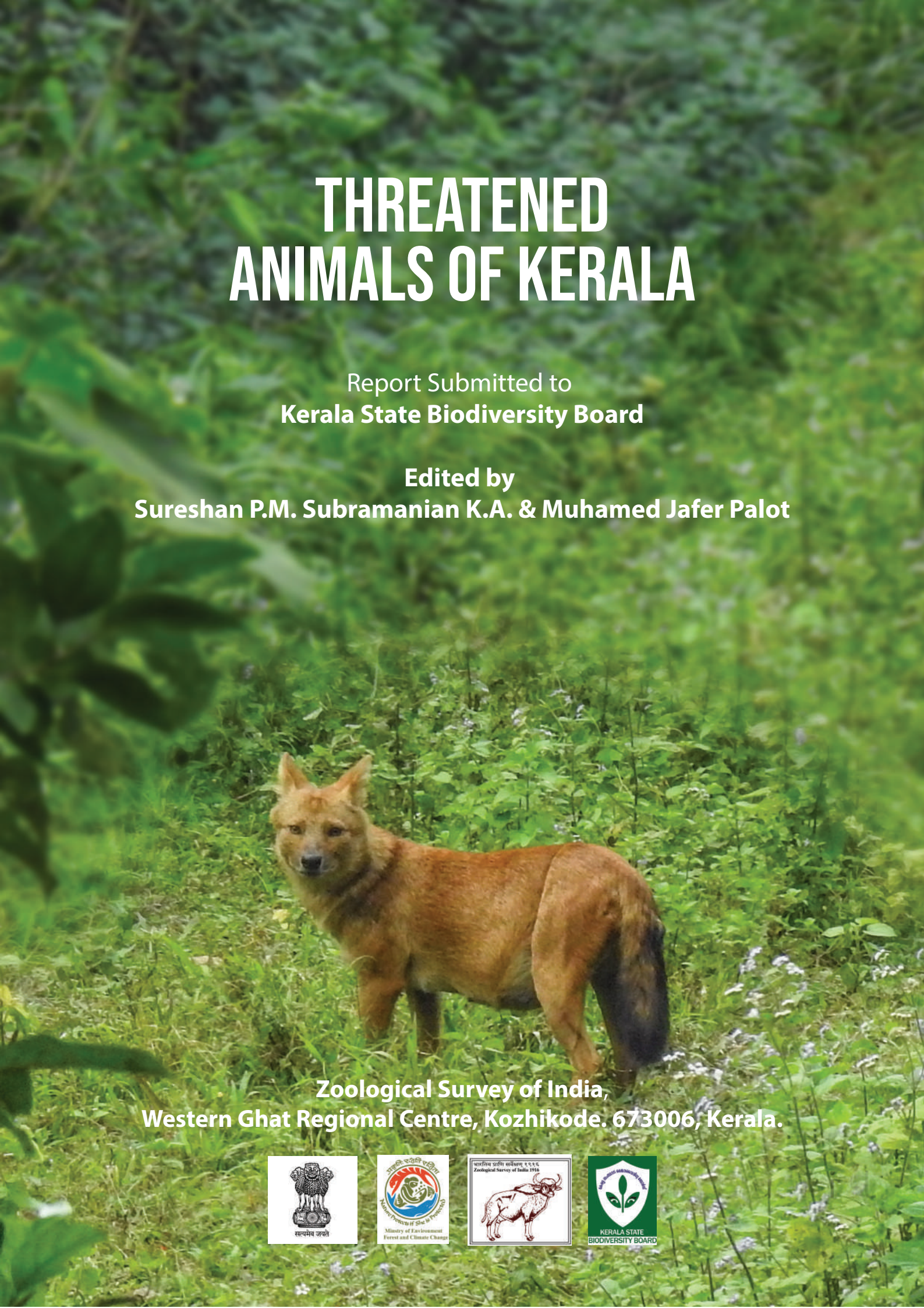
THREATENED ANIMALS OF KERALA

Report Submitted to
Kerala State Biodiversity Board

Edited by
Sureshan P.M. Subramanian K.A. & Muhamed Jafer Palot



Zoological Survey of India,
Western Ghat Regional Centre, Kozhikode. 673006, Kerala.

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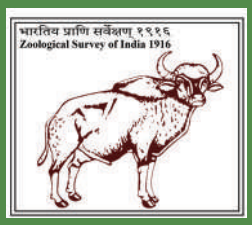

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We are also Grateful to all the contributors who have provided the updated information available with them in the form of separate chapters, the names of them are mentioned in the respective chapters. We are also grateful to Dr. Easa Former Director, Kerala Forest Research Institute, Kerala for his valuable suggestions for preparing this document.

Our sincere thanks are also due to the scientists and staff members of Zoological Survey of India, Western Ghat Regional Centre, Kozhikode for helping us in various ways to prepare this report. Finally, sincere thanks and word of appreciation for all those who have helped in bringing this volume in the present form and who might have missed, inadvertently a separate mention in the above paragraphs.

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पर्यावरण, वन एवं जलवायु परिवर्तन मंत्रालय
Government of India
Zoological Survey of India
Ministry of Environment, Forest and Climate Change

Message

The state of Kerala has a unique place in the geographical map of India, with a total land area 38,863 sq. km which accounts for about 1.2% of the total geographical area of the country. The varied topographical features and ecosystems in the state support a unique flora and fauna. The biological diversity of the state is very rich. When compared to invertebrates, the vertebrate diversity of Kerala is well documented which is represented by 35% of the diversity of the country. Due to increasing anthropogenic pressures, population of many animal species are declining in the state. For many species listed in the threatened category of IUCN and various Schedules of Indian Wildlife (Protection) Act 1972, proper assessments were not undertaken at regional level or global assessments are not updated. Though species listed in the threatened categories of IUCN are getting proper protection inside protected areas, their populations surviving outside need urgent attention for initiating measures for conservation. Many rare and endemic species of Kerala are not listed in IUCN Red list, Wildlife (Protection) Act 1972 and CITES. Threat assessment of the surviving populations of many animal groups of Kerala as per IUCN guidelines is the urgent need of the hour for initiating programmes for their conservation.

The report on "Threatened Animals of Kerala" prepared by India's oldest and premier research organisation under the Ministry of Environment, Forests and Climate Change, the Zoological Survey of India with the support from more than 50 experts from 20 institutions of India and Kerala State Biodiversity Board is a pioneering attempt in the country. It is prepared based on the assessment of threatened status of fauna following the guidelines of IUCN at regional level with suitable taxa specific modifications based on data availability. The report also contains priority list of species for conservation and local action and species to be notified under Section 38 of Biodiversity Act and list of species commercially traded in the state.

I hope the present report will be of use to a wide range of readers and will encourage Governmental and Non-Governmental agencies working in the field of conservation and sustainable utilisation of biological resources for initiating similar such exercise in other states of India. I congratulate all the authors and editors for their efforts in this noble venture.

Dhriti Banerjee

Director

ZOOLOGICAL SURVEY OF INDIA 1916

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ജൈവവൈവിധ്യ മാനേജ്മെന്റ്

കേരള സംസ്ഥാന ജൈവവൈവിധ്യ ബോർഡ്
KERALA STATE BIODIVERSITY BOARD

A statutory and autonomous body, Government of Kerala

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Message

Kerala is blessed with a wealth of diverse bio resources and the diverse ecosystems of Kerala having amosaic of natural, and human-made habitats offer refuge for many threatened and endemic flora and fauna. Kerala State Biodiversity Board is the nodal agency for conserving biodiversity of the State with the mandate of advising the State Government on matters relating to the conservation and sustainable utilization of Biodiversity. The Section 38 of the Biological Diversity Act explicitly provides for notification of threatened species by the Central Government in consultation with the concerned State Government and prohibits or regulate collection of such species and take appropriate steps to conserve them.

KSBB has embarked upon an ambitious project of documenting the threatened plants and animals specific to Kerala and to prepare a priority list of species of concern for conservation. The Zoological Survey of India was entrusted with the task of preparing a Red data book of Kerala (Fauna). The present report by ZSI gives a detailed analysis of the threatened faunal species of Kerala covering 10 faunal groups such as Mammalia, Aves, Reptilia, Amphibia, Pisces, Lepidoptera, Odonata, Araneae, Crustacea, and Mollusca, and 37 species has been recommended for notification under Section 38 of Biological Diversity Act 2002 on a priority basis.

Weexpress our sincere thanks to all nationally and internationally renowned contributors for providing this in-depth study report and hope that with the concerted effort, our knowledge base for conserving biodiversity would be widened. I take this opportunity to acknowledge the hard work and dedication of the entire team of Zoological Survey of India and wish them all success.

Dr.C.George Thomas
Chairman

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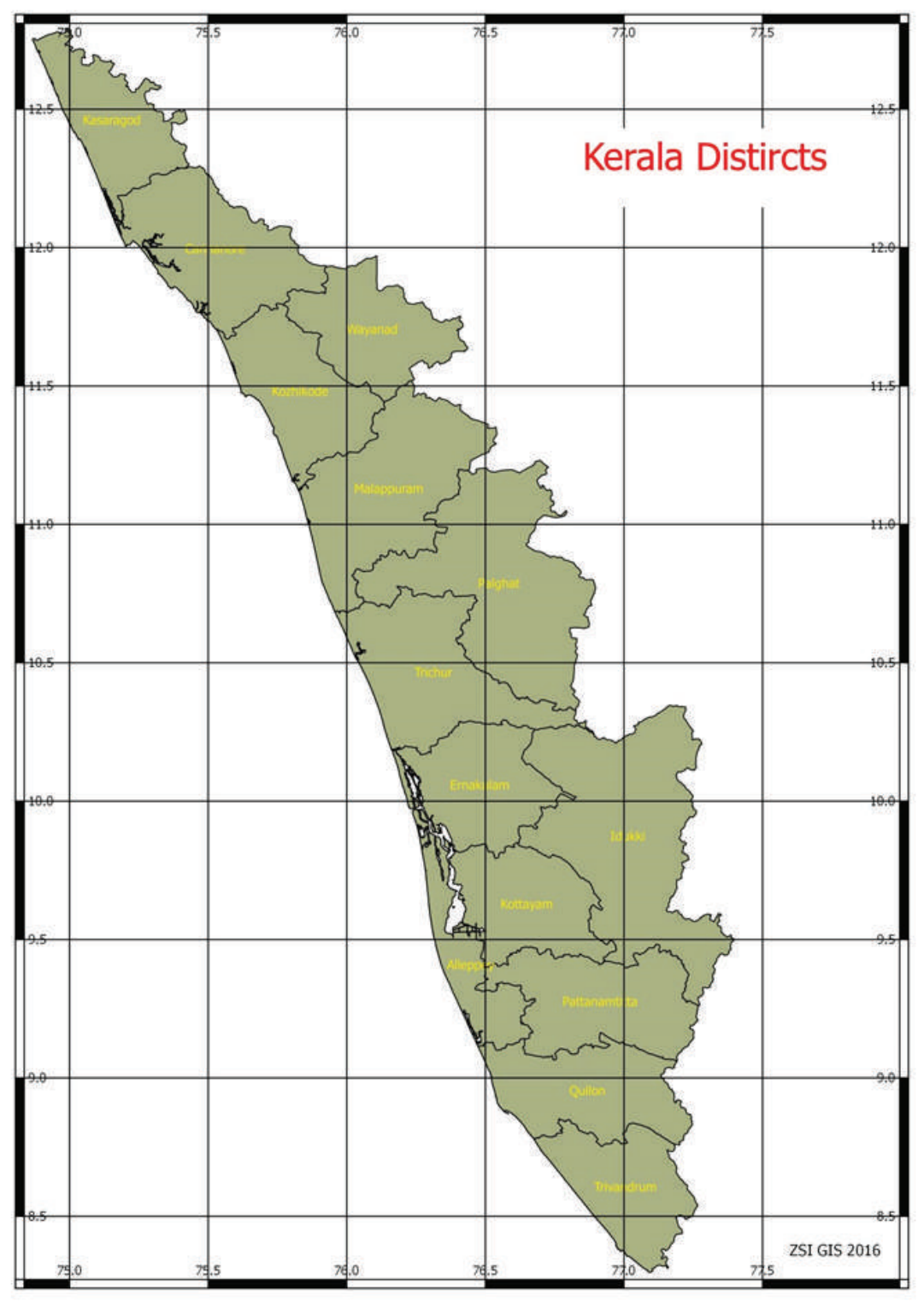
Introduction

The biodiversity is facing unprecedented threat of extinction due to severe habitat loss triggered by anthropogenic pressure and impact of climate change. Major threats to natural resources include over harvesting, illegal trade, habitat destruction, invasive species, pollution, and other anthropogenic activities, many species of plants and animals are at the verge of extinction or are being destroyed by the activities of human beings. In this decade of ecosystem restoration, developing conservation strategies at local and regional level with people's participation is the way forward to achieve sustainable developmental goals. Though we have stringent laws to protect our biodiversity and wildlife, we have not achieved much progress in the matters of conservation of biodiversity outside protected areas. One of the main reasons for this is our poor knowledge on the status of biodiversity and lack of assessment of threat faced by species at various spatial scales. Without proper scientific assessment of the threats faced by various life forms, it would be difficult to implement suitable programmes for their conservation.

The state of Kerala lies along the southern west coast of India between the latitudes 8^{o} 18′ and 12^{o} 48′ N and longitudes 74^{o} 52′ and 77^{o} 2′ E. It has a unique place in the geographical map of India, represented by a narrow costal belt lying sandwiched between the Western Ghats on the east and Arabian Sea on the west. The State is bordered by Tamil Nadu on its Southern and Eastern part, Karnataka on the North and Eastern part, the Lakshadweep Sea on the West and the Indian Ocean along the South. The total land area of the state is 38,863 sq. km which accounts for about 1. 2 per cent of the total geographical area of the country. The state is administratively divided in to 14 districts and support about 2.76% of India's population which is estimated to be above 35 million. The State has a total coastline of about 579.35 km and from sea level it rises to about 2694 meter at Annamudi peak located in the Eravikulam National Park of Idukkki district. Biogeographically the state is divided in to three climatically distinct regions, viz. highland, midland and coastal lowland. More than 50% of the area is highland and mainly consist of Western Ghats. The midland is mainly of lateritic plateau with about 41% of the State. The lowlands are representing with only 10% of the state and consists of densely populated coastal plains, beach dunes, flood plains, wetlands, mangroves and swamps (Maps, 1 & 2).

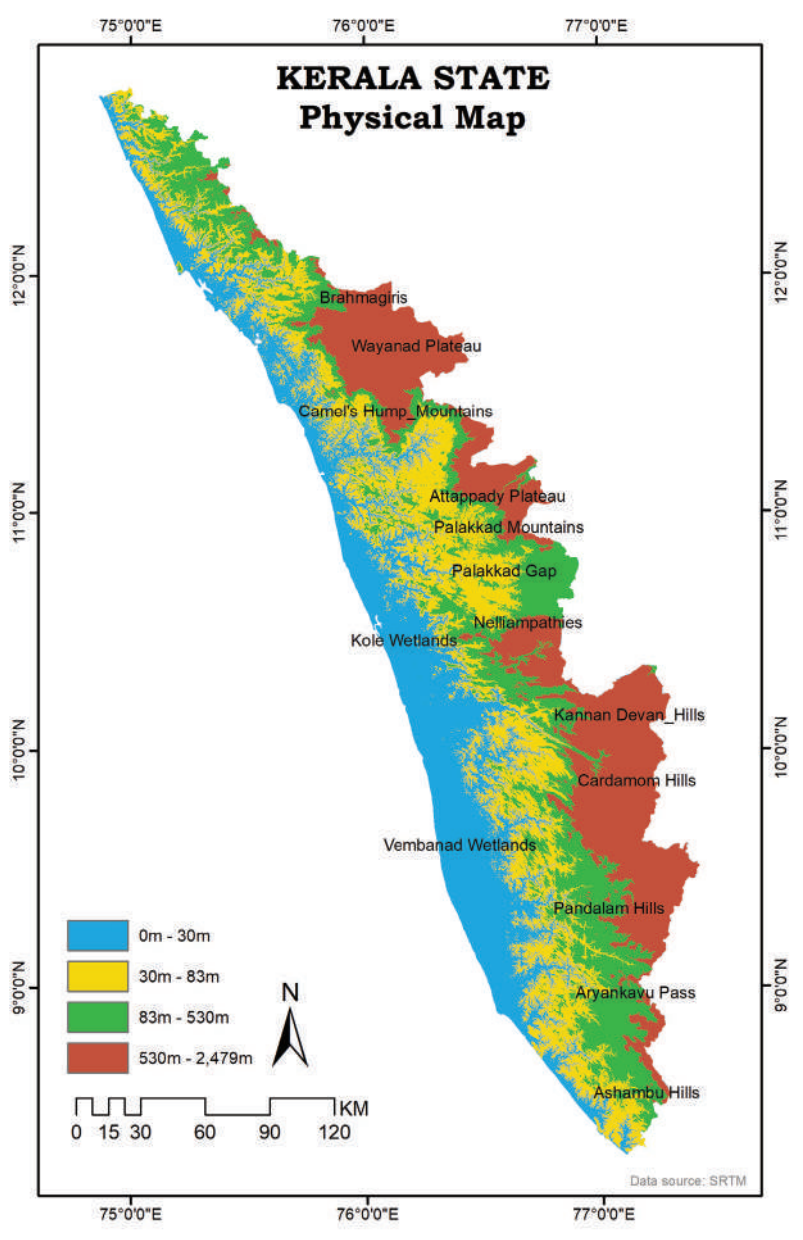
The varied topographical features, high rainfall and geologic conditions have favoured the formation of varied ecosystems in Kerala from shola forests on the mountain valleys to the mangrove forests along sea coasts and estuaries. Almost 78 percent of the total land area of the State is under agriculture and habitation, and the remaining 22 percent of the land is under forests and forest plantations. Quite obviously, the pristine status of nature is better protected only in a limited area, and that too in the higher altitudes, whereas, most of the remaining area of the state is subjected to degradation and transformations of various types (Map 3).

Map 1. Administrative Districts of Kerala



Map 2

The most outstanding feature of the State is the formation of tropical rainforests along the windward side of the Southern Western Ghats, which is lying parallel to the west coast. A small extent of area of the State is along the rain shadow region the Western Ghats, where the vegetation is dominated by dry deciduous forests and scrub jungles. The wetlands are mostly confined to the low land region of the State. Champion and Seth (1968) recognized 26 forest types in Kerala of which the major ones are the west coast tropical evergreen, west coast semi-evergreen, southern moist mixed deciduous, southern dry mixed deciduous, southern montane wet temperate forests, southern subtropical hill forests, southern montane wet temperate grasslands and littoral forests (mangroves). Certain edaphic vegetational types recognized in the state are Bamboo brakes, Cane brakes, Reed brakes, Euphorbiaceous scrub jungles, laterite thorn forests and Myristica swamp forests. Based on dynamics, they recognized secondary forests such as secondary evergreen, secondary moist deciduous, secondary dry deciduous, etc.



The varied ecosystems in the state support a rich flora and fauna. Till the middle of nineteenth century, 70% of the geographical area of Kerala was under dense forest cover. However, during the beginning of 20th century this was reduced to less than 50%. In the pre- independent Kerala there was no significant steps undertaken for the wildlife conservation in the state since the focus during the period was on revenue oriented forest management. The first official action towards the conservation of wildlife and biodiversity in Kerala was taken in 1934 by the Maharaja of the Princely state of Travancore, Chithira Thirunal Balarama Varma, by declaring the forests around Periyar lake as a private game reserve to stop the encroachment of tea plantations. The area was declared as Nellikkampatty Game Reserve. Currently, the total forest area in the state is 10,566 km2 (201-16), forming 27.19% of the total geographic area. There are five national parks, 2 tiger reserves, 15 wildlife sanctuaries, 3 bird sanctuaries and one community reserve with a total area of 3441.2072 km2 which cover 32.6% of the total forest area and 8.9% of the geographical area of Kerala state.

Map 3

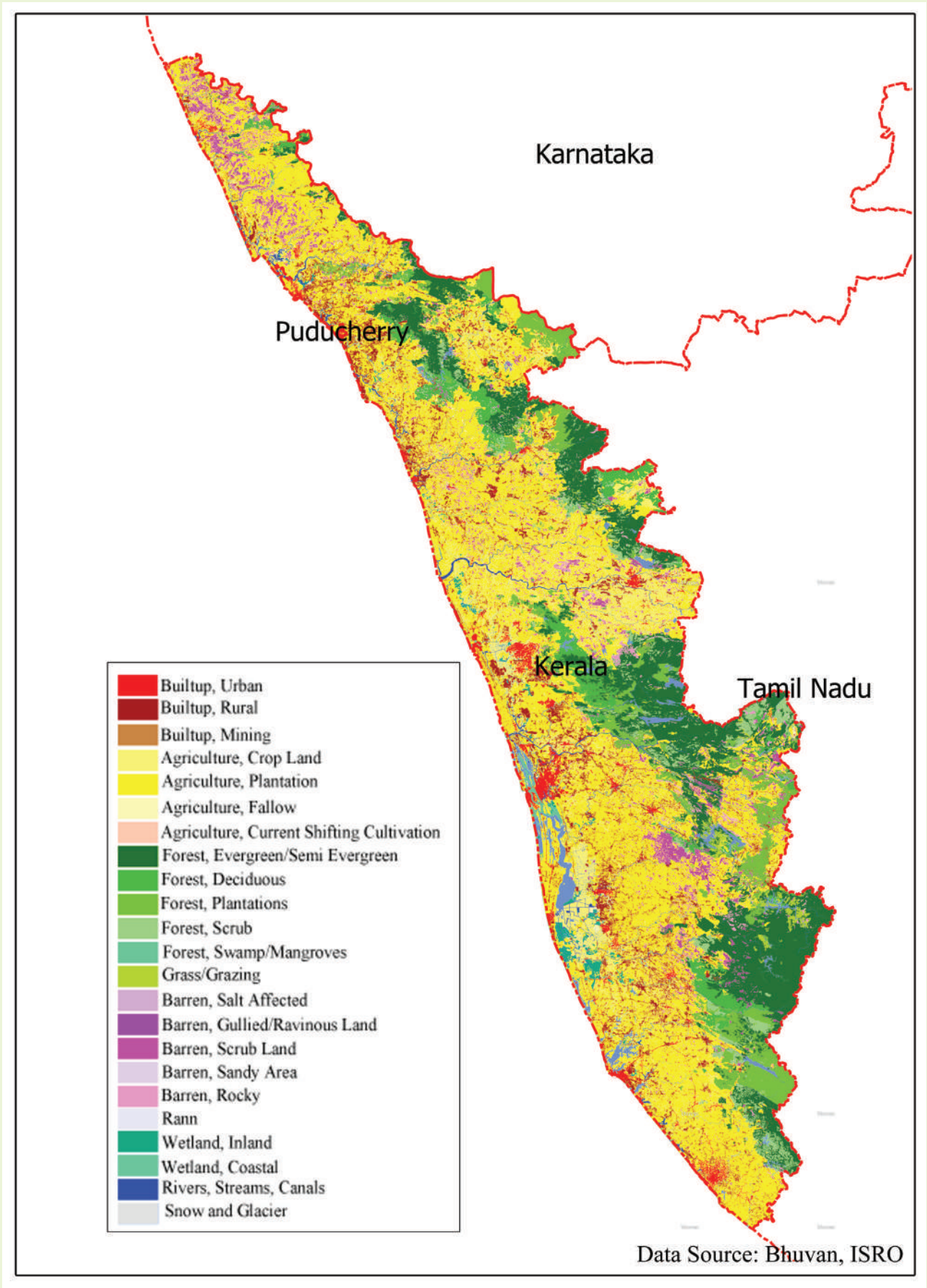

Karnataka
Puducherry
Kerala
Tamil Nadu
Builtup, Urban
Builtup, Rural
Builtup, Mining
Agriculture, Crop Land
Agriculture, Plantation
Agriculture, Fallow
Agriculture, Current Shifting Cultivation
Forest, Evergreen/Semi Evergreen
Forest, Deciduous
Forest, Plantations
Forest, Scrub
Forest, Swamp/Mangroves
Grass/Grazing
Barren, Salt Affected
Barren, Gullied/Ravinous Land
Barren, Scrub Land
Barren, Sandy Area
Barren, Rocky
Rann
Wetland, Inland
Wetland, Coastal
Rivers, Streams, Canals
Snow and Glacier
Data Source: Bhuvan, ISRO

Table 1
Protected Areas (PAs) of Kerala

Name of WLS/NPs	G.O. No. & Date	Year of Formation	Total Area in sq. km
National Parks			
Eravikulam National Park	G.O.(MS)142/78 dated 19-05-1978	1978	97.0000
Silent Valley National Park	GO-5462/FSA3/82/AD dated 15.11.84	1984	237.5200
Anamudi Shola National Park	G.O.12876/F2/2003/F&WLD dated 14-12-2003	2003	7.5000
Mathikettan Shola National Park	GO(MS)No.50/2003/F&WLD dated 10-10-2003	2003	12.8170
Pambadum Shola National Park	G.O.12875/F2/2003/F&WLD dated 14-12-2003	2003	1.3180
Tiger Reserves & Wildlife Sanctuaries			
Parambikulam Wildlife Sanctuary (Tiger Reserve)	GO(P)39/73/AD dated 12..02..1973 GO(P) No. 443/06/F&WLD dated 31..10..2006	1973 2006	643.6600
Periyar Wildlife Sanctuary (Tiger Reserve)	F1-2854/AD dated 11-08-1950 G-11025/34/FRY(PT) dated 29-08-1977	1950 1977	925.0000
Neyyar WLS	GO(MS)871/58 dated 06..08..1958	1958	128.0000
Peechi-Vazhani WLS	GO(MS)871/58 dated 06..08..1958	1958	125.0000
Wayanad WLS	GO(MS)182/73/AD dated 30..05..1973	1973	344.4400
Idukki WLS	GO.7898/FM3/76/AD dated 09.02.76	1976	70.0000
Peppara WLS	GO(P)379/83/AD dated 21..12..1983	1983	53.0000
Thattekkad B.S	GO.35743/FM3/83/AD dated 27..08..83	1983	25.0000
Shendurney WLS	GO(P)258/84/AD dated 25..08..1984	1984	171.0000
Chinnar WLS	GO(P)229/84/AD dated 04..08..1984	1984	90.4400
Chimmony WLS	GO(P)259/84/AD dated 25..08..1984	1984	85.0000
Aralam WLS	GO(P)300/84/AD dated 15..10..1984	1984	55.0000
Mangalavanam Bird Sanctuary	G.O(MS) No.42/04/F&WLD dated 31..08..2004	2004	0.0274
Kurinjimala Sanctuary	G.O.(P)36/2006/F&WLD dated 06-10-2006	2006	32.0000
Choolannur Pea Fowl Sanctuary	G.O.(P) 24/2007/F&WLD dated 15-05-2007	2007	3.4200
Malabar WLS	G.O (P) 26/2009 / F&WLD dated 05-06-2009	2009	74.2150
Kottiyoor WLS	G.O (P) 17/2011 / F&WLD dated 01-03-2011	2011	30.3798
Karimpuzha WLS	G.O. (P) No. 9/2019/F&WLD dated 17-08-2019	2019	227.97
Community Reserve			
Kadalundi-Vallikunnu Community Reserve	G.O(MS)No.66/2007/F&WL dated 17-10-2007	2007	1.5000
TOTAL			**3441 .2072**

Due to increasing anthropogenic pressure and habitat destruction, population of many species of animals are declining in the state which is not assessed properly for initiating appropriate conservation interventions. For many species found in the state which are listed in the threatened category of IUCN and various schedules of Indian Wildlife (Protection) Act, proper assessments were not undertaken at regional level or global assessments are not updated. Apart from the species listed in IUCN Redlist, the Schedules of Wildlife (Protection) Act and CITES, several other species are also facing serious threat of extinction due to habitat destruction, over exploitation, climate change and lack of proper conservation intervention. Though many species listed in the threatened categories of IUCN are getting proper protection inside protected area network, their population surviving outside protected areas need urgent attention for initiating measures for conservation. Many species of invertebrates are rare and several endemic species are not listed in IUCN Redlist, Wildlife Act (Protection), CITES etc. Assessment of the surviving populations of threatened species of Kerala such as the present status of their population, habitat, threats etc. need to be undertaken immediately in order to recommend them for including in the red data book and also to develop programmes for their conservation.

The vertebrate diversity of Kerala is relatively well documented and IUCN Redlist assessments has been completed for many of the groups. However, the invertebrate diversity is not fully known and threat assessment is attempted only for a few groups. Species which are assessed as not threatened at global or country level may face threat of local extinction. Though there are many scientific publications on both invertebrates and vertebrates in Kerala, a compilation of the status of individual groups or species are so far not attempted which is very essential for their conservation or protecting them from further decline. In this context, it is imperative to assess the threatened status of many animal species or groups from the conservation point of view by the joint efforts of Kerala State Biodiversity Board, Kerala Forest Department, local administrative bodies, NGOs and individual experts.

An attempt has been made here to present the threat status of vertebrate animal groups and selected invertebrate animal groups from Kerala following IUCN assessment guidelines. In the case of freshwater fishes and birds, a regional level assessment has been attempted and findings are presented here and for the rest of the taxa dealt, the assessments are carried out by taxa experts based on available regional data or by extracting data from IUCN global assesment. The present work is undertaken by different taxa experts, many of them are members of IUCN taxa specialist groups.

IUCN is the international agency working for the conservation of nature and natural resources and their sustainable utilisation for the benefit of the mankind. The IUCN Red List of Threatened Species is the world's most comprehensive inventory of the global conservation status of plant and animal species. It uses a set of quantitative criteria to evaluate the extinction risk of species globally. IUCN conducts studies on the assessment of extinction risk faced by different life forms and grade them in to different categories for prioritisation of conservation activities. This process of assessment is being continuously undertaken by the experts working on different groups under the guidelines of IUCN. The aim of the publication of IUCN Redlist is to convey the message of the urgency of conservation issues to the public and policy makers, as well as to help the international community to try to reduce species extinctions.

Though IUCN Red List Categories and Criteria were designed for global taxon assessments, many people are interested in applying them as subsets of global data, especially at regional, national or local levels. According to IUCN Red List Categorisation, species are at high risk of global extinction are classified into various categories such as Extinct (EX), Extinct in the wild (EW), Critically endangered (CR), Endangered (EN), Vulnerable (VU), Near Threatened (NT), Not Evaluated (NE) Data Deficient (DD) and Least Concern (LC). Threat assessment of life forms are also being undertaken at regional level (country, region etc) by following guidelines of IUCN. Though many plant and animal species of Kerala find a place in various IUCN Red lists, none of the animal groups are assessed at the Regional (State) level.

IUCN REDLIST CATEGORIES

EXTINCT (EX)
A taxon is Extinct when there is no reasonable doubt that the last individual has died. A taxon is presumed Extinct when exhaustive surveys in known and/or expected habitat, at appropriate times (diurnal, seasonal, annual), throughout its historic range have failed to record an individual. Surveys should be over a time frame appropriate to the taxon's life cycle and life form.

EXTINCT IN THE WILD (EW)
A taxon is Extinct in the Wild when it is known only to survive in the cultivation, in captivity or as a naturalized population (or populations) well outside the past range. A taxon is presumed Extinct in the Wild when exhaustive surveys in known and/or expected habitat, at appropriate times (diurnal, seasonal, annual), throughout its historic range have failed to record an individual. Surveys should be over a period appropriate to the taxon's life cycle and life form.

CRITICALLY EXDANGERED (CR)
A taxon is Critically Endangered when the best available evidence indicates that it is not Extinct and it is considered to be facing an extremely high risk of extinction in the wild. Survey should be over a time appropriate to the taxon's life cycle and life form.

ENDANGERED (EN)
A taxon is Endangered when the best available evidence indicates that it is not Critically Endangered but is considered to be facing a very high risk of Extinction in the wild in the near future, as defined by any of the criteria.

VULNERABLE (VU)
A taxon is Vulnerable when the best available evidence indicates that it is not Critically Endangered or Endangered but is therefore considered to be facing a high risk of extinction in the wild in the medium-term future, as defined by any of the criteria.

NEAR THREATENED (NT)
A taxon is near Threatened when it has evaluated against the criteria but does not qualify for Critically Endangered, Endangered or Vulnerable now, but is close to qualify for or is likely to qualify for a threatened category in the near future.

LEAST CONCERN (LC)
A taxon is Least concern when it have been evaluated against the criteria and does not qualify for Critically Endangered, Endangered, Vulnerable or Near Threatened. Widespread and abundant taxa are indicated in this category.

DATA DEFICIENT (DD)
A taxon is Data Deficient when there is inadequate information to make a direct, or indirect, assessment of its risk of extinction based on its distribution and/or population status. A taxon in this category may be well studied, and its biology well known, but appropriate data on abundance and/or distribution are lacking. Data Deficient is therefore not a category of threat. Listing of this taxa in this category indicates that more information is required and acknowledges the possibility that future research will show that threatened classification is appropriate. It is important to make positive use of whatever data are available.

In many cases great care should be exercised in choosing between DD and a threatened status. If the range of a taxon is suspected to be relatively circumscribed, and a considerable period of time has elapsed since the last record of the taxon, threatened status may well be justified.

NOT EVALUATED (NE)
A taxon is Not Evaluated when it is has not yet been evaluated against the criteria.

Section 38 in THE BIOLOGICAL DIVERSITY ACT, 2002
Power of central government to notify threatened species –without prejudice to the provisions of any other law for the time being in force, the central government, in consulation with the concerned state government, may from time to time notify any species which is on the verge of extinction or likely to become extinct in the near future as a threatened species and prohibit or regulate collection thereof for any purpose and take appropriate steps to rehabilitate and preserve those species.

With a view to develop a Red data book of threatened species of Kerala, Kerala State Biodiversity Board (KSBB) has assigned a project to Zoological Survey of India, Western Ghat Regional Centre, Calicut to prepare a Red data Book on threatened species of Kerala (Terrestrial fauna including freshwater fauna). KSBB also desires to publish a list of species which require urgent conservation in Kerala scenario and need to be notified under section 38 of Biological Diversity Act (2002) to ensure their conservation and also to develop the data of species which face threat due to commercial trading in order to ensure their protection and sustainable harvesting. The duration of the project was 10 months; the fund was released during the end of August 2020 and accordingly, an MOU was signed between KSBB and ZSI, WGRC, Calicut with the following objectives.

Objectives of the Study

- To Prepare a Red data book of threatened species for Kerala (major terrestrial fauna including fresh water fauna) following the guidelines of IUCN red list criteria at regional level.
- Developing a priority list of species (mainly vertebrates and few invertebrates) for conservation and local action and species to be notified under Section 38 of Biological Diversity Act, 2002.
- Preparation of a list of species commercially traded and suggest recommendations for sustainable management measures.

