	LC
		<i>Chanda ranga</i> (Hamilton, 1822)	LC

**Table 2** Doubtful species removed from the final checklist of fishes of Ahilyanagar

Species	Reason	Reference
<i>Lepidocephalichthys berdmorei</i> (Blyth 1860)	This species is known from Manipur, India, as well as Bangladesh, China (Yunnan), Myanmar, Laos, Thailand, and Vietnam.	Daniels & Dahanukar, 2020
<i>Diptychus maculatus</i> Steindachner 1866	This species is known from North and East Asia, including China (Xinjiang, Tibet), Kazakhstan, Kyrgyzstan, Tajikistan, and Uzbekistan.	Karimov& Mamilov, 2020
<i>Garra lamta</i> (Hamilton 1822)	This species is known from the Ganga and Brahmaputra River basins in India, Nepal, and Bangladesh.	Singh, 2010a
<i>Labeo angra</i> (Hamilton 1822)	This species is known from northern India, including Assam, West Bengal, Bihar, Uttar Pradesh, Punjab, and Odisha.	Devi & Boguskaya, 2009
<i>Barbus chilinoides</i> Günther, 1868	This species is known from Uttar Pradesh, India, and Nepal, in the headwater drainages of the Ganges.	Dahanukar, 2015

<i>Pethia punctata</i> (Day 1865)	This species is endemic to the Western Ghats of India	Dahanukar, 2023
<i>Tariqilabeo latius</i> (Hamilton, 1822)	This species is known from the drainages of the Ganga and Brahmaputra in northern India.	Singh, 2018
<i>Amblypharyngodon melettinus</i> (Valenciennes 1844)	This species is distributed along the coastal water bodies of Karnataka, Kerala, and Tamil Nadu in India and in the coastal water bodies of Sri Lanka.	Abraham, 2011a
<i>Barilius vagra</i> (Hamilton 1822)	This species is widely distributed from Afghanistan to Manipur, including the Indus, Ganga, and Brahmaputra drainages in northern India, Nepal, and Bangladesh.	Vishwanath, 2010a
<i>Laubuka fasciata</i> (Silas 1958)	This species is endemic to Kerala.	Raghavan & Ali, 2011
<i>Rasbora rasbora</i> (Hamilton 1822)	This species is known from the Gangetic provinces and Assam in India.	Vishwanath, 2010b
<i>Ompok binotatus</i> Ng, 2002	This species is known only from the Kapuas River drainage in western Borneo.	Ng, 2020
<i>Nemacheilus beavani</i> (Günther 1868)	This species occurs predominantly in the Ganga River drainage.	Vishwanath, 2010c
<i>Cirrhinus fulungee</i> (Sykes, 1839)	This species is known from the Mula-Mutha, Pavana, Neera, Krishna, Koyna, Panchaganga, and Adan rivers, Ujani Wetland, Pashan Lake, and Kinwat in Maharashtra.	Dahanukar, 2011
<i>Chanos salamoneus</i>	This species inhabits coastal and marine waters.	Fricke et al. 2024
<i>Chitala chitala</i> (Hamilton, 1822)	This species is recorded from Manipur, Uttarakhand, West Bengal, Assam, Tripura, Uttar Pradesh, and Bihar in India.	Chaudhary, 2010
<i>Hyporhamphus xanthopterus</i> (Valenciennes 1847)	This species is endemic to the lakes of southern Kerala.	Shaji, 2011
<i>Channa orientalis</i> Bloch & Schneider, 1801	This species is is endemic to Sri Lanka.	Goonatilake et al. 2019
<i>Mugil cephalus</i> Linnaeus, 1758	This species inhabits coastal and marine waters.	Froese and Pauly, 2024
<i>Pangasius pangasius</i> (Hamilton, 1822)	This species is reported from lower stretch of Godavari river.	Jadhav et al. 2024
<i>Claris batrachus</i> (Linnaeus, 1758)	Due to a recent taxonomic change, this species is now restricted to Java, Indonesia, while <i>Clarias magur</i> (Hamilton, 1822) applies to the taxon in the Indian subcontinent.	Ng & Kottelat 2008
<i>Discognathus modestus</i>	<ul style="list-style-type: none"> <li>• Synonym of <i>Garra lissorhynchus</i> (McClelland, 1842)</li> </ul> This species is known from northeastern India mainly from Arunachal Pradesh, Assam, Manipur, Mizoram, Nagaland and Meghalaya.	Froese and Pauly, 2024 Singh, 2010b
<i>Osteobrama alfredianus</i> (Valenciennes 1844)	This species is known from South east Asia.	Fricke et al. 2024
<i>Macrones malabaricus</i> (Jerdon, 1849)	<ul style="list-style-type: none"> <li>• Synonym of <i>Mystus malabaricus</i> (Jerdon, 1849)</li> </ul> This species is endemic to Western Ghats, found in the west-flowing rivers of Kerala and Karnataka, and the Mula-Mutha and Pavana rivers in Maharashtra.	Froese and Pauly, 2024 Abraham, 2011
<i>Chela fasciata</i> Silas 1958	<ul style="list-style-type: none"> <li>• Synonym of <i>Laubuka fasciata</i> (Silas, 1958)</li> </ul> This species is endemic to Kerala.	Froese and Pauly, 2024

While compiling this list, 25 species from earlier publications and checklists were removed due to taxonomic reasons and/or distribution mismatch (Table 2), along with additional synonymous species.

The species richness, diversity, and abundance of fish are higher in the Godavari River system (Khedkar et al., 2014; Jadhav et al., 2024). The Ahilyanagar district, being part of this basin, exhibits similar patterns, as confirmed by the results of the present study. The increasing number and spatial distribution of exotic species, coupled with pollution from municipal and industrial sources, pose significant threats. There is an urgent need to conduct stream-wise surveys in Ahilyanagar District to more accurately document the current status of fish diversity for its sustainable utilization and conservation.

## Conclusion

The Ahilyanagar District has a rich diversity of fish, with 81 species identified. The increasing number of invasive species is major threats to the region's freshwater ecosystems. Despite previous studies, an updated and comprehensive species inventory is lacking, which limits conservation efforts. The study calls for urgent stream surveys, which would provide a more precise understanding of the current status of fish diversity in the district. Overall, this updated inventory of fish species of Ahilyanagar District, covering nomenclature, systematics, IUCN status, endemic and exotic species, will serve as a baseline resource for future ichthyological studies and conservation efforts aimed at ensuring the sustainable utilization and protection of freshwater fish biodiversity in the District.

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