FISH DIVERSITY AND STATUS

Key words: Fishes, Corals, Diversity, Endemic

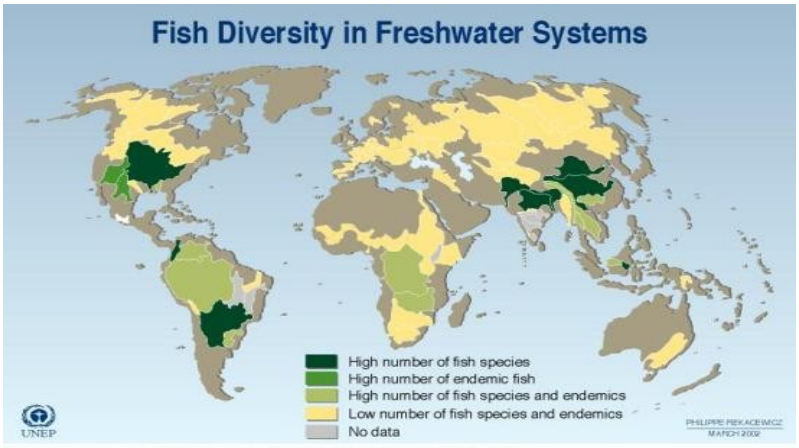
INTRODUCTION

Ichthyodiversity refers to variety of fish species; depending on context and scale, it could refer to alleles or genotypes within piscian population, to species of life forms within a fish community, and to species of life forms across aquaregimes (Burton *et.al*., 1992). Biodiversity is also essential for stabilization of ecosystems, protection of overall environmental quality, for understanding intrinsic worth of all species on the earth (Ehrlich & Wilson, 1991). Positive correlations between biomass production and species abundance have been recorded in various earlier studies (Nikolsky, 1978). The species diversity of an ecosystem is often related to the amount of living and nonliving organic matter present in it. However, apparently, species diversity depends less on the characteristics of a single ecosystem than on the interaction between ecosystems, e.g., transport of living animals across the different gradient zones in the waterbody. The effect of such transport is an important 'information' exchange enhancing the genetic diversity. The genetic imprinting of various populations of lentic fish species is essential since the freshwater ecosystems constitute crucial parts of their life-support systems by providing nursing grounds and feeding areas (Hammer *et al*., 1993). Further, species diversity is a property at the population level while the functional diversity concept is more strongly related to ecosystem stability and stress, physical and chemical factors for determining population dynamics in the lentic ecosystem. Also, the various organisms including the plankton play a significant role in the dynamics of the ecosystem (Kar & Barbhuiya, 2004).

Fish constitutes almost half of the total number of vertebrates in the world. They live in almost all conceivable aquatic habitats. They exhibit enormous diversity of size, shape and biology, and in the habitats they occupy. Of the 39,900 species of vertebrates in the world, Nelson (1984) estimated 21,723 extant species of fish under 4,044 genera, 445 families and 50 Orders in the world, compared to 21,450 extant tetrapods. Of these, 8,411 are freshwater species and 11,650 are marine. Other researchers, have arrived at different estimates, most of which range between 17,000 and 30,000 for the numbers of currently recognized fish species. The eventual number of living fish species may be close to 28,000 in the world. Day (1889) described 1418 species of fish under 342 genera from the British India. The fish fauna of the major tropical regions, Southern Asia, Africa, South and Central America are generally different with respect to genera; but, some families have members in two or all of the continents. In Southern Asia the predominant fish groups are the carps (Cyprinidae) and the cat fishes (Siluroidea) (Berra, 1981).

India is one of the megabiodiversity countries in the world and occupies the ninth position in terms of freshwater megabiodiversity (Mittermeier & Mittermeier, 1997). The Indian fish population represents 11.72% of species, 23.96% of genera, 57% of families and 80% of the global fishes. Out of the 2200 species so far listed, 73 (3.32%) belong to the cold freshwater regime, 544 (24.73%) to the warm fresh waters domain, 143 (6.50%) to the brackish waters and 1440 (65.45%) to the marine ecosystem. This bewildering ichthyodiversity of this region has

been attracting many ichthyologists both from India and abroad. Concomitantly, the northeastern region of India was identified as a biodiversity hotspot by the World Conservation Monitoring Centre (WCMC, 1998). This rich diversity of this region could be assigned to certain reasons, notably, the geomorphology and the tectonics of this zone. The hills, and the undulating valleys of this area gives rise to large number of torrential hill streams, which lead to big rivers; and, finally, become part of the Ganga-Brahmaputra-Barak-Chindwin-Kolodyne-Gomati-Meghna system (Kar, 2005).



Source: Revenga et al., World Resources Institute (WRI), Washington DC, 1998.

Fig – 3.1

The Indian fish fauna is divided into two classes, viz., Chondrichthyes and Osteichthyes. The Chondrichthyes are represented by 131 species under 67 genera, 28 families and 10 Orders in the Indian region. The annual average landings of the Indian Chondrichthyes is 33,442 tonnes, of which, 15,537 tonnes come from the east coast and 17,605 tonnes come from the west coast and the rest come from the Andaman and Nicobar, and Lakshadeep Islands.