Methodology

Assessment of extinction risk of fauna at regional level following IUCN guideline can be undertaken by two ways such as 1) to publish an unaltered subset of the global IUCN redlist containing those species that reproduce in the region or at any stage regularly visit the region or 2) to assess species extinction risk within the region and publish Red lists. The second option involves many practical difficulties and in most of the cases it is not practical due to the lack of enough data regarding assessment of populations, handling non-breeding populations and non-indigenous taxa. In Kerala there were no previous attempts to assess the taxa at regional level. Because of this reason, in the present document the following methodology has been adopted for the preparation of the list of threatened fauna.

Ten faunal groups such as Mammalia, Aves, Reptiles, Amphibia, Pisces (Freshwater fishes), Lepidoptera (Butterflies), Odonata, Araneae (Mygalomorph spiders) , Crustacea (Freshwater crabs) and Mollusca (Non marine molluscs) are considered for threat assessment. Faunal groups such as birds (Aves) and freshwater fishes (Pisces) for which enough data available are assessed here following the guidelines of IUCN regional level assessment by the taxa experts. For the faunal groups such as mammals, reptiles, amphibians, butterflies, dragonflies, mygalomorph spiders, freshwater crabs and molluscs, list of the threatened species occurring in the state are prepared as per the latest Redlist published by IUCN and suitable comments or suggestions are provided for upgrading or downgrading their status based up on the data available at state level. Priority list of species for conservation and local action and species to be notified under section 38 of Biological Diversity Act, 2002 and list of species commercially traded in the above taxa were also identified by the working groups. In order to achieve the above targets, expert group leaders were selected to co-ordinate the assessment work in the different faunal groups and they were given freedom to invite maximum number of experts working in that taxa.

EXECUTIVE SUMMARY

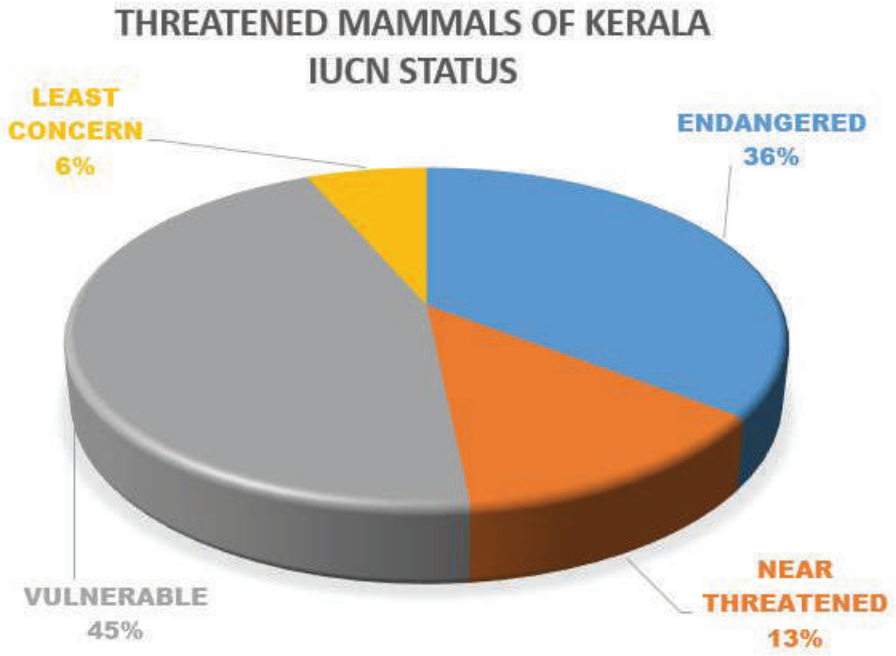
Summary of threat assessment of selected animal groups form Kerala is provided below in the form of a table (Table.2). Ten animal groups such as Mammals (excluding marine species) Birds, Reptiles (excluding marine species) , Amphibia, Freshwater fishes, Butterflies, Odonata, Freshwater crabs, Non marine molluscs and Myglaomorph spiders are selected for the threat assessment studies. Among these, Butterflies and Non marine molluscs are not assessed by IUCN till date. Except for these groups, a total of 234 species of animals face threat of extinction under various categories of IUCN global red list assessment in Kerala scenario. Birds and freshwater fishes of Kerala are assessed regionally by following the guidelines of IUCN Regional level assessment by expert groups and 20 species of birds and 35 species of freshwater fishes face threat of extinction in Kerala. For the remaining groups, species are assigned various threat categories based on different criteria such as rarity, endemicity, taxonomic distinctiveness, microhabitat preferences, level of threat etc. at regional level (Kerala) and probable upgrading or downgrading of global IUCN status are also proposed. A total of 37 animal species belonging to the above groups are recommended for inclusion under section 38 of Biological Diversity Act, 2002 taking in to consideration various threats faced by them. Among the vertebrates, amphibia contains maximum number of endemic species followed by freshwater fishes and reptilia. Many endemic species of amphibians and freshwater fishes are known only from the type locality or having limited distribution in the state and many of them are devoid of required data for a regional level assessment as per IUCN guidelines. Among invertebrates non marine molluscs are represented by maximum number of endemic species followed by freshwater crabs.

Table. 2
Threatened animals of Kerala

Taxa	Diversity						
	Family	Genera	Species	Endemic Species to Kerala	No. of Species Globaly Threatened as per IUCN	No. of Species Threatened as per Regional Assessment	No. of species recommended for conservation under Section 38 of BD Act
Terrestrial Mammals	31	67	101	01	31	--	03
Birds	86	285	540	_	43	20	07
Reptiles	24	79	201	14	25	54	02
Amphibia	11	30	186	59	54	--	03
Freshwater fishes	36	84	196	53	58	35	09
Butterflies	06	168	326	_	--	49	05
Odonata	13	117	175	2	11	38	02
Freshwater crabs	01	14	35	24	08	15	04
Mygalomorph spiders	03	09	18	_	04	-	02
Non marine mollusca	12	34	96	75	--	03	_
				Total	234	214	37

MAMMALS (Mammalia)

Loris lydekkerianus © Uthaman



A total of 101 species of terrestrial mammals belonging to 67 genera under 31 families and 11 orders are recorded from Kerala (Nameer, 2015 & Jafer, 2020). Of these, 15 species are endemic to Western Ghats and one species Ranjini's field rat *Rattus ranjiniae* is known only from Kerala. The occurrence of some species such as Malabar civet *Viverra civettina*, the fishing cat *Prionailurus viverrinus* and Eurasian otter *Lutra lutra* within the political boundary of Kerala have been ruled out by recent studies. As per the IUCN global assessment 2011, thirty one species of mammals are included in various threatened categories and out of these, Spiny Tree Mouse *Platacanthomys lasiurus* Blyth, Madras tree shrew, *Anathana ellioti* (Waterhouse) and Bare bellied Hedgehog, *Paraechinus nudifentris* (Horsfield) are recommeneded for inclusion under section 38 of Biological Diversity Act 2002 and eight sepceies face threat due to wild life trade.Another 31 species of marine mammals are also reported from the coastal boundaries of Kerala which are not dealt here since Central Marine Fisheries Research Institute (CMFRI) Kochi is providing the threat status of those species seperately.The details of regional level assessment are given separately for 31 species of terrestrial mammals of Kerala .

Threatened Terrestrial Mammals of Kerala

(Based on IUCN assessment) (Ver. 2021-1)

Abbreviations: CR–Critically Endangered; EN-Endangered; VU- Vulnerable; NT–Near Threatened .LC- Least concern, DD- Data deficient, NE -Not Evaluated, KL- Kerala; TN- Tamil Nadu; KA- Karnataka; GA- Goa; MH- Maharashtra, WPA - Wildlife Protection Act.

Sl No	Common English name	Species	Malayalam name	IUCN Status	WPA	CITES	Endemism
1	Asian Elephant	*Elephas maximus* Linnaeus, 1758	ആന	EN	Schedule I	Appendix I	
2	Gray Slender Loris	*Loris lydekkerianus* Cabrera, 1908	കുട്ടിത്തേവാങ്ക്	NT	Schedule I	Appendix II	
3	Lion-tailed Macaque	*Macaca Silenus* (Linnaeus, 1758)	സിംഹവാലൻ കുരങ്ങ്	EN	Schedule I	Appendix I	Western Ghats
4	Black-footed Gray Langur	*Semnopithecus hypoleucos* Blyth, 1841	കരിങ്കയ്യൻ കുരങ്ങ്	VU	Schedule II	Appendix I	Western Ghats
5	Nilgiri Langur	*Semnopithecus johnii* (J. Fischer, 1829)	കരിംകുരങ്ങ്	VU	Schedule I	Appendix II	Western Ghats
6	Tufted Gray Langur	*Semnopithecus priam* Blyth, 1844	തൊപ്പി ഹനുമാൻ കുരങ്ങ്	NT	Schedule II	Appendix I	
7	Grizzled Giant Squirrel	*Ratufa macroura* (Pennant, 1769)	ചാമ്പൽ അണ്ണാൻ	NT	Schedule I	Appendix II	
8	Travancore Flying Squirrel	*Petinomys fuscocapillus* (Jerdon, 1847)	കുന്നൻ പറാൻ	NT	Schedule I		
9	Nilgiri Palm Squirrel	*Funambulus sublineatus* (Waterhouse, 1838)	കുന്നൻ അണ്ണാൻ	VU			Western Ghats
10	Spiny Tree Mouse	*Platacanthomys lasiurus* Blyth, 1859	മുള്ളെലി	VU	Schedule V		Western Ghats
11	Bonhote's Mouse	*Mus famulus* Bonhote, 1898	കാട്ടു ചുണ്ടെലി	EN	Schedule V		Western Ghats
12	Ranjini's Field Rat	*Rattus ranjiniae* Agarwal and Ghosal, 1969	നെല്ലെലി	EN	Schedule V		Kerala
13	Sahyadris Forest Rat	*Rattus satarae* Hinton, 1918	സഹ്യാദ്രി കാട്ടെലി	VU	Schedule V		Western Ghats
14	Nilgiri Vandeleuria	*Vandeleuria nilagirica* Jerdon, 1867	വാലൻ ചുണ്ടെലി	EN	Schedule V		Western Ghats
15	Kelaart's Long-clawed Shrew	*Feroculus feroculus* (Kelaart, 1850)	സിലോൻ നെച്ചെലി	EN			

16	Day's Shrew	*Suncus dayi (Dobson,1888)*	കാട്ടുനച്ചെലി	EN			Western Ghats
17	Indian Pangolin	*Manis crassicaudata* E.Geoffiroy, 1803	ഈനാംപേച്ചി	EN	Schedule I	Appendix II	
18	Indian wild dog	*Cuon alpinus (Pallas,1811)*	കാട്ടുനായ	EN	Schedule II	Appendix II	
19	Sloth Bear	*Melursus ursinus* (Shaw, 1791)	കരടി	VU	Schedule I	Appendix I	
20	Nilgiri Marten	*Martes gwatkinsi* Horsfield, 1851	മരനായ	VU	Schedule II	Appendix III	Western Ghats
21	Asian Small-clawed Otter	*Aonyx cinereus (Illiger,1815)*	മലനീർനായ	VU	Schedule I	Appendix II	
22	Smooth-coated Otter	*Lutrogale perspicillata* (I. Geoffroy Saint-Hilaire, 1826)	നീർനായ	VU	Schedule II	Appendix II	
23	Rusty-spotted Cat	*Prionailurus rubiginosus* (I. Geoffroy Saint-Hilaire, 1831)	തുരുമ്പൻപൂച്ച	VU	Schedule I	Appendix I	
24	Fishing cat	*Prionailurus viverrinus (Bennett,1833)*		VU	Schedule I		
25	Leopard	*Panthera pardus* (Linnaeus, 1758)	പുള്ളിപ്പുലി	NT	Schedule I	Appendix I	
26	Tiger	*Panthera tigris* (Linnaeus, 1758)	കടുവ	EN	Schedule I	Appendix I	
27	Barking Deer	*Muntiacus muntjak* (Zimmermann, 1780)	കേഴമാൻ	LC	Schedule III		
28	Sambar Deer	*Rusa unicolor* (Kerr, 1792)	കലമാൻ	VU	Schedule III		
29	Gaur	*Bos gaurus* Smith, 1827	കാട്ടുപോത്ത്	VU	Schedule I	Appendix I	
30	Four-horned Antelope	*Tetracerus quadricornis* (de Blainville, 1816)	ഉല്ലമാൻ	VU	Schedule I		
31	Nilgiri Tahr	*Nilgiritragus hylocrius* (Ogilby, 1838)	വരയാട്	EN	Schedule I		Western Ghats

Mammal species of Kerala recommended for inlcusion under section 38 of biological diversity act, 2002.

Sl.no.	Common name	Scientific Name	Justification
1	Spiny Tree Mouse	*Platacanthomys lasiurus* Blyth	This species is sensitive to habitat changes. Habitat loss is due to expansion of coffee and tea plantations, agro-industry based farming activities, and forest fires. To maintain healthy population large areas of undisturbed rainforests is needed (Mudappa et al, 2001). Consumed because of medicinal value. Moreover not listed in any of the schedules of wildlife protection Act, and very rare in Kerala.
2.	Madras tree shrew	*Anathana ellioti* (Waterhouse)	Threat due to habitat loss, denudation for agriculture, thinning out of forest, plantation, developmental activities construction of dams and roadways.
3.	Bare-bellied Hedgehog	*Paraechinus nudiventris* (Horsfield)	Threat due to expansion of agriculture and pesticide usage. Extremely rare in Kerala

Mammal species of Kerala which are in commercial trade

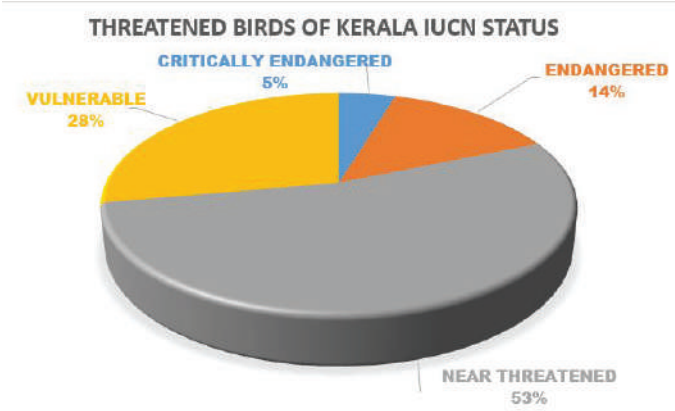
Due to strict enforcement of Wildlife Protection (Act) 1972, the trade of mammal species and their body parts are not much active in Kerala. But due the high demand of tiger body parts, scales of pangolin, civet, skin of otters etc. , these species are secretly hunted by local people. Due the ban of export of Ivory, hunting of elephants is drastically reduced in the state. Different sepcies of mangoose are hunted for their valuable hairs which are used for making painting brush.

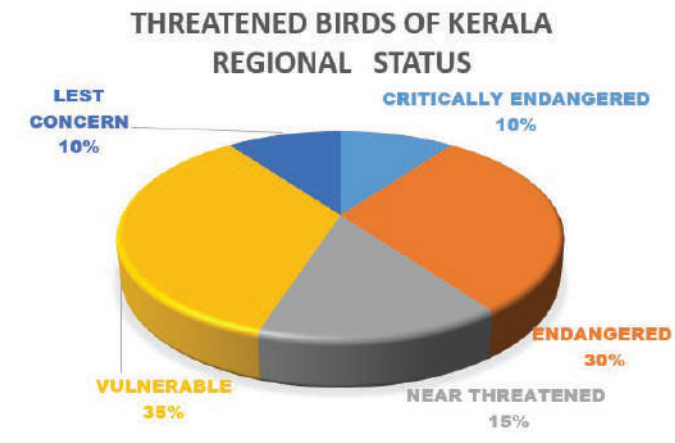
Sl. No	Order/Family	Scientific name	Common Name	Malayalam Name
1	PRIMATES Lorisidae	*Loris lydekkerianus* Cabrera, 1908	Grey Slender Loris	കുട്ടിത്തേവാങ്ക്
2	RODENTIA Sciuridae	*Ratufa indica* (Erxleben, 1777)	Malabar Giant Squirrel	മലയണ്ണാൻ
3	RODENTIA Platacanthomyidae	*Platacanthomys lasiurus* Blyth , 1859	Spiny Tree Mouse	മുള്ളെലി
4	ERINACEOMORPHA Erinaceidae	*Paraechinus nudiventris* (Horsfield, 1851)	Bare-bellied Hedgehog	ഇത്തിൾപന്നി
5	PHOLIDOTA Manidae	*Manis crassicaudata* E. Geoffiroy, 1803	Indian Pangolin	ഈനാംപേച്ചി
6	CARNIVORA Mustelidae	*Lutrogale perspicillata* (I. Geoffroy Saint-Hilaire, 1826)	Smooth-coated Otter	നീർനായ
7	CARNIVORA Viverridae	*Viverricula indica* (E.Geoffiroy Saint Hilaire, 1818)	Small Indian Civet	പൂവെരുക്
8	CARNIVORA Herpestidae	*Herpestes edwardsii* (E. Geoffroy Saint Hilaire, 1818)	Indian Grey Mongoose	നാടൻ കീരി

BIRDS (AVES)

Buceros bicornis
© Uthaman

According to the recent checklist 540 species of birds are reported from Kerala. (Chandran et al. 2020). Of these, 43 species fall under various threatened categories of the IUCN global assessment. However, the threat levels of various species within Kerala are different from the global threat levels. In the present work, 20 species are categorised under various categories of IUCN regional level assessment out of a total of 37 species assessed. Out of the 20, seven species are considered as of high conservation priority for Kerala and 13 are of moderate conservation priority. Seven species of high conservation priority are recommended for inclusion in Section 38 of Biological Diversity Act.





THREATENED BIRDS OF KERALA
(As per IUCN Redlist)

l No	Species	Malayalam Name	IUCN Category	Status in Kerala
1	Red-headed Vulture *Sarcogyps calvus*	കാതിലക്കഴുകൻ	CR	Rare resident in Wayand WLS
2	White-rumped Vulture *Gyps bengalensis*	ചുട്ടിക്കഴുകൻ	CR	Uncommon resident in Wayanad WLS
3	Great Knot *Calidris tenuirostris*	കിഴക്കൻനട്ട്	EN	Wintering sparingly in the undisturbed beaches, north of Kollam district
4	Black-bellied Tern *Sterna acuticauda*	കരിവയറൻ ആള	EN	Lower Bharathapuzha river basin but breeding population possibly extinct.
5	Steppe Eagle *Aquila nipalensis*	കായൽപ്പരുന്ത്	EN	Rare winter visitor to coastal wetlands
6	Banasura Laughingthrush *Montecincla jerdoni*	ബാണാസുരചിലപ്പൻ	EN	Restricted to the sky islands of Aralam WLS, Banasura and Camel's Hump Mountains.
7	Nilgiri Laughingthrush *Montecincla cachinnans*	നീലഗിരിചിലപ്പൻ	EN	Restricted to the sky islands of Silent Valley NP, Attappady RF, Muthikulam and Palakkad RF
8	Nilgiri Sholakili *Sholicola major*	ചെമ്പുവയറൻ ചോലക്കിളി	EN	Restricted to the sky islands north of Palakkad gap
9	Nilgiri Wood Pigeon *Columba elphinstonii*	മരപ്രാവ്	VU	Uncommon resident in the Western Ghats
10	Woolly-necked Stork *Ciconia episcopus*	കരുവാരക്കുരു, വക്കീൽക്കൊക്ക്, കന്യാസ്ത്രീക്കൊക്ക്	VU	Breeding in Bharathapuzha basin and Periyar TR but common winter visitor to all wetlands
11	Lesser Adjutant *Leptoptilos javanicus*	വയൽനായ്ക്കൻ	VU	Very rare. Restricted to the forested wetlands of Wayanad, Nilambur and Parambikulam WLS.
12	Indian Spotted Eagle *Clanga hastata*	ചെറിയ പുള്ളിപ്പരുന്ത്	VU	Uncommon winter visitor to large coastal wetlands
13	Greater Spotted Eagle *Clanga clanga*	വലിയ പുള്ളിപ്പരുന്ത്	VU	Regular winter visitor to large coastal wetlands
14	Great Hornbill *Buceros bicornis*	മലമുഴക്കി വേഴാമ്പൽ	VU	Uncommon resident in the Western Ghats but common in mature forests

15	Broad-tailed Grassbird *Schoenicola platyurus*	പോതക്കിളി	VU	Restricted to grasslands in the Western Ghats
16	Bristled Grassbird *Schoenicola striatus*	മുള്ളൻപുൽക്കുരുവി	VU	Nomadic winter visitor to the coastal wetlands
17	Yellow-throated Bulbul *Pycnonotus xantholaemus*	മഞ്ഞത്താലി ബുൾബുൾ	VU	Restricted to Chinnar WLS and sporadically elsewhere in the leeward side of the Ghats.
18	Ashambu Laughingthrush *Montecincla meridionalis*	തെക്കൻ ചിലുചിലുപ്പൻ	VU	Restricted to the sky islands south of Shengottah gap.
19	White-bellied Sholakili *Sholicola albiventris*	വെള്ളവയറൻ ചോലക്കിളി	VU	Restricted to the sky islands south of Palakkad gap
20	Nilgiri Pipit *Anthus nilghiriensis*	മലവരമ്പൻ, പുല്ലോളിയൻ	VU	Restricted to Munnar hills
21	Great Thick-knee *Esacus recurvirostris*	പെരുങ്കൊക്കൻ പ്ലോവർ	NT	Nomadic winter visitor to riverine and coastal wetlands
22	Eurasian Oystercatcher *Haematopus ostralegus*	കടൽ മണ്ണാത്തി	NT	Regular winter visitor in small numbers to the beaches
23	Eurasian Curlew *Numenius arquata*	വാൾക്കൊക്കൻ	NT	Regular winter visitor in small numbers to the coastal wetlands north of Kollam district
24	Bar-tailed Godwit *Limosa lapponica*	വരവാലൻ സ്നാപ്പ്	NT	Regular winter visitor in small numbers to the coastal wetlands north of Kollam district
25	Black-tailed Godwit *Limosa limosa*	പട്ടവാലൻ സ്നാപ്പ്	NT	Common and abundant winter visitor, augmented by passage migrants, to all fresh water, coastal wetlands
26	Curlew Sandpiper *Calidris ferruginea*	കടൽക്കാട	NT	Regular winter visitor in small numbers to coastal wetlands
27	River Tern *Sterna aurantia*	പുഴ ആള	NT	Common in inland reservoirs

28	Swinhoe's Storm-petrel *Oceanodroma monorhis*	തവിടൻ കാറ്റിളക്കി	NT	Common non-breeding visitor in off-shore waters
29	Flesh-footed Shearwater *Ardenna carneipes*	ചെങ്കാലൻ തിരവെട്ടി, അയലക്കാക്ക	NT	Common non-breeding visitor in off-shore waters
30	Painted Stork *Mycteria leucocephala*	വർണ്ണക്കൊക്ക്	NT	Common winter visitor to all wetlands with a tiny breeding population
31	Oriental Darter *Anhinga melanogaster*	ചേരക്കോഴി	NT	Common resident across Kerala
32	Spot-billed Pelican *Pelecanus philippensis*	പുള്ളിച്ചുണ്ടൻ കൊതുമ്പന്നം	NT	Regular winter visitor in small numbers to all wetlands with a small breeding population in Alappuzha-Ernakulam region
33	Black-headed Ibis *Threskiornis melanocephalus*	വെള്ളഅരിവാൾകൊക്കൻ, കഷ്ഠിക്കൊക്ക്	NT	Common non-breeding visitor to all wetlands with some breeding sites across Kerala
34	Rufous-bellied Eagle *Lophotriorchis kienerii*	ചെമ്പൻ എറിയൻ, മുയലമുക്കൻ	NT	Resident along the Western Ghats in small numbers
35	Pallid Harrier *Circus macrourus*	മേടുതപ്പി	NT	Uncommon winter visitor to the open grasslands in all zones
36	Lesser Fish Eagle *Haliaeetus humilis*	ചെറിയ മീൻപരുന്ത്	NT	Resident in all riverine habitats in the Western Ghats
37	Grey-headed Fish Eagle *Haliaeetus ichthyaetus*	വലിയ മീൻപരുന്ത്	NT	Small numbers restricted to northern Wayanad and Sholayar river basin
38	Malabar Pied Hornbill *Anthracoceros coronatus*	പാണ്ടൻ വേഴാമ്പൽ	NT	Resident of Vazhachal region and the forests of northern Kerala but nomadic everywhere in central Kerala
39	Red-necked Falcon *Falco chicquera*	ചെന്തലയൻ പുള്ള്	NT	Nomadic non-breeding visitor across Kerala
40	Alexandrine Parakeet *Psittacula eupatria*	വൻ തത്ത	NT	Restricted to the forests of north-eastern Wayanad
41	Grey-headed Bulbul *Brachypodius priocephalus*	ചാരത്തലയൻ ബുൾബുൾ	NT	Uncommon resident along the wetter low- and mid-altitude forests of Western Ghats
42	Tytler's Leaf Warbler *Phylloscopus tytleri*	സൂചിമുഖി ഇലക്കുരുവി	NT	Uncommon winter visitor restricted to highlands
43	Palani Laughingthrush *Montecincla fairbanki*	വടക്കൻ ചിലുചിലപ്പൻ	NT	Restricted to the sky islands between Palakkad and Shengottah gap

Redlist species of birds for Kerala with its conservation priority (IUCN regional level assessment out of a total of 37 species assessed)

No	Common name	Species name	Kerala Redlist	IUCN Redlist	Conservation Priority
1	Cinnamon Bittern	*Ixobrychus cinnamomeus*	EN	LC	High
2	Indian Thick-knee	*Burhinus indicus*	VU	LC	High
3	Jerdon's Baza	*Aviceda jerdoni*	EN	LC	High
4	Malabar Pied Hornbill	*Anthracoceros coronatus*	VU	NT	High
5	Yellow-wattled Lapwing	*Vanellus malabaricus*	EN	LC	High
6	Forest Wagtail	*Dendronanthus indicus*	EN	LC	High
7	Pacific Golden Plover	*Pluvialis fulva*	CR	LC	High
8	Malabar Lark	*Galerida malabarica*	LC	LC	Moderate
9	White-bellied Sea Eagle	*Haliaeetus leucogaster*	LC	LC	Moderate
10	Black Bittern	*Ixobrychus flavicollis*	VU	LC	Moderate
11	Cotton Teal	*Nettapus coromandelianus*	VU	LC	Moderate
12	Grey-headed Bulbul	*Brachypodius priocephalus*	EN	NT	Moderate
13	Streaked Weaver	Ploceus manyar	VU	LC	Moderate
14	Watercock	*Gallicrex cinerea*	EN	LC	Moderate
15	Bar-tailed Godwit	*Limosa lapponica*	NT	NT	Moderate
16	Curlew Sandpiper	*Calidris ferruginea*	NT	NT	Moderate
17	Eurasian Curlew	*Numenius arquata*	CR	NT	Moderate
18	Great Knot	*Calidris tenuirostris*	NT	EN	Moderate
19	Indian Eagle Owl	*Bubo bengalensis*	VU	LC	Moderate
20	Yellow Bittern	*Ixobrychus sinensis*	VU	LC	Moderate

Bird species of Kerala recommended for inlcusion under section 38 of biological diversity act 2002

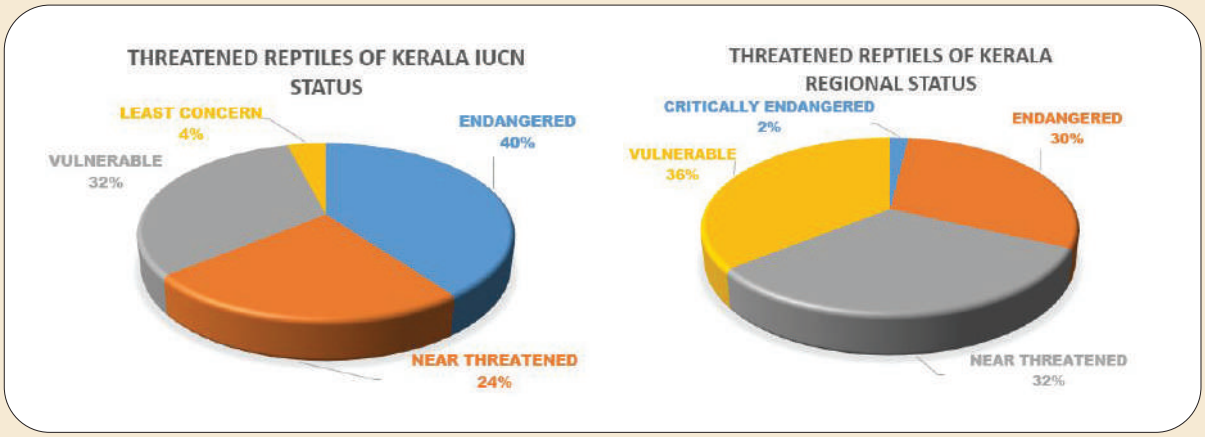
Sl.no.	Common name	Scientific Name	Justification
1	Cinnamon Bittern	*Ixobrychus cinnamomeus,* (Gmelin)	Habitat loss due to draining of wetlands and paddy fields. Need conservation of wetlands especially *Pandanus* brakes and reed beds. High conservation priority species in Kerala
2.	Indian Thick-knee	*Burhinus indicus,* (Salvadori)	Threat due to habitat loss. Need conservation of wetlands, seashore. High conservation priority species in Kerala
3.	Jerdon's Baza	*Aviceda jerdoni,* (Blyth)	Threat due to Deforestation. High conservation priority species in Kerala. Need intensive study of habitat requirements. Conservation of forests in Wayanad.
4	Malabar Pied Hornbill	*Anthracoceros coronatus,* (Boddaert)	Species of high conservation priority in Kerala.Threat due to poaching. high demand in international market. Need monitoring of nesting sites
5	Yellow-wattled Lapwing	*Vanellus malabaricus,* (Boddaert)	Species of high conservation priority in Kerala. Threat due to habitat degradation
6	Forest Wagtail	*Dendronanthus indicus,* (Gmelin)	Species of high conservation priorityin Kerala. Threat due to degradation of low and mid-altitude forests
7	Pacific Golden Plover	*Pluvialis fulva* (Gmelin)	Species of high conservation priority in Kerala. Threat due to habitat degradation Need conservation of wetlands, seashore

Bird species of Kerala which are in commercial trade

Sl/ No	Order/Family	Scientific Name	Common Name	Malayalam Name
1	Columbiformes/ Columbidae	*Streptopelia decaocto* (Frivaldszky, 1838)	Eurasian Collared Dove	പൊട്ടൻ ചെങ്ങാലിപ്രാവ്
2	Columbiformes/ Columbidae	*Streptopelia senegalensis* (Linnaeus, 1766)	Laughing Dove	തവിടൻ പ്രാവ്
3	Strigiformes/ Tytonidae	*Tyto alba* (Scopoli, 1769)	Common Barn Owl	വെള്ളിമൂങ്ങ
4	Psittaciformes/ Psittaculidae	*Psittacula cyanocephala* (Linnaeus,1766)	Plum-headed Parakeet	പൂന്തത്ത
5	Psittaciformes/ Psittaculidae	*Psittacula columboides* (Vigors, 1830)	Malabar Parakeet	നീലത്തത്ത
6	Psittaciformes/ Psittaculidae	*Psittacula eupatria* (Linnaeus, 1766)	Alexandrine Parakeet	വൻതത്ത
7	Psittaciformes/ Psittaculidae	*Psittacula krameri* (Scopoli, 1769)	Rose-ringed Parakeet	മോതിരത്തത്ത
8	Psittaciformes/ Psittaculidae	*Loriculus vernalis* (Sparrman, 1787)	Vernal Hanging Parrot	നീലത്തത്ത
9	Passeriformes/ Ploceidae	*Ploceus philippinus* (Linnaeus, 1766)	Baya Weaver	തൂക്കണാംകുരുവി
10	Passeriformes/ Estrildidae	*Amandava amandava* (Linnaeus, 1758)	Red Munia	കുങ്കുമക്കുരുവി
11	Passeriformes/ Estrildidae	*Euodice malabarica* (Linnaeus, 1758)	Indian Silverbill	വയലാറ്റ
12	Passeriformes/ Estrildidae	*Lonchura striata* (Linnaeus, 1766)	White-rumped Munia	ആറ്റക്കറുപ്പൻ
13	Passeriformes/ Estrildidae	*Lonchura punctulata* (Linnaeus, 1758)	Scaly-breasted Munia	ചുട്ടിയാറ്റ
14	Passeriformes/ Estrildidae	*Lonchura malacca* (Linnaeus, 1766)	Tricoloured Munia	ആറ്റച്ചെമ്പൻ
15	Passeriformes/ Sturnidae	*Gracula indica* (Cuvier, 1829)	Southern Hill Myna	കാട്ടുമൈന

Reptiles (Reptilia)

Draco dussumieri © Jafer Palot



A recent estimate from the State showed that a total of 201 species of terrestrial reptiles classified under 24 families belonging to 3 orders (Palot, 2021). Now the updated list consists of two species of crocodiles, 12 species of turtles and tortoises, 75 species of lizards and 112 species of snakes.Of these, 109 species (54%) are endemic to the Western Ghats, which include 14 species endemics to the geographical boundary of Kerala. One species of crocodile (Estuarine crocodile, *Crocodylus porosus)* has been extirpated from the coastal habitats of Kerala. As per the last IUCN assessment (2013), 25 species of terrestrial or freshwater reptilian fauna of Kerala are globally threatened, which included 10 endangered, 7 vulnerable ,6 near threatened and 2 species in least concern category. In the present document, a list of threatened species of reptiles of Kerala are prepared based on the analysis of the data on rarity, endemicity, taxonomic distinctiveness, microhabitat preference, conservation status of the species in IUCN Redlist and Indian Wildlife (Protection) Act of 1972 from the region. Accordingly 54 sepcies are grouped under various categories of IUCN at regional level (Critically endangered 1, Endangered 16, Near threatened 17 and Vulnerable 20) Two species viz. Indian Pond Terrapin *Melanochelys trijuga* and Flying Lizard *Draco dussumieri* are proposed for Section 38 of Biological Diversity Act.