The Indian Osteichthyes are represented by 2,415 species belonging to 902 genera, 226 families and 30 orders, of which, five families, notably the family Parapsilorhynchidae are endemic to India. These small hillstream fishes include a single genus, viz., *Parapsilorhynchus* which contains 3 species. They occur in the Western Ghats, Satpura mountains and the Bailadila range in Madhya Pradesh only. Further, the fishes of the family Psilorhynchidae with the only genus Psilorhynchus are also endemic to the Indian region. Other fishes endemic to India include the genus *Olytra* and the species *Horaichthys* setnai belonging to the families Olyridae and Horaichthyidae respectively. The latter occur from the Gulf of Kutch to Trivandrum coast. The endemic fish families form 2.21 per cent of the total bony fish families of the Indian region. 223 endemic fish species are found in India, representing 8.75 per cent of the total fish species known from the Indian region and 128 monotypic genera of fishes found in India, representing 13.20 per cent of the genera of fishes known from the Indian region.

There are about 450 families of freshwater fishes globally. Roughly 40 are represented in India (warm freshwater species). About 25 of these families contain commercially important species. Number of endemic species in warm water is about 544. Major warm water species are:

Bagarius bagarius, Catla catla, Channa marulius, C. punctatus, C. striatus, Cirrhinus mrigala, Clarias batrachus, Heteropneustes fossilis, Labeo bata, L. calbasu, L. rohita, Aorichthys seenghala, Notopterus chitala, N. notopterus, Pangasius pangasius, Rita rita, Wallago attu.

Cyprinids (family: Cyprinidae), Live fish (family: Anabantidae, Clariidae, Channidae, Heteropneustidae), Cat fish (family: Bagridae, Silurdae, Schilbeidae), Clupeids (family: Clupeidae), Mullets (family: Mugilidae), featherbacks (family: Notopteridae), Loaches (family: Cobitidae), Eels (family: Mastacembelidae), Glass fishes (family: Chandidae) and Gobies (family: Gobiidae) are the major groups of fresh water fishes found in India.

The Western Ghats, one of the well-known biodiversity hotspots of the world, harbours 289 species of freshwater fish of which 119 are endemic. The ecosystems in this region have been, over the past 150 years or so, experiencing tumultuous changes due to the ever-increasing human impacts. In this regard, a study was conducted in Sharavathi River, central Western Ghats to understand fish species composition with respect to landscape dynamics. The study, using a combination of remote-sensing data as well as field investigations shows that the streams having their catchments with high levels of ever greenness and endemic tree species of the Western Ghats were also richer in fish diversity and endemism, compared to those catchments with other kinds of vegetation. This illustrates that the composition and distribution of fish species have a strong association with the kind of terrestrial landscape elements and the importance of landscape approach to conservation and management of aquatic ecosystems. (**Fish diversity in relation to landscape and vegetation in central Western Ghats, India;** Sreekantha, M. D. Subash Chandran, D. K. Mesta, G. R. Rao, K. V. Gururaja and T. V. Ramachandra).

CORAL REEFS

Coral reefs have long been known for their rich diversity of fish and invertebrates, but examining the diversity of highly mobile fish in the open ocean has been elusive. Fish are the most prominent mobile animals on coral reefs, and achieve a level of local diversity that is rarely found among terrestrial vertebrates. The high fish diversity is unusual in that it occurs along with high total densities of individuals and high total biomass. Another unusual feature of the high fish diversity is the large number of closely related species found on most reefs.

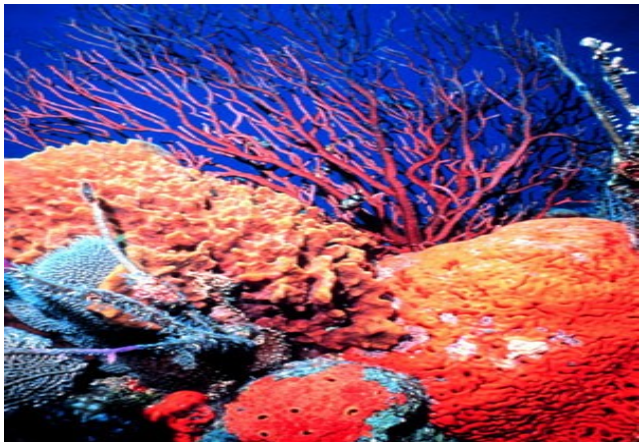


Fig – 3.2

For example, in the Capricon group of reefs at the southern end of Australia's Great Barrier Reef, there are around 850 species of fish, representing 84 families and 297 genera. A number of genera have over a dozen species, including *Chaetodon*, *Scarus*, *Apogon*, *Pomacentrus*, *Acanthurus* and *Halichoeres*. Fifty or more species commonly coexist on patch reefs only three meters in diameter, and even more species can be found coexisting within a similarly sized area at the northern end of the Great Barrier Reef, where fish diversity is even higher (Sale, 1978). equilibrium from occuring. A similar phenomenon is found in the great rift lakes of Africa (Malawi, Tanganyika, Victoria) (Lowe-McConnell, 1987).

Coral reefs are the most complex ecosystems in the seas. Fish communities reach their highest degree of diversity in these ecosystems, and differ enormously within and between reefs in the same area (William, 1991; Ormond and Roberts, 1997) and between geographic regions (Briggs, 1974, 1996). The relative roles of local and regional processes in explaining community diversity in marine systems, as well as in terrestrial systems, have been hotly debated and several, most often contradictory, explanations have been proposed (Strong *et.al*., 1984; Ricklefs, 1987).

The high level of diversity supported by coral reefs may be best explained as the result of various processes operating on different scales in space and time (Jackson, 1991; Kohn, 1997). At the local scale (e.g., within reef zones), the diversity observed in local fish assemblages is explained by both deterministic (interspecific competition for food and shelter; predation pressure) and stochastic (recruitments; perturbation) ecological processes (Scale, 1977, 1991; Harmelin-Vivien, 1989).

On the regional scale (e.g., Pacific vs. Atlantic, West Pacific vs. Central Pacific), the diversity of extant faunas of reef fishes is explained mainly by interactions of historical hydrodynamic and geological processes with each species' life cycle characteristics, particularly larval dispersal ability (Victor, 1991). On the global scale (e.g., tropical vs. temperate), explaining why tropical regions contain so many species has been one of problems of community ecology since the nineteenth century (Pianka, 1966; MacArthur, 1972; Stevens, 1989; Crame and Clarke, 1997), despite intensive studies in both aquatic and terrestrial environments. Until now, no convincing explanation in terms of physiology, ecology, or evolutionary processes has been offered (A. Clarke, 1996). Some arguments state that the high diversity of fishes observed on present day coral reefs is partly related to the sustained higher temperatures in the tropics over geological time, and to the more efficient use and transfer of energy permitted by long-term temperature stability. High temperature and environmental stability have influenced evolutionary processes form the molecular level to the community level of organization.

Erosion of fish diversity

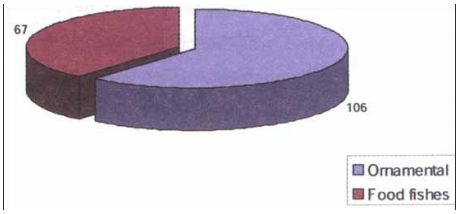


Fig – 3.3

The freshwaters of India have been viewed from a single perspective: that of economic production. They are to be sources of irrigation or urban-industrial water supply or of hydel power; they are to receive sewage and industrial waste; they may produce edible fish. In this strictly utilitarian framework, there is no space to conserve the rich heritage of freshwater fish diversity of the country. All over India, freshwater fish diversity is on a decline. Many of them have been lost forever Few studies have been carried out so far regarding this aspect. They mainly identified three major forces driving extinction which are; over –harvesting, competition by newly introduced exotic fishes and pollution.

According to a workshop estimate hosted out by National Bureau Fish Genetic Resources a total of 227 Indian freshwater fishes are threatened based on the IUCN Red list Categories of 1994. The species that suffered much are Indian long fin eel (*Anguilla bengalensis*), the redfinned Mahseer, the catfish (*Rita pervimentata*), Chitala (*Notoptrus chitala*), smaller fishes like Indian Hatchet fish (*Chela laubuca*), Scarletbanded Barb (*Puntis amphibious*), Indian Tiger Barb (*Puntis filamentous)* to name a few.

Some other factors are also contributing towards this biodiversity erosion. In the irrigation canal when water is stopped in the canals, they are trapped near the gate and fished out. The nets used for the fishing often have very small mesh and so everything is caught. The shallow streams and pools, such as those at the base of waterfalls, fall victim to the easy availability of dynamite ever since quarrying and road construction began on a grand scale in the country. The shock waves of the blast destroy all fish in the vicinity. Sewage, industrial effluents, chemical fertilizers and pesticides are polluting India's freshwaters. Several carps and barbs as well as fresh water prawns are being susceptible to pollution. The drastic modification of freshwater habitats by damming streams and rivers siltation leading to reduction in their depth has also profoundly affected many fish species like the Indian shad (*Hilsa ilisha*), the carps (*Labeo calbasu*), the catfish (*Bagarius bagarius*) etc. Due to changed habitat, the life cycles of these species have been seriously disrupted. Moreover exotic species like Tilapia, the silver carps, the grass carps, the African catfishes proved catastrophic for native species. Its prolific breeding nature simply crowd out its native competitors. The overall deterioration of habitat has rendered many fishes susceptible to diseases. One of the most serious is epizootic ulcerative syndrome disease that brought mass mortalities and extinction of some species in Indian freshwater fishes.