THREATENED REPTILES OF KERALA
(Based on IUCN Redlist of 2013 (Srinivasulu et al., 2014)

Sl.No	Species Name	Common Name	IUCN Status	ENDEMIC	WPA	Remarks
1	*Crocodylus palustris*	Mugger (Marsh Crocodile)	VU		Sch. I	Patchy distribution in Kerala.
2	*Vijayachelys silvatica*	Cochin Forest Cane Turtle (Kerala Forest Terrapin, Kavalai Forest Turtle)	EN	WG	Sch. I	Patchy distribution in Kerala. Rare in most of the localities.
3	*Melanochelys trijuga*	Indian Black Turtle (Indian Pond Terrapin)	NT			Common throughout Kerala. Extensively poached for meat in many localities.
4	*Geochelone elegans*	Indian Star Tortoise (Indian Starred Tortoise)	VU		Sch. IV	Extensively collected from the wild as part of the pet trade.
5	*Indotestudo travancorica*	Travancore Tortoise (Forsten's Tortoise)	EN	WG	Sch. IV	Extensively poached for local consumption.
6	*Nilssonia leithii*	Leith's Softshell Turtle	VU		Sch. IV	Few isolated records in Kerala but distributed across Peninsular India.
7	*Pelochelys cantorii*	Asian Giant Softshell Turtle (Cantor's Giant Softshell Turtle)	EN		Sch. I	Very few records in Kerala. Patchy in distribution. Threatened with poaching and habitat degradation.
8	*Chitra indica*	Indian Narrow-headed Softshell Turtle (Narrow-headed Softshell Turtle)	EN		Sch. IV	A single record from the estuarine areas of Valapatanam river in Kannur district. Highly threatened due to habitat degradation and poaching.
9	*Agasthyagama beddomei*	Indian Kangaroo Lizard	EN	WG		This species is mostly restricted to low-land forests in the southern Western Ghats.
10	*Cnemaspis nairi*	Ponmudi Day Gecko	LC	WG		This species is known only from the Agasthyamalai hills of Kerala.
11	*Cnemaspis ornata*	Ornate Day Gecko (Ornate Dwarf Gecko)	NT	WG		Known only from the Agasthyamalai hills of Kerala and Tamil Nadu.
12	*Cnemaspis sisparensis*	Sispara Day Gecko	NT	WG		There is insufficient data available to assess the distribution and conservation status of this species

13	*Cnemaspis indica*	Indian day Gecko	VU	WG		
14	*Cnemaspis wynadensis*	Wayanad Day Gecko	EN	KL		This species is currently known only from few localities in Wayanad.
15	*Dasia subcaerulea*	Boulenger's Dasia	EN	WG		
16	*Eutropis clivicola*	Mountain Skink (Inger's Ponmudi Mabuya)	EN	KL		Described from Ponmudi hills in Thiruvananthapuram, Kerala. This species appears to be common in few localities but nothing is known about their populations status.
17	*Kaestlea laterimaculata*	Side-spotted Ground Skink	VU	WG		This species is widely distributed in the southern WG of Kerala and Tamil Nadu.
18	*Melanophidium bilineatum*	Yellow-striped Shieldtail (Two-lined Black Earth Snake)	VU	WG	Sch. IV	This species has a highly restricted distribution and is Known from Periya, Sugandhagiri and Banasura hills of Wayanad, and Kakkayam in Malabar WLS Kozhikode.
19	*Uropeltis grandis*	Violet Shieldtail (Smith's Earth Snake)	NT	WG	Sch. IV	Reported from Anamalai hills. No recent report from the region.
20	*Rhinophis travancoricus*	Travancore Shieldtail (Tamil Nadu Earth Snake)	EN	WG	Sch. IV	This species was described from Trivandrum in Kerala. But is also known from other lowland forested regions in southern Kerala and Ambadi in Kanyakumari, Tamil Nadu.
21	*Oligodon brevicauda*	Striped Kukri Snake (Short-tailed Kukri Snake)	VU	WG	Sch. IV	In recent past only one confirmed record from Agasthyamalai hills
22	*Ahaetulla perroteti*	Bronze-headed Vine Snake (Perrotet's Vine Snake)	EN	WG	Sch. IV	Known only from high-altitude shola grasslands of Nilgiri Hills in Kerala and Tamil Nadu.
23	*Ahaetulla dispar*	Günther’s Vine Snake	NT	WG	Sch. IV	
24	*Ophiophagus hannah*	King Cobra	VU		Sch. II	
25	*Trimeresurus macrolepis*	Large-scaled Green Pit Viper	NT	WG	Sch. IV	

Threatened species of reptiles (terrestrial) of Kerala with their conservation status at regional level

Sl.No	Species Name	Common Name	IUCN status	ENDEMIC	WPA	Regional status
1	*Crocodylus palustris* (Lesson,1831)	Mugger (Marsh Crocodile)	VU		Sch. I	VU
2	*Vijayachelys silvatica*	Cochin Forest Cane Turtle (Kerala Forest Terrapin, Kavalai Forest Turtle)	EN	WG	Sch. I	EN
3	*Geochelone elegans*	Indian Star Tortoise (Indian Starred Tortoise)	VU		Sch. IV	VU
4	*Indotestudo travancorica*	Travancore Tortoise (Forsten's Tortoise)	VU	WG	Sch. IV	EN
5	*Nilssonia leithii*	Leith's Softshell Turtle	CR		Sch. IV	CR
6	*Lissemys punctata*	Indian flapshell Turtle	VU		Sch. I	VU
7	*Pelochelys cantorii*	Asian Giant Softshell Turtle (Cantor's Giant Softshell Turtle)	EN		Sch. I	EN
8	*Chitra indica*	Indian Narrow-headed Softshell Turtle (Narrow-headed Softshell Turtle)	EN		Sch. IV	EN
9	*Calotes grandisquamis*	Large-scaled Forest Lizard (Large-scaled Calotes)	LC	WG		NT
10	*Monilisaurus ellioti*	Elliots Forest Lizard	LC	WG		NT.
11	*Salea anamallyana*	Anamalai Spiny Lizard (Anamalai Salea)	LC	WG		NT
12	*Salea horsfieldii*	Horsfield's Spiny Lizard (Nilgiri Salea)	LC	WG		NT
13	*Agasthyagama beddomei*	Indian Kangaroo Lizard	EN			EN
14	*Cnemaspis chengodumalensis*	Chengodumala Day Gecko	NE	KL		EN
15	*Cnemaspis indica*	Indian Day Gecko	VU	WG		VU
16	*Cnemaspis kottiyoorensis*	Kottiyur Day Gecko	NE	KL		VU

17	*Cnemaspis nilagirica*	Nilgiri Day Gecko	NT	WG		EN
18	*Cnemaspis zacharyi*	Zacharia's Day Gecko	NE	WG		NT
19	*Hemidactylus paaragowli*	Travancore Rock Gecko	NE	WG		VU
20	*Eutropis clivicola*	Mountain Skink (Inger's Ponmudi Mabuya)	EN	WG		VU
21	*Ristella rurkii*	Rurk's Cat Skink (Rurk's Ristella)	DD	WG		VU
22	*Kaestlea bilineata*	Two-lined Ground Skink	LC	WG		VU
23	*Kaestlea laterimaculata*	Side-spotted Ground Skink	VU	WG		NT
24	*Kaestlea travancorica*	Travancore Ground Skink	LC	WG		VU
25	*Kaestlea palnica*	Palni Hills Ground Skink	DD	WG		EN
26	*Varanus bengalensis*	Bengal Monitor	LC		Schedule I	NT
27	*Melanophidium punctatum*	Pied-belly Shieldtail (Beddome's Black Earth Snake)	LC	WG	Schedule IV	NT
28	*Melanophidium bilineatum*	Yellow-striped Shieldtail (Two-lined Black Earth Snake)	VU	WG	Schedule IV	EN
29	*Platyplectrurus madurensis*	Three-lined Shieldtail	EN	WG	Schedule IV	EN
30	*Plectrurus guentheri*	Purple Shieldtail (Gunther's Burrowing Snake)	DD	WG	Schedule IV	EN
31	*Uropeltis beddomii*	Beddome's Shieldtail (Beddome's Earth Snake)	DD	WG	Schedule IV	VU

32	*Uropeltis rubrolineata*	Red-lined Shieldtail (Red-lined Earth Snake)	LC	WG	Schedule IV	EN
33	*Uropeltis myhendrae*	Barred Shieldtail (Boulenger's Earth Snake)	DD	WG	Schedule IV	VU
34	*Uropeltis maculata*	Red- sided Shieldtail (Spotted Earth Snake)	DD	WG	Schedule IV	VU
35	*Uropeltis madurensis*	Madura Shieldtail	LC	WG	Schedule IV	VU
36	*Uropeltis pulneyensis*	Palni Shieldtail (Indian Earth Snake)	LC	WG	Schedule IV	NT
37	*Rhinophis sanguineus*	Red-bellied Shieldtail (Beddome's Shieldtail)	LC	WG	Schedule IV	VU
38	*Rhinophis travancoricus*	Travancore Shieldtail (Tamil Nadu Earth Snake)	EN	WG	Schedule IV	VU
39	*Rhinophis melanoleucus*	Black and White shieldtail	NE	KL	Schedule IV	EN
40	*Rhinophis karinthandani*	Karinthandan Shieldtail	NE	WG	Schedule IV	VU
41	*Python molurus*	Indian Rock python	NT		Schedule I	NT
42	*Eryx whitakeri*	Whitaker's Boa (Whitaker's Sand Boa)	NE		Schedule IV	NT
43	*Oligodon venustus*	Black-spotted Kukri Snake	LC	WG	Schedule IV	NT
44	*Rhabdops olivaceus*	Olive Forest Snake	LC	WG	Schedule IV	NT
45	*Ahaetulla perroteti*	Bronze-headed Vine Snake (Perrotet's Vine Snake)	EN	WG	Schedule IV	EN
46	*Ahaetulla travancorica*	Travancore Vine Sanke	NE	WG	Schedule IV	VU
47	*Proahaetulla antiqua*	Antiq Vine Snake	NE	WG	Schedule IV	EN

48	*Xylophis captaini*	Captain’s Wood Snake	LC	WG	Schedule IV	NT
49	*Xylophis perroteti*	Striped Narrow-headed Snake	LC	WG	Schedule IV	NT
50	*Xylophis mosaicus*	Anamalai Wood Snake				VU
51	*Dieurostus dussumieri*	Dussumier's Smooth Scale Water Snake (Kerala Mud Snake)	LC	KL	Schedule IV	NT
52	*Ophiophagus hannah*	King Cobra	VU		Schedule II	VU
53	*Trimeresurus macrolepis*	Large-scaled Green Pit Viper	NT	WG	Schedule IV	NT
54	*Trimeresurus strigatus*	Horseshoe Pit Viper	LC	WG	Schedule IV	EN

Reptile species of Kerala recommended for inlcusion under section 38 of biological diversity act 2002

Sl. No.	Common Name	Scientific Name	Justification
1	Indian Pond Terrapin	*Melanochelys trijuga* Schweigger, 1812	Heavily hunted for meat.Currently not protected under any of the Schedules of Indian Wildlife (Protection) Act of 1972.
2	South Indian Flying Lizard	*Draco dussumieri* Dumeril & Bibron, 1837	Locally captured as museum exhibits and for alleged medicinal properties

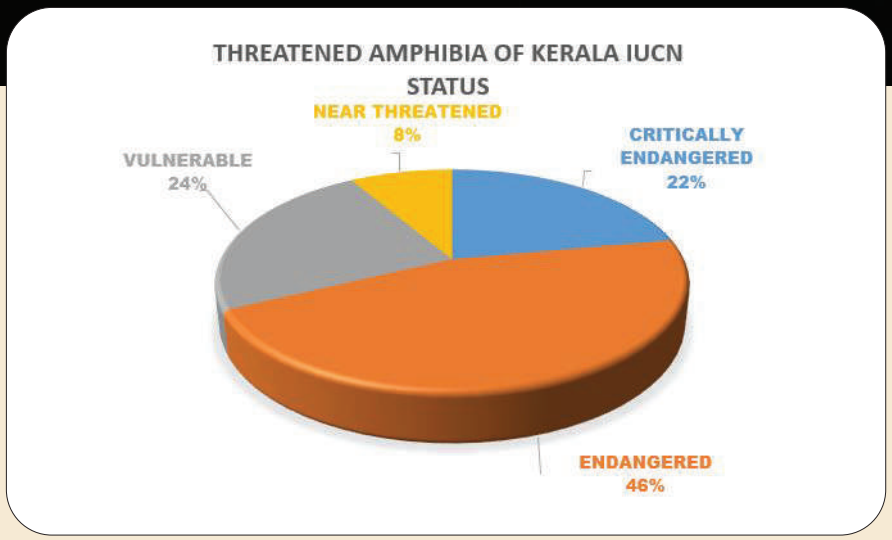
Reptile Species of Kerala which are hunted/in Commercial Trade in Kerala

Reptiles are mainly hunted for meat locally and traded as pets or animals with alleged medicial properties within and outside country based on superstitious believes. Some species of sand boa fetch huge sum in the market because of alleged supernatural powers assigned to them. The detailed list of reptile sepcies commonly involved in wildlife trade are listed below.

Sl. No	Common Name	Scientific name	Remarks
1	Indian Pond Terrapin	*Melanochelys trijuga* Schweigger 1812	Hunted for meat
2	Indian Flap-shelled Turtle	*Lissemys punctata* (Bonnatere, 1789)	Hunted for meat; pet trade.
3	Indian Star Tortoise	*Geochelone elegans* (Schoepff 1795)	Pet trade
4	Travancore tortoise	*Indotestudo travancorica* (Boulenger, 1907)	Hunted for meat
5	Indian Chameleon	*Chamealeo zeylanica* Laurenti 1768	Pet trade
6	South Indian Flying Lizard	*Draco dussumieri* Dumeril & Bibron 1837	Colleced as museum exhibits and alleged medicinal properties
7	Bengal Monitor (Indian Monitor)	*Varanus bengalensis* (Daudin 1802)	Hunted for meat and skin to make musical instruments.
8	Indian Rock Python	*Python molurus* (Linnaeus 1758)	Hunted for meat & skin; pet trade
9	Red Sand Boa (Indian Sand Boa)	*Eryx johnii* (Russell 1801)	Pet trade, black magic
10	Common Sand Boa	*Eryx conicus* (Schneider 1801)	Pet trade, black magic

FROGS (AMPHIBIA)

Raorchestes ochlandrae © KP Dinesh



In the updated checklist of amphibians for the state a total of 186 species are reported wherein type localities for the 125 species are within the political boundaries of the state and rest of the 56 species reported are either described from the adjacent states or the adjacent countries which have their distribution in Kerala. Among these, 54 species are categorized as threatened as per the latest IUCN assessment (IUCN 2004) (13 species Critically Endangered; 27 species as Endangered and 14 species as Vulnerable); 5 species as Near Threatened; 27 species as Least Concern; 32 species as Data Deficient and 68 species as not assessed category. Three species of frogs are proposed and discussed for inclusion in 'Section 38 of Biological Diversity Act' for Kerala, they are *Euphlyctis karaavali, Hoplobatrachus tigerinus* and *Hoplobatrachus crassus.*

THREATENED AMPHIBIANS OF KERALA
(based on IUCN 2004 to 2020 assessment) (As on July 2020)

Sl. No	Species	IUCN Red List Code*
	FAMILY: BUFONIDAE Gray	
1	*Duttaphrynus beddomii* (Gnther, 1875)	EN
2	*Duttaphrynus microtympanum* (Boulenger, 1882)	VU
3	*Ghatophryne ornata* (Gnther, 1876)	EN
4	*Ghatophryne rubigina* (Pillai and Pattabiraman, 1981)	VU
5	*Pedostibes tuberculosus* Gnther, 1875	EN
	FAMILY: DICROGLOSSIDAE Anderson	
6	*Euphlyctis karaavali* Priti, Naik, Seshadri, Singhal, Vidisha, Ravikanth and Gururaja, 2016	EN
7	*Minervarya murthii* (Pillai, 1979)	CR
8	*Minervarya nilagirica* (Jerdon, 1854)	EN
9	*Minervarya sahyadris* Dubois, Ohler and Biju, 2001	EN
	FAMILY: MICRIXALIDAE Dubois, Ohler and Biju	
10	*Micrixalus gadgili* Pillai and Pattabiraman, 1990	EN
11	*Micrixalus nudis* Pillai, 1978	VU
12	*Micrixalus saxicola* (Jerdon, 1853)	VU
13	*Micrixalus phyllophilus* (Jerdon, 1853)	VU
	FAMILY: MICROHYLIDAE Günther	
14	*Melanobatrachus indicus* Beddome, 1878	EN
15	*Microhyla sholigari* Dutta and Ray, 2000	EN
16	*Uperodon mormoratus* (Rao, 1937)	EN
17	*Uperodon triangularis* (Gnther, 1875)	VU
	FAMILY: NASIKABATRACHIDAE Biju and Bossuyt	
18	*Nasikabatrachus sahyadrensis* Biju and Bossuyt, 2003	EN
	FAMILY: NYCTIBATRACHIDAE Blommers-Schlösser	
19	*Nyctibatrachus aliciae* Inger, Shaffer, Koshy and Bakde, 1984	EN
20	*Nyctibatrachus beddomii* (Boulenger, 1882)	EN
21	*Nyctibatrachus deccanensis* Dubois, 1984	VU
22	*Nyctibatrachus major* Boulenger, 1882	VU
23	*Nyctibatrachus minor* Inger, Shaffer, Koshy and Bakde, 1984	EN
24	*Nyctibatrachus vasanthi* Ravichandran, 1997	EN
	FAMILY: RANIDAE Batsch	
25	*Indosylvirana aurantiaca* (Boulenger, 1904)	VU
	FAMILY: RANIXALIDAE Dubois	
26	*Indirana brachytarsus* (Gnther, 1875)	EN
27	*Indirana gundia* (Dubois, 1986)	CR
28	*Walkerana diplosticta* (Gnther, 1876)	EN
29	*Walkerana leptodactyla* (Boulenger, 1882)	EN
30	*Walkerana phrynoderma* (Boulenger, 1882)	CR
	FAMILY: RHACOPHORIDAE Hoffman	
31	*Ghatixalus variabilis* (Jerdon, 1853)	EN
32	*Pseudophilautus wynaadensis* (Jerdon, 1853)	EN
33	*Raorchestes bobingeri* (Biju and Bossuyt, 2005)	VU
34	*Raorchestes chalazodes* (Günther, 1876)	CR

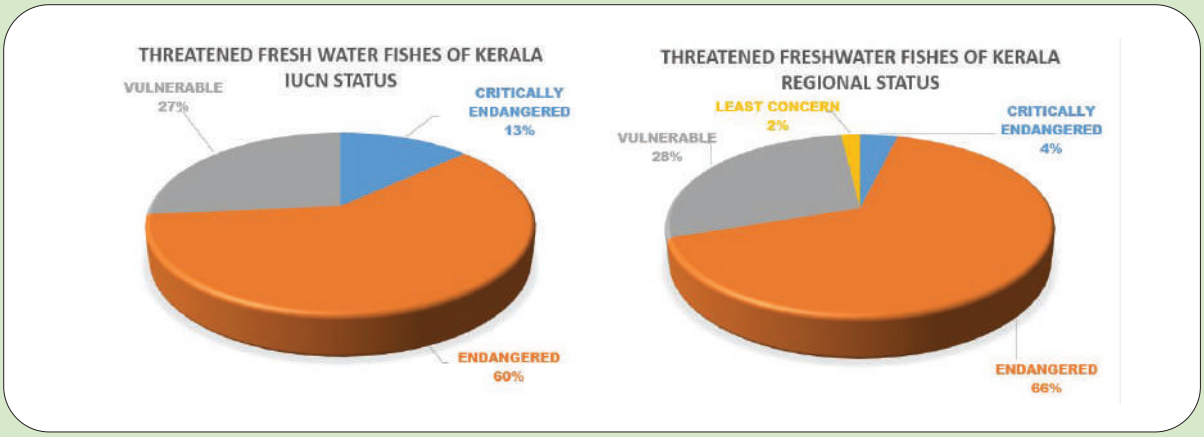
35	*Raorchestes charius* (Rao, 1937)	EN
36	*Raorchestes chlorosomma* (Biju and Bossuyt, 2009)	CR
37	*Raorchestes chromasynchysi* (Biju and Bossuyt, 2009)	VU
38	*Raorchestes dubois* (Biju and Bossuyt, 2006)	VU
39	*Raorchestes glandulosus* (Jerdon, 1853)	VU
40	*Raorchestes graminirupes* (Biju and Bossuyt, 2005)	VU
41	*Raorchestes griet* (Bossuyt, 2002)	CR
42	*Raorchestes kaikatti* (Biju and Bossuyt, 2009)	CR
43	*Raorchestes marki* (Biju and Bossuyt, 2009)	CR
44	*Raorchestes munnarensis* (Biju and Bossuyt, 2009)	CR
45	*Raorchestes nerostagona* (Biju and Bossuyt, 2005)	EN
46	*Raorchestes ponmudi* (Biju and Bossuyt, 2005)	CR
47	*Raorchestes resplendens* Biju, Shouche, Dubois, Dutta and Bossuyt, 2010	CR
48	*Raorchestes signatus* (Boulenger, 1882)	EN
49	*Raorchestes sushili* (Biju and Bossuyt, 2009)	CR
50	*Raorchestes tinniens* (Jerdon, 1853)	EN
51	*Raorchestes travancoricus* (Boulenger, 1891)	EN
52	*Rhacophorus calcadensis* Ahl, 1927	EN
53	*Rhacophorus lateralis* Boulenger, 1883	EN
54	*Rhacophorus pseudomalabaricus* Vasudevan and Dutta, 2000	CR

Amphibia species of kerala recommended for inlcusion under section 38 of biological diversity act 2002

Sl. No.	Common Name	Scientific Name	Justification
1	Carnatic Bulfrog	*Hoplobatrachus crassus* Jerdon 1853	Locally collected for frog meat consumption. Threat due to Habitat destruction and use of pesticides.
2	Kaaravali Skittering frog	*Euphlyctis karaavali*, Priti, Naik, Seshadri, Singal, Vidisha, Ravikanth, and Gururaja, 2016	Locally collected for frog meat consumption. Threat due to Habitat destruction and use of pesticides.
3	Indian bull frog	*Hoplobatrachus tigerinus* (Daudin, 1802)	Locally collected for frog meat consumption. Threat due to Habitat destruction and use of pesticides.

Fresh water fishes (Pisces)

Puntius muvattupuzhaensis © CP. Shaji



Altogether 196 sepcies of freshwater fishes belonging to 36 families 14 orders and 84 genera are currently known from Kerala, out of which 53 sepcies, 7 genera and 2 famiies are endemic to the state. All species of freshwater fishes occurring in Kerala described till 2009 – 2010 are assessed by IUCN during 2010-2011. Accordingly there are 53 sepcies of threatened freshwater fishes are occurring in Kerala as given in the table below. Subsequent to IUCN redlist assessment in 2011, the literature on freshwater fishes of Kerala has increased considerably and the conservation status of many species have been changed as a result of new data generated during the last ten years. In the current programme 35 sepcies of freshwater fishes (described from Kerala or described elsewhere and having a distribution in Kerala) have been assessed and proposed different conservation status as per IUCN guidelines. Nine species of freshwater fishes are prioritised for inclusion under the section 38 of the Biological Diversity Act. Apart from these, 17 sepcies are listed in this document which are facing high levels of threats due to over exploitation and trade and need urgent attention for regular monitioirng with specific focus on their exploitation and trade.

Threatened fresh water fishes of Kerala based on the IUCN Red List, 2011

Sl. No.	Species	Status of global IUCN Red List of Threatened Species	Status of present regional IUCN Red List Assessment
1	*Garra arunachalami*	CR	CR
2	*Hemibagruspunctatus*	CR	Likely to trigger EN
3	*Hypselobarbus thomassi*	CR	Likely to trigger VU
4	*Mesonoemacheilus herrei*	CR	Likely to trigger EN
5	*Neolissochilus wynaadensis*	CR	Likely to trigger EN
6	*Pethia pookodensis*	CR	Possibly meeting LC
7	*Tor remadevii*	CR	CR
8	*Dawkinsia arulius*	EN	EN
9	*Dawkinsia exclamation*	EN	EN
10	*Devario neilgherriensis*	EN	EN
11	*Eechathalakenda ophicephalus*	EN	EN
12	*Garra hughi*	EN	EN
13	*Garra surendranathanii*	EN	EN
14	*Ghatsa montana*	EN	EN
15	*Ghatsa santhamparaiensis*	EN	EN
16	*Glyptothorax anamalaiensis*	EN	EN
17	*Glyptothorax davissinghi*	EN	EN
18	*Glyptothorax housei*	EN	EN
19	*Glyptothorax madraspatanus*	EN	EN
20	*Snaha aruna*	EN	EN
21	*Horabagrus nigricollaris*	EN	EN
22	*Hypselobarbus dubius*	EN	EN
23	*Hypselobarbus micropogon*	EN	EN
24	*Hypselobarbus periyarensis*	EN	EN
25	*Lepidopygopsis typus*	EN	EN

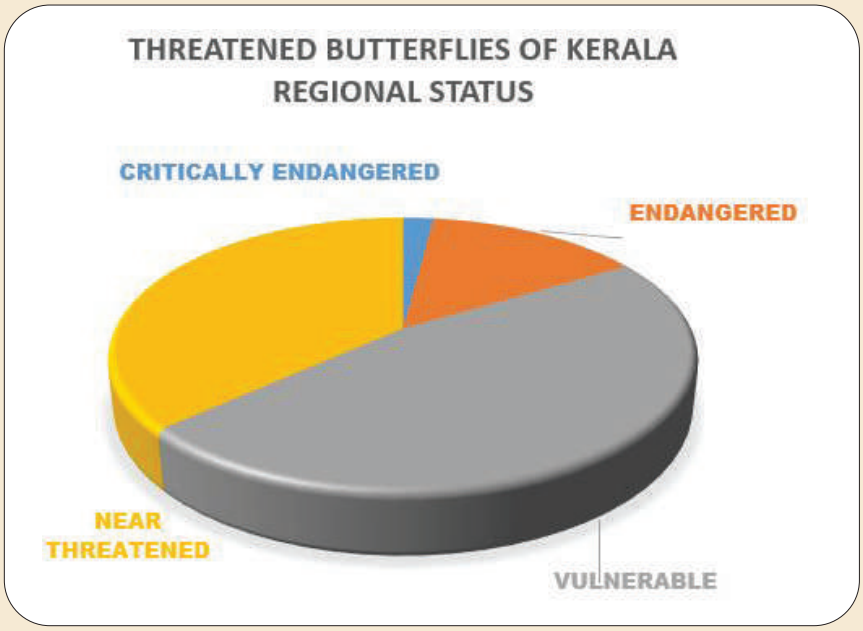
26	*Mesonoemacheilus pulchellus*	EN	EN
27	*Ophichthys fossorius*	EN	EN
28	*Opsarius canarensis*	EN	EN
29	*Osteochilichthys longidorsalis*	EN	EN
30	*Pseudeutropius mitchelli*	EN	EN
31	*Pterocryptis wynaadensis*	EN	EN
32	*Puntius cauveriensis*	EN	EN
33	*Sahyadria denisonii*	EN	EN
34	*Sahyadria chalakkudiensis*	EN	EN
35	*Schistura striata*	EN	EN
36	*Tariqilabeo periyarensis*	EN	EN
37	*Tor malabaricus*	EN	EN
38	*Travancoria elongata*	EN	EN
39	*Travancoria jonesi*	EN	EN
40	*Batasio travancoria*	VU	VU
41	*Balitora mysorensis*	VU	VU
42	*Channa diplogramma*	VU	VU
43	*Carinotetraodon travancoricus*	VU	VU
44	*Garra menoni*	VU	VU
45	*Garra periyarensis*	VU	VU
46	*Horabagrus brachysoma*	VU	VU
47	*Hyporhamphus xanthopterus*	VU	VU
48	*Indoreonectes keralensis*	VU	VU
49	*Laubuka fasciata*	VU	VU
50	*Mesonoemacheilus menoni*	VU	VU
51	*Mesonoemacheilus pambarensis*	VU	VU
52	*Mesonoemacheilus periyarensis*	VU	VU
53	*Pseudosphromenus dayi*	VU	VU

Fresh water fish species of Kerala recommended for inlcusion under section 38 of Biological Diversity Act 2002

Sl. No.	Common Name	Scientific Name	Justification
1	Hump-backed mahseer	*Tor remadevii* Kurup & Radhakrishnan	Threat due to indiscriminate fishing by local communities.
2	Gollum Snakehead	*Aenigmachanna Gollum* Britz, Anoop, Dahanukar and Raghavan	High demand in aquarium pet trade
3	Subterranean Catfish	*Kryptoglanis shajii*Vincent & J. Thomas	Threat due to high levels of water extraction from laterite aquifers. Species of unique evolutionary status
4	Blind catfish	*Horaglanis abdulkalami* Babu	..do..
5	Blind catfish	*Horaglanis alikunhii* Subhash Babu & Nayar	..do..
6	Blind catfish	*Horaglanis krishnai* , Menon	..do..
7	Blind synbranchid eel	*Rakthamichthys digressus*	..do..
8	Blind synbranchid eel	*Rakthamichthys indicus*	..do..
9	Blind synbranchid eel	*Rakthamichthys roseni*	..do..

Butterflies (Lepidoptera)

Halpe homolea © Jafer Palot



A total of 326 species of butterflies belonging to 168 genera are recorded from the geographical boundary of Kerala. All the six families known from India are represented in the region, in which the family Nymphalidae dominated with 97 species (in 47 genera) followed by Lycaenidae (94 in 56 genera), Hesperiidae (82 in 46 genera), Pieridae (32 in 14 genera) Papilionidae (19 in 4 genera) and two species (in one genera) from the family Riodinidae. No Indian butterfly species was assessed for IUCN Red List category till date. The assessment of 326 speceis of butterflies of Kerala attempted here was mainly based on the reliable published and unpublilshed information available during the assessment process. A total of 49 species of butterflies are shortlisted in to various Threatened category of IUCN, out of these, the Palni Sailer, *Neptis palnica* is proposed to the Critically Endangered category owing to its narrow geographical range, 7 species are Endangered, 23 are Vulnerable and 18 species are in the Near Threatened category. Many of the endemic species or species which are in illegal trade are not listed in any of the Schedules of the Indian Wildlfie (Protection) Act 1972. Hence, five species vulnerable to illegal trade viz. Southern Birdwing *Troides minos,* Common Banded Peacock *Papilio crino,* Red Helen *Papilio helenus*, Tamil Lacewing *Cethosia mahratta,* Malabar Tree Nymph *Idea malabarica* are prioritised for inclusion in the Section- 38 of Biological Diversity Act 2002. Since Indian butterfly species are not assessed for IUCN Red List category till date, the list of butterflies are assessed regionally based on the available data on endemicity, rarity, distribution, threats etc.