Fishes-most diverse, yet most neglected

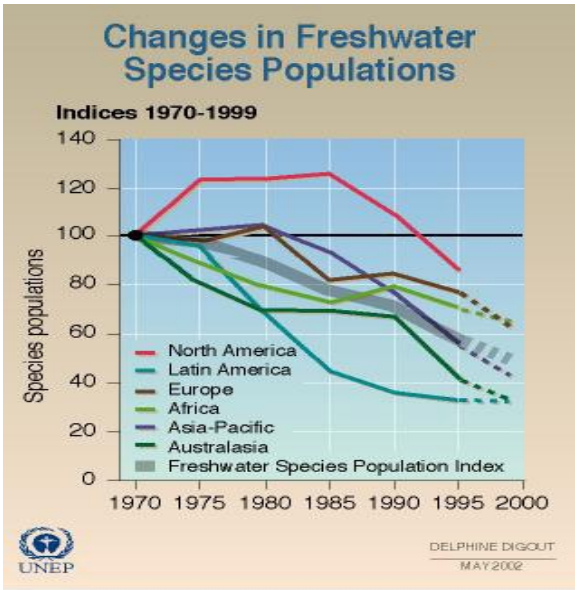
Fishes are the most numerous vertebrates living on this earth and worldwide there are over 25000 species of fishes. Of this about 48% live in freshwaters that constitute just 0.01% of the earth's water. Freshwater fish diversity is unevenly distributed on this planet. The species richness is high in tropical region compared to other parts of the earth. Usually these regions are characterized by high levels of endemism. The world's major rivers like Amazon, Congo, Nile, etc. are some of the pristine rivers of the world with respect to freshwater fish diversity. I t has been estimated that the river Amazon and its tributaries may together harbour 3000 or more species of fishes. Such species-rich areas are called 'hotspots' and dominate other patterns or trends. Probably the climatic conditions of the tropical region are more stable compared to the

temperate regions of the world. This could be one of the favourable conditions for the growth, survival and evolution for the species in tropical regions.

While a great deal of attention has been given to the loss of biodiversity in tropical rain forests, or in coastal areas, the diversity of and within freshwaters has been widely neglected. There is little doubt that freshwater fishes represent the most threatened set of vertebrates (Leveque, 1997). In classifying the worlds' top 25 biodiversity hotspots, vertebrate group was considered excluding fish. This is mainly because of the poorly available data wherein the author (Myer *et al* 2000) predicts that there could be at least 5,000 species waiting to be discovered among fish, which is more than all mammals.

Freshwater Species Population Index:

Between 1970 and 1999, the Freshwater Species Population Index fell by nearly 50%, which constitutes a very rapid decline in population indices.



Source: *Living Planet Report 2000*, World Wide Fund for Nature (WWF).

Fig – 3.4

The Freshwater Species Population Index measures the average change over time in the populations of some 194 species of freshwater birds, mammals, reptiles, amphibians and fish. The index represents the average of six regional indices, which measure freshwater species populations in Africa, Asia-Pacific, Australasia, Europe, Latin America and the Caribbean, and North America. There has been a much smaller decline over the past 30 years in the freshwater species of North America and Europe than those in the other regions. Much of the loss and degradation of freshwater ecosystems in the industrialized world took place prior to 1970.

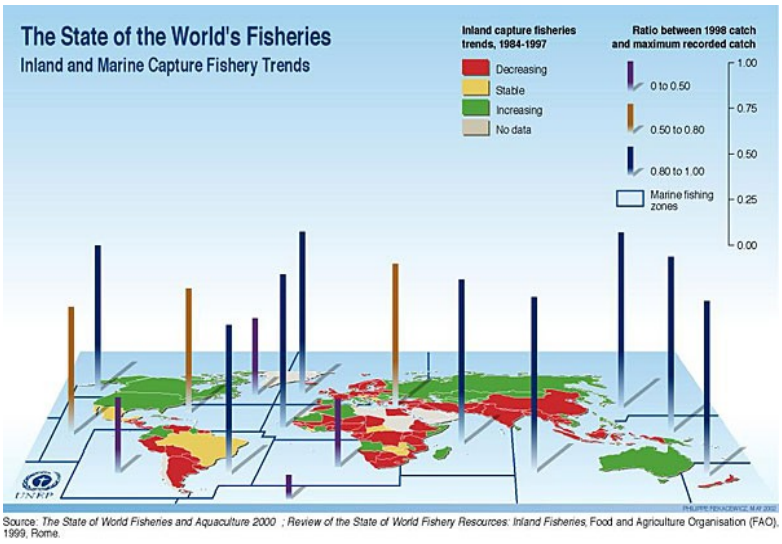


Fig – 3.5

The harvest of freshwater fish is likely to increase either through **capture fisheries** or **aquaculture** (otherwise known as 'fish farming'). In many developing countries, freshwater fish provide a significant contribution to the diets of local communities.

- The introduction of the non-native Nile Perch to Africa's Lake Victoria in 1954, combined with pollution loading and increased water turbidity resulting from agriculture and industrial development, has greatly reduced indigenous fish populations. Kenya for example, reported only 0.5% of its commercial fish catch as Nile Perch in 1976. Five years late, the proportion was 68%. Lake Victoria, the second largest lake in the world, has lost an estimated 200 different endemic species found nowhere else, while the remaining 150 are endangered. Two-thirds of the freshwater species introduced into the tropics worldwide have become established (Revenga et al., 1998)

- In Africa and Asia, fish provide 21% and 28% of all animal protein, respectively (Revenga et al., 1998). The figures are more significant in landlocked countries, where data on the fish caught are often not formally recorded, and their importance is not fully known.

- In 1999, the reported fish production form inland waters totaled 28 million tonnes, with contributions of 8.2 and 19.8 million tonnes from capture fisheries and aquaculture, respectively. With major under-reporting from subsistence fisheries, these figures could be twice as high (FAO, 2000).

FRESHWATER FISH DIVERSITY OF WESTERN GHATS

Several attempts have been made to compile a checklist of freshwater fishes of the Western Ghats. These attempts mainly focused on evolving with a comprehensive checklist of freshwater fishes, which is an outcome of the patchy (may be of a river basin, a region in the Western Ghats,

an administrative boundary within the Western Ghats, etc) taxonomic information available on the diversity of freshwater fishes. Daniels (2001) has listed 218 species from the Western Ghats of which 114 (52%) are endemic to Western Ghats. However, this report lacks a detailed checklist of fishes found in the Western Ghats. The subsequent checklist (Shaji *et al* 2001) listed 287 fishes with names of individual species. This compilation considered certain estuarine fishes that are found to ascend freshwater for longer distances. The list highlighted the presence of 67% endemic species and 18 exotic or transplanted to the region. The most recent information available is by Dahanukar *et al* 2004 that lists 288 freshwater fishes, of which 118 (41%) are endemic to Western Ghats. The threat status of fishes found in Western Ghats suggests that at least 41% of fish fauna is threatened by either being vulnerable, endangered, or critically endangered. This study also necessitates the implication of potent conservation measures to conserve the fish fauna of Western Ghats.

Present scenario

Present compilation of the checklist (Annexure) of the freshwater fishes in Western Ghats region lists 318 species of which 42.8% (136 species) are endemic to the region. Of this about 27 species are critically endangered and 55 endangered while 128 are data deficient. Altogether, 39.1% (123 species) of the freshwater fishes come under the category of critically endangered, endangered and vulnerable (Figure 1). Of the 27 critically endangered species 24 are endemic to the region. Similarly, of the 55 endangered species, 37 are endemic. Yet 49 endemic species are data deficient. A comparison of IUCN status between endemic and non-endemic species has been made in figure 2, which clearly shows that the endemic species comprises more of threatened species and the non-endemic comprise more of generalist species in Western Ghats.

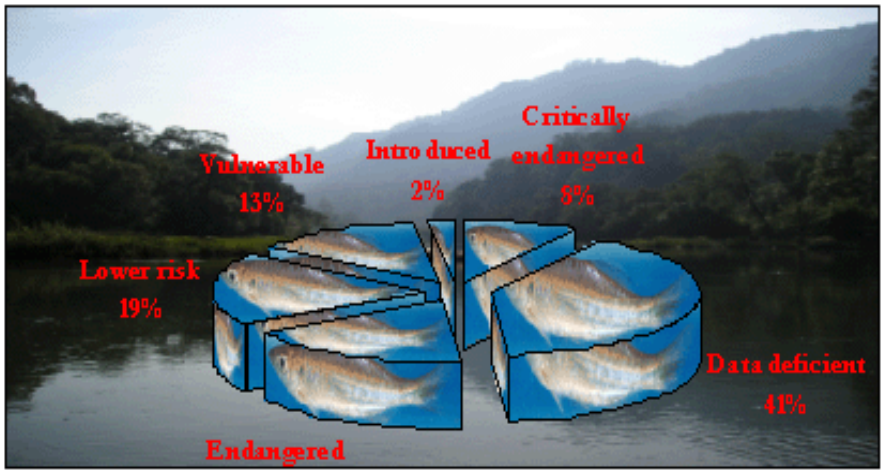


Fig – 3.6 - Composition with respect to IUCN status

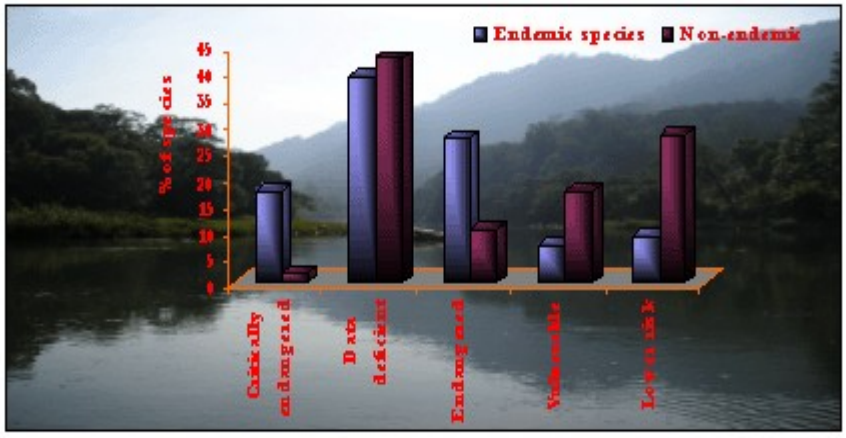


Fig – 3.7 - Comparison of the IUCN status between endemic and non endemic groups of fish species

Annexure:
*Checklist of freshwater fishes of Western Ghats (Compiled from various published sources)
Note : CR - Critically Endangered, EN - Endangered, VU - Vulnerable, LR - Lower Risk, DD - Data Deficient.

Endemic Species of Western Ghats

S.No.	Species Name	Status	S.No.	Species Name	Status
1	*Amblypharyngodon chakaiensis*	CR	69	*Monopterus eapeni*	CR
2	*Balitora brucei*	DD	70	*Mystus malabaricus*	EN
3	*Balitora mysorensis*	CR	71	*Mystus punctatus*	EN
4	*Barilius bakeri*	VU	72	*Nemacheilichthys ruppelli*	DD
5	*Barilius canarensis*	DD	73	*Nemacheilus anguilla*	LR
6	*Barilius evezardii*	LR	74	*Nemacheilus keralensis*	EN
7	*Barilius gatensis*	DD	75	*Nemacheilus monilis*	EN
8	*Batasio sharavatiensis*	DD	76	*Nemacheilus pambarensis*	DD
9	*Batasio travancoria*	EN	77	*Neolissochilus wynaadensis*	CR
10	*Bhavania australis*	EN	78	*Ompok malabaricus*	CR
11	*Botia striata*	EN	79	*Osteobrama bakeri*	EN
12	*Chela dadyburjori*	DD	80	*Osteobrama bheemensis*	DD
13	*Chela fasciata*	CR	81	*Osteobrama neilli*	DD
14	*Clarias dayi*	EN	82	*Osteocheilichthys longidorsalis*	CR
15	*Crossocheilus periyarensis*	VU	83	*Osteocheilichthys nashii*	VU

16	*Danio fraseri*	DD	84	*Osteocheilichthys thomassi*	EN
17	*Dayella malabarica*	LR	85	*Osteochilichthys godavariensis*	DD
18	*Esomus barbatus*	DD	86	*Osteochilus (Kantaka) brevidorsalis*	EN
19	*Etroplus suratensis*	LR	87	*Pangio bashai*	DD
20	*Eutropiichthys goongwaree*	DD	88	*Parambassis dayi*	EN
21	*Garra bicornuta*	DD	89	*Parapsilorhynchus discofhorus*	DD
22	*Garra gotyla stenorhynchus*	EN	90	*Parapsilorhynchus prateri*	DD
23	*Garra hughi*	EN	91	*Parmabassis thomassi*	VU
24	*Garra kalakadensis*	DD	92	*Pristolepis marginata*	VU
25	*Garra mcclellandi*	EN	93	*Pseudeutropius mitchelli*	DD
26	*Garra menoni*	VU	94	*Puntius arenatus*	DD
27	*Garra surendranathanii*	LR	95	*Puntius arulius arulius*	EN
28	*Glypthothorax conirostre poonaensis*	DD	96	*Puntius arulius tambraparniei*	CR
29	*Glyptothorax anamalaiensis*	CR	97	*Puntius bovanicus*	CR
30	*Glyptothorax devisinghi*	CR	98	*Puntius carnaticus*	VU
31	*Glyptothorax housei*	DD	99	*Puntius cauveriensis*	DD
32	*Glyptothorax lonah*	LR	100	*Puntius chalakudaiensis*	DD
33	*Glyptothorax madraspatanum*	VU	101	*Puntius crescentus*	DD
34	*Glyptothorax trewavasae*	DD	102	*Puntius deccanensis*	CR
35	*Gonoproktopterus curmuca*	EN	103	*Puntius denisonii*	EN
36	*Gonoproktopterus dubius*	EN	104	*Puntius fraseri*	DD
37	*Gonoproktopterus kolus*	EN	105	*Puntius goaensis*	EN
38	*Gonoproktopterus kurali*	EN	106	*Puntius jerdoni*	EN
39	*Gonoproktopterus lithopidos*	EN	107	*Puntius kannikattiensis*	DD
40	*Gonoproktopterus micropogon*	EN	108	*Puntius melanostigma*	EN
41	*Gonoproktopterus thomassi*	EN	109	*Puntius mudumalaiensis*	CR
42	*Heteropneustes longipectoralis*	DD	110	*Puntius narayani*	CR
43	*Homaloptera menoni*	DD	111	*Puntius ophicephalus*	EN
44	*Homaloptera montana*	CR	112	*Puntius parrah*	EN
45	*Homaloptera pillaii*	VU	113	*Puntius sahyadriensis*	DD
46	*Homaloptera santhampareiensis*	DD	114	*Puntius sarana subnasutus*	LR

47	*Horabagrus brachysoma*	EN	115	*Puntius setnai*	DD
48	*Horabagrus nigricollaris*	CR	116	*Puntius sharmai*	DD
49	*Horaglanis alikunhi*	DD	117	*Rasbora caverii*	DD
50	*Horaglanis krishnai*	CR	118	*Rasbora labiosa*	DD
51	*Horalabiosa joshuai*	DD	119	*Rohtee ogilbii*	LR
52	*Horalabiosa palaniensis*	DD	120	*Salmostoma boopis*	LR
53	*Hyporhampus xanthopterus*	CR	121	*Salmostoma horai*	DD
54	*Labeo ariza*	CR	122	*Salmostoma novacula*	LR
55	*Labeo dussumieri*	EN	123	*Schismatorhynchus (Nukta) nukta*	DD
56	*Labeo kontius*	EN	124	*Schistura denisoni mukambbikaensis*	DD
57	*Labeo nigrescens*	DD	125	*Schistura denisoni pambarensis*	DD
58	*Labeo potail*	DD	126	*Schistura kodaguensis*	DD
59	*Lepidopygopsis typus*	CR	127	*Schistura nilgiriensis*	EN
60	*Longischistura striatus*	DD	128	*Schistura semiarmatus*	VU
61	*Macropodus dayi*	DD	129	*Schistura sinuatus*	DD
62	*Mesonemacheilus guentheri*	LR	130	*Silonia childreni*	EN
63	*Mesonemacheilus herrei*	DD	131	*Silurus wynaadensis*	CR
64	*Mesonemacheilus petrubanarescui*	DD	132	*Tetraodon travancoricus*	EN
65	*Mesonemacheilus pulchellus*	DD	133	*Tor khudree malabaricus*	CR
66	*Mesonemacheilus triangularis*	LR	134	*Tor mussulah*	CR
67	*Monopterus (Amphipnous) fossorius*	EN	135	*Travancoria jonesi*	EN
68	*Monopterus (Amphipnous) indicus*	DD	136	*Travencoria elongata*	CR

Non-endemic Species of Western Ghats

S.No.	Species Name	Status	S.No.	Species Name	Status
1	*Acanthocobitis botia*	LR	89	*Mastacembelus armatus*	LR
2	*Acanthocobitis moreh*	DD	90	*Megalops cyprinoides*	DD
3	*Ambassis gymnocephalus*	DD	91	*Microphis cuncalus*	VU
4	*Ambassis interruptus*	DD	92	*Mugil cephalus*	DD

5	*Ambassis nalua*	DD	93	*Mystus armatus*	LR
6	*Amblypharyngodon melettinus*	LR	94	*Mystus bleekeri*	VU
7	*Amblypharyngodon microlepis*	DD	95	*Mystus cavesius*	LR
8	*Amblypharyngodon mola*	LR	96	*Mystus gulio*	LR
9	*Anabas testudineus*	VU	97	*Mystus keletius*	DD
10	*Anguilla bengalensis bengalensis*	EN	98	*Mystus menoda*	DD
11	*Anguilla bicolor bicolor*	EN	99	*Mystus montanus*	VU
12	*Aphanius dispar*	DD	100	*Mystus oculatus*	LR
13	*Aplocheilus blocki*	DD	101	*Mystus viittatus*	VU
14	*Aplocheilus lineatus*	LR	102	*Nandus nandus*	LR
15	*Aplocheilus panchax*	DD	103	*Nangra itchkeea*	DD
16	*Aspidoparia morar*	LR	104	*Nemacheilus beavani*	DD
17	*Awaous grammepomus*	DD	105	*Nemacheilus viridescens*	LR
18	*Awaous gutum*	DD	106	*Neotropius khavalchor*	DD
19	*Badis badis*	DD	107	*Notopterus chitala*	EN
20	*Bagarichthys yarrellii*	DD	108	*Notopterus notopterus*	LR
21	*Bagarius bagarius*	VU	109	*Omobranchus punctatus*	DD
22	*Balitora brucei*	LR	110	*Omobranchus zebra*	DD
23	*Barilius barila*	VU	111	*Ompok bimaculatus*	EN
24	*Barilius barna*	LR	112	*Ompok pabo*	DD
25	*Barilius bendelisis*	LR	113	*Oreichthys cosuatis*	DD
26	*Barilius vagra*	VU	114	*Oreonectes evezardi*	EN
27	*Bathygobius fuscus*	DD	115	*Oryzias melastigma*	DD
28	*Brachydanio rerio*	LR	116	*Osphronemus goramy*	DD
29	*Brachygobius nunus*	DD	117	*Osteobrama belangeri*	EN
30	*Catla catla*	VU	118	*Osteobrama cotio cotio*	LR
31	*Chanda nama*	VU	119	*Osteobrama cotio cunma*	VU
32	*Channa marulius*	LR	120	*Osteobrama cotio peninsularis*	EN
33	*Channa micropeltes*	CR	121	*Osteobrama vigorsii*	DD
34	*Channa orientalis*	VU	122	*Pangasius pangasius*	CR
35	*Channa punctatus*	LR	123	*Parambassis ranga*	DD
36	*Channa striatus*	LR	124	*Parapsilorhynchus*	DD

				tentaculatus	
37	*Chela cachius*	DD	125	*Periophthalmus variabilis*	DD
38	*Chela laubuca*	LR	126	*Pomadasys argenteus*	DD
39	*Chelonodon patoca*	DD	127	*Pristolepis fasciata*	DD
40	*Cirhinus fulungee*	LR	128	*Proeutropiichthys taakree taakree*	CR
41	*Cirhinus mrigala mrigala*	LR	129	*Pseudambassis baculis*	DD
42	*Cirhinus reba*	VU	130	*Pseudeutropius atherinoides*	EN
43	*Cirrhinus cirrhosus*	VU	131	*Puntius amphibius*	LR
44	*Clarias batrachus*	VU	132	*Puntius bimaculatus*	DD
45	*Clarias dussumieri dussumieri*	VU	133	*Puntius burmanicus*	DD
46	*Crossocheilus latius latius*	DD	134	*Puntius chola*	VU
47	*Danio aequipinatus*	LR	135	*Puntius conchonius*	VU
48	*Danio malabaricus*	LR	136	*Puntius dorsalis*	EN
49	*Danio neilgherriensis*	DD	137	*Puntius fasciatus fasciatus*	EN
50	*Esomus danricas*	VU	138	*Puntius filamentosus*	DD
51	*Esomus thermoicos*	DD	139	*Puntius guganio*	LR
52	*Etroplus canarensis*	DD	140	*Puntius phutunio*	LR
53	*Etroplus maculatus*	LR	141	*Puntius pleurotaenia*	VU
54	*Euryglossa orientalis*	DD	142	*Puntius sarana orphoides*	DD
55	*Eutropichthys vacha*	EN	143	*Puntius sarana sarana*	VU
56	*Gagata gagata*	DD	144	*Puntius sophore*	LR
57	*Garra gotyla gotyla*	VU	145	*Puntius ticto ticto*	LR
58	*Garra lamta*	DD	146	*Puntius vittatus*	VU
59	*Garra mullya*	LR	147	*Rasbora daniconius*	LR
60	*Glossogobius giuris*	LR	148	*Rasbora rasbora*	DD
61	*Glyptothorax annandalei*	EN	149	*Rhinomugil corsula*	VU
62	*Glyptothorax saisii*	EN	150	*Rita kuturnee*	LR
63	*Heteropneustes fossilis*	VU	151	*Rita pavimentatus*	EN
64	*Hilsa ilisha*	VU	152	*Rita rita*	LR
65	*Hilsha kelee*	DD	153	*Salmo gardineri*	DD
66	*Horaichthys setnai*	DD	154	*Salmostoma acinaces*	VU
67	*Hyporhamphus limbatus*	DD	155	*Salmostoma bacaila*	LR

68	*Ichthyocampus carce*	DD	156	*Salmostoma clupeoides*	EN
69	*Johnius belangerii*	DD	157	*Salmostoma phulo*	DD
70	*Labeo bata*	LR	158	*Scatophagus argus*	DD
71	*Labeo boga*	LR	159	*Schistura denisoni denisoni*	VU
72	*Labeo boggut*	DD	160	*Schistura savona*	DD
73	*Labeo calbasu*	LR	161	*Schistura denisoni dayi*	DD
74	*Labeo fimbriatus*	LR	162	*Sicyopterus fasciatum*	DD
75	*Labeo gonius*	LR	163	*Silurus berdmorei*	DD
76	*Labeo kawrus*	DD	164	*Sperata aor*	DD
77	*Labeo pangusia*	LR	165	*Sperata seenghala*	DD
78	*Labeo porcellus*	DD	166	*Stigmatogobius javanicus*	DD
79	*Labeo rohita*	LR	167	*Stigmatogobius sadanundio*	DD
80	*Labeo sindensis*	DD	168	*Strongylura strongylura*	DD
81	*Lepidocephalus guntea*	DD	169	*Sciopterus griseus*	VU
82	*Lepidocephalus thermalis*	LR	170	*Tor khudree*	VU
83	*Liza macrolepis*	DD	171	*Tor mosal*	EN
84	*Liza parsia*	DD	172	*Tor putitora*	EN
85	*Lutjanus johni*	DD	173	*Tor tor*	EN
86	*Macrognathus guentheri*	VU	174	*Wallago attu*	LR
87	*Macrognathus pancalus*	LR	175	*Xenentodon cancila*	LR
88	*Macropodus cupanus*	DD	176	*Zenarchopterus striga*	DD

Introduced Species

S.No.	Species Name
1	*Ctenopharyngodon idella*
2	*Cyprinus carpio communis*
3	*Gambusia affinis*
4	*Oreochromis mossambica*
5	*Poecilia (Lebistes) reticulata*
6	*Xiphophorus helleri*