Sl. No	Scientific Name	Common Name	Distribution in WG	Justification	Proposed IUCN Category*
Family: HESPERIIDAE					
1.	*Bibasis sena*, (Moore,1866)	Orange-tail Awl	KL,TN, KA, GA,MH	Schedule- II species. Population found declining in Kerala and elsewhere in Western Ghats.	NT
2.	*Aeromachus dubius* Elwes& Edwards, 1897	Dingy Scrub Hopper	TN, KL, KA	*A. dubius is* reported from high altitude Shola grasslands of Anamalais and Palani Hills. Very patchy in distribution.	NT
3.	*Baracus subditus* Moore, [1884] *	Yellow-striped Hedge Hopper/ Striped Hedge Hopper	TN, KL	Narrow endemic. Known only from 2-3 localities of Idukki and Pathanamthitta Dts only.	EN
4.	*Thoressa evershedi* (Evans, 1910) *	Evershed's Ace/ Travancore Tawny Ace	TN, KL	Narrow endemic. Very Rare. A montane shola- grassland species	EN
5.	*Thoressa sitala* (de Nicéville, 1885) *	Sitala Ace/ Nilgiri Plain Ace	KL, KA	Narrow endemic. So far reported only from North of Palghat Gap up to Coorg. Reported from Kannur and Kozhikode Dts in the State. Very rare. Depends mostly on Shola Grasslands.	EN
6.	*Zographetus ogygia* (Hewitson, [1866])	Purple Spotted Flitter	KL, KA, GA	Rare. Rediscovered in 2013 from Aralam WLS Also reported from north & N.E. India	VU
7.	*Suastus minuta* (Moore, 1877*)*	Small Palm Bob	KL,TN, KA, GA	The Subspecies *bipunctus* is restricted to southern WG. Inhabits moist dense evergreen forests at lower and high elevations.	NT
8.	*Salanoemia sala (Hewitson,1866)*	Maculate Lancer	KL,TN, KA, GA	Patchy in distribution. A few observations from the State	NT
9.	*Caltoris canaraica* (Moore , [1884]) *	Kanara Swift/ Karwar Swift	TN, KL, KA	Endemic. Patchy in distribution. Reported from Wayanad & Parambikkulam	VU
10.	*Sarangesa purendra* (Moore,1882)	Spotted Small Flat	TN, KL, KA, GA	*S. pandra*, population is found declining alarmingly. Depends mainly on Midland laterite hill ecosystem,which is under serious threat in the state.	NT

*Endemic to Western Ghats

Family : LYCAENIDAE					
11.	*Acytolepis lilacea* (Hampson, 1889)	Hampson's Hedge Blue/ Lilac Hedge Blue	TN, KL, KA	Schedule- II species. Larvae feeds only on *Cycas circinalis* plants in forested areas. Reported from Parambikkulam, Neyyar,Peechi etc. Very patchy in distribution	NT
12.	*Celatoxia albidisca* (Moore, [1884])*	White-disc Hedge Blue	TN, KL	Narrow endemic. Depends mostly on the Shola Grassland eco system of Anamalais and Palni Hills.	VU
13.	*Arhopala alea* (Hewitson, 1862) *	Rosy or Kanara Oakblue	TN, KL, KA, GA	Rare, Endemic. Mainly reported from Aralam, Kottiyoor WLS and Brahmagiri range in Wayanad. Also, Sporadic records from outside these regions.	NT
14.	*Rapala lankana* (Moore,1879)	Malabar Flash	KL,TN,	Rare. Endemic to South India and Sri Lanka. Patchy in distribution. Inhabits dense forests and well-wooded areas. Association with Red ants needed for the survival of larvae in the wild.	NT
15.	*Prosotas noreia* (R.Felder,1868)	White-tipped Lineblue	KL,TN, KA, GA,MH	Schedule- I species. Prefer dense forests up to 1000m.Very few records from Kerala.	NT
16.	*Ionolyce helicon* (C.Felder,1860*)*	Pointed Line blue	KL,TN, KA	Schedule-II species. Rare among Lineblue butterflies. Population declining in Kerala and elsewhere in Western Ghats.	NT
17.	*Spindasis abnormis* (Moore,1883)	Abnormal Silver line	KL,TN, GA KA,MH	Only one confirmed report from Brahmagiri hills,Wayanad. Local and seasonal populations reported from northern WG in Maharashtra.	VU
18.	*Horaga viola* Moore, 1882	Brown Onyx	TN, KL, KA, GA	Very rare in the State and elsewhere in India (NE). Only recorded from Kannapuram, Kannur district and from Wayanad in Kerala.	VU
19.	*Hypolycaena nilgirica* Moore, [1884] *	Nilgiri Tit	TN, KL	Very rare in Kerala and Western Ghats. Only reported from Chinnar WLS in Kerala. Other records are from Coimbatore region, mainly in Kallar.	VU
20.	*Creon cleobis* (Godart, [1824])	Broadtail Royal	TN, KL, KA, GA	Prefers moderate elevations and well wooded areas. Rare in Kerala. Only few localities in Wayanad & Idukki. Also from N & NE	NT
21.	*Tajuria maculatus* (Hewit son, [1865])	Spotted Royal	TN, KL, KA	Very rare in Western Ghats and elsewhere in India.Very few records from Kerala. Also from TN & KA & NE	VU

22.	*Tajuria melastigma* (de Niveville,1887)	Branded Royal	TN, KL, KA	Very rare in Western Ghats and elsewhere in India. Very few records from the State (Idukki,Wayanad and Nelliyampathy).	VU
23.	*Ancema sudica* (Evans, 1926)	Silver Royal/ Sahyadri Silver Royal	TN, KL, KA,GA, MH	A rare Western Ghats endemic .Only recorded from Wayanad and Aralam wls.	VU
Family: NYMPHALIDAE					
24.	*Idea malabarica* (Moore, 1877) *	Malabar Tree Nymph	TN, KL, KA, GA, MH	Iconic endemic species of Western Ghats. Inhabits dense moist evergreen forests. Affinity to riparian and swamp ecosystems.	NT
25.	*Parantica nilgiriensis* (Moore, 1877)*	Nilgiri Tiger	TN, KL, KA	Endemic to higher mountains of South India. Mostly a species of Evergreen Shola Forests above 1200M.	NT
26.	*Argynnis castetsi* Oberthür, 1891*	Palni Fritillary	TN, KL	Endemic to Western Ghats South of Palghat Gap (Anamalai & Palni hills), now treated as a separate species. Inhabits Montane shola Grassland ecosystem of Western Ghats.	VU
27.	*Argynnis* (*castetsi*) *hybrida* Evans, 1912*	Nigiri Fritillary	TN, KL.	Endemic to Western Ghats north of Palghat Gap (Nilgiri Hills), now treated as a separate species. Inhabits Montane shola Grassland ecosystem of Western Ghats.	VU
28.	*Neptis palnica* Eliot, 1969*	Palni Sailer	KL	Narrow endemic. Earlier a sub sp of *N. soma*., now treated as separate species. Inhabits Evergreen shola forests of higher mountains south of Palghat Gap. All the records are only from Idukki dt.	CR
29.	*Amathusia phidippus* (Linnaeus, 1763)	Palmking	KL	South east Asian species. Western Ghats sub sp, *friderici* treated as a separate species by some authors. Records in our state are solely from Shendurney WLS.	EN
30.	*Parantirrhoea marshalli* Wood-Mason, [1881] *	Travancore Evening Brown	TN, KL, KA	Endemic to Western Ghats. A rare, monotypic species, very local and confined to low land evergreen forests with dense *Ochlandra rheedi* thickets. Protected under Sch.II of WPA.	VU
31.	*Mycalesis igilia* Fruhstorfer, 1911*	Small Longbrand Bushbrown/ Bicoloured Bushbrown	TN, KL, KA	Rare endemic. Confined to Dense evergreen and moist deciduous forests, lower to moderate elevations.	VU

32.	*Mycalesis orcha* Evans, 1912	Pale-brand Bushbrown	TN, KL, KA	Rare. Narrow Endemic. Prefer dense jungles at moderate elevations.	VU
33.	*Telinga adolphei* (Guérin-Méneville, 1843)*	Red-eye Bushbrown	TN, KL, KA	Narrow endemic. Suspected divoltine. Confined to Montane shola forests north of Palghat gap. Found two or three as a small colony. Reported from Paithal ma la (Kannur dt) in Kerala. Other records are from Nilgiris and Coorg. Declining in population.	EN
34.	*Telinga davisoni* (Moore, [1891])*	Palni Bushbrown	TN, KL	Narrow endemic. Confined to the forests of high elevation in Anamalais and Palni hills.	EN
35.	*Telinga oculus* (Marshall, 1881) *	Red-disc Bushbrown	TN, KL	Narrow endemic. A charismatic butterfly. Found as small colonies in dense evergreen forests adjacent to Montane grasslands of Western Ghats. Reported mostly from Anamalais, Agasthyamalais and Palni hills. Recently reported from Coorg.	VU
36.	*Ypthima chenu* (Guérin-Méneville, 1843) *	Nilgiri Four-ring	TN, KL	Endemic to Nilgiris & Anamalais. Prefer high elevation rocky grasslands. Rare.	VU
37.	*Ypthima singala* R. Felder, 1868	Sinhalese Five-ring	TN, KL	Reported only from Chinnar WLS in Kerala. Other records are from Coimbatore and Sathyamangalam regions in TN. Also known from Sri Lanka. Rare.	VU
38.	*Ypthima striata* Hampson, [1889]	Striated Fivering/Nilgiri Jewel Fourring	TN, KL, KA	Records from Agasthyamalai hills and Anamalais. Other records from TN, KA and also AP(Eastern ghats). Endemic to South India	NT
39.	*Ypthima ypthimoides* (Mo ore, 1881) *	Palni Four ring	TN, KL	Narrow endemic (Anamalais, Palni hills& Agasthyamalai hills). Found in small colonies and prefer rocky grasslands at high elevation.	VU
40.	*Ypthima tabella* (Marshall,1883)	Baby fivering/Sahyadri Baby Fivering	KL,TN, KA, MH	Only a few colonies reported from Mangaladevi of Periyar Tiger Reserve in Kerala. Another report from Meghamalais and from MH. In Kerala, confined to Montane Grasslands.	VU
Family: PAPILIONIDAE					
41.	*Papilio buddha* Westwood 1872 *	Buddha Peacock	TN, KL, KA,	A rare endemic. State butterfly of Kerala. This iconic and charismatic butterfly faces	VU

			GA, MH	serious threat of losing its habitat in Kerala. Deforestation in midland laterite hills causes threats to the survival of its only known larval food plant, *Zanthoxylum rhetsa.* Rare and mostly recorded from North of Palghat gap up to MH.	
42.	*Papilio liomedon* Moore, [1875] *	Malabar Banded Swallowtail	TN, KL, KA, GA	Rare endemic. Inhabits dense evergreen forests or well-wooded areas at lower elevations.	VU
43.	*Pachliopta pandiyana* (Moore, 1881) *	Malabar Rose	TN, KL, KA, GA, MH	Rare endemic. Population seasonal and scanty.	VU
44.	*Papilio dravidarum* Wood-Mason, 1880	Malabar Raven	TN, KL, KA, GA	Western Ghats Endemic Declining population	NT
Family : PIERIDAE					
45.	*Eurema nilgiriensis* (Yata , 1990) *	Nilgiri Grass Yellow	TN, KL, KA, GA, MH	A widespread low to midland endemic. Inhabits dense evergreen riparian forests. Only one host plant for larvae, recorded, ie *Ventilago bombaiensis*.	NT
46.	*Eurema andersoni* (Moore,1886*)*	One-Spot Grass Yellow	TN, KL, KA, GA, MH	Sub sp *shimai* is very rare in Kerala. Reports from Marayur and Chinnar only. Not rare in NE India.	NT
47.	*Appias lalage* (Doubleday, 1842)	Spot Puffin	TN, KL, KA	Known only from Idukki, Palakkad, Pathanamthitta & Trivandrum districts. Reported from higher elevations. Also known from N & NE India	EN
48.	*Appias wardii (Moore, [1884])* *	Lesser Albatross/ Sahyadri Albatross	TN, KL, KA	Rare endemic. Sympatric with *A. albina* (Common Albatross). Data deficient due to difficulty in differentiating from female *A.albina.* Very local.	NT
49.	*Colias nilagiriensis* (C. & R. Felder, (1859)*	Nilgiri Clouded Yellow	TN, KL, KA	Narrow endemic (Nilgiris, Anamalais & Palni hills). Confined to the Montane grasslands of higher elevations. Disturbances to the Montane grasslands adversely affect this species.	VU

Butterfly species of Kerala recommended for inclusion under section 38 of Biological Diversity Act 2002

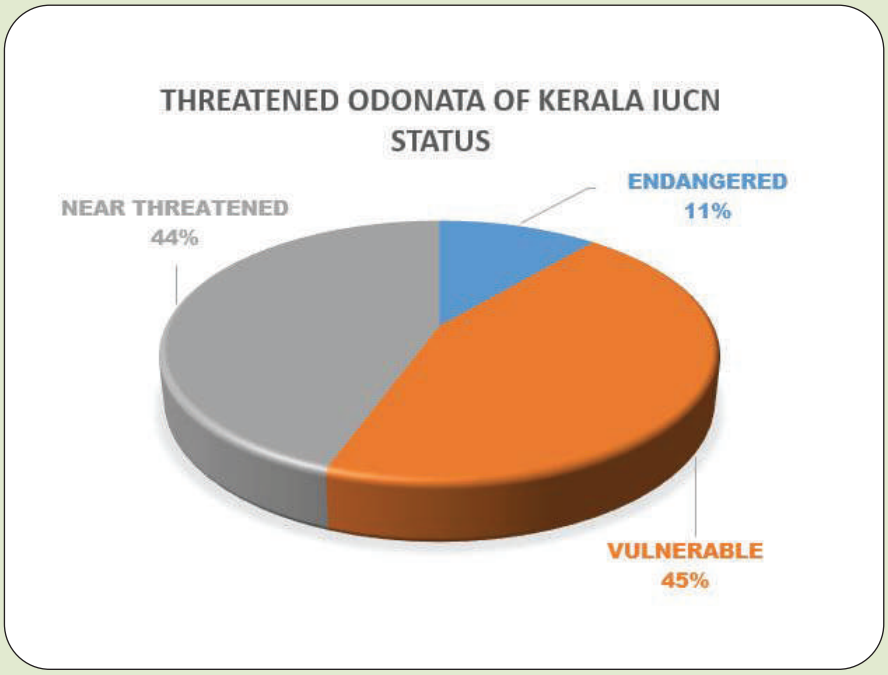
Sl. No	Scientific Name	Common Name	Family	Justification
1	*Troides minos* (Cramer, [1779])	Southern Birdwing	Papilionidae	Showy attractive butterfly. Largest butterfly in India.
2	*Papilio crino* Fabricius, 1793	Common Banded Peacock	Papilionidae	One of the beautiful butterfly species in the region. Reported from very few localities in Kerala. A popular species in illegal trade
3	*Papilio helenus* Linnaeus, 1758	Red Helen	Papilionidae	One of the largest butterflies in the region. Reported in the illegal trade
4	*Cethosia mahratta* Moore, 1872	Tamil Lacewing	Nymphalidae	A rare and beautiful endemic species of the Western Ghats. Rarely reported in the illegall trade
5	*Idea malabarica* (Moore, 1877)	Malabar Tree Nymph	Nymphalidae	A rare endemic species of the Western Ghats. Reported from the illegal trade

Following are some of the colourful and magnificient butterfly sepcies collecting by people illegely for trading They are used for making different types of trophies or ornaments in the international market.

1. Southern Birdwing *Troides minos* (Cramer, [1779])
2. Common Banded Peacock *Papilio crino* Fabricius, 1793
3. Red Helen *Papilio helenus* Linnaeus, 1758
4. Tamil Lacewing *Cethosia mahratta* Moore, 1872
5. Malabar Tree Nymph *Idea malabarica* (Moore, 1877)

Dragonflies and damselflies (Odonata)

Epithemis mariae © Subramanian



Currently 175 species of odonates are recorded from Kerala and high diversity and endemism of species are reported from the streams and rivers of the Western Ghats region. However recent discoveries of new species from the coastal wetlands highlight the importance of this threatened habitats which lie outside protected area network and is fast disappearing due to agricultural expansion and urbanization. As per International Union for Conservation of Nature (IUCN) assessment, eleven species are listed under threatened categories. Among them one species is endangered, six are Near Threatened and four are Vulnerable (Subramanian et al., 2011). Based on current published information and filed studies the threat assessment of odonates of Kerala is attempted here. Accordingly a total of 38 species were prioritized for threat assessment from the 175 odonate species reported from Kerala by considering the criteria of endemicity, rarity, IUCN Red List status and microhabitat specificity. Two species of damselflies viz. *Calocypha laidlawi* and D*isparoneura apicalis* are also recommended for listing under Section 38 of Biological Diversity Act 2002

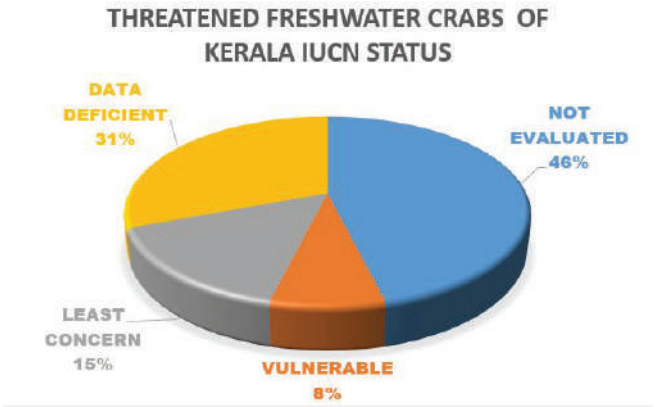
Threatened Odonata of Kerala (IUCN, 2011)		
SlNo.	**Species**	**IUCN Status**
1.	*Idionyx galeata* Fraser, 1924	Endangered
2.	*Heliogomphus promelas* (Selys, 1873)	Near Threatened
3.	*Megalogomphus hannyngtoni* (Fraser, 1923)	Near Threatened
4.	*Melanoneura bilineata* Fraser, 1922	Near Threatened
5.	*Phylloneura westermanni* (Selys, 1860)	Near Threatened
6.	*Chlorogomphus xanthoptera* (Fraser, 1919)	Vulnerable
7.	*Disparoneura apicalis* (Fraser, 1924)	Vulnerable
8.	*Indosticta deccanensis* (Laidlaw, 1915)	Vulnerable
9.	*Protosticta sanguinostigma* Fraser, 1922	Vulnerable

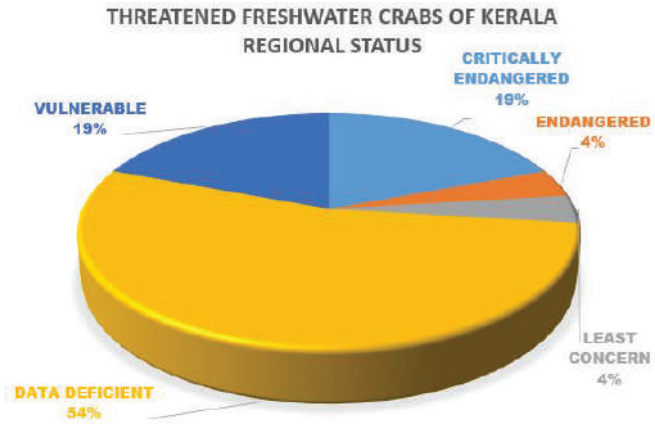
Odonata species of Kerala recommended for listing under section 38 of BD Act (2002) for conservation action

Sl No	Family	Species	Justification
1	Chlorocyphidae	*Calocypha laidlawi* (Fraser, 1924)	Endemic to the Southern Western Ghats, recorded only from Kerala and Karnataka till date. Mostly restricted to Myristica swamps and associated streams. IUCN Red List Status: .
2	Platycnemididae	*Disparoneura apicalis* (Fraser, 1924)	Endemic to riparian habitats in the Western Ghats, reported only from Kodagu in Karnataka and Kuruva Islands, Wayanad, Kerala till date. IUCN Red List Status: Data Deficient.

Fresh water crabs (Crustacea)

Cylindrotelphusa breviphallus © SK Pati





A total of 35 species of freshwater crabs in 14 genera of the lone family Gecarcinucidae, including 24 endemic species are currently known from Kerala. The information on the freshwater crab species of Kerala available in the IUCN Red List of Threatened Species was based on an older version [Version 3.1 (2008)]. During the last decade, another 12 species of freshwater crabs have been recorded from the state. The regional IUCN Red List Assessment of freshwater crabs of Kerala is, attempted here by following the latest criteria [Version 14 (2019)] and recommended guidelines. Accordingly five species are categorised as Critically Endangered, including one possibly extinct species; four species as Endangered; four species as Vulnerable; and two species as Near Threatened. Among the crab species with a threatened category (Critically Endangered, Endangered, or Vulnerable), only four species are recommended here for inclusion under Section 38 of the Biological Diversity Act, 2002, viz., *Arcithelphusa tumpikkai* Pati, Sujila & Sudha Devi, 2019, *Cylindrotelphusa breviphallus* Pati, Rajesh, Raj, Sheeja, Kumar & Sureshan, 2017, *Cylindrotelphusa granulata* (Pillai, 1951), and Vela virupa Bahir & Yeo, 2007.

THREATENED FRESH WATER CRABS OF KERALA

Sl No	Species	Status of global IUCN Red List of Threatened Species	Status of present regional IUCN Red List Assessment
1	*Arcithelphusa cochleariformis* Pati & Sudha Devi, 2015 *	NE	VU B1ab(iii)+2ab(iii)
2	*Arcithelphusa tumpikkai* Pati, Sujila & Sudha Devi, 2019 *	NE	EN B1ab(iii)+2ab(iii)
3	*Baratha peena* Bahir & Yeo, 2007 *	DD	DD
4	*Baratha pushta* Bahir & Yeo, 2007 *	DD	DD
5	*Barytelphusa cunicularis* (Westwood in Sykes, 1836)	LC	LC
6	*Cylindrotelphusa breviphallus* Pati, Rajesh, Raj, Sheeja, Kumar & Sureshan, 2017 *	NE	CR B2ab(iii)
7	*Cylindrotelphusa granulata* (Pillai, 1951) *	NE	CR (Possibly Extinct) B1ab(iii)+2ab(iii)
8	*Cylindrotelphusa longiphallus* Pati, Rajesh, Raj, Sheeja, Kumar & Sureshan, 2017 *	NE	CR B2ab(iii)
9	*Cylindrotelphusa steniops* (Alcock, 1909)	LC	NT, nearly meeting VU B1b(iii)+2b(iii)
10	*Kani maranjandu* Kumar, Raj & Ng, 2017 *	NE	DD
11	*Karkata ghanarakta* Pati, Rajesh, Raj, Sheeja, Kumar & Sureshan, 2017 *	NE	DD
12	*Karkata kusumbha* Pati, Rajesh, Raj, Sheeja, Kumar & Sureshan, 2017 *	NE	DD
13	*Lamella lamellifrons* (Alcock, 1909) *	LC	NT, nearly meeting VU B2b(iii)
14	*Oziotelphusa biloba* Bahir & Yeo, 2005 *	VU	VU B1ab(iii)+2ab(iii)
15	*Oziotelphusa kerala* Bahir & Yeo, 2005 *	DD	DD
16	*Oziotelphusa wagrakarowensis* (Rathbun, 1904)	VU	CR B2ab(iii)
17	*Pilarta anuka* Bahir & Yeo, 2007 *	DD	DD
18	*Pilarta aroma* Pati, Rajesh, Raj, Sheeja, Kumar & Sureshan, 2017 *	NE	DD
19	*Pilarta punctatissima* Pati, Rajesh, Raj, Sheeja, Kumar & Sureshan, 2017 *	NE	DD
20	*Snaha aruna* Bahir & Yeo, 2007 *	DD	DD
21	*Spiralothelphusa gibberosa* Pati & Sudha Devi, 2015 *	NE	CR B2ab(iii)
22	*Travancoriana charu* Bahir & Yeo, 2007 *	DD	DD
23	*Travancoriana convexa* (Roux, 1931)	LC	VU B1ab(iii)+2ab(iii)
24	*Travancoriana granulata* Pati & Sharma, 2013 *	NE	DD
25	*Travancoriana kuleera* Bahir & Yeo, 2007	DD	DD
26	*Travancoriana pollicaris* (Alcock, 1909)	DD	DD

27	*Travancoriana schirnerae* Bott, 1969	LC	DD
28	*Vanni ashini* Bahir & Yeo, 2007 *	DD	DD
29	*Vanni deepta* Bahir & Yeo, 2007 *	DD	DD
30	*Vanni giri* Bahir & Yeo, 2007	DD	DD
31	*Vanni malabarica* (Henderson, 1912) *	DD	VU B1ab(iii)+2ab(iii)
32	*Vanni nilgiriensis* (Roux, 1931)	DD	EN B1ab(iii)+2ab(iii)
33	*Vanni travancorica* (Henderson, 1913)	DD	DD
34	*Vela carli* (Roux, 1931)	DD	EN B1ab(iii)+2ab(iii)
35	*Vela virupa* Bahir & Yeo, 2007 *	DD	EN B1ab(iii)+2ab(iii)
* Species endemic to Kerala			

Fresh water crab sepcies of Kerala recommended for inlcusion under section 38 of Biological Diversity Act 2002

Sl.no.	Scientific Name	Justification
1	*Arcithelphusa tumpikkai* Pati, Sujila & Sudha Devi	Facing threat due to habitat degradation and agrarian development,more likely to become extinct in the near future
2	*Cylindrotelphusa breviphallus* Pati, Rajesh, Raj, Sheeja, Kumar & Sureshan	Facing threat due to habitat degradation and pesticide pollution.
3	*Cylindrotelphusa granulata* (Pillai)	Threat due to habitat conversion.The species might be now on the verge of extinction
4	*Vela virupa* Bahir & Yeo	Facing threat due to habitat degradation and pesticide pollution.

Mygalomorph spiders (Arachnida)


Haploclastus kayi © S.Sen

For the threat assessment of spiders, only Mygalomorph spiders are considered in the present document. Mygalomorph spiders belong to the family Theraphosidae, are known as 'Tarantula spiders'. The last assessment for the spider species of India by IUCN was in 2008 (Molur et al., 2008a). Based on the available data on the species distribution and abundance and CITES database the current assessment has been attempted. Out of the 18 species of mygalomorph spiders reported from Kerala, four species could be categorized as Threatened. Among the Mygalomorph spiders, three species of the genus *Poecilotheria* are also listed in the Appendix II of CITES. Based on the literature review and the field explorations it has been observed that most of the threatened species of Mygalomorph spiders are reported from the protected areas of the State.

THREATENED MYGALOMORPH SPIDERS OF KERALA (Based on IUCN assessment 2008)

No.	Species	Kerala Redlist	IUCN Redlist	CITES	Conservation priority
1.	*Haploclastus kayi* Gravely, 1915	EN	EN	-	High
2.	*Poecilotheria regalis* Pocock, 1899	LC	LC	Appendix II	Low
3.	*Poecilotheria rufilata* Pocock, 1899	EN	EN	Appendix II	High
4.	*Poecilotheria striata* Pocock, 1895	VU	VU	Appendix II	Moderate

MYGALOMORPH SPIDERS OF KERALA WHICH ARE IN COMMERCIAL TRADE

1. *Poecilotheria rufilata* Pocock, 1899.
2. *Poecilotheria striata* Pocock, 1895

NON -MARINE MOLLUSCA (MOLLUSCA)


Indrella ampulla © ZSI WGRC

Kerala has 68 terrestrial snails and 28 freshwater molluscs. Of the 28 freshwater molluscs, 21 species of freshwater molluscs are Gastropods and seven species are bivalves. Of the 96 species of non-marine molluscs known from Kerala, 75 species are endemic to the state and most of the endemism occurs in terrestrial snails. None of the freshwater mollucs reported from Kerala are threatened and none of the species are either listed in Indian Wildlife (Protection) Act or in the CITES. An assessment of non-marine molluscs of Kerala is attempted here based on the available literature and from the field surveys conducted all along the Western Ghats durng the last two decades. Based on this, the sepcies *Corilla anax* (Benson 1865) is categorised as Endangered, The species *Beddomea calcadensis* (Blanford 1870) and *Apatetes bourdilloni* (Theobald 1876) has been classified as Near Threatened. Since the non marine molluscs are not assessed by IUCN till date, the list of species emerged out fomr the regional level assessment is provided here

Threatened non-marine molluscs of Kerala

Sl No.	Species	Status
	Family Corillidae	
1	*Corilla anax*(Benson 1865)	Endangered
	Family Camaenidae	
2	*Beddomea calcadensis* (Blanford 1870)i	Near Threatened
3	*Apatetes bourdilloni*(Theobald 1876)	Near Threatened

(Based on regional level assessment)

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REGIONAL REDLIST ASSESMENT

Aonyx cinerea © Sreehari

MAMMALS

P.O. Nameer, Sreehari Raman, Abhin M. Sunil, Abhirami C., Abhirami M. Jayakumar, Afthab K. Faisal, Devika Sanghamithra, Dilgith Surendran, Niranjana C., Sachin K. Aravind, Sreekumar, E.R., Sreehari K. Mohan, Syamili, M.S. and Vishnupriya S.

Background:

Mammals are perhaps the most dominant life forms on earth. They have been evolved over the past 225 million years or so and occupy all the continents and oceans. Currently, more than 5000 species of mammals are recognised globally (Wilson and Mittermeier, 2009) and the number keep increasing, thanks to the field surveys combined with the taxonomical studies using modern molecular techniques. More than 400 species of mammals are known from India (Nameer, 2015).

Why this work:

The primary objective of this work is to enlist the threatened mammals of Kerala, as per the most recent assessment by the IUCN (Ver. 2021-1). The other objective is to propose high conservation priority species for inclusion under Section 38 of the Biological Diversity Act.

Methodology:

The threatened status of the mammals of Kerala was extracted from the most recent IUCN publications. Moreover, the same has been arranged taxonomically, adding additional information on the global distribution, distribution within India and Kerala, habitat, and threats. For each of the threatened mammals, information on the schedules of the Wild Life (Protection)Act, 1972 and the appendix of Convention on International Trade in Endangered Species of Fauna and Flora (CITES) are also given.

Results:

Out of the 101 species of terrestrial mammals of Kerala, 31 are threatened with various levels of extinction risk. Fourteen species belong to the Endangered category, 17 species are Vulnerable, five are Near Threatened. One species, the *Suncus niger* is Not Evaluated.

The large mammal species that are found in Kerala and coming under the Endangered category are Asian elephant, tiger, Nilgiri tahr, Lion-tailed macaque, Wild dog, while the small sized Endangered mammals found in Kerala include Indian pangolin, and the rodents such as Bonhot's mouse, Ranjini's field rat, Nilgiri vandeleuria. The other Endangered mammals in Kerala include two species of shrews such as Kelaart's long-clawed shrew and Day's shrew, and two species of bats such as Andersen's leaf-nosed bat and Salim Ali's fruit bat.

There are 14 terrestrial mammal species of Kerala that belong to the Vulnerable category. These include leopard, sloth bear, gaur, sambar deer, Four-horned antelope, Nilgiri langur, Nilgiri marten, Small-clawed otter, Smooth Indian otter. The rodent species in the Vulnerable category are, Sahyadris forest rat, Spiny tree mouse and Nilgiri palm squirrel. An interesting change in the conservation status is on the Bonnet macaque, which has been elevated to the Vulnerable category from the Least Concern category.

Additionally, there are four species of mammals of Kerala that belong to the Near Threatened category of the IUCN. They are the gray Slender loris, Tufted gray langur, Grizzled giant squirrel and Rusty-spotted cat.

Redlist assessment

Asian Elephant
ENDANGERED

Elephas maximus

Local Name (Malayalam): ആന
Order: Proboscidea
Family: Elephantidae
Global Distribution: Bangladesh, Bhutan, Cambodia, China, India, Indonesia, Lao People's Democratic Republic, Malaysia, Myanmar, Nepal, Sri Lanka, Thailand and Viet Nam.
Distribution within India: North-western and north-eastern Himalayan foothills, central and southern India.
Distribution within Kerala: Throughout the forests of Kerala.
Habitat: Wide range of forest types including shola grasslands, evergreen, semi-evergreen, deciduous patches, adjacent plantations.
Conservation Status: WPA (1972)- Schedule 1, IUCN- Endangered A2c, CITES- Appendix I, CMS- Appendix I
Threats: Habitat loss and fragmentation, poaching, human-wildlife conflict.

Slender Loris
NEAR THREATENED

Loris lydekkerianus

Local Names (Malayalam): കുട്ടിത്തേവാങ്ക്
Order: Primates
Family: Lorisidae
Global Distribution: Peninsular India and Sri Lanka
Distribution within India: Andhra Pradesh, Karnataka, Kerala, Tamil Nadu.
Distribution within Kerala: Most of the forests of Kerala and adjacent areas.
Habitat: In open scrub jungle, dry and moist deciduous forests and evergreen forests.
Conservation Status: WPA (1972)- Schedule I, IUCN- Near Threatened A2cd, CITES- Appendix II, CMS- Unlisted.
Threats: Road kills, hunting for traditional medicine and trade and habitat destruction.

Bonnet Macaque
VULNERABLE

Macaca radiata

Local Names (Malayalam): നാടൻ കുരങ്ങ്
Order: Primates
Family: Cercopithecidae
Global Distribution: Peninsular India.
Distribution within India: South India.
Distribution within Kerala: Throughout forests of Kerala and human-dominated landscapes.
Habitat: In urban and rural areas, tropical dry thorn, scrub, dry and moist deciduous forest, semi-evergreen and evergreen forest.
Conservation Status: WPA (1972)- Schedule II, IUCN- Vulnerable A2acd+3cd, CITES- Appendix II, CMS- Unlisted.
Threats: Human-animal interactions in agricultural and urban areas are an increasing threat to the species. Killing as pests, capturing and releasing macaques at sites far off (thereby affecting the group composition). Feeding monkeys is considered a significant threat as it is suspected that commensal areas are sinks for groups and individuals are replaced constantly from an ever-depleting resource of forest populations. Road kills are also an increasing threat in ecotourism zones. Deliberate feeding of animals in this tourist zone may also cause considerable behavioural changes to the animal.

Lion-tailed Macaque
ENDANGERED

Macaca silenus

Local Names (Malayalam): സിംഹവാലൻ കുരങ്ങ്

Order: Primates
Family: Cercopithecidae
Global Distribution: Western Ghats of South India.
Distribution within India: Endemic to the Western Ghats in the states of Karnataka, Kerala, and Tamil Nadu.
Distribution within Kerala: Most of the evergreen forests of Kerala and in some adjoining estates.
Habitat: Dense evergreen and semi-evergreen forest (100-1700m) and adjoining plantations.
Conservation Status: WPA (1972)- Schedule I, IUCN- Endangered C2a(i), CITES- Appendix I, CMS- Unlisted.
Threats: Hunting, habitat loss and fragmentation.

Nilgiri Langur
VULNERABLE
Semnopithecus johnii
Local Names (Malayalam): കരിങ്കുരങ്ങ്
Order: Primata
Family: Cercopithecidae
Global Distribution: Western Ghats of South India.
Distribution within India: Endemic to the Western Ghats in the states of Karnataka, Kerala, and Tamil Nadu.
Distribution within Kerala: Most of the forests of Kerala and adjoining plantations.
Habitat: Evergreen, semi-evergreen, and moist deciduous forests and adjoining plantations between 500-2500m.
Conservation Status: WPA (1972)- Schedule I, IUCN- Vulnerable C2a(i), CITES- Appendix I, CMS- Unlisted.
Threats: Hunting for medicinal purposes, forest fragmentation, habitat destruction, road kills.

Tufted Gray Langur
NEAR THREATENED
Semnopithecus priam
Local Names (Malayalam): തൊപ്പിക്കുരങ്ങ്
Order: Primata
Family: Cercopithecidae.
Global Distribution: Peninsular India and Sri Lanka.
Distribution within India: Andra Pradesh, Karnataka, Tamil Nadu and Kerala.
Distribution within Kerala: Wayanad WLS, Chinnar WLS and Parambikulam TR.
Habitat: Dry deciduous, dry scrub and plantation.
Conservation Status: WPA (1972)- Schedule II, IUCN- Near Threatened A2cd+3cd, CITES- Appendix I, CMS- Unlisted.
Threats: Poaching, forest fragmentation, habitat destruction and road kills.

Grizzled Giant Squirrel
NEAR THREATENED
Ratufa macroura
Local Names (Malayalam): ചാമ്പൽ അണ്ണാൻ


© Ardra Raju

Order: Rodentia
Family: Sciuridae
Global Distribution: South India and Sri Lanka
Distribution within India: Kerala, Karnataka and Tamil Nadu.
Distribution within Kerala: Chinnar WLS
Habitat: Riparian (riverine) forests among the dry deciduous/dry evergreen/scrub jungle.
Conservation Status: WPA (1972)- Schedule II, IUCN- Near Threatened A2c, CITES- Appendix 2, CMS- Unlisted.
Threats: Hybridization (with Indian Giant Squirrel), pilgrimage, tourism, road kills, habitat loss and poor regeneration of food/breeding plants.

Nilgiri Palm Squirrel
VULNERABLE
Funambulus sublineatus
Local Names (Malayalam): കുന്നൻ അണ്ണാൻ
Order: Rodentia
Family: Sciuridae
Global Distribution: Western Ghats of South India.
Distribution within India: Kerala and Tamil Nadu.
Distribution within Kerala: Throughout the forests of Kerala.
Habitat: Evergreen and moist deciduous forests, Ochlandra reedbeds and forest adjacent plantations
Conservation Status: WPA (1972)- , IUCN- Vulnerable B2ab(i,ii,iii), CITES- Unlisted, CMS- Unlisted.
Threat: Habitat loss and fragmentation.

Spiny Tree Mouse
VULNERABLE
Platacanthomys lasiurus
Local Names (Malayalam): മുള്ളെലി
Order: Rodentia
Family: Platacanthomyidae
Global Distribution: Western Ghats of South India.
Distribution within India: Kerala, Karnataka, Tamil Nadu.
Distribution within Kerala: Throughout the forests of Kerala.
Habitat: Evergreen and moist deciduous forests.
Conservation Status: WPA (1972)- Unlisted, IUCN- Vulnerable A2c, CITES- Unlisted, CMS- Unlisted.
Threats: Habitat loss and fragmentation.

Bonhote's Mouse
ENDANGERED
Mus famulus
Local Names (Malayalam): കാട്ടുചുണ്ടെലി
Order: Rodentia
Family: Muridae
Global Distribution: Western Ghats of South India.
Distribution within India: Kerala and Tamil Nadu.
Distribution within Kerala: Most of the high-altitude evergreen forests.
Habitat: Evergreen forests and grasslands.
Conservation Status: WPA (1972)- Schedule V, IUCN- Endangered B1ab(ii,iii), CITES- Unlisted, CMS- Unlisted.
Threat: Habitat loss and fragmentation.

Ranjini's Field Rat
ENDANGERED
Rattus ranjiniae
Local Names (Malayalam): നെല്ലെലി
Order: Rodentia
Family: Muridae
Global Distribution: Western Ghats of South India.
Distribution within India: Kerala.
Distribution within Kerala: Alleppey, Thrissur and Thiruvananthapuram.
Habitat: Paddy fields
Conservation Status: WPA (1972)- Schedule V, IUCN- Endangered B1ab(iii)+2ab(iii), CITES- Unlisted, CMS- Unlisted.
Remarks: Detailed taxonomic assessment need to be undertaken to ascertain the status of this species.

Sahyadris Forest Rat
VULNERABLE
Rattus satarae
Local Names (Malayalam): സ്യാഹ്യാദ്രി കാടെലി
Order: Rodentia
Family: Muridae
Global Distribution: Western Ghats of South India.
Distribution within India: Maharashtra, Goa, Tamil Nadu, Karnataka and Kerala.
Distribution within Kerala: Most of the forests of Kerala and adjacent areas.
Habitat: Montane moist deciduous and evergreen forests.
Conservation Status: WPA (1972)- Schedule V, IUCN- Vulnerable B2ab(i,ii,iii,iv,v), CITES- Unlisted, CMS- Unlisted.
Threat: Habitat loss and fragmentation.

Nilgiri Vandeleuria
ENDANGERED
Vandeleuria nilagirica
Local Names (Malayalam): വാലൻ ചുണ്ടെലി
Order: Rodentia
Family: Muridae
Global Distribution: Western Ghats of South India.
Distribution within India: Kerala, Karnataka and Tamil Nadu.
Distribution within Kerala: Throughout the evergreen forests of Kerala and adjacent areas.
Habitat: Montane evergreen forest and adjacent plantations.
Conservation Status: WPA (1972)- Schedule V, IUCN- Endangered B2ab(iii), CITES- Unlisted, CMS- Unlisted.
Threat: Habitat loss and fragmentation, use of pesticides.

Kelaart's Long-clawed Shrew
ENDANGERED
Feroculus feroculus
Local Names (Malayalam): സിലോൺ നെച്ചെലി
Order: Soricomorpha
Family: Soricidae
Global Distribution: South India and Sri Lanka.
Distribution within India: Kerala and Tamil Nadu.
Distribution within Kerala: Eravikulam NP
Habitat: Inhabits montane forest, montane swamp and marshes.
Conservation Status: WPA (1972)- Unlisted, IUCN- Endangered B2ab (ii, iii), CITES- Unlisted, CMS- Unlisted.
Threats: Habitat loss and fragmentation

Day's Shrew
ENDANGERED
Suncus dayi
Local Names (Malayalam): കാട്ടു നെച്ചെലി
Order: Soricomorpha
Family: Soricidae
Global Distribution: Western Ghats of South India.
Distribution within India: Tamil Nadu and Kerala.
Distribution within Kerala: Eravikulam National Park and Periyar Tiger Reserve.
Habitat: Montane grassland-shola habitat.
Conservation Status: WPA (1972)- Unlisted, IUCN- Endangered B2ab (ii, iii), CITES- Unlisted, CMS- Unlisted.
Threats: Habitat loss and fragmentation.

Hill Shrew
NOT EVALUATED
Suncus niger
Local Names (Malayalam): മല നെച്ചലി
Order: Soricomorpha
Family: Soricidae
Global Distribution: Western Ghats of South India.
Distribution within India: Tamil Nadu, Karnataka and Kerala.
Distribution within Kerala: Eravikulam National Park.
Habitat: This species has been mostly recorded from montane forests and grasslands.
Conservation Status: WPA (1972)- Unlisted, IUCN- Not Evaluated, CITES- Unlisted, CMS- Unlisted.
Threats: Habitat loss and fragmentation.

Andersen's Leaf-nosed Bat
ENDANGERED
Hipposideros pomona
Local Names (Malayalam): ആന്റേഴ്സണ്ണിന്റെ ഇലമൂക്കൻ വവ്വാൽ
Order: Chiroptera
Family: Hipposideridae
Global Distribution: Western Ghats of South India
Distribution within India: Karnataka, Kerala and Tamil Nadu
Distribution within Kerala: Dense forests of Kerala
Habitat: Evergreen Forest
Conservation Status: WPA (1972)- Unlisted, IUCN- Endangered B2ab (ii, iii, iv, v), CITES- Unlisted, CMS- Unlisted.
Threats: Habitat loss, cave tourism and climate change.

Salim Ali's Fruit Bat
ENDANGERED
Latidens salimalii
Local Names (Malayalam): സലിംഅലി പഴംതീനി വവ്വാൽ
Order: Chiroptera
Family: Pteropodidae
Global Distribution: Western Ghats of South India.
Distribution within India: Tamil Nadu and Kerala.
Distribution within Kerala: Silent Valley NP, Periyar TR, Mankulam RF and Agastyamalai BR.
Habitat/Ecology: Evergreen forests.
Conservation Status: WPA (1972)- Schedule 1, IUCN- Endangered C1, CITES- Unlisted, CMS- Unlisted.
Threats: Habitat loss, roost disturbance and climate change.

Indian Pangolin
ENDANGERED
Manis crassicaudata
Local Names (Malayalam): ഈനാംപേച്ചി

Order: Pholiodota
Family: Manidae
Global Distribution: Bangladesh, India, Nepal, Pakistan and Sri Lanka.
Distribution within India: Most of peninsular India.
Distribution within Kerala: Throughout Kerala in the forests and the adjacent areas.
Habitat: Wide range of forests including moist and dry deciduous forests, dry scrub, plantations and well-wooded human-dominated landscapes.
Conservation Status: WPA (1972): Schedule I, IUCN- Endangered A3d+4d, CITES- Appendix II, CMS- Unlisted.
Threats: Hunting and poaching for meat and scales, trade.

Indian Wild Dog
ENDANGERED
Cuon alpinus
Local Names (Malayalam): കാട്ടുനായ, ചെന്നായ
Order: Carnivora
Family: Canidae
Global Distribution: Bangladesh, Bhutan, Cambodia, China, India, Indonesia, Lao People's Democratic Republic, Malaysia, Myanmar, Nepal and Thailand.
Distribution within India: Patchy distribution in central Indian highlands, northeast India, Western Ghats, Eastern Ghats and some parts of Himalayas.
Distribution within Kerala: Throughout the forests of Kerala.
Habitat: Dry and moist deciduous forests, evergreen and semi-evergreen forests.
Conservation Status: WPA (1972)- Schedule II, IUCN- Endangered C2a(i), CITES- Appendix II (2013), CMS-
Threats: Habitat loss, fragmentation, agriculture, mining and land-use change.

Sloth Bear
VULNERABLE

Melursus ursinus

Local Names (Malayalam): കരടി
Order: Carnivora
Family: Ursidae
Global Distribution: India, Nepal and Sri Lanka.
Distribution within India: Throughout peninsular India, lower elevations of Himalayas, patchy in north-east India, absent in desert, semi-arid and non-forested areas.
Distribution within Kerala: Most of the forests of Kerala.
Habitat: Inhabits a wide variety of habitats, including evergreen, moist and dry deciduous forests, dry scrub, montane wet temperate grasslands, and adjacent plantations.
Conservation Status: WPA (1972)- Schedule I, IUCN- Vulnerable A3c, CITES- Appendix I, CMS- Unlisted.
Threats: Habitat loss, fragmentation, agriculture, mining, land-use change, hunting and human-wildlife conflict.

Nilgiri Marten
VULNERABLE

Martes gwatkinsii

Local Names (Malayalam): മരനായ
Order: Carnivora
Family: Mustelidae
Global Distribution: Western Ghats of South India
Distribution within India: Karnataka, Tamil Nadu and Kerala.
Distribution within Kerala: Dense forests and its adjoining areas
Habitat: Montane wet temperate forests and grasslands, high elevation evergreen forests and forest fringes. Occasionally found in tea plantations.
Conservation Status: WPA (1972)- Schedule II part II, IUCN- Vulnerable D1, CITES- Appendix III of CITES by India, CMS-
Threats: Habitat loss, fragmentation and tourism.

Asian Small-clawed Otter
VULNERABLE

Aonyx cinereus

Local Names (Malayalam): മലനീർനായ
Order: Carnivora
Family: Mustelidae
Global Distribution: Bangladesh; Bhutan; Brunei Darussalam; Cambodia; China; India; Indonesia; Lao People's Democratic Republic; Malaysia; Myanmar; Nepal; Philippines; Singapore; Taiwan, Province of China; Thailand; Viet Nam.
Distribution within India: Arunachal Pradesh, Assam, West Bengal, Himachal Pradesh, Maharashtra, Karnataka, Kerala and Tamil Nadu.
Distribution within Kerala: Periyar Tiger Reserve, Silent Valley National Park andEravikulam National Park.
Habitat: Shallow and rocky forest streams in high altitude areas.
Conservation Status: WPA (1972)- Schedule I, IUCN- Vulnerable A2acde, CITES- Appendix II, CMS-
Threats: Habitat degradation.

Smooth-coated Otter
VULNERABLE

Lutrogale perspicillata

Local Names (Malayalam): നീർനായ
Order: Carnivora
Family: Mustelidae
Global Distribution: Bangladesh; Bhutan; Brunei Darussalam; Cambodia; China; India; Indonesia; Iraq; Lao People's Democratic Republic; Malaysia; Myanmar; Nepal; Pakistan; Thailand; Viet Nam.
Distribution within India: Found all over India except in the high Himalayas and arid areas of Deccan and northwest India.
Distribution within Kerala: Throughout waterbodies of Kerala in the hills and the plains.
Habitat: They are the top predators of aquatic habitats. Inhabit rivers, lakes, dams, extensive paddy fields, and mangrove forests.
Conservation Status: WPA (1972)- Schedule II, IUCN- Vulnerable A2cde, CITES- Appendix II, CMS- Unlisted.
Threats: Loss of water bodies and their degradation, pollution, aquaculture and conflict with people.

Rusty-spotted Cat
NEAR THREATENED

Prionailurus rubiginosus

Local Names (Malayalam): തുരുമ്പൻ പൂച്ച
Order: Carnivora
Family: Felidae
Global Distribution: India, Nepal and Sri Lanka.
Distribution within India: Throughout southern and central India; Saurashtra and parts of Rajasthan (west), Sariska (north), isolated population in Jammu and Kashmir.
Distribution within Kerala: Wayanad, Walayar, Parambikulam TR and Chinnar.

Habitat: Moist and dry deciduous forests, shrub land.
Conservation Status: WPA (1972)- Schedule I, IUCN- Near Threatened A3c, CITES- Appendix I, CMS Unlisted.
Threats: Habitat loss, habitat fragmentation, commercial and residential development, mining, hunting and diseases.

Leopard
VULNERABLE
Panthera pardus
Local Names (Malayalam): പുള്ളിപ്പുലി
Order: Carnivora
Family: Felidae
Global Distribution: Asia (South and South East) and Africa.
Distribution within India: All over India except high Himalayas and arid parts of Kutch and Rajasthan.
Distribution within Kerala: Throughout the forests and adjacent plantations of Kerala.
Habitat: Wide range of forests including evergreen, moist deciduous, and dry deciduous forests, adjacent plantations and scrublands.
Conservation Status: WPA (1972)- Schedule I, IUCN- Vulnerable A2cd, CITES- Appendix I, CMS-Unlisted.
Threats: Urbanisation, agriculture, mining, habitat loss and fragmentation, land-use change and human-wildlife conflict.

Tiger
ENDANGERED
Panthera tigris
Local Names (Malayalam): കടുവ
Order: Carnivora
Family: Felidae
Global Distribution: Bangladesh, Bhutan, China, India, Indonesia, Lao People's Democratic Republic, Malaysia, Myanmar, Nepal, Russia and Thailand.
Distribution within India: Terai foothills of Himalayas, North-East India, central India, Eastern Ghats and Western Ghats.
Distribution within Kerala: Forest of Kerala.
Habitat: Inhabits a wide range of forests, including high altitude shola, evergreen, dry deciduous, moist deciduous habitats.
Conservation Status: WPA (1972)- Schedule I, IUCN- Endangered A2abcd; C1, CITES- Appendix I, CMS-Unlisted.
Threats: Urbanisation, agriculture, mining, habitat loss and fragmentation, land-use change, hunting and human-wildlife conflict.

Sambar Deer
VULNERABLE
Rusa unicolor
Local Names (Malayalam): കലമാൻ, മ്ലാവ്
Order: Artiodactyla
Family: Cervidae
Global Distribution: South and south-east Asia and parts of China.
Distribution within India: Throughout mainland India except for trans-Himalayan and desert zones.
Distribution within Kerala: Throughout the forests of Kerala and adjacent areas.
Habitat: Evergreen and deciduous areas forests and adjacent plantations.
Conservation Status: WPA (1972)- Sch. III, IUCN-Vulnerable A2cd+3cd+4cd, CITES- Unlisted, CMS-Unlisted.
Threats: Habitat loss and fragmentation, hunting for meat.

Gaur
VULNERABLE
Bos gaurus
Local Names (Malayalam): കാട്ടുപോത്ത്
Order: Artiodactyla
Family: Bovidae
Global Distribution: Bhutan; Cambodia; China; India; Laos; Malaysia; Myanmar; Nepal; Thailand and Viet Nam.
Distribution within India: South-western India, central India and north-eastern India.
Distribution within Kerala: Throughout the forests of Kerala.
Habitat: Forests including dense and open forests, evergreen and deciduous areas, old-growth and secondary forests and grass-cropland adjacent to forests.
Conservation Status: WPA (1972)- Sch. 1, IUCN-Vulnerable A2cd+3cd+4cd, CITES- Appendix I, CMS- Unlisted.
Threats: Habitat loss, fragmentation and poaching.

Four-horned Antelope
VULNERABLE
Tetracerus quadricornis
Local Names (Malayalam): ഉല്ലമാൻ
Order: Artiodactyla
Family: Bovidae
Global Distribution: Peninsular India.

Distribution within India: Occur in scattered populations over most of India, from the Himalayan foothills to peninsular India.
Distribution within Kerala: Wayanad WLS.
Habitat: Dry thorn and dry deciduous forests.
Conservation Status: WPA (1972)- Sch. 1, IUCN- Vulnerable C2a(i), CITES- As per latest CITES data, CMS- As per CMS data.
Threats: Habitat loss and fragmentation.

Nilgiri Tahr
ENDANGERED
Nilgiritragus hylocrius
Local Names (Malayalam): വരയാട്
Order: Artiodactyla
Family: Bovidae
Global Distribution: Western Ghats of South India
Distribution within India: Karnataka, Tamil Nadu and Kerala.
Distribution within Kerala: Most of the high-elevation grasslands of Kerala from Brahmagiris to Agasthyamalai.
Habitat: Montane grasslands and cliffs among the shola forests.
Conservation Status: WPA (1972)- Sch. I, IUCN- Endangered C2a(i), CITES- Unlisted, CMS- Unlisted.
Threats: Habitat loss and human disturbances, quite a few small and isolated populations.

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Schoenicola platyurus © Jafer palot

BIRDS

Praveen J, Abhinand Chandran& C Sashikumar

Introduction

Birds are one of the better studied groups of vertebrates in Kerala. The state checklist that we maintain has 540 species (Chandran et al. 2020), following the taxonomy of Indian BIRDS. BirdLife International assess the threat levels of birds for the IUCN annually. Under this, 32 species found in Kerala fall under various threatened categories of the IUCN with an additional 32 falling as Near Threatened. However, the threat levels of various species within Kerala are different from the global threat levels – some of them showing significant increase in recent years (e.g. Painted Stork *Mycteria leucocephala*) while other declining more rapidly (e.g. Eurasian Curlew *Numenius arquata*).

Our endemic species are residents of the Western Ghats and the protected areas and reserve forests conserve most of them. As a majority of our endemic species have excellent population within Kerala, the IUCN assessment for these species are more realistic at a state/regional level as well. However, species that are not endemic or largely living outside forests tend to get their regional threats under assessed barring a few trans-continental coastal migrants. Hence, such species are rapidly lost as they do not figure under the gambit of any existing regional conservation programs. Land use and land cover of Kerala has changed rapidly in the last few decades. It is important to assess how our birds are doing under these intensive changes happening in areas outside reserve forests.

In summary, while we have threat level assessment for most of our forest species from the IUCN, we lack the regional threat level assessment for all the species that live outside the forest areas barring a few wetland dependent birds. Hence, it is imperative to augment the global redlist with a regional redlist from Kerala to bring parity of focus.

Methodology

As the scope of the exercise is to come out with a list of threatened bird species in Kerala outside the protected area network, with a view on their conservation priority in a limited time frame, we took 20 species votes from each author for assessment to come up with a total of 37 species to assess. While this selection has an inherent bias, our combined experience is expected to cover most species that require urgent conservation attention. On this list, we conducted IUCN's regional redlist assessment. After conducting the first step (What to assess), we selected 32 species to assess - visiting populations of nine of them were assessed while the breeding population was assessed for the remaining. For one species (Orange-breasted Green Pigeon), though the assessment criteria required to assess both breeding and visiting population, lack of phenotypic differences between the populations lead to an assessment that considered them together. Black-bellied Tern, that used to breed historically, has not been found breeding in the last two decades and hence we treat its breeding population as regionally extinct (RE).

Population Declines: We assessed population trends using the methodology detailed in State of India's Birds (SoIB 2020), with the same year bands (Before 2000, 2000-2006, 2007-2010, 2011-2012, 2013, 2014, 2015, 2016, 2017, 2018); that included curated data upto May 2019. While SoIB (2020) used 200 km x 200 km grids for the entire country, the higher data density in Kerala enabled us to do it with 100km x 100km grids. The data was assessed specifically for the state of Kerala and the decline percentage with 95% CI calculated.

We made strong cut-offs to treat only well-groomed as certain (e.g. IMeans > 2 SE and Overall SE < 50). We used the pessimistic value of decline in reporting frequency for assessing the threat level against Criteria A.

Range Size: We used eBird data to calculate the Extent of Occurrence (EOO) and Area of Occupancy (AOO) for these birds by keeping relevant filters to account for the required accuracy. For EOO,

we used all eBird lists from Kerala post 2000 with duration < 8 hours and distance < 50km. For AOO, we used two square sizes: 1/16th of a degree (~7km x 7km = 50 sq.km) and 1/8 th of a degree (13.8 x 13.8km = 192.5 sq.km.) as two aggregation units. Using this, we scaled it down to 2km x 2km as recommended by IUCN for AOO using a uniform scaling factor.

We did not directly use 2 x 2 for AOO since our list density will drastically reduce for using with such higher accuracy. Hence, all eBird lists from Kerala post 2000 with duration < 4 hours and distance < 10km were only used to ensure we do not account for false positive squares due to likelihood of records being included from a broader area. These range size parameters were used to assess against Criteria B.

Population Size: We did not have any metric for the population of mature individuals in the state in the case of any of these 32 species. Hence, we collaborated with bird experts from every district to arrive at an upper bound of the population in that district to cap the upper bound of the total number of mature individuals in Kerala. We only did this evaluation for the species that would meet the sub criteria for population decline. We used that to assess species meeting the thresholds for Criteria C (CR: 250, EN: 2,500, VU: 10,000) and even Criteria D (CR: 50, EN: 250, VU: 1,000) - though there are none for Criteria D.

Extinction probability: There is no quantitative analysis done for these bird species on their extinction probability and hence we did not assess against Criteria E.

After the criteria is assessed, we used to regional redlist guidelines to downlist based on rescue effect from global population to arrive at the final threat category.

Once the redlist is done, we used the following parameters to assign a Conservation Priority (Critical, High, Medium) for the birds in the non-protected areas in Kerala.

1. IUCN Redlist Status
2. Conservation Concern of State of India's Birds
3. Percentage share of global population/global range in Kerala
4. Percentage share of regional population/regional range in Kerala (E.g. Western Ghats population is a regional population).
5. Assessment of success/failure of relevant conservation practices in that past in Kerala

Results

We came up with a list of twenty species that fall in the various threat categories of IUCN as per regional redlist guidelines. We assess seven of them as high conservation priority for Kerala and 13 are of moderate conservation priority. The details of the redlist assessment for each of the species are provided below We also carry the full global list of threatened birds and species classified under Appendix found in Kerala after removing the vagrants.

Acknowledgements

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Critically Endangered

Pacific Golden Plover

***Pluvialis fulva* (J. F. Gmelin, 1789)**

Regional Redlist: CR A4b

Global Redlist (IUCN): LC

Photos © Praveen

Local Name (Malayalam): പൊൻമണൽക്കോഴി

Distribution: Global: Breeds in Eastern Palearctic region (Russia) and Alaska (USA). Winters upland and coastal habitats from Hawaiian Islands to east-central Japan, Okinawa, Polynesia, Micronesia, Melanesia, New Guinea, New Zealand, Australia, south China, Taiwan, South East Asia (including Thailand, Malaysia, Singapore, Indonesia, Philippines, Bangladesh, Nepal, India, Sri Lanka, Pakistan, Iran, Bahrain, and northeastern Africa (Ethiopia, Somalia).

India: Winter visitor to the coasts of entire region, Andaman & Nicobar Is and Lakshadweep Is.

Kerala: Widespread winter visitor throughout the coastal zone of the state in appropriate habitat.

Habitat/Ecology: Tidal mudflats, ploughed and wet fields, coastal lagoons, edges of lakes, river banks and grasslands near the coast.

Conservation Status: WPA (1972)- Schedule-IV, IUCN Red list Status-Least Concern, Regional Red list-Critically Endangered, CMS-Appendix II.

Population trend in Kerala Since 2000: Long Term Decline: 91%, Short Term Decline: 47%

Regional Redlist Assessment

Pacific Golden Plover winters in the larger wetlands in the coastal plains and adjoining estuaries. Its regional population is inferred to have declined by 70% over a period of 14 years (3 generations = 13.8y) between 2000 and 2014 and is projected to be declining by 83% between 2014 and 2028 - projected for nine years using a five-year decline of 47% between 2014 and 2019. Its EOO is over 38,000 sq.km while its AOO is over 3,600 sq.km. - both not approaching the thresholds of Vulnerable. The number of mature individuals wintering in Kerala is not expected to approach the thresholds of Vulnerable as the total wintering population itself is believed to be over 10,000 individuals. Hence, the highest category of threat is CR A4b. Based on the results of State of India's Birds, the rate of decline across the country is similar (https://www.stateofindiasbirds.in/species/pagplo/). Rate of immigration is likely to decrease due to climate change (https://birdsoftheworld.org/bow/species/pagplo/cur/conservation) and consequent elimination of suitable nesting habitat (Wauchope et al. 2017). Its breeding habitat is classified as highly imperiled (Galbraith et al. 2014). Hence, the regional status does not require any correction.

Geographic/Habitat of sustainable population in Kerala: Throughout the coastal line and major wetlands of the state where it winters mainly.

Level of Exploitation: Commercial Consumption- None, Local consumption- None, Poaching- None, Pet trade- None, Wildlife trade- None.

Threats: Habitat loss.

Recommended conservation measures in Kerala: Conservation of wetlands, seashore

Conservation priority area in Kerala: High.

BMC responsible for conservation and sustainable utilization: Local governing bodies of Coastal and Midland regions of all districts except Wayanad and Idukki.

References:

Galbraith, H., D. W. DesRochers, S. Brown, and J. M. Reed (2014). Predicting vulnerabilities of North American shorebirds to climate change. PLoS ONE 9:e108899.https://doi.org/10.1371/journal.pone.0108899

Wauchope, H. S., J. D. Shaw, O. Varpe, E. G. Lappo, D. Boertmann, R. B. Lanctot, and R. A. Fuller (2017). Rapid climate-driven loss of breeding habitat for Arctic migratory birds. Global Change Biology 23:1085–1094.https://doi.org/10.1111/gcb.13404

Eurasian Curlew
***Numenius arquata* (Linnaeus, 1758)**
Regional Redlist: CR: A2b
Global Redlist (IUCN): NT

Local Names (Malayalam): വാൾക്കൊക്കൻ
Distribution: Global: Breeds in Palearctic region; winters from Iceland and British Is southern to Mediterranean, eastern, north-western and southern Africa, Madagascar, and from southern Caspian Sea to Persian Gulf and western India, and east through South Asia to eastern China and southern Japan, and south to Philippines and Greater Sundas.
India: Winter visitor to coasts of entire region including Lakshadweep Is. and Andamans and Nicobar Is. A few non-breeders over summer.
Kerala: Regular winter visitor in small numbers along the coastline of Kerala.
Habitat/Ecology: Tidal mudflats, estuaries, seashore, mangrove wetlands, backwaters.
Conservation Status: WPA (1972)- Schedule-IV, IUCN Redlist Status- Near Threatened, Regional Redlist- Critically Endangered, CMS- Appendix II.
Population trend in Kerala Since 2000: Long Term **Decline:** 89%, Short Term Decline: Uncertain.

Regional Red list Assessment
Eurasian Curlew winters along the tidal mudflats, seashore, estuaries, mangrove wetlands and backwaters of Kerala (Sashikumar et al. 2011). The regional population is inferred to have declined by 96% between 1991 to 2019 (3 generations = 28.2 y) -projected for 28 years into the past from 89% decline between 2000 to 2019 (19 years). This qualifies it as Critically Endangered under the criteria A2b. EOO is about 16,000 sq.km. while AOO is 2,178 sq. km - EOO meeting the thresholds for Vulnerable - but it does not meet two of the sub-criteria (number of locations > 10, no extreme fluctuations) to be classified as such and hence will meet only Near Threatened category under criteria B1. Though it is suspected to have a continuing decline, we do not have high confidence measures for 1 GEN (9y) or 2 GEN (19y) to evaluate the species under Criteria C. Globally, habitat alteration of breeding, migration staging and wintering areas likely to intensify the population decline of this species and hence globally it is classified as Near Threatened (Birdlife International, 2021; Van Gils et al., 2020). In India, there is a strong long term decline across the country and is classified as Moderate concern (https://www.stateofindiasbirds.in/species/eurcur/). As the conditions outside the region and within the region are deteriorating, the regional status does not require a correction.

Geographic/Habitat of sustainable population in Kerala: Throughout the coastal line and coastal wetlands of northern and central Kerala
Level of Exploitation: Commercial Consumption- None, Local consumption- None, Poaching- None, Pet trade- None, Wildlife trade- None.
Threats: Unknown.
Recommended conservation measures in Kerala: Conservation of coastal wetlands, seashore and mudflats.
Conservation priority area in Kerala: Moderate.
BMC responsible for conservation and sustainable utilization: Local governing bodies of Coastal region.
Stake holders responsible for conservation and sustainable utilization: Land owners, Kerala Forests and Wildlife Department, Local governing bodies.

References:
BirdLife International (2021) Species factsheet: Numenius arquata. Downloaded from http://www.birdlife.org on 07/01/2021. Recommended citation for factsheets for more than one species: BirdLife International (2021) IUCN Red List for birds. Downloaded from http://www.birdlife.org on 07/01/2021.
Van Gils, J., P. Wiersma, G. M. Kirwan, and C.J. Sharpe (2020). Eurasian Curlew (Numenius arquata), version 1.0. In Birds of the World (J. del Hoyo, A. Elliott, J. Sargatal, D. A. Christie, and E. de Juana, Editors). Cornell Lab of Ornithology, Ithaca, NY, USA. https://doi.org/10.2173/bow.eurcur.01

Endangered

Cinnamon Bittern

***Ixobrychus cinnamomeus* (J. F. Gmelin, 1789)**

Regional Redlist: EN A4b, C1

Global Redlist (IUCN): LC

Local Names (Malayalam): മഴക്കൊച്ച

Distribution: Global: Indian Subcontinent to central, southern & eastern China and Taiwan, and through South East Asia to Greater and Lesser Sundas, Sulawesi and Philippines; also occurs in Sri Lanka, Andaman and Nicobar Is and Maldives.

India: Widespread resident- Gangetic Plain, North-east India, Patchily distributed in central India & Deccan Plateau, West & East coasts, and Andaman & Nicobar Is.

Kerala: Uncommon resident. Patchily distributed across Kerala.

Habitat/Ecology: Flooded paddy fields, reed beds, grassy areas and mangroves.

Conservation Status: WPA (1972)- Schedule-IV, IUCN Redlist Status- Least Concern, Regional Redlist- Endangered.

Population trend in Kerala Since 2000: Long Term Decline: 57%, Short Term Decline: Uncertain.

Regional Redlist Assessment

Cinnamon Bittern is an uncommon resident of paddyfields, reedbeds, swamps and mangroves where it occurs in small numbers (Sashikumar et al. 2011). Its regional population is inferred to have declined by 24% over a period of 10 years (3 generations = 11.7y) between 2000 and 2010 and is projected to be declining by 74% between 2013 and 2023- projected for 8 years using a six year past decline of 49% between 2013 and 2019. Population reduction approaching the threshold of Endangered and the category of threat is EN A4b. Its EOO is over 41,000 sq.km while its AOO is over 870 sq.km. - both not approaching the thresholds of Vulnerable. The number of mature individuals in Kerala is not expected to be more than 2,600 individuals (upper bound of total population) and it has declined by 72% in 8 years (2 generations = 7.8y). Hence, the highest category of threat is VU C1. Based on the results of State of India's Birds, the rate of decline across the country is similar (https://www.stateofindiasbirds.in/species/cinbit1/). It is highly unlikely that a significant immigration of propagules that are likely to reproduce within the region due to its overall population decline. Hence, the regional status does not require any correction.

Geographic/Habitat of sustainable population in Kerala: Mangroves and wetlands of Northern Kerala, Kole wetlands of Malappuram and Thrissur districts, Kuttanad Wetlands, Coastal wetlands of Central and Southern Kerala.

Level of Exploitation: Commercial Consumption- None, Local consumption- None, Poaching- No information, Pet trade- None, Wildlife trade- None.

Threats: Habitat loss due to draining of wetlands and paddy fields.

Recommended conservation measures in Kerala: Conservation of wetlands especially Pandanus brakes and reed beds.

Conservation priority area in Kerala: High.

BMC responsible for conservation and sustainable utilization: Local Governing bodies of the Coastal and Midland areas of Kasaragod, Kannur, Kozhikode, Malappuram, Thrissur, Ernakulum, Kottayam, Alappuzha, Pathanamthitta, Kollam and Thiruvananthapuram districts.

Stake holders responsible for conservation and sustainable utilization: Farmers, Kerala Forests and Wildlife Department, Department of Fisheries.

Cultural significance and associated traditional knowledge: None.

References:

Sashikumar, C., Praveen J., M. J. Palot, & P. O. Nameer (2011) Birds of Kerala: status and distribution. 1–835. DC Books. Kottayam, Kerala.

SoIB 2020. State of India's Birds factsheet: Cinnamon BitternIxobrychus cinnamomeushttps://www.stateofindiasbirds.in/species/cinbit1/. Accessed on 2020-07-06.

Grey-headed Bulbul
***Brachypodius priocephalus* (Jerdon, 1839)**
Regional Redlist: EN A2b
Global Redlist (IUCN): NT

Local Names (Malayalam):
ചാരത്തലയൻ ബുൾബുൾ
Distribution: Global: Western Ghats (from extreme southern Maharashtra and Goa south to Kerala) in south-western India.
India: Western Ghats (from extreme southern Maharashtra and Goa south to Kerala) in south-western India.
Kerala: Uncommon resident of the forests of Kerala. Also reported from some sacred groves of northern Kerala.
Habitat/Ecology: Evergreen and moist deciduous forests, secondary forests.
Conservation Status: WPA (1972)- Schedule-IV, IUCN Redlist Status- Near Threatened, Regional Redlist- Endangered.
Population trend in Kerala Since 2000: Long Term Decline: 45%, Short Term Decline: Uncertain.

Regional Redlist Assessment
Grey-headed Bulbul is a resident of low- and mid-elevation evergreen forests that exhibit several life history traits associated with low productivity such as relatively short breeding season, low clutch size (lowest in the genus), less number of broods per year and nesting failures due to predation (Balakrishnan 2011). Its regional population is inferred to have declined by 60% over a period of 12 years (3 generations = 12.6y) between 2007 and 2019 and is projected to be declining by 32% between 2013 and 2025 - projected for six years using a six year past decline of 16.5% between 2013 and 2019. Its EOO is over 40,000 sq.km while its AOO is over 5,100 sq.km. - both not approaching the thresholds of Vulnerable. The number of mature individuals wintering in Kerala is not expected to approach the thresholds of Vulnerable as the total resident population itself is believed to be over 10,000 individuals. Hence, the highest category of threat is EN A2b. Being an endemic bird of the Western Ghats, with most of its prime habitats within Kerala, there is less likelihood that the adjoining populations will rescue the regional population lest it approaches regional extinction. Hence, the regional status does not require any correction.
Geographic/Habitat of sustainable population in Kerala: Protected areas of the state, sacred groves of N Kerala.
Level of Exploitation: Commercial Consumption- None, Local consumption- None, Poaching- None, Pet trade- None, Wildlife trade- None.
Threats: Deforestation.
Recommended conservation measures in Kerala: Conservation of forests next to running water sources.
Conservation priority area in Kerala: Moderate.
Stake holders responsible for conservation and sustainable utilization: Kerala Forests and Wildlife Department.

References:
Balakrishnan, P. (2011). Breeding biology of the Grey-headed Bulbul Pycnonotus priocephalus (Aves: Pycnonotidae) in the Western Ghats, India. Journal of Threatened Taxa. 3(1): 1415–1424

Jerdon's Baza
***Aviceda jerdoni* (Blyth, 1842)**
Regional Redlist: EN B1B2
Global Redlist: LC

Local Names (Malayalam): പ്രാപ്പരുന്ത്
Distribution: Global: Southern Western Ghats, northern Eastern Ghats, central India and southern

Sri Lanka; southern Nepal, Northeast India through Myanmar, southern China (south-west Yunnan, north-western and south-western Guangxi, Hainan), Thailand and parts of Indochina to northern Malay Peninsula, Borneo, Philippines, Sulawesi, Togian Is, Banggai Is and Sula Is. Also in Nicobar Is.
India: Resident in terai and foothills of Eastern Himalayas and Bengal duars to Assam Valley, southern Western Ghats (mainly Wayanad and Karnataka Ghats) and northern Eastern Ghats.
Kerala: Rare resident, most of the sightings from Wayanad where its breeding observed.
Habitat/Ecology: Evergreen and moist deciduous forests; sometimes coffee and tea plantations.
Conservation Status: WPA (1972)- Schedule-I, IUCN Redlist Status- Least Concern, Regional Redlist- Endangered, CITES- Appendix II, CMS- Appendix II.
Population trend in Kerala Since 2000: Long Term Decline: Uncertain, Short Term Decline: Uncertain

Regional Red list Assessment
Rare resident of the forests; most sightings from north Kerala, especially Wayanad where its breeding has been observed in a tea plantation (Sashikumar et al. 2011). The status of the regional population of Jerdon's Baza is uncertain but it has been inferred that there is a continuing decline in area, extent and quality of its habitat. Its EOO is 558 sq.km. and AOO is 299 sq. km. qualifying it as Endangerd (criteria B1 and B2). Assessed as Near Threatened as per criteria A and C. its national trend is uncertain (data deficient) and its distribution range size is Moderate; its category of conservation concern has been assessed as Moderate (https://www.stateofindiasbirds.in/species/jerbaz1/).
Geographic/Habitat of sustainable population in Kerala: Major population restricted to forests and plantations of Wayanad district. It can be seen in other protected areas in small numbers.
Level of Exploitation: Commercial Consumption- None, Local consumption- None, Poaching- None, Pet trade- None, Wildlife trade- No information.
Threats: Deforestation.
Recommended conservation measures in Kerala: Intensive study of habitat requirements. Conservation of forests in Wayanad.
Conservation priority area in Kerala: High
BMC responsible for conservation and sustainable utilization: All local bodies in Wayanad district.
Stake holders responsible for conservation and sustainable utilization: Kerala Forests and Wildlife Department, Estate owners.
Cultural significance and associated traditional knowledge: None.

References:
Sashikumar, C., Praveen J., M. J. Palot, & P. O. Nameer (2011) Birds of Kerala: status and distribution. 1–835. DC Books. Kottayam, Kerala
SoIB 2020. State of India's Birds factsheet:Jerdon's Baza Aviceda jerdoni https://www.stateofindiasbirds.in/species/jerbaz1/. Accessed on 2020-07-06.

Watercock
***Gallicrex cinerea* (J. F. Gmelin, 1789**
Regional Redlist: EN A4b
Global Redlist (IUCN): LC

Local Names (Malayalam): തീപൊരിക്കണ്ണൻ
Distribution: Global: Pakistan, India, Maldives and Sri Lanka east to central & eastern China, Korea, S Japan and S Ryukyu Is, and S through Andamans, Nicobars and South East Asia to Sumatra and Philippines. Winters south to Greater and Lesser Sundas and Sulawesi.
India: Widespread resident and summer visitor, along base of Himalayas and Gangetic Plain to Assam Valley, widespread through Peninsula, Andamans and Nicobars Is.
Kerala: Uncommon resident. Patchily distributed across Kerala in suitable habitats.
Habitat/Ecology: Wet paddy fields and swamps.
Conservation Status: WPA (1972)- Schedule-IV, IUCN Redlist Status- Least Concern, Regional Redlist- Endangered.
Population trend in Kerala Since 2000: Long Term Decline: 36%, Short Term Decline: 34%

Regional Redlist Assessment
Watercock is an uncommon resident of paddyfields and swamps where it is patchily distributed across Kerala (Sashikumar et al. 2011). Its regional

population is inferred to have declined by 12% over a period of 10 years (3 generations = 12y) between 2000 and 2010 and is projected to be declining by 64% over a period of 10 years between 2014 and 2024, using a five year past decline of 35% between 2014 and 2019. Population reduction approaching the threshold of Endangered and the category of threat is EN A4b. Its EOO is over 37,000 sq.km while its AOO is over 3500 sq.km. - both not approaching the thresholds of Vulnerable. The number of mature individuals in Kerala is not expected to be more than 7200 individuals (upper bound of total population) and it has declined by 47% in 8 years (2 generations = 8y) approaching the thresholds of Vulnerable and the category of threat is VU C1. Its national trend is uncertain (data deficient) but current trends showing strong decline in population and its distribution range size is Moderate (https://www.stateofindiasbirds.in-/species/waterc1/). Hence, the regional status does not require any correction.

Geographic/Habitat of sustainable population in Kerala: Coastal wetlands of Kerala and paddy fields of Palakkad district.
Level of Exploitation: Commercial Consumption- None, Local consumption- All rallids trapped with noose, Poaching- Some poaching in wetlands, Pet trade- None, Wildlife trade- None.
Threats: Poaching, conversion of wetlands.
Recommended conservation measures in Kerala: Conservation of wetlands and paddy fields.
Conservation priority area in Kerala: Moderate.
BMC responsible for conservation and sustainable utilization: Local governing bodies of Coastal and Midland regions of all districts.
Stake holders responsible for conservation and sustainable utilization: Land owners, Kerala Forests and Wildlife Department, Local governing bodies.

References:

Sashikumar, C., Praveen J., M. J. Palot, & P. O. Nameer (2011) Birds of Kerala: status and distribution. 1–835. DC Books. Kottayam, Kerala
SoIB 2020. State of India's Birds factsheet: Watercock Gallicrex cinerea https://www.stateofindiasbirds.in/species/waterc1/. Accessed on 2020-07-06

Yellow-wattled Lapwing
Regional Redlist: EN A4b
***Vanellus malabaricus* (Boddaert, 1783)**
Global Redlist (IUCN): LC

Local Names (Malayalam): മഞ്ഞക്കണ്ണി തിത്തിരി
Distribution: Global: Southern Pakistan (Sind), and India from Gujarat and Himachal east to Bihar and south through the peninsula to Sri Lanka; non-breeding visitor to southern Nepal (has bred), West Bengal and Bangladesh.
India: Resident (with local movements) from Kutch to about Delhi area and east through Gangetic Plain to Bihar; and through Peninsula.
Kerala: Resident. Widespread throughout the state in appropriate habitat.
Habitat/Ecology: Generally dry biotope. Barren lands, lateritic plains, fallow fields, playground, irrigated and freshly ploughed paddy fields.
Conservation Status: WPA (1972)- Schedule-IV, IUCN Redlist Status- Least Concern, Regional Redlist- Endangered, CMS- Appendix II.
Population trend in Kerala Since 2000: Long Term Decline: Uncertain, Short Term Decline: 49%

Regional Redlist Assessment
Yellow-wattled Lapwing is a resident of the laterite midlands and is patchily distributed across Kerala (Sashikumar et al. 2011). Its regional population is projected to be declining by 88% over a period of 16 years (3 generations = 16.2y) between 2014 and 2030 - projected for 16 years using a five year past decline of 49% between 2014 and 2019. Its EOO is over 37,000 sq.km while its AOO is over 4,200 sq.km. - both not approaching the thresholds of Vulnerable. The number of mature individuals in Kerala is not expected to be more than 2,200 individuals (upper bound of total population) and it has declined by 86% in 11 years (2 generations = 10.8y). Hence, the highest category of threat is CR A4b while it also meets EN C1. However, it is likely that the regional population is experiencing significant immigration of propagules that are likely to reproduce within the region and it is unlikely that this immigration will reduce in the period till 2030.

Hence, we down list the regional status by one level from CR to EN.

Geographic/Habitat of sustainable population in Kerala: Midland lateritic plains and hillocks of the state. Major population restricted to laterite plains of north Kerala, Calicut University campus, dry lands of Palakkad, Kole wetlands, Nedumbassery wetlands, HMT estate, Kuttanad wetlands and NTPC ground.

Level of Exploitation: Commercial Consumption-None, Local consumption-None, Poaching-None, Pet trade-None, Wildlife trade-None.

Threats: Loss of habitat.

Recommended conservation measures in Kerala: Conservation of open scrubland and laterite plains.

Conservation priority area in Kerala: High.

BMC responsible for conservation and sustainable utilization: Local governing bodies of Coastal and Midland regions of all districts.

Stake holders responsible for conservation and sustainable utilization: Land owners, Kerala Forests and Wildlife Department, Local governing bodies.

References:

Sashikumar, C., Praveen J., M. J. Palot, & P. O. Nameer (2011) Birds of Kerala: status and distribution. 1–835. DC Books. Kottayam, Kerala

Forest Wagtail

Regional Redlist: EN A4b, A2b

***Dendroanthus indicus* (J. F. Gmelin, 1789)**

Global Redlist: LC

Local Names (Malayalam): കാട്ടുവാലു കുലുക്കി

Distribution: Global: Russian Far East (southern Ussuriland) south to south-eastern China (South to south-western Sichuan, northern Guizhou and northern Fujian) and, rare, southern Japan (south-western Honshu, north-western Kyushu); winters in South and South East Asia, south to south-western India, Sri Lanka and Greater Sundas.

India: Winter visitor with widely scattered passage records, mainly north-eastern and south Assam hills. Winters primarily Western Ghats and Andaman's Is.

Kerala: Widespread winter visitor throughout the state in appropriate habitat.

Habitat/Ecology: Forests, plantations.

Conservation Status: WPA (1972)- Schedule-IV, IUCN Redlist Status- Least Concern, Regional Redlist-Endangered, CMS- Appendix II.

Population trend in Kerala Since 2000: Long Term Decline: 80%, Short Term Decline: 47%

Regional Redlist Assessment

Uncommon winter visitor to Kerala,, mainly in the forested areas and sporadically at other places also (Sashikumar et al. 2011). Its past decline is 57.83% over a period of 10 years from 2007 to 2o17 (3 Generations = 10 years) and a projected decline of 72.32% qualifying it as Endangered (Criteria A4b, A2b). Elsewhere in India also, it is showing a strong long-term declining trend (https://www.stateofindiasbirds.in/species/forwag1/). Its EOO is 41189 sq. km. and AOO is 6231, both in the threshold of Least Concern. The number of mature individuals wintering in Kerala has been assessed to be 4850, assigning this species in Vulnerable (Criteria C1) category.

Geographic/Habitat of sustainable population in Kerala: Protected areas and reserve forests of the state where it winters mainly.

Level of Exploitation: Commercial Consumption-None, Local consumption- None, Poaching- None, Pet trade- None, Wildlife trade- None.

Threats: Unknown.

Recommended conservation measures in Kerala: Conservation of low and mid-altitude forests.

Conservation priority area in Kerala: High.

Stake holders responsible for conservation and sustainable utilization: Kerala Forest and Wildlife Department.

Cultural significance and associated traditional knowledge: Wagtails in general are subject of folklore.

References:

Sashikumar, C., Praveen J., M. J. Palot, & P. O. Nameer (2011) Birds of Kerala: status and distribution. 1–835. DC Books. Kottayam, Kerala

SoIB 2020. State of India's Birds factsheet: Forest Wagtail Dendronanthus indicus https://www.stateofindiasbirds.in/species/forwag1/. Accessed on 2020-07-06

Vulnerable

Black Bittern

***Ixobrychus flavicollis* (Latham, 1790)**

Regional Redlist: VU A4b, A2b, C1

Global Redlist (IUCN): LC

Local Names (Malayalam): കരിങ്കൊച്ച

Distribution: Pakistan east to south-eastern China, Peninsular India, Sri Lanka & Maldives, south to Greater Sundas, Philippines, Sulawesi and satellite islands. Moluccas, Timor, Aru Is, lowland New Guinea, and Bismarck Archipelago south to western, northern and eastern Australia and Solomon Is.

India: Widespread resident. Summer visitor (mainly) to Gangetic Plain to Assam Valley. Resident locally along coasts and rivers of southern India.

Kerala: Uncommon resident, patchily distributed across Kerala in suitable habitats.

Habitat/Ecology: Paddy fields, reed beds, grassy areas and mangroves.

Conservation Status: WPA (1972)- Schedule-IV, IUCN Redlist Status- Least Concern, Regional Redlist- Vulnerable.

Population trend in Kerala Since 2000: Long Term Decline: 62%, Short Term Decline: 31%.

Regional Redlist Assessment

Black Bittern is an uncommon resident of paddy-fields, reedbeds, swamps and mangroves where it occurs in small numbers (Sashikumar et al. 2011). Its regional population is inferred to have declined by 72% over a period of 17 years (3 generations = 16.8y) between 2000 and 2017 and is projected to be declining by 72% over a period of 17 years between 2014 and 2031, using a five year past decline of 31% between 2014 and 2019. Population reduction approaching the threshold of Endangered and the category of threat is EN A2b and EN A4b. Its EOO is over 41,000 sq.km while its AOO is over 4000 sq.km. - both not approaching the thresholds of Vulnerable. The number of mature individuals in Kerala is not expected to be more than 1900 individuals (upper bound of total population) and it has declined by 69% in 11 years (2 generations = 11.2y). Hence, the highest category of threat is VU C1. Its national trend is uncertain but its current trend showing strong decline and its distribution range size is Moderate (https://www.stateofindiasbirds.in/species/blabit1/). However, it is likely that the regional population is experiencing significant immigration of propagules that are likely to reproduce within the region and it is unlikely that this immigration will reduce in the period till 2031. Hence, we down list the regional status by one level from EN to VU.

Geographic/Habitat of sustainable population in Kerala: Mangroves and coastal wetlands of Kerala.

Level of Exploitation: Commercial Consumption- None, Local consumption- None, Poaching- No information, Pet trade- None, Wildlife trade- None.
Threats: Habitat loss due to draining of wetlands and paddy fields.

Recommended conservation measures in Kerala: Conservation of wetlands especially Pandanus brakes and reed beds.

Conservation priority area in Kerala: Moderate.
BMC responsible for conservation and sustainable utilization: Local governing bodies of Coastal and Midland regions of all districts.

Stake holders responsible for conservation and sustainable utilization: Farmers, Kerala Forests and Wildlife Department, Department of Fisheries.

References:

Sashikumar, C., Praveen J., M. J. Palot, & P. O. Nameer (2011) Birds of Kerala: status and distribution. 1–835. DC Books. Kottayam, Kerala

SoIB 2020. State of India's Birds factsheet: Black Bittern Ixobrychus flavicollishttps://www.stateofindiasbirds.in/species/blabit1/.
Accessed on 2020-07-06.

Cotton Teal
***Nettapus coromandelianus* (J.F. Gmelin, 1789)**
Regional Redlist: VU A4b
Global Redlist (IUCN): LC

Local Names (Malayalam): പുള്ള് എരണ്ട
Distribution: Most of Oriental Region; north New Guinea, eastern Australia (mainly eastern Queensland).
India: Resident with local movements, from Gujarat to Delhi area, east to Assam Valley, and through Peninsula.
Kerala: Uncommon resident. Occurs in small numbers throughout the state in suitable habitats.
Habitat/Ecology: Wetlands with aquatic vegetation, mainly fresh water.
Conservation Status: WPA (1972)- Schedule-IV, IUCN Redlist Status- Least Concern, Regional Redlist- Vulnerable, CMS- Appendix II.
Population trend in Kerala Since 2000: Long Term Decline: 39%, Short Term Decline: 20%

Regional Redlist Assessment
Cotton Teal is a resident of the freshwater wetlands in coastal plains and midlands across Kerala (Sashikumar et al. 2011). Its regional population is inferred to be declining by 24% over a period of 10 years (3 generations < 10y) between 2007 and 2017 and projected to decline at 37% over a period of 10 years between 2014 and 2024, using a five year past decline of 20% between 2014 and 2019. Its EOO is over 39,000 sq.km while its AOO is over 4,000 sq.km. - both not approaching the thresholds of Vulnerable. The number of mature individuals in Kerala is believed to be over 10,000 (upper bound of total population) and hence not expected to approach the thresholds of Vulnerable. Hence, the highest category of threat is VU A4b. Based on the results of State of India's Birds, the rate of decline across the country is similar with a long-term decline of 60% and current annual decline of 8% (https://www.stateofindiasbirds.in/species/copgoo1/). Though the regional population receives a significant immigration of propagules that are likely to reproduce in the region, this immigration is also expected to decrease basis national declines in its population. Hence, the regional status does not require any correction.
Geographic/Habitat of sustainable population in Kerala: Major wetlands and freshwater ponds of the state.
Level of Exploitation: Commercial Consumption- None, Local consumption- Sparingly hunted for local consumption, Poaching- Some poaching in wetlands, Pet trade- None, Wildlife trade- None.
Threats: Poaching, conversion of wetlands.
Recommended conservation measures in Kerala: Arresting conversion of inland freshwater wetlands.
Conservation priority area in Kerala: Moderate.
BMC responsible for conservation and sustainable utilization: Local governing bodies of Coastal and Midland regions of all districts.
Stake holders responsible for conservation and sustainable utilization: Farmers, Kerala Forests and Wildlife Department, Department of Fisheries.

References:
Sashikumar, C., Praveen J., M. J. Palot, & P. O. Nameer (2011) Birds of Kerala: status and distribution. 1–835. DC Books. Kottayam, Kerala.

Indian Thick-knee
***Burhinus indicus* (Salvadori, 1865)**
Regional Redlist: VU B1, B2
Global Redlist (IUCN): LC

Local Names (Malayalam): വയൽകണ്ണൻ
Distribution: Global: India south of Himalayas and Sri Lanka; east to Vietnam and northern Malay Peninsula; probably also Pakistan east of the Indus river.

India: Widespread resident- from Gujarat north to southern Kashmir, along base of Himalayas and north-western Bengal, south to Kolkata and through Peninsula (except Western Ghats strip).
Kerala: Uncommon resident with a patchy distribution in Kerala.
Habitat/Ecology: Grassy laterite plains interspersed with cashew plantation or scrub jungle and banks of creeks.
Conservation Status: WPA (1972)- Schedule-IV, IUCN Redlist Status- Least Concern, Regional Redlist- Vulnerable.
Population trend in Kerala Since 2000: Long **Term Decline:** Uncertain, Short Term Decline: Uncertain.

Regional Redlist Assessment
Indian Thick-knee is an uncommon resident of grassy laterite plains interspersed with cashew plantation, scrub jungle and banks of creeks (Sashikumar et al. 2011). The status of the regional population of Indian Thick-knee is uncertain but it has been inferred that there is a continuing decline in area, extent and quality of its habitat. Its population declines within the region are uncertain but is believed to be strongly declining and 62% long-term decline nationally (https://www.stateofindiasbirds.in/species/indthk1/) and global population trend also appears to be decreasing (http://datazone.birdlife.org/species/factsheet/indian-thick-knee-burhinus-indicus). Its EOO is 10358 sq.km. and AOO is 646 sq. km. qualifying it as Vulnerable (criteria B1 and B2). The number of mature individuals in Kerala is not estimated but it will not meet any of the subcriteria of C as the population declines are not available, no extreme fluctuations are observed nor will meet the subcriteria for number of mature individuals in each subpopulation. Hence, the highest category of threat is Vulnerable B1 and B2. As both nationally and globally, there is suspected ongoing decline, the status of immigration of propagules is unknown. The rate of destruction of laterite hills and open habitats in the midlands are happening at a great pace and the coastal habitats face threats from reclamation. Hence, the regional status does not require any correction.
Geographic/Habitat of sustainable population in Kerala: Lateritic plains of Kasaragod and Kannur districts, Calicut University Campus, Beaches of Malappuram and Thrissur districts, Scrub jungles of Amateur taluk (Palakkad district), Kole wetlands and KAU campus in Thrissur district, Nedumbassery wetlands in Ernakulam district.
Level of Exploitation: Commercial Consumption- None, Local consumption- None, Poaching- None, Pet trade- None, Wildlife trade- None.
Threats: Habitat loss, laterite mining, fire.
Recommended conservation measures in Kerala: Conservation of laterite plains in North Kerala, and hillocks of Palakkad district.
Conservation priority area in Kerala: High.
BMC responsible for conservation and sustainable utilization: Madayi Grama Panchayath, Tarur Grama Panchayath.
Stake holders responsible for conservation and sustainable utilization: Land owners, Kerala Forests and Wildlife Department, Local governing bodies.
Cultural significance and associated traditional knowledge: None.

References:
BirdLife International (2021) Species factsheet: Burhinus indicus. Downloaded from http://www.birdlife.org on 10/01/2021.
Sashikumar, C., Praveen J., M. J. Palot, & P. O. Nameer (2011) Birds of Kerala: status and distribution. 1–835. DC Books. Kottayam, Kerala.
SoIB 2020. State of India's Birds factsheet: Indian Thick-knee Burhinus indicushttps://www.stateofindiasbirds.in/species/indthk1/. Accessed on 2020-07-06.

Malabar Pied Hornbill
***Anthracoceros coronatus* (Boddaert, 1783)**
Regional Redlist: VU A4b, C1
Global Redlist (IUCN): NT
Local Names (Malayalam): പാണ്ടൻ വേഴാമ്പൽ

Distribution: Global: Western India (Western Ghats south from southern Maharashtra), central and eastern India (from south-western West Bengal and Bihar to Andhra Pradesh and Madhya Pradesh) and Sri Lanka.
India: Resident in Peninsular hills, NE Peninsula from SW W Bengal and Bihar to N Andhra, Western Ghats (mainly along E edge) south of S Maharashtra.
Kerala: Rare resident with a patchy distribution in Kerala.
Habitat/Ecology: Evergreen and moist deciduous forests.
Conservation Status: WPA (1972)- Schedule-I, IUCN Redlist Status- Near Threatened, Regional Redlist- Vulnerable, CITES- Appendix II.
Population trend in Kerala Since 2000: Long **Term Decline:** Uncertain, Short Term Decline: 33%

Regional Redlist Assessment
Malabar Pied Hornbill is a resident of lowland riverine forests and sparsely populated midland villages of north-central Kerala with similar remnant habitats. It is nomadic and moves locally for large distances in search of fruiting trees. Its regional population is projected to be declining by 74% over a period of 17 years (3 generations = 16.5y) between 2014 and 2031 - projected for 17 years using a five year past decline of 33% between 2014 and 2019. This meets criteria Endangered under A4b. Its EOO is over 27,000 sq.km while its AOO is over 1,900 sq.km. - AOO within the threshold of Vulnerable but it does not meet two of the sub-criteria (number of locations > 10, no extreme fluctuations) to be classified as such and hence will meet only Near Threatened category under criteria B2. The number of mature individuals in Kerala is not expected to be more than 400 individuals (upper bound of total population) and it is projected to be declining by 30% over a period of 11 years (2 generations = 11y) between 2011 and 2022 - projected for 11 years using an eight year past decline of 22% between 2011 and 2019. This meets criteria Endangered under Criteria C1. Hence, the highest category of threat is EN A4b, C1 while it also meets NT B2. However, it is likely that the regional population is experiencing significant immigration of propagules that are likely to reproduce within the region as significant population of this species habitats forests outside the and it is unlikely that this immigration will reduce in the period till 2031 though there is a moderate recent decline across the country (https://www.stateofindiasbirds.in/species/maphor1/). Hence, we downlist the regional status by one level from EN to VU.
Geographic/Habitat of sustainable population in Kerala: Major population of this species restricted to forests north of Wayanad (Aralam WLS, Thirunelli) and Vazhachal RF and neighbouring contiguous forests. It can also be seen in other protected areas with a straggling population, sporadical movements observed (depends on fruiting trees).
Level of Exploitation: Commercial Consumption- None, Local consumption- None, Poaching- Nests raided in some cases, Pet trade- No information available, Wildlife trade- All Hornbills in high demand in international market and hence possibility of wildlife trade cannot be ruled out.
Threats: Poaching.
Recommended conservation measures in Kerala: Monitoring nesting sites.
Conservation priority area in Kerala: High.
BMC responsible for conservation and sustainable utilization: Aralam WLS, Kottiyoor WLS, Wayanad WLS, North Wayanad Forest Division, Silent Valley NP, Palakkad Forest Division, Parambikulam Tiger Reserve, Vazhachal RF, and Thattekkad Bird Sanctuary.
Stake holders responsible for conservation and sustainable utilization: Kerala Forests and Wildlife Department, Vana Samrakshana Samithi, Tribal co-operatives.
Cultural significance and associated traditional knowledge: Hornbills in general considered as harbinger of rains. Incarcerated female and chicks considered said to be a culinary delicacy and having medicinal properties for some tribals.

References:
Sashikumar, C., Praveen J., M. J. Palot, & P. O. Nameer (2011) Birds of Kerala: status and distribution. 1–835. DC Books. Kottayam, Kerala.

Streaked Weaver
***Ploceus manyar* (Horsfield, 1821)**
Regional Redlist: VU A4b
Global Redlist (IUCN): LC

Local Names (Malayalam): കായലാറ്റ
Distribution: Global: Pakistan, India, Sri Lanka, south-eastern Nepal, south-eastern Bhutan, Bangladesh, Myanmar, southern China (western Yunnan), Laos; north-western, central and south-eastern Thailand, Cambodia and southern Vietnam, Java and Bali. Introduced to northern Egypt (Nile Delta), Saudi Arabia, United Arab Emirates and Singapore, also probably to Qatar and Kuwait.
India: Resident mostly along sub-Himalayan region to Brahmaputra Plains, scattered localities over Peninsula.
Kerala: Uncommon resident. Patchy distribution in Kerala in suitable habitats.
Habitat/Ecology: Backwaters and paddy fields, particularly near coastal area.
Conservation Status: WPA (1972)- Schedule-IV, IUCN Redlist Status- Least Concern, Regional Redlist- Vulnerable.
Population trend in Kerala Since 2000: Long Term Decline: Uncertain, Short Term Decline: 36%
Regional Redlist Assessment
Patchily distributed, the major population in central and south Kerala. Short-term decline is (5 years – 2014 to 2019) is 36.5% and Projected Decline is almost 60% (3 generations = 10 years), qualifying it as Vulnerable under IUCN Redlist Criteria A4b. Its EOO is 21,550 sq. km. and AOO is 1781 sq. km both not crossing the threshold of Vulnerable. The number of mature individuals is inferred to be 7,700 and there is a continuing threat of its habitat loss. The State of India's Birds has assigned its conservation concern as Moderate, with a current trend of strong decline (https://www.stateofindias-birds.in/species/strwea2/).
Geographic/Habitat of sustainable population in Kerala: Kole wetlands of Malappuram and Thrissur districts, Kadamakudy wetlands of Ernakulam district, Changaram wetlands of Alappuzha, Kuttanad wetlands, Karingali puncha of Pathanamthitta district, Vellayani-Punchakkari wetlands of Thiruvananthapuram district.
Level of Exploitation: Commercial Consumption- None, Local consumption- None, Poaching- None, Pet trade- Potentially caught with Munias, Wildlife trade- None.
Threats: Habitat loss.
Recommended conservation measures in Kerala: Conservation of wetlands and paddy fields. Conservation priority area in Kerala: Moderate.
BMC responsible for conservation and sustainable utilization: Local governing bodies of Coastal and Midland regions of Malappuram, Thrissur, Ernakulam, Alappuzha, Kottayam, Pathanamthitta, and Thiruvananthapuram.
Stake holders responsible for conservation and sustainable utilization: Farmers, Kerala Forests and Wildlife Department, Department of Fisheries.

References:

SoIB 2020. State of India's Birds factsheet: Streaked Weaver Ploceus manyarhttps://www.stateofindias-birds.in/species/strwea2/ Accessed on 2020-07-06.

Yellow Bittern
Ixobrychus sinensis *(J.F. Gmelin, 1789)*
Regional Redlist: VU A2b
Global Redlist (IUCN): LC

Local Names (Malayalam): മഞ്ഞകൊച്ച
Distribution: Global: Oman; Seychelles; Indian Subcontinent, south-eastern Russia and Japan through central & eastern China and Taiwan to South East Asia, Greater and Lesser Sundas, Philippines, New Guinea (possibly), northern Solomons (Bougainville) and western Micronesia. Northern populations migrate to south of the range, to South India, Philippines and Indonesia, some reaching Wallacea and New Guinea.
India: Widespread resident. South-western Gujarat to Gangetic Plain, Northeast India and Peninsula, Lakshadweep and Andamans and Nicobars Is.
Kerala: Uncommon resident. Patchily distributed across Kerala in suitable habitats.
Habitat/Ecology: Low-lying coastal wetlands with extensive reed beds, weedy edge of tanks and canals, paddy fields.
Conservation Status: WPA (1972)- Schedule-IV, IUCN Redlist Status- Least Concern, Regional Redlist- Vulnerable.
Population trend in Kerala Since 2000: Long Term Decline: 62%, Short Term Decline: 24%

Regional Redlist Assessment
Yellow Bittern is a resident of low-lying coastal wetlands with extensive reed beds. Its regional population is inferred to have declined by 59% over a period of 10 years (3 generations = 10.5y) between 2000 and 2010 and is projected to be declining by 46% between 2014 and 2024 - projected for 10 years using a five year past decline of 25% between 2014 and 2019. This meets the criteria of Endangered under A2b and Vulnerable under A4b. Its EOO is over 35,000 sq.km while its AOO is over 3,400 sq.km. - both not approaching the thresholds of Vulnerable. The number of mature individuals in Kerala is not expected to be more than 6200 individuals (upper bound of total population) and it is projected to be declining by 46% over a period of 10 years (3 generations = 10.5y) between 2014 and 2024 - projected for 10 years using a five year past decline of 25% between 2014 and 2019. This meets criteria Vulnerable under Criteria C1. Hence, the highest category of threat is Endangered A2b. However, it is likely that the regional population is experiencing significant immigration of propagules that are likely to reproduce within the region and it is unlikely that this immigration will reduce in the period till 2024. Hence, we down list the regional status by one level from EN to VU.

Geographic/Habitat of sustainable population in Kerala: Coastal wetlands and mangrove forests of the state.

Level of Exploitation: Commercial Consumption- None, Local consumption- None, Poaching- No information, Pet trade- None, Wildlife trade- None.

Threats: Habitat loss due to draining of wetlands and paddy fields.

Recommended conservation measures in Kerala: Conservation of wetlands especially Pandanus brakes and reed beds.

Conservation priority area in Kerala: Moderate.

BMC responsible for conservation and sustainable utilization: Local governing bodies of Coastal and Midland regions of all districts.

Stake holders responsible for conservation and sustainable utilization: Farmers, Kerala Forests and Wildlife Department, Department of Fisheries.

Near-threatened
Bar-tailed Godwit
***Limosa lapponica* (Linnaeus, 1758)**
Regional Redlist: NT B1, B2
Global Redlist (IUCN): NT

Local Names (Malayalam): വരവാലൻ സ്നാഷ്
Distribution: Global: Breeds in Palearctic region and Alaska (USA). In winter, concentrations occur along Atlantic coasts of Europe and Africa from British Isles south to South Africa, along northwest coast of Indian Ocean, and in Australasia from south-western China to Australia and New Zealand, including Indochina, Indonesia, and islands of south-western Pacific.

India: Winter visitor to the coasts, mainly western India, recorded from eastern coasts, Andamans and Nicobars Is. and Lakshadweep Is.

Kerala: Regular winter visitor in small numbers along the coastline of Kerala.

Habitat/Ecology: Coastal mudflats, seashore, estuaries, mostly saltwater wetlands but can be seen occasionally inland.

Conservation Status: WPA (1972)- Schedule-IV, IUCN Redlist Status- Near Threatened, Regional Redlist- Near Threatened, CMS- Appendix II.

Population trend in Kerala Since 2000: Long Term Decline: Uncertain, Short Term Decline: Uncertain

Regional Redlist Assessment
Bar-tailed Godwit is a regular winter visitor in small numbers to coastal mudflats, seashore, estuaries, mostly saltwater wetlands but can be seen occasionally inland (Sashikumar et al. 2011). Information of its national population trend is unknown (Data deficient) (https://www.stateofindiasbirds.in/species/batgod/) and global population trend of nominate subspecies is unknown but all other populations appear to be declining rapidly (Birdlife International, 2021; McCaffery et al. 2020). Its EOO is only about 13,000 sq.km while its AOO is not more than 1730 sq.km- both meeting the thresholds for Vulnerable - but it does not meet two of the sub-criteria (number of locations > 10, no extreme fluctuations) to be classified as such and hence will meet only Near Threatened category under criteria B1 and B2. The number of mature individuals in Kerala

is not estimated but it will not meet any of the sub criteria of C as the population declines are not available, no extreme fluctuations are observed nor will meet the sub criteria for number of mature individuals in each subpopulation. Hence, the highest category of threat is Near Threatened B1, B2. As there is ongoing decline in global population, the rate of winter migration is expected to decrease. All shorebirds habitats within the region are threatened due to reclamation of land for development. Hence, the regional status does not require any correction.

Geographic/Habitat of sustainable population in Kerala: Throughout the coastal line of northern and central Kerala.

Level of Exploitation: Commercial Consumption- None, Local consumption- None, Poaching- None, Pet trade- None, Wildlife trade- None.

Threats: Unknown.

Recommended conservation measures in Kerala: Conservation of coastal wetlands and mudflats.

Conservation priority area in Kerala: Moderate.
BMC responsible for conservation and sustainable utilization: Local governing bodies of Coastal regions.

Stake holders responsible for conservation and sustainable utilization: Land owners, Kerala Forests and Wildlife Department, Local governing bodies.

References:

Sashikumar, C., Praveen J., M. J. Palot, & P. O. Nameer (2011) Birds of Kerala: status and distribution. 1–835. DC Books. Kottayam, Kerala

BirdLife International (2021) Species factsheet: Limosa lapponica. Downloaded from http://www.birdlife.org on 12/01/2021

McCaffery, B. J. and R. E. Gill (2020). Bar-tailed Godwit (Limosa lapponica), version 1.0. In Birds of the World (S. M. Billerman, Editor). Cornell Lab of Ornithology, Ithaca, NY, USA. https://doi.org/10.2173/bow.batgod.01

Curlew Sandpiper
***Calidris ferruginea* (Pontoppidan, 1763)**
Regional Redlist: NT B1, B2
Global Redlist (IUCN): NT

Local Names (Malayalam): കടൽകാക്ക
Distribution: Global: Arctic Siberia from Yamal Peninsula to Kolyuchinskaya Gulf (northern Chukotskiy Peninsula). Winters from sub-Saharan Africa through Middle East and South & South East Asia to Australasia.
India: Winter visitor mainly to coasts, also inlands.
Kerala: Regular winter visitor distributed across coastal Kerala in suitable habitats.
Habitat/Ecology: Seashore, tidal mudflats at estuaries, waterlogged paddy fields, marshes, and fish and shrimp ponds.
Conservation Status: WPA (1972)- Schedule-IV, IUCN Redlist Status- Near Threatened, Regional Redlist- Near Threatened, CMS- Appendix II.
Population trend in Kerala Since 2000: Long Term Decline: Uncertain, Short Term Decline: Uncertain.

Regional Redlist Assessment
Curlew Sandpiper is a winter visitor to the shores of Kerala - frequenting estuaries, beaches and low-lying coastal wetlands. Its population declines within the region are uncertain but is believed to be declining as there is a strong (>87%) long-term decline nationally (https://www.stateofindiasbirds.in/species/cursan/) as well as globally (http://datazone.birdlife.org/species/factsheet/curlew-sandpiper-calidris-ferruginea). Its EOO is only about 13,000 sq.km while its AOO is not more than 1,700 sq.km. - both within the thresholds of Vulnerable but it does not meet two of the sub-criteria (number of locations > 10, no extreme fluctuations) to be classified as such and hence will meet only Near Threatened category under criteria B1 & B2.

The number of mature individuals in Kerala is not estimated but it will not meet any of the sub criteria of C as the population declines are not available, no extreme fluctuations are observed nor will meet the sub criteria for number of mature individuals in each subpopulation. Hence, the highest category of threat is Near Threatened B1, B2. As both nationally and globally, there is ongoing decline the rate of winter migration is expected to decrease. All shorebirds habitats within the region are threatened due to reclamation of land for development. Hence, the regional status does not require any correction.

Geographic/Habitat of sustainable population in Kerala: Throughout the coastal line and coastal wetlands of the state.
Level of Exploitation: Commercial Consumption- None, Local consumption- None, Poaching- None, Pet trade- None, Wildlife trade- None.
Threats: Unknown.
Recommended conservation measures in Kerala: Conservation of wetlands, seashore and mudflats.
Conservation priority area in Kerala: Moderate.
BMC responsible for conservation and sustainable utilization: Local governing bodies of coastal regions.
Stake holders responsible for conservation and sustainable utilization: Land owners, Kerala Forests and Wildlife Department, Local governing bodies.

Great Knot
***Calidristenuirostris* (Horsfield, 1821)**
Regional Redlist: NT B1, B2
Global Redlist: VU

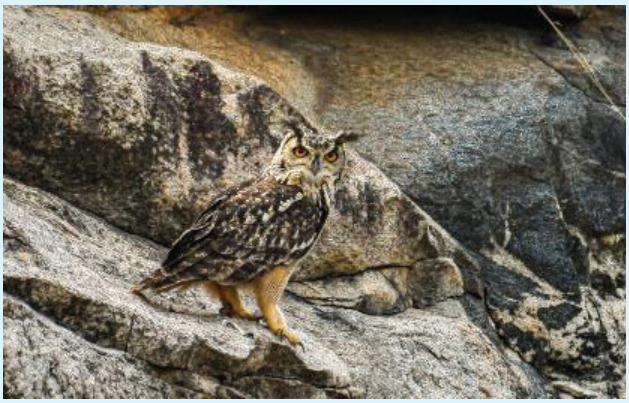
Local Names (Malayalam): കിഴക്കൻ നട്ടീ
Distribution: Global: NE Siberia from Verkhoyansk Mts E to Magadan, Koryak Highlands and S Chukotskiy Peninsula; distribution poorly known. Winters mainly in SE Asia and S to Australia; also in Arabia, Pakistan, NW, S & NE India and Bangladesh. India: Winter visitor to coasts. Also reported from Lakshadweep Is and Andamans Is.
Kerala: Uncommon winter visitor in small numbers to Kerala coasts.
Habitat/Ecology: Sandy or muddy estuaries and coasts.
Conservation Status: WPA (1972)- Schedule-IV, IUCN Redlist Status- Endangered, Regional Redlist- Near Threatened, CMS- Appendix I.
Population trend in Kerala Since 2000: Long Term Decline: Uncertain, Short Term Decline: Uncertain.

Regional Redlist Assessment
Irregular winter visitor, uncommon (Sashikumar et al. 2011). Its status in Kerala is uncertain over the years. Great Knot's EOO is 5,175 and EOO is 708, assigning this migratory species to Near Threatened category with Criteria B1 and B2, Its status is uncertain for the rest of India as well, but due to the restricted distribution range its conservation concern has been set as High (https://www.stateofindiasbirds.in/species/grekno/).
Geographic/Habitat of sustainable population in Kerala: Beaches like Payyambalam, Muzhuppilangad (Kannur), Kottappuram, Kappad, Elathur (Kozhikode), Kadalundi Reserve, Ponnani (Malappuram), Chavakkad (Thrissur), Puthuvype (Ernakulam), and Purakkad (Alappuzha).
Level of Exploitation: Commercial Consumption- None, Local consumption- None, Poaching- None, Pet trade- None, Wildlife trade- None.
Threats: Unknown.
Recommended conservation measures in Kerala: Conservation of coastal wetlands, seashore and mudflats.
Conservation priority area in Kerala: Moderate.
BMC responsible for conservation and sustainable utilization: Local governing bodies of Coastal region of Kannur, Kozhikode, Malappuram, Thrissur, Ernakulam, and Alappuzha districts.
Stake holders responsible for conservation and sustainable utilization: Land owners, Kerala Forests and Wildlife Department, Local governing bodies.

References:
Sashikumar, C., Praveen J., M. J. Palot, & P. O. Nameer (2011) Birds of Kerala: status and distribution. 1–835. DC Books. Kottayam, Kerala.

SoIB 2020. State of India's Birds factsheet: Great Knot Calidris tenuirostrishttps://www.stateofindiasbirds.in/species/grekno/.
Accessed on 2020-07-06

Indian Eagle Owl
***Bubo bengalensis* (Franklin, 1831)**
Regional Redlist: VU B1, B2
Global Redlist (IUCN): LC



Local Names (Malayalam): കൊമ്പൻ മൂങ്ങ
Distribution: Global: Indian Subcontinent (except Sri Lanka) north to foothills of Himalayas.
India: Resident, outer ranges of S Kashmir, along outer Himalayas and adjacent plains, Bihar and western Bengal and throughout Peninsula.
Kerala: Rare resident. As the suitable habitat is scarce in the state, it is very rare.
Habitat/Ecology: Dry rocky country, abandoned quarries.
Conservation Status: WPA (1972)- Schedule-IV, IUCN Redlist Status- Least Concern, Regional Redlist- Vulnerable, CITES- Appendix II.
Population trend in Kerala Since 2000: Long Term Decline: Uncertain, Short Term Decline: Uncertain.

Regional Redlist Assessment
Indian Eagle Owl is a rare resident of dry rocky habitat. As the suitable habitat is scarce in the state, it is considered to be very rare (Sashikumar et al. 2011). Its status in Kerala is uncertain over the years (Data deficient), so criteria A is not evaluated. Its EOO is only about 1,000 sq.km while its AOO is not more than 125 sq.km- both within the thresholds of Vulnerable and meeting the two sub-criterias (number of locations > 10, no extreme fluctuations). Hence the category of threat is Vulnerable (Criteria B1 and Criteria B2). The number of mature individuals in Kerala is not estimated. The global population trend is stable (Birdlife International, 2021) but the rate of destruction of rocky hills and barren habitats are happening at a great pace within the state, also the number of illegal quarries working in the state is very high recently. Hence, the regional status does not require any correction.
Geographic/Habitat of sustainable population in Kerala: Dry rocky hills of Palakkad district.
Level of Exploitation: Commercial Consumption- None, Local consumption- None, Poaching- None, Pet trade- None, Wildlife trade-Though no trade known from Kerala for this species, it is under widespread trade across India.
Threats: Wildlife trade?
Recommended conservation measures in Kerala: Conservation of dry rocky scrub habitat, and strict enforcement of Wildlife Protection Act to curb illegal trade.
Conservation priority area in Kerala: Moderate.
BMC responsible for conservation and sustainable utilization: Kerala Agricultural University (Mannuthy), Chinnar WLS, Palakkad Forest Division.
Stake holders responsible for conservation and sustainable utilization: Kerala Forests and Wildlife Department, KAU.

References:

Sashikumar, C., Praveen J., M. J. Palot, & P. O. Nameer (2011) Birds of Kerala: status and distribution. 1–835. DC Books. Kottayam, Kerala
BirdLife International (2021) Species factsheet: Bubo bengalensis. Downloaded from http://www.birdlife.org on 16/01/2021.

Least concern
Malabar Lark
***Galerida malabarica* (Scopoli, 1786)**
Regional Redlist: LC
Global Redlist (IUCN): LC

Local Names (Malayalam): കൊമ്പൻ വാനമ്പാടി
Distribution: Global: South-eastern Gujarat and Western Ghats, also reported from south-western Gujarat.

India: South-eastern Gujarat and Western Ghats, also reported from south-western Gujarat.
Kerala: Resident. Patchily distributed across northern and central Kerala in suitable habitats.
Habitat/Ecology: Fallow paddy fields, lateritic plains with grass and scrub, and grassy hillside.
Conservation Status: WPA (1972)- Schedule-IV, IUCN Redlist Status- Least Concern, Regional Redlist- Least Concern.
Population trend in Kerala Since 2000: Long Term Decline: Uncertain, Short Term Decline: Uncertain.
Geographic/Habitat of sustainable population in Kerala: Lateritic plains and wetlands of northern Kerala. Kole wetlands of Malappuram and Thrissur districts, hillocks of Palakkad district, Nedumbassery wetlands and HMT estate of Ernakulam district.
Level of Exploitation: Commercial Consumption- None, Local consumption- None, Poaching- None, Pet trade- None, Wildlife trade- None.
Threats: Habitat loss.
Recommended conservation measures in Kerala: Conservation of open grassland and fallow land in the coastal and midlands.
Conservation priority area in Kerala: Moderate.
BMC responsible for conservation and sustainable utilization: Local governing bodies of Coastal and Midland regions of districts north of Kottayam.
Stake holders responsible for conservation and sustainable utilization: Land owners, Kerala Forests and Wildlife Department, Local governing bodies.

White-bellied Sea Eagle
***Haliaeetus leucogaster* (J.F. Gmelin, 1788)**
Regional Redlist: LC
Global Redlist (IUCN): LC

Local Names (Malayalam):
വെള്ളവയറൻ കടൽപ്പരുന്ത്
Distribution: Global: India and Sri Lanka through South East Asia, Andaman Is and southern China, Sunda Is, Philippines, Wallacea, New Guinea and Bismarcks to Australia and Tasmania.
India: Resident along the coasts, also in Andaman & Nicobar Is.
Kerala: Uncommon resident. Thinly distributed along the coastline from the north to south till Mahe. Stray observations from the coast and inland waterbodies till south.
Habitat/Ecology: Sea coast, occasionally recorded at inland waterbodies.
Conservation Status: WPA (1972)- Schedule-I, IUCN Redlist Status- Least Concern, Regional Redlist- Least Concern, CITES- Appendix II, CMS- Appendix II.
Population trend in Kerala Since 2000: Long Term Decline: Uncertain, Short Term Decline: Uncertain.
Geographic/Habitat of sustainable population in Kerala: Coastline from the north to south till Mahe where it known to breed.
Level of Exploitation: Comme ` rcial Consumption- None, Local consumption- None, Poaching- None, Pet trade- None, Wildlife trade- No information.
Threats: Loss of nest trees.
Recommended conservation measures in Kerala: Identification of nest trees, offering incentive to the landowners of nest trees, nest monitoring.
Conservation priority area in Kerala: Moderate.
BMC responsible for conservation and sustainable utilization: Local governing bodies of Coastal region north of Mahe.
Stake holders responsible for conservation and sustainable utilization: Land owners, Kerala Forests and Wildlife Department, Local governing bodies.
Cultural significance and associated traditional knowledge: Mentioned in the folklore of fishermen community for its 'magical power' in catching sea snakes. Its large nest on large trees in the coastal area used traditionally for decades attracts local attention.

References:
Palot, Mohamed Jafer 2011. Status and conservation of White-bellied Sea-eagle, Haliaeetus leucogaster (Gmelin). Status of Indian birds and their conservation: First International Conference on Indian Ornithology (ICIO) - 2011. 267. Salim Ali Centre for Ornithology and Natural History. Coimbatore, India.

REPTILES

Nilssonia leithii © KA Subramanian

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Introduction

Among the terrestrial vertebrates, reptiles are the most species-rich group with more than 11,000 species in the world (Uetz et al., 2021). The reptile fauna of India is unique in its diversity and endemicity.They have a zoogeographical affinity more towards Oriental region, as well as others, showing close relationship to the Indo-Malayan region. India has more than 250 years of history in studies of reptilian fauna with a diversity of more than 572 species (Aengals et al., 2018). Kerala, with its long coastline and the toporgaphiclly complex hills of the southern and central Western Ghats, harbours exceptional reptilian diversity. Although there have been several attems to study the reptile diversity of Kerala during the colonial and post-colonial periods (e.g. Beddome 1870, 1878; Boulenger 1887, 1890, 1893; Ferguson, 1895; Wall, 1905, 1918; Annandale, 1909; Murthy, 1981; Inger et al. 1984; Radhakrishnan, 1996, 1997; Thomas et al. 1997; Zacharias, 1997; Easa, 1998; Ajith, 1998; Abraham et al. 1999; Palot & Radhakrishnan, 2002, 2003, 2004; Easa & Ramachandran 2004; Jahas & Easa 2008, Cyriac et al. 2018, 2020; Cyriac & Umesh, 2011, 2014, Chaithanya et al., 2019), reptiles remain one of the least known vertebrate classes.

The snakes of Kerala in Malayalam language by Adiyodi (1965), was the first published book pertaining to the snakes of the State. The first comprehensive checklist on the reptilian fauna of the State was compiled by Radhakrishnan (1997), who listed 169 species. Subsequently, Palot & Radhakrishnan (2003) compiled a checklist with vernacular names of snakes of Kerala. Further, as part of biodiversity documentation, Kerala Forest Research Institute (KFRI) published a series of checklists on the biodiversity of the State including reptiles (Easa & Ramachandran, 2004). More recently, Palot (2015) updated a checklist of reptiles of Kerala by listing 173 species from the region. A recent estimate from the State showed that a total of 202 species of reptiles classified under 24 families belonging to 3 orders (Palot, 2021, In press). Now the updated list consists of two species of crocodiles, 12 species of turtles and tortoises, 75 species of lizards and 112 species of snakes. Of these, 109 species (54%) are endemic to the Western Ghats, which include 14 species endemics to the geographical boundary of Kerala. One species of crocodile (Estuarine crocodile, *Crocodylus porosus*) has been extirpated from the coastal habitats of Kerala.

Threatened taxa

Reptiles generally have narrower distributional ranges than other vertebrates such as birds and mammals making them more susceptible to threat processes (Anderson and Marcus, 1992; Chapple et al., 2021). Nearly one in five reptilian species are threatened with extinction, with another one in five species categorized as Data Deficient (Böhm et al. 2013). In India, there is limited information on the population trends and conservation ststus of most reptile species, and no Indian reptile is known to have become 'extinct' in recent times. However, there are clear signs of population decline in many larger reptile species. For instance, the estuarine crocodile that once had a wide distribution in Peninsular India is now extinct in most of its older ranges, including Kerala. Thus, highlighting the urgent need to collect basic natural history and ecological data on Indian reptiles and reassess their conservation status.

The last IUCN assessment of the region (Srinivasulu et al., 2014), documented 53 species of threatened or data deficient reptiles from the state of Kerala, which included one 'Critically Endangered', 13 'Endangered', 10 'Vulnerable', and 7 'Near Threatened' species. The assessment also listed 23 species as 'Data Deficient' according to the IUCNs categorization. All the marine turtle species repored from the coastal waters of Kerala viz. Leatherback Sea Turtle *(Dermochelys coriacea),* Hawksbill Sea Turtle *(Eretmochelys imbricata),* Green Sea Turtle *(Chelonia mydas)* and the Olive Ridley Turtle *(Lepidochelys olivacea)* are endangered. The very rapidly deteriorating status of endemic tortoises and freshwater turtles in India has resulted in an increasing number of these species being listed as threatened. Species such as the Cochin Cane Turtle *(Vijayachelys silvatica),* the Travancore Tortoise *(Indotestudo travancorica),* Giant Softshell Turtle *(Pelochelys cantorii)* and the Leith's Softshell

Turtle *(Nelsonia leithii),* are globally threatened species. Charismatic species such as the King Cobra *(Ophiophagus hannah)* have been classified as 'Vulnerable' by the IUCN Redlist (2010) due to drastic decline in its population across many parts of its range. However, many lesser-known species such as Uropeltid snakes (Shieldtails), geckos and skinks have very narrow geographical ranges, and their status is not yet ascertained and listed in data deficient category of the IUCN Redlist. In light of new data collected by us over several years, we here reassess the conservation status of the reptiles of Kerala, and identify potential threats to species in the region..

Methodology

In the present work, we attempted to assess or reassess the conservation status of the reptiles of Kerala following the IUCN criteria. We enlist potential threatened species by assessing its status in the state of Kerala based on our data collected over several herpetological surveys conducted over the years, published literature, and verifying observations by other herpetologists of the region. We assessed the conservation status of each species listed in the checklist of reptiles of Kerala (Palot, 2015), and few additional species that were recently described from the State. The conservation status of species were based on rarity, endemicity, taxonomic distinctiveness, threats to its habitat, conservation status of the species in IUCN Redlist and Indian Wildlife (Protection) Act of 1972 from the region. The data accumulated over 25 years of herpetological research in the Western Ghats part of Kerala by the regional centre of ZSI (Kozhikode) is also considered for the finalisation of the list. Since the data on the distribution and status of many of the newly described species are lacking, most of them are listed in the 'Data Deficient' category of the IUCN. The marine turtles and seas snakes are not included for the present assessment.

Results

As per the last IUCN assessment (2014), 25 species of terrestrial or freshwater reptilian fauna of Kerala are globally threatened, which included 9 Endangered, 9 Vulnerable and 7 species in Near Threatened category. In the present work, we assessed the conservation status of the 188 species of terrestrial and freshwater reptilian fauna of Kerala. Based on our assessment of the distribution and threats to each species we identified 54 potential threatened species in Kerala, of which one Critically Endangered, 16 species can be considered Endangered, 20 species as Vulnerable and 17 species as Near Threatened. We found that there is insufficient data to assess conservation status for a large majority of species (66 species), which we classified as Data Deficient and also treated 68 species as least concern. We also updated the conservation status of several species assessed by Srinivasulu et al. (2014), based on addition data. For instance, we consider Kaestlea palnica, Plectrurus guentheri, Uropeltis rubrolineata and Trimeresurus strigatus, which were classified as Least Concern or Data Deficient by Srinivasulu et al. (2014), to be Endangered. Similarly, we treat Uropeltis beddomii, U. myhendrae and Rhinophis sanguines, which were considered as Least Concern or Data Deficient by Srinivasulu et al. (2014), as Vulnerable species. .

Threatened species of Terrrestral/ freshwater Reptiles of Kerala along with assessment of their conservation status.

Sl.no.	English name	Species name	IUCN status 2013	Ende-mic	WPA	Remarks	Kerala Status
I. ORDER CROCODYLIA							
1. Family Crocodylidae (crocodiles)							
1	Mugger Marsh Crocodile	*Crocodylus palustris*	VU		Sch. I	Widely distributed across India. It has a patchy distribution in Kerala with reports from Kabini in Wayanad and around Athirapalli and Parambikulam WLS. Captive populations were released in Neyyar WLS and Peruvannamuzhi as part of a captive breeding program established in 1977.	VU
II. ORDER TESTUDINES							
2. Family Geoemydidae (turtles & terrapins)							
2	Cochin Forest Cane Turtle	*Vijayachelys silvatica*	EN	WG	Sch. I	This is a very rare species with a very patchy distributed in semi-evergreen and evergreen forests of Kerala, Tamil Nadu and Karnataka. Population estimations have indicated very low densities possibly due to its crepuscular habits (Kanagavel et al., 2013).	EN
3	Indian Black Turtle	*Melanochelys trijuga*	NT			The most common freshwater turtle throughout Kerala. it is extensively poached for meat in many localities. Populations in Kerala appear to be stable and can be considered as Least Concern within the state.	LC
5. Family Testudinidae (tortoises)							
4.	Indian Star Tortoise	*Geochelone elegans*	VU		Sch. IV	Recorded from the drier regions of Kerala, but widely distributed in India. Extensively collected from the wild for pet trade.	VU
5	Travancore Tortoise	*Indotestudo travancorica*	VU	WG	Sch. IV	A widely distributed species in semi-evergreen and evergreen forests of the Western Ghats in Kerala, Tamil Nadu and Karnataka, extensively poached for local consumption and also threatened by forest-fires. Considering these threats, Kanagavel & Raghavan (2013), suggested that the conservation	EN

						status of this species be elevated to Endangered.	
6. Family Trionychidae (softshell turtles)							
6	Leith's Softshell Turtle	*Nilssonia leithii*	CR		Sch. IV	Few isolated records in Kerala but distributed across Peninsular India. It was recently elevated from Vulnerable to Critically Endangered.	CR
7	Indian Flapshell Turtle	*Lissemys punctata*	VU		Sch. I	Locally common across Kerala but severely hunted for meat and is part of the pet trade. Recently elevated from Least Concern to Vulnerable based on new data on the species.	VU
8	Asian Giant Softshell Turtle	*Pelochelys cantorii*	EN		Sch. I	A widespread species in South and Southeast Asia but with a very patchy distribution. This species is threatened by poaching and degradation of wetland and river habitats.	EN
9	Narrow-headed Softshell Turtle	*Chitra indica*	EN		Sch. IV	A single record from the estuarine areas of Valapattanam river in Kannur district (Palot & Murthy, 2015). Highly threatened due to habitat degradation and poaching.	EN
III. ORDER SQUAMATA							
7. Family Agamidae (lizards)							
10	Common Green Forest Lizard	*Calotes calotes*	NE			It is common in most low to mid-elevation forests.	LC
11	Large-scaled Forest Lizard	*Calotes grandisquamis*	LC	W G		Wide, but highly patchy distribution in Kerala and Tamil Nadu. The species is an arboreal lizard restricted to semi-evergreen and evergreen forests, thus, is likely to be threatened by habitat fragmentation (Ishwar et al. 2003), can be considered as Near Threatened.	NT
12	Nilgiri Forest Lizard	*Calotes nemoricola*	LC	W G		Wide but highly patchy distribution.	DD
13	Indian Garden Lizard	*Calotes versicolor*	NE			Common throughout India and in Kerala.	LC
14	Montane Forest Lizard	*Monilisaurus montanus*	NE	W G		This is a recently described species, and is known only from	DD

						high elevation forests in four locations in the Western Ghats.	
15	Spiny-headed Forest Lizard	*Monilisaurus acanthocephalus*	NE	WG		This is a recently described species, and is currently known only from high elevation forests of Meghamalai hills.	DD
16	Roux's Forest Lizard	*Monilisaurus rouxii*				Patchy but wide distribution in the Western Ghats.	LC
17	Elliots Forest Lizard	*Monilisaurus ellioti*	LC	WG		Patchily distributed over Kerala, Tamil Nadu and Karnataka. Could consider elevating the conservation status to Near Threatened	NT
18	Orange-lipped Forest Lizard	*Microauris aurantolabium*	NE	WG		Known only from the Agasthyamalai hills. There is not enough data to assess its status .	DD
19	Anamalai Spiny Lizard	*Salea anamallyana*	LC	WG		Widely distributed in the highland montane shola grassland ecosystem in Anamalais. It is threatened by habitat fragmentation and encroachment of plantations, can be considered as Near Threatened.	NT
20	Horsfield's Spiny Lizard	*Salea horsfieldii*	LC	WG		A high altitude species restricted to the Nilgiri hills of Kerala and Tamil Nadu. Could consider elevating the conservation status to Near Threatened	NT
21	Indian Kangaroo Lizard	*Agasthyagama beddomei*	EN	WG		Mostly restricted to low-land forests in the southern Western Ghats.	EN
22	Blanford's Rock Agama	*Psammophilus blanfordanus*	LC			Reported from Thenmala in Shendurney WLS (Annandale, 1909). Reports needs confirmation.	LC
23	South Indian Rock Agama	*Psammophilus dorsalis*	LC			Widely distributed and common across Peninsular India and across Kerala.	LC
24	Fan-throated Lizard	*Sitana marudhamneydhal*	NE			This is a recently described species. Currently Known from the sand dune beaches of southernmost coast of Thiruvananthapuram district.	DD
25	Southern Flying Lizard	*Draco dussumieri*	LC			Widely distributed in the Western Ghats but is thought to be have multiple cryptic species.	LC

8. Family Chamaeleonidae (chamaeleons)							
26	Indian Chamaeleon	*Chamaeleo zeylanicus*	NE		Sch. II	Widely distributed in the drier regions of India. It has a patchy distribution in Kerala and is known from the drier regions of Palakkad.	DD
9. Family Gekkonidae (geckoes)							
27	Aaronbauer's Day Gecko	*Cnemasppis aaronbaueri*	NE	WG		This species is restricted to the Agasthyamalai Hills of Kerala and Tamil Nadu.	DD
28	Anamudi Day Gecko	*Cnemaspis anamudiensis*	NE	WG		This species is currently known only from montane shola forests of Pettimudi in Anamudi reserve forest, Anamudi Shola NP in Idukki district of Kerala.	DD
29	Beddome's Day Gecko	*Cnemaspis beddomei*	DD	WG		This species is restricted to the Agasthyamalai Hills and is confidently recorded from few locations in Ponmudi and Peppara Wildlife Sanctuary of Kerala.	DD
30	Chengodumala Day Gecko	*Cnemaspis chengodumalensis*	NE			A recently described species from the midland hillocks of Kozhikode. It is currently under severe threat from illegal quarrying in these hills. Assuming a 50 km square area for each location, the estimated area of occupancy (AOO) would be < 200 km square. Given the narrow distribution (< 5 localities) and the threat from habitat loss, the conservation status can be considered as Endangered.	EN
31	Indian Day Gecko	*Cnemaspis indica*	VU	WG		Has a restricted distribution and is known from the Nilgiri hills. In Kerala, there is confirmed reports only from Sispara in Silent Valley NP.	VU
32	Slender Day Gecko	*Cnemaspis gracilis*				Distributed in the few dry localities in Kerala and Tamil Nadu.	LC3
33	Kottiyur Day Gecko	*Cnemaspis kottiyoorensis*	NE	KL		Known from six localities in evergreen forests of Kerala and Karnataka (Cyriac et al., 2020). Given the restricted distribution and the small area of occupancy (assuming 50 km square for each	VU

						locality), the species can be considered as Vulnerable.	
34	Coastal Day Gecko	*Cnemaspis littoralis*	DD	W G		This is a widespread gecko in the coastal areas and drier regions of Kerala.	LC
35	Agasthya mala Day Gecko	*Cnemaspis maculicollis*	NE	W G		The species is currently known from Pandimotta in Shendhurney WLS (Cyriac et al., 2018) but is presumed to have a wider distribution in Agasthyamalai hills.	DD
36	Mountain Day Gecko	*Cnemaspis monticola*	DD	KL		Known only from the type specimens collected from Wayanad, Kerala (Manamendra-Arachchi et al., 2007).	DD
37	Ponmudi Day Gecko	*Cnemaspis nairi*	LC	W G		This species is known only from the Agasthyamalai hills of Kerala.	DD
38	Nilgiri Day Gecko	*Cnemaspis nilagirica*	NT	W G		This species was recently rediscovered after about 130 years and is currently known only from the higher reaches of Thudukki and Sispara in Silent Valley NP (Cyriac et al., 2019). Given its restricted range (3 localities) in high elevation forests in the Nilgiri hills, It can be considered as Endangered.	EN
39	Ornate Day Gecko	*Cnemaspis ornata*	NT	W G		Known only from the Agasthyamalai hills of Kerala and Tamil Nadu.	DD
40	Palakkad Day Gecko	*Cnemaspis palakkadensis*	NE	W G		A recently described species. Known only from lowland moist deciduous and semi-evergreen forests of Anakkal reserve forest in Palakkad district.	DD
41	Mysore Day Gecko	*Cnemaspis mysoriensis*	LC	W G		This species is common in human habitations and rocky outcrops of Bangalore and Mysore. However, record from Kerala is likely erroneous.	LC
42	Sispara Day Gecko	*Cnemaspis sisparensis*	NT	W G		Described from Sholakkal (now Cholakkal in Malappuram district) at the base of Sispara Ghat. Recently ttwo other species *Gonatodes bireticulatus* and *Cnemaspis anaikattiensis* are synonymized with C. *sisparensis*.	DD

43	Wayanad Day Gecko	*Cnemaspis wynadensis*	EN	KL		This species is currently known only from few localities in Wayanad.	DD
44	Zacharia's Day Gecko	*Cnemaspis zacharyi*	NE	WG		This is a recently described large-sized gecko species from Kerala. This species has mostly been observed outside protected areas, where its habitat is under threat from conversion of forest areas into plantations.	NT
45	Kollegal Ground Gecko	*Cyrtodactylus cf. collegalensis*	LC			This species is recently split into multiple species.	DD
46	Four-clawed Gecko	*Gehyra mutilata*	NE			A widely but patchily distributed gecko In India, Sri Lanka, south China, Japan, south-east Asia, Australia, Oceania, Madagascar and Masacrene Islands.	LC
47	Janaki's Dravidogecko	*Dravidogecko janakiae*	NE	WG		Recently described from Munnar hills, Idukki district.	DD
48	Smith's Dravidogecko	*Dravidogecko smithi*	NE	WG		Recently described from Ponmudi hills, Thiruvananthapuram	DD
49	Wayanad Dravidogecko	*Dravidogecko septentrionalis*	NE	WG		Recently described from Wayanad hills.	DD
50	Common Spotted Gecko	*Hemidactylus parvimaculatus*	NE			A widely distributed gecko found in the southern parts of India and Sri Lanka (Lajmi et al., 2016).	LC
51	Travancore Rock Gecko	*Hemidactylus paaragowli*	NE	WG		This species is currently known only from low to mid-elevation forests in Ambanad, Achankovil, and Devarmalai-Sivagiri Hill in Kollam, Kerala (Srikanthan et al., 2018). Given the very small restricted range of the species, it can be considered as Vulnerable.	VU
52	Prashad's Gecko	*Hemidactylus prashadi*	LC	WG		This species is highly adaptable and has recently started colonizing human habitations in Kerala.	LC
53	Asian House Gecko	*Hemidactylus frenatus*	LC			Widely distributed species across India.	LC

54	Bark Gecko	*Hemidactylus leschenaultii*	LC			Has a wide distribution in India but a patchy distribution in Kerala.	LC
55	Muray's Day Gecko	*Hemidactylus murrayi*	NE			A few reports from Kerala. previously synonymized with *H. brooki* but revalidated by Lajmi et al. 2016.	DD
56	Termite Hill Gecko	*Hemidactylus triedrus*	NE			Known from the drier regions of Kerala, Tamil Nadu, Telangana and Andhra Pradesh.	DD
11. Family Lacertidae (lacertas)							
57	Leschenault's Lacerta	*Ophisops aculateltia*	NE			Patchy in distribution in Peninsular India. In Kerala, common in Chinnar WLS.	DD
58	Beddome's Lacerta	*Ophisops beddomei*	LC			Earlier records. No recent reports from the state.	LC
10. Family Scincidae (Skinks)							
59	Blue-bellied Tree Skink	*Dasia subcaerulea*	EN	WG		Isolated records from Bodinaikanur in Madurai and Kudremukh in Karnataka. One unconfirmed report from Periya in Wayanad, Kerala.	DD
60	Allapalli Grass Skink	*Eutropis allapallensis*	LC			A widespread species recorded from several localities in peninsular India.	LC
61	Beddome's Grass Skink	*Eutropis beddomii*	NE			A widely distributed skink throughout Peninsular India and Sri Lanka.	LC
62	Bibron's Seashore Skink	*Eutropis bibronii*	LC			Widely distributed on the eastern coast of Peninsular India from Orissa to Kanyakumari in Tamil Nadu, and in Sri Lanka.	LC
63	Gunther's Grass Skink	*Eutropis brevis*	NE	WG		This species is known to be distributed throughout the wet forests of the southern Western Ghats of Kerala and Tamil Nadu.	DD
64	Common Keeled Skink	*Eutropis carinata*	LC			This is a widespread species distributed throughout the Indian subcontinent.	LC
65	Mountain Skink	*Eutropis clivicola*	EN	KL		This species was described from Ponmudi hills in Kerala. Given its wide but patchy distribution (10 localities), the species can be considered as Vulnerable.	VU
66	Bronze Grass Skink	*Eutropis macularia*	NE			A widespread species in the Indian subcontinent.	LC

67	Dawson's Grass Skink	*Eutropis dawsoni*		W G		This species is restricted to the evergreen forests patches below the Shencottah gap in Kerala and Tamil Nadu.	DD
68	White-spotted Supple Skink	*Riopa albopunctata*	NE			Has a wide distribution across the Indian Subcontinent but few authentic records from Kerala.	DD
69	Spotted Supple Skink	*Riopa aculate*	NE			Common throughout the Indian subcontinent	LC
70	Gunther's Supple Skink	*Riopa guentheri*	LC			Known from the Travancore region of Kerala ,but widely distributed in other parts of Peninsular India.	DD
71	Beddome's Cat Skink	*Ristella beddomii*	LC	W G		A widely distributed species from the central and southern Western Ghats of Karnataka, Kerala and Tamil Nadu.	LC
72	Günther's Cat Skink	*Ristella guentheri*	DD	W G		This species is restricted to south of the Palakkad gap in the southern Western Ghats of Kerala and Tamil Nadu. Reports of this species from Wayanad need confirmation.	DD
73	Rurk's Cat Skink	*Ristella rurkii*	DD	W G		This species has a restricted distribution in the Anamalai and Palni hills of Kerala and Tamil Nadu. In Kerala, this species is found in high-elevation evergreen and shola forests of Parambikulam, Marayoor (VPC Pers. Obs.), Anamudi Shola NP, Pambadum Shola NP and Eravikulam NP.	VU
74	Travancore Cat Skink	*Ristella travancorica*	DD	W G		Restricted to the Southern WG of Kerala and Tamil Nadu.	DD
75	Beddome's Ground Skink	*Kaestlea beddomii*	LC	W G		This species shows a wide but patchy distribution in the central and southern WG of Karnataka, Kerala and Tamil Nadu.	DD
76	Two-lined Ground Skink	*Kaestlea bilineata*	LC	W G		This species is restricted to the high-altitude evergreen and shola-grassland habitats of the Nilgiri hills of Kerala and Tamil Nadu. Although, this species is common in high-altitude forests of this range, it is under threat from human encroachment in to	VU

						shola-grassland habitats. Given the low EOO and the restricted distribution, this species can be listed as Vulnerable.	
77	Side-spotted Ground Skink	*Kaestlea laterimaculata*	VU	WG		This species is widely distributed in the southern WG of Kerala and Tamil Nadu. Given its wide distribution in Kerala and other parts of Tamil Nadu, this species can be considered as Near Threatened.	NT
78	Travancore Ground Skink	*Kaestlea travancorica*	LC	WG		Widely distributed south of the Palakkad gap in the southern WG of Kerala and Tamil Nadu. Given its restricted distribution to high-elevation forests of Kerala and Tamil Nadu, this species can be considered as Vulnerable	VU
79	Palni Hills Ground Skink	*Kaestlea palnica*	DD	WG		This species has a highly restricted range to the high-altitude shola grasslands of Anamalai and Palni Hills of Kerala and Tamil Nadu. However, given the highly restricted distribution range (5 confirmed locations) and an estimated AOO of 250 km square (assuming 50 km square at each location), this species can be considered as Endangered.	EN
80	Dussumier's Litter Skink	*Sphenomorphus dussumieri*	LC	WG		A very common skink from the lowland forests of Kerala.	LC
81	Earless Skink	*Chalcides pentadactylus*	DD	KL		This species was described from Kadalundi in Beypore, Kozhikode dt.	DD
12. Family Varanidae (monitor lizards)							
82	Bengal Monitor	*Varanus bengalensis*	LC		Sch. I	Distributed throughout India and across most forested areas of Kerala. This species is common in most of its range in Kerala but is extensively hunted for its meat.	NT
Suborder: Serpentes							
13. Family Typhlopidae (worm snakes)							
83	Brahminy Worm Snake	*Indotyphlops braminus*	NE		Sch. I	Widespread species. Should be in Least concern category	LC

84	Beaked Worm Snake	*Grypotyphlops acutus*	LC		Sch. IV	Widely distributed in the drier regions across Kerala.	LC
14. Family Gerrhopilidae (worm snakes)							
85	Thurston's Worm Snake	*Gerrhopilus thurstoni*	DD	WG	Sch. IV	Historically known from only few specimens from Wayanad, Nilgiris, Thrissur and Cochin.	DD
86	Tindall's Worm Snake	*Gerrhopilus tindalli*	DD	WG	Sch. IV	Historically reported from Nilambur in Kerala and Pillur in Tamil Nadu	DD
87	Beddome's Worm Snake	*Gerrhopilus beddomii*	DD	WG	Sch. IV	No recent report from the region.	DD
15. Family Uropeltidae (shieldtails)							
88	Pied-belly Shieldtail	*Melanophidium punctatum*	LC	WG	Sch. IV	This species was thought to be widely distributed throughout the Western Ghats but a recent taxonomic revision of the genus has found *Melanophidium punctatum* to be restricted to the Southern Western Ghats of Kerala and Tamil Nadu.	NT
89	Yellow-striped Shieldtail	*Melanophidium bilineatum*	VU	WG	Sch. IV	This species has a highly restricted distribution This species is threatened by the extensive road network and fragmentation of forested areas in its range and several road killed specimen have been observed. Given the highly restricted distribution of this species (< 5 localities), the species can be considered as Endangered.	EN
90	Wayanad Shieldtail	*Melanophidium wynaudense*	LC	WG	Sch. IV	Recent studies show the presence of cryptic species within this group and the status of this species needs to be reevaluated	DD
91	Three-lined Shieldtail	*Platyplectrurus trilineatus*	DD	WG	Sch. IV	This species is known from high elevation forests of the Anamalai and Shembaganur in Palni Hills of Kerala and Tamil Nadu. In Kerala, It is known from Munnar in Idukki.	DD
92	Three-lined Shieldtail	*Platyplectrurus madurensis*	EN	WG	Sch. IV	This species has a very restricted distribution in high elevation forests above 1800 m ASL of the Anamalai and Palni Hills of Kerala and Tamil Nadu. It is one	EN

						of the most common species in Kodaikanal. In Kerala, it has been reported from Nemmakadu in Munnar, Pambadumshola NP and Mannavanchola NP.	
93	Western Shieldtail	*Teretrurus sanguineus*	LC	WG	Sch. IV	Although distributed throughout the central and southern WG of Kerala and Tamil Nadu, recent phylogenetic analysis indicates the presence of multiple cryptic species. Thus, restricting the range of *T.sanguineus* to the Anamalai hills. However, there is insufficient data on the range and population status of this species and it should be listed as Data Deficient.	DD
94	Wall's Shieldtail	*Teretrurus rhodogaster*	LC	WG	Sch. IV	We doubt this species occurs in Kerala. Most recorded specimens are from Shembaganur in Kodaikanal. Possibilities are from the higher reaches of Kurinjimala WLS in Idukki district. It should be treated as Data Deficient	DD
95	Golden Shieldtail	*Plectrurus aureus*	DD	KL	Sch. IV	This species is only known from historical specimens collected from Chembra peak in Wayanad. However, recent surveys to the region have not been able to locate this snake.	DD
96	Purple Shieldtail	*Plectrurus guentheri*	DD	WG	Sch. IV	This species is restricted to high-altitude forests of the Nilgiris in Kerala and Tamil Nadu. In Kerala it is reported only from Walakkad and Sispara in Silent Valley NP where it is rarely encountered. This species is under threat from degradation of forests and human encroachment into shola-grassland habitats. Given the highly restricted geographic range (< 5 localities), this species can be considered as Endangered.	EN
97	Perrotet's Shieldtail	*Plectrurus perroteti*	LC	WG	Sch. IV	This species is one of the most common snakes in high-altitude regions the Nilgiris of Kerala and Tamil Nadu.	LC

98	Elliot's Shieldtail	*Uropeltis ellioti*	LC		Sch. IV	This species has a wide distribution throughout forested regions of Peninsular India and is likely a species complex. Its occurrence in Kerala is doubtful and is likely due to misidentification	LC
99	Cochin Shieldtail	*Uropeltis nitida*	DD	KL	Sch. IV	This species is reported from Nelliampathi hills in Palakkad and from Parambikulam WLS (VPC Pers. Obs).	DD
100	Nilgiri Shieldtail	*Uropeltis ocellata*	LC	W G	Sch. IV	This species is reported to be one of the most commonly found uropeltid snakes in evergreen forests of the Nilgiri hills in Kerala and Tamil Nadu, north of the Palakkad gap. However, this species belongs to a larger species complex	DD
101	Beddome's Shieldtail	*Uropeltis beddomii*	DD	W G	Sch. IV	This species is reported from the slightly drier regions of Anamalai hills of Kerala and Tamil Nadu. It is known to be found in agricultural landscapes in this region and is thus under threat from extensive land use changes.	VU
102	Anamalai Shieldtail	*Uropeltis macrorhyncha*	DD	W G	Sch. IV	Not much data is available on the species from Kerala. Data deficient	DD
103	Black-bellied Shieldtail	*Uropeltis woodmasoni*	LC	W G	Sch. IV	Although reported to be common in the Palni hills (Kodaikanal), there are no recent reports of this species from Kerala.	DD
104	Kerala Shieldtail	*Uropeltis ceylanicus*	LC		Sch. IV	This species belongs to a large species complex and the current status needs to be revaluated.	DD
105	Periyar Shieldtail	*Uropeltis arcticeps*	LC	W G	Sch. IV	This species belongs to a large species complex and the current status needs to be revaluated.	DD
106	Red-spotted Shieldtail	*Uropeltis rubromaculatus*	LC	W G	Sch. IV	This species in known from high-elevation forests of the Anamalai Hills of Kerala and Tamil Nadu.	DD
107	Red-lined Shieldtail	*Uropeltis rubrolineata*	LC	W G	Sch. IV	This species is reported from the Agasthyamalai hills of Kerala and Tamil Nadu (KMTR). It is threatened by extensive vehicular movement and tourism	EN

						activities in this region. Given the highly restricted distribution of the species within the Agasthyamalai hills of Kerala and Tamil Nadu (5 localities) and an estimated Area of Occupancy of < 500 km square, this species can be considered as Endangered.	
108	Barred Shieldtail	*Uropeltis myhendrae*	DD	W G	Sch. IV	This species is fairly common in most of its range and is threatened by forest fragmentation and the extensive road network within its range The habitat of this species is also being degraded by extensive rubber plantations. Given its wide but patchy distributional range (<10 localities), this species can be considered as Vulnerable.	VU
109	Red- sided Shieldtail	*Uropeltis maculata*	LC	W G	Sch. IV	This is a common species in high-elevation forests of the Anamalai hills above 1800m ASL. Given its restricted range (6 localities) and the degradation of high-elevation shola grassland forests within its habitat, this species can be considered as Vulnerable	VU
110	Madura Shieldtail	*Uropeltis madurensis*	LC	W G	Sch. IV	This species is found in mid to high elevation forested regions of the cardamom hills in Kerala and Tamil Nadu. It is common in its range and is also seen in plantations. Considering its restricted range, it can be considered Vulnerable.	VU
111	Peter's Shieldtail	*Uropeltis petersi*	DD	W G	Sch. IV	This species is known from a type series of 6 specimens (Pyron et al. 2016), all collected from forests above Pollachi in the Anamalai hills at 4000ft (ca 1200m) ASL.	DD
112	Ashambu Shieldtail	*Uropeltis liura*	DD	W G	Sch. IV	A very common snake found in high elevation evergreen forests of the Agasthyamalai hills of Tamil Nadu.	DD
113	Palni Shieldtail	*Uropeltis pulneyensis*	LC	W G	Sch. IV	This is a common species in high-elevation forests above	NT

						1800m ASL of Anamalai and Palni hills of Kerala and Tamil Nadu. It is one of the most common snakes in Kodaikanal where it can be found even near human habitations. Given the restricted and patchy distribution in high-elevation forests of Palni and Anamalai hills, this species can be considered as Near Threatened.	
114	Violet Shieldtail	*Uropeltis grandis*	NT	WG	Sch. IV	Reported from Anamalai hills. No recent report from the region.	DD
115	Red-bellied Shieldtail	*Rhinophis sanguineus*	LC	WG	Sch. IV	This species is restricted to mid-elevation evergreen forests in Wayanad of Kerala and Nilgiri district of Tamil Nadu. There is insufficient information on the population of this species. The habitat of this species is largely under cultivated plantations and is under extensive threat from land encroachments.	VU
116	Cardamom Shieldtail	*Rhinophis fergusonianus*	DD	KL	Sch. IV	This species is only known from the type specimen collected from the Cardamom hills of Idukki district.	DD
117	Travancore Shieldtail	*Rhinophis travancoricus*	EN	WG	Sch. IV	This species was described from Thiruvananthapuram in Kerala. But is also known from other lowland forested regions in southern Kerala and Ambadi in Kanyakumari, Tamil Nadu. The habitat of this species is under threat due to expanding rubber plantations and the extensive road network cutting through forested areas.	VU
118	Black and White shieldtail	*Rhinophis melanoleucus*	NE	KL	Sch. IV	This newly described species restricted to evergreen forests of south-western Wayanad. The current habitat of this species is mostly under coffee plantations and is under threat from land encroachment. Given the extremely narrow distribution range (<5 localities) of this species within a small region of Wayanad, this species can be considered as Endangered.	EN

119	Karinthandan shield tail	*Rhinophis karinthandani*	NE	WG	Sch. IV	This is a newly described species currently known only from evergreen forests of Wayanad. This species is found to be locally abundant and tolerant to agricultural lands and plantations.	VU
16. Family Pythonidae (pythons)							
120	Indian Rock python	*Python molurus*	NT		Sch. I	A common species distributed throughout the Indian subcontinent. Although common, this species is sometimes hunted for meat in few regions of the state.	NT
121	Common Sand Boa	*Eryx conicus*	NE		Sch. IV	The species is widely distributed all along the State. This species is illegally collected from the wild for trade, which may be leading to local decline.	LC
122	Red Sand Boa (Indian Sand Boa)	*Eryx johnii*	NE		Sch. IV	Mainly seen in drier tracts of Kerala, but has a wider distribution across India. This species is illegally collected from the wild for trade, which may be leading to local decline.	DD
123	Whitaker's Boa (Whitaker's Sand Boa)	*Eryx whitakeri*	NE		Sch. IV	Many reports from the northern part of the Kerala in Kannur, Kozhikode and Kasargod districts. This species is illegally collected from the wild for trade, which may be leading to local decline.	NT
124	Lesser Stripe-necked Snake	*Liopeltis calamaria*	NE		Sch. IV	This species has a wide distribution across India and Sri Lanka but is uncommon throughout its range.	DD
125	Trinket Snake	*Coelognathus helena*	NE		Sch. IV	The species is widely distributed all along the State.	LC
126	Rat Snake	*Ptyas mucosa*	NE		Sch. II	One of the widely distributed species in the State	LC
127	Banded Racer	*Argyrogena fasciolata*	NE		Sch. IV	This species has a wide distribution across India and Sri Lanka but is uncommon throughout its range.	DD
128	Black-spotted Kukri Snake	*Oligodon venustus*	LC	WG	Sch. IV	This species known to have a wide distribution in forested areas of Kerala and Tamil Nadu. Although there is no information on population trends, this species is negatively impacted	NT

						by plantations and threatened by conversion of natural habitats into plantation (Bhupathy and Nixon, 2011).	
129	Travancore Kukri Snake	*Oligodon travancoricus*	DD	WG	Sch. IV	Known to have a patchy distribution in Kerala and Tamil Nadu, south of the Palakkad gap.	DD
130	Common Kukri Snake	*Oligodon arnensis*	NE		Sch. IV	A very common snake across Kerala and other parts of India.	LC
131	Russell's Kukri Snake	*Oligodon taeniolatus*	LC		Sch. IV	A very common snake across Kerala and other parts of India	LC
132	Western Kukri Snake	*Oligodon affinis*	LC		Sch. IV	In Kerala, the species is distributed to evergreen or semi evergreen forests of most of the Protected areas of the State	LC
133	Striped Kukri Snake	*Oligodon brevicauda*	VU	WG	Sch. IV	Historically reported from the Anamalai hills, Agasthyamalai hills and Nilgiri hills.	DD
134	Ashok's Bronzeback Tree Snake	*Dendrelaphis ashoki*	LC	WG	Sch. IV	This species has a wide distribution throughout the central and southern Western Ghats.	LC
135	Giri's Bronzeback Tree Snake	*Dendrelaphis girii*	LC	WG	Sch. IV	Widely distributed across the Western Ghats.	LC
136	Large-eyed Bronzeback Tree Snake	*Dendrelaphis grandoculis*	LC	WG	Sch. IV	This species has a wide but patchy distribution in moist forests of the the central and southern Western Ghats of Karnataka, Kerala and Tamil Nadu.	LC
137	Southern Bronzeback Tree Snake	*Dendrelaphis chairecaeos*	NE	WG	Sch. IV	This species is widely distributed in the central and southern Western Ghats of Karnataka, Kerala and Tamil Nadu.	LC
138	Common Bronzeback Tree Snake	*Dendrelaphis tristis*	NE		Sch. IV	One of the commonest snake species in India	LC
139	Ornate Flying Snake	*Chrysopelea ornata*	NE		Sch. IV	This species has a wide distribution in the Western Ghats.	LC
140	Barred Wolf Snake	*Lycodon striatus*	NE		Sch. IV	A widely distributed species across the Indian subcontinent	DD

141	Common Wolf Snake	*Lycodon aulicus*	NE		Sch. IV	One of the commonest snake species in Kerala	LC
142	Russell's Wolf Snake	*Lycodon fasciolatus*	NE		Sch. IV	One of the commonest snake species in Kerala	LC
143	Travancore Wolf Snake	*Lycodon travancoricus*	NE		Sch. IV	One of the commonest snake species in Kerala .	LC
144	Bridal Snake	*Lycodon nympha*	NE		Sch. IV	This species is known to have a patchy but wide distribution in the drier regions of Peninsular India and Sri Lanka.	DD
145	Dumeril's Black-headed Snake	*Sibynophis subpunctatus*	NE		Sch. IV	This is a widespread snake in India and Sri Lanka	LC
146	Olive Forest Snake	*Rhabdops olivaceus*	LC	WG	Sch. IV	This is a rare semi-aquatic snake known only from few isolated records from Karnataka and Kerala. Many records of this species are from outside protected areas and are affected by habitat degradation.	NT
147	Common Cat Snake	*Boiga trigonata*	LC		Sch. IV	A common snake found in the drier regions of the Indian subcontinent.	LC
148	Thackeray's Cat Snake	*Boiga thackerayi*	NE		Sch. IV	Earlier considered as *B. ceylonensis.* Common in most evergreen forests across Kerala.	LC
149	Collared Cat Snake	*Boiga nuchalis*	NE		Sch. IV	This is a wide spread species in forested areas across India.	LC
150	Forsten's Cat Snake	*Boiga forsteni*	LC		Sch. IV	This is a widespread species but with a patchy distribution across India	LC
151	Travancore Cat Snake	*Boiga dightoni*	DD	KL	Sch. IV	This species is reported from Pirmed in Idukki district and Ponmudi hills in Thiruvananthapuram district.	DD
152	Yellow Green Cat Sanke	*Boiga flaviviridis*	NE		Sch. IV	A recently described species, which is known to have a wide distribution in Peninsular India.	DD
153	Whitaker's Cat Snake	*Boiga whitakeri*	NE	WG	Sch. IV	A recently described species from the Southern Western Ghats of Kerala and Tamil Nadu (Ganesh et al., 2021).	DD
154	Bronze-headed Vine Snake	*Ahaetulla perroteti*	EN	WG	Sch. IV	Known only from high-altitude shola grasslands of Nilgiri Hills in Kerala and Tamil Nadu. Although it is very common in	EN

						these landscapes, it has a highly restricted distribution and is under threat from conversion of shola grasslands into plantations.	
155	Günther's Vine Snake	*Ahaetulla dispar*	NT	W G	Sch. IV	A recent revision of the vine snakes in the Western Ghats established that this species is restricted to high elevation forests below the Palakkad gap and above the Shengottah gap	DD
156	Long-nosed Vines Snake	*Ahaetulla oxyrhyncha*	NE		Sch. IV	This species was recently resurrected from the *Ahaetulla nasuta* group and is distributed throughout the Peninsular India	LC
157	Brown Vine Snake	*Ahaetulla sahyadrensis*	LC	W G	Sch. IV	This species was split from *Ahaetulla pulverulenta*, which is restricted to Sri Lanka. This species has a wide distribution in the Central and Southern Western Ghats.	LC
158	Isabelline/ Wall's Vine Snake	*Ahaetulla isabellina*	NE	W G	Sch. IV	Recently resurrected from the *Ahaetulla nasuta* group. It is recorded from Southern Western Ghats, south of the Palakkad Gap, from an elevation of 550 m to 1475m ASL.	LC
159	Malabar Vine Snake	*Ahaetulla malabarica*	NE	W G	Sch. IV	A recently described species from the *Ahaetulla nasuta* group.	LC
160	Travancore Vine Sanke	*Ahaetulla travancorica*	NE	W G	Sch. IV	A recently described species which was split from *Ahaetulla dispar*. At present, this species is known from a few localities in the Agasthyamalai hills Kerala and Tamil Nadu. Although common in its range, it can be considered Vulnerable given its highly restricted distribution (< 5 localities).	VU
161	Antiq Vine Snake	*Proahaetulla antiqua*	NE	W G	Sch. IV	A recently described species from the Agasthyamalai hills of Kerala and Tamil Nadu. Given the narrow distributional range (2 localities), this species could be considered Endangered	EN
162	Striped Keelback	*Amphiesma stolatum*	NE		Sch. IV	Widely distributed throughout India	LC
163	Beddome's Keelback	*Hebius beddomei*	LC	W G	Sch. IV	This is one of the most common snakes found throughout most of the Western Ghats.	LC

164	Hill Keelback	*Hebius monticola*	LC	W G	Sch. IV	Widespread species in the central and southern Western Ghats, generally found in undisturbed habitats.	LC
165	Checkered Keelback	*Fowlea piscator*	NE		Sch. II	Widely distributed across India and is one of the most common snakes in Kerala.	LC
166	Green Keelback	*Rhabdophis plumbicolor*	NE		Sch. IV	A widely distributed species across the Indian subcontinent	LC
167	Olive Keelback Water Snake	*Atretium schistosum*	LC		Sch. II	A widespread species in India and Sri Lanka.	DD
18. Family Pareidae (narrow-headed snakes)							
168	Captain's Wood Snake	*Xylophis captaini*	LC	W G	Sch. IV	A very common snake in the lowland forests along the Achankovil hills to Agasthyamalai hills in the southern Western Ghats. Bupathy et al. (2016) assessed the conservation status of this species and recommended it to be elevated to Near Threatened.	NT
169	Striped Narrow-headed Snake	*Xylophis perroteti*	LC	W G	Sch. IV	This species has a very restricted distribution in high elevation shola grasslands of Nilgiri hills in Kerala and Tamil Nadu. Although this species is very common in its range and is generally tolerant of degraded habitats and plantations (Bupathy et al., 2016), they are threatened by extensive road mortality (Santhoshkumar and Kannan, 2017).	NT
170	Günther's Narrow-headed Snake	*Xylophis stenorhynchus*	DD	W G	Sch. IV	Very rare. Known only from the Anamalai hills. A recent observation of this species from Munnar needs confirmation.	DD
171	Anamalai Wood Snake	*Xylophis mosaicus*				A recently described species from the high elevation grasslands of Anamalai and Palni hills. The habitats of this species has experienced extensive rains and landslides during the last few years. Given the restricted and patchy distribution (<10 localities) of this species in grassland-shola	VU

						habitats, it can be considered as Vulnerable.	
19. Family Homalopsidae (mud snakes)							
172	Dussumier 's Smooth Scale Water Snake	*Dieurostus dussumieri*	LC	KL	Sch. IV	Distributed in the coastal plains of Kerala from the wetlands to the Neyyar river in Thiruvananthapuram district to the wetlands of Korappuzha river in Kozhikode district. Although common throughout its range, the wetland habitats of this species is threatened by pollution, many of which have become sites of waste disposal (MPJ, VPC & UPK Pers. Obs.). Therefore, the species can be considered as Near Threatened.	NT
173	Dog-faced Water Snake	*Cerberus rynchops*	LC		Sch. II	Known throughout most of the mangrove forests and intertidal zones on the western and eastern coast of Peninsular India	LC
174	Glossy Marsh Snake	*Gerarda prevostiana*	LC		Sch. IV	This species has a wide distribution in intertidal zones in Asia.	LC
20. Family Elapidae (elapid snakes)							
175	Common Indian Krait	*Bungarus caeruleus*	NE		Sch. IV	Widely distributed across India.	LC
176	Slender Coral Snake	*Calliophis melanurus*	NE		Sch. IV	Widely distributed in the drier regions of the Western Ghats, Eastern Ghats and Sri Lanka.	LC
177	Striped Coral Snake	*Calliophis nigrescens*	LC	W G	Sch. IV	Patchy but wide distribution in the central and southern Western Ghats. t is locally common in some localities in Wayanad and Periyar TR and Munnar.	LC
178	Beddome's Coral Snake	*Calliophis beddomei*	DD		Sch. IV	Known only from few isolated records in Karnataka, Kerala and Tamil Nadu.	DD
179	Bibron’s Coral Snake	*Calliophis bibroni*	LC	W G	Sch. IV	Wide but patchy distribution in the central and southern Western Ghats.	LC
180	Spectacled Cobra	*Naja naja*	NE		Sch. II	Widely distributed in the Indian subcontinent and one of the most common venomous snakes in Kerala.	LC
181	King Cobra	*Ophiophagus hannah*	VU		Sch. II	A widely distributed species across forested regions of South and Southeast Asia. However, recent phylogeographic analysis	VU

						have suggested that the species includes multiple species and the Western Ghats populations are a separate distinct species.	
21. Family Viperidae (vipers)							
182	Russel's Viper	*Daboia russelii*	NE		Sch. II	One of the most common venomous snakes found in the Indian subcontinent.	LC
183	Saw-scaled Viper	*Echis carinatus*	NE		Sch. IV	A common snake in the drier regions of India. In Kerala.	LC
184	Common Hump-nosed Pit Viper	*Hypnale hypnale*	NE		Sch. IV	Widely distributed in the Western Ghats and is one of the more common venomous snakes in Kerala	LC
185	Large-scaled Green Pit Viper	*Trimeresurus macrolepis*	NT	WG	Sch. IV	Recorded from high altitude (above 900m ASL) forests of Kerala and Tamil Nadu, south of the Palakkad gap. Although occurring mostly within protected areas, they are often killed by vehicles on roads passing through forested areas	NT
186	Malabar Pit Viper	*Trimeresurus malabaricus*	LC	WG	Sch. IV	One of the most common snakes in the forests of the Western Ghast.	LC
187	Horseshoe Pit Viper	*Trimeresurus strigatus*	LC	WG	Sch. IV	Restricted to high-altitude montane shola grasslands habitats of the upper Nilgiri hills in Kerala and Tamil Nadu. This species is threatened by conversion of shola-grassland habitats into plantations (Bupathy & Nixon, 2011). Considering its highly restricted distribution and threats to its habitat, this species can be considered as Endangered.	EN
188	Bamboo Pit Viper	*Trimeresurus gramineus*	LC		Sch. IV	A widespread species with a patchy distribution in Peninsular India.	DD

Threats

Reptiles are objects of fear, but also a subject of worship in India from time immemorial. Many snakes and lizards are dreaded and often killed. This 'phobia' of snakes and other reptiles may be a product of human evolution and has to some extent proved a hurdle in conservation efforts. The principal cause for the decline of reptile populations in India is identified as habitat destruction/alteration like forest clearing, damming, rapid urbanization, pollution and mining. Many species of reptiles have very narrow distributional ranges and often lie outside protected areas. For instance, the recently described uropeltid snake *Rhinophis melanoleucus* from Wayanad and the gecko *Cnemaspis chengodumalaensis*, both predominantly occur outside protected areas (Cyriac et al., 2020a.b). The habitat of *Cnemaspis chengodumalaensis* in the midland hillocks of northern Kerala are under severe threat from illegal granite quarrying and mining (Cyriac et al., 2020a). Many of the potentially threatened species we identified are restricted to high-altitude montane shola-grassland habitats. These habitats, although ecologically fragile and aid in water storage, have been viewed as having no commercial value which has led to the conversion of these grassland habitats into plantations. This along with man-made fire in these mountain habitats can have a great impact on species restricted to such habitats. Roads and highways inside the forests, wetlands and other natural habitats are known to be deadly for many species of reptiles, particularly snakes, that regularly attempt to cross roads during their foraging and seasonal movements at the time of breeding. Climate change also has a huge negative impact on reptiles. Kerala has seen sudden bursts of heavy rainfalls over the last few years causing more regular flooding and landslides in many ecologically fragile habitats, many of which harbour highly range restricted species of snakes and lizards. Collection of specimens for food, medicine and trade may also contribute to their population decline. Many species of Freshwater Turtles and Monitor lizards are still smuggled out of the country for their alleged medicinal properties. The illegal trade of the Indian Star Tortoise, Indian Chameleon, Sand Boas and Pythons has increased many folds in recent past (Pragatheesh et al, 2021. The recent invasion of exotic species like Red-eared Slider (*Trachemys scripta elegans*) is a new threat to our turtle species and the biodiversity of the water bodies of the state. Indiscriminate use of insecticides, herbicides and pesticides in agriculture and forestry practices could also aggravated the depletion of many habitat-specialist reptiles such as uropeltid snakes and other wetlands associated species.

Conservation:

Conservation aspects of reptiles gained prominence in 1970s. The Government of India banned snake skin trade in mid 1970s that halted a slaughter of about 10 million snakes per year. The Government also listed some species as protected under the Indian Wildlife

(Protection) Act (1972), mainly in the context of the threat posed by the skin trade. Another important aspect of conservation is the designation of large number of Protected Areas, such as National Parks, Wildlife Sanctuaries, Biosphere Reserves, Tiger Reserves and Reserve Forests, which are safe home to many species of reptiles.

As per the Indian Wildlife (Protection) Act of 1972, Indian Rock Python *Python molurus*, is the only snake species in Kerala listed in the Schedule -1 of the Act. Snakes such as Indian Rat Snake *Ptyas mucosa*, Olive Keelback *Atretium schistosum,* Indian Cobra *Naja naja*, Russel's Viper *Daboia russelii*, Checkered Keelback *Fowlea piscator*, Dog-faced Water Snake *Cerberus rynchops* and the King Cobra *Ophiophagus hannah* are listed in the Schedule - II of the Act. In an amendment on the Indian Wildlife (Protection) Act (1986), all the snake families are listed in the various schedules of the Wildlife Act. Most of the turtle and tortoise species are in various schedules of the Act. In contrast, the lizards have not been given much attention. Except for a two species viz. Indian Monitor Lizard (*Varanus bengalensis*.) and the Indian Chameleon (*Chamaeleo zeyylanicus)*, none are listed in any of the Schedules of Indian Wildlife (Protection) Act.

As per the new provisions of Indian Biodiversity Act (2002), we have selected two species of Reptiles of Kerala viz. Indian Pond Terrapin and South Indian Flying Lizard under section 38 of the Act .

Summary

We assess or reassess the conservation status of 188 species of terrestrial and freshwater reptiles found in Kerala based on its distribution and our assessment of threats to the species. There was insufficient data to assess the conservation status of a large number of species and were listed as Data Deficient. We identified 37 potentially threatened species (1 Critically Endangered, 16 Endangered and 20 Vulnerable species). We also identified 17 species as Near Threatened. About 35% of all the species we assessed were listed as Data Deficient, stressing on the need for further investigations on the herpetofauna of the region. Most of the threatened species have very restricted geographic ranges and are threatened by extensive habitat degradation due to fragmentation, conversion to plantations and illegal quarrying and mining in ecologically fragile habitats or from trade and consumption. A few threatened species were also predominantly found to be outside protected areas. We also propose two species viz. Indian Pond Terrapin *Melanochelys trijuga* and South Indian Flying Lizard *Draco dussumieri* prioritised for inclusion in Section 38 of Indian Biological Diversity Act.

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THREATENED AMPHIBIANS OF KERALA

STATUS AND CONSERVATION

Raorchestes travancoricus
@ Sandeep Das

K. P Dinesh | Sujith V Gopalan | Sandeep Das

A riverine ecosystem at PeriyarTiger Reserve

Threatened Amphibians of Kerala

Background of the study

Amphibians are the cold-blooded poikilothermic vertebrates which are preliminary in their body forms and are the connecting link between the vertebrate life between the water and land (Zardoya and Meyer, 2001). Wherein the terminology 'Amphibia' is derived from the Greek language "amphi" meaning "of both or double kinds" and "bios" referring "life" (AmphibiaWeb, 2018). For the completion of the life cycle amphibian require both fresh water (for tadpoles) as well as land (adults).

In the ecosystem amphibians play a very crucial role in the food web both as predators (by eating insects and invertebrates) and prey (being eaten by snakes, birds and carnivorous small mammals). For having primitive body structure and internal organs they are very sensitive and these are the first vertebrate's life forms to sense any adverse environmental changes due to their moist sensitive skin and occupy all the three habitats (Land, water and air). All these above vital reasons Amphibians are referred as 'ecological indicators' (Simon et al., 2011). Very presence or absence of amphibians in an ecosystem adds value to the ecosystem diversity and its assessment.

Objectives of the study

The present account has bee prepared with the following three set of objectives

a) Enlisting the amphibian species of Kerala with their general distribution and conservation status (see Appendix I)

b) Enlisting the threatened amphibian species of Kerala based on the IUCN red list (IUCN, 2020) (see Appendix II and Plate I, Plate II, Plate III, Plate IV, Plate V, Plate VI& Plate VII)

c) Proposal of high conservation priority species for inclusion in Section 38 of Biological Diversity Act

Methodology followed

Amphibian species for the state Kerala were documented with the latest international (Frost, 2021) and Indian (Dinesh et al., 2021) data bases. IUCN criteria were considered from the earlier IUCN assessments between the years 2004 to 2020 for the Indian species (IUCN, 2020) (the latest assessment is in progress). For the proposal of high conservation priority species for inclusion in Section 38 of Biological Diversity Act the amphibian species which were earlier in the 'frog leg trade' and species used for academic purpose are considered with updated taxonomic names.

Outcomes:

a) Amphibian species distribution status and conservation Status In general amphibians include legged and tailless frogs (Anura), legged and tailed salamanders (Caudata) and legless caecilians (Gymnophiona). Globally 8282 species of amphibians are documented including 7301 frog species, 767 species of salamanders and 214 species of caecilians (Frost, 2021). In India amphibian species documented till April 2020 include 406 species of frogs, two species of salamanders and 39 species of caecilians totalling to 447 species (Dinesh et al., 2020)

For the state Kerala 104 species of amphibians were enlisted by Dinesh et al., (2010) followed by the studies of Das (2015) enlisting 151 species. In the updated checklist of amphibians for the state a total of 186 species are reported (see Appendix I), wherein type localities for the 125 species are within the political boundaries of the state and rest of the 56 species are reported are either described from the adjacent states or the adjacent countries which have their distribution from Kerala.

From the state Kerala, chronologically the first species descriptions started from the year 1838 with the description of the species *Rana malabarica* (now *Hydrophylax malabaricus*) by Tschudi and the latest being the species *Raorchestes drutaahu, Raorchestes kakkayamensis, Raorchestes keirasabinae, Raorchestes sanjappai* and *Raorchestes vellikkannan* in 2021. In pre-independent India 37 species were discovered from the state and in the post-independent India 88 species were discovered from the state (wherein 76 species were being discovered in the last two decade).

b) Threatened amphibian species of Kerala

For the Threatened taxa of amphibians for the state IUCN Red List among the 186 species reported for the state 54 species could be categorized as threatened species (13 species Critically Endangered; 27 species as Endangered and 14 species as Vulnerable); 5 species as Near Threatened; 27 species as Least Concern; 32 species as Data Deficient and 68 species as Not Assessed category.

IUCN categories as per 2004 assessment		Threatened species			Total	Lower risk species				Total
Group	Total	CR	EN	VU		NT	LC	DD	NA	
Amphibia	186	13	27	14	54	5	27	32	68	132

Among the 14 species of amphibians categorized as Critically Endangered taxonomy needs to stabilized for the species *Minervarya murthii* (wherein the species is not recorded after its description in 1979) and all the species enlisted are either reported from either reserve forests or protected areas of the state.

From the Endangered category 27 species are reported and all the species are either reported from reserve forests or protected areas except for the species *Euphlyctis karaavali* which is having predominant distribution towards the coastal plain fresh water bodies. In the Vulnerable category list for the state 13 species are document wherein most of the species are either reserve forests or protected areas where as the species like *Indosylvirana aurantiaca* are narrow range endemics in one or two districts for these species' maintenance of pristinity of fresh water bodies are crucial for the survival of the species.

Five species reported under the Near Threatened category are either reserve forests or protected areas as most of these species are reported from hilly tracts of the state. Although 27 species are categorized as Least Concern based on the IUCN Global assessment the species like *Hydrophylax malabaricus* needs reassessment as the there is a recent taxonomic correction in the species complex and the species is mostly restricted to homestead as well as agro ecosystems in Kerala.

Under the Data Deficient and Not Assessed category 32 and 68 species are placed respectively, as both the categories include recently described species they require field based local assessment to decipher their exact conservation status due to the fact that many of these species are either point endemics or narrow endemics. In these categories the taxonomic status of the species *Minervarya brevipalmata* (Peters, 1871), *Minervarya parambikulamana* (Rao, 1937), members of the caecilian genus *Uraeotyphlus* needs to be resolved. Although most of the species of these two categories are reported from either reserve forests or protected areas only the species *Indosylvirana urbis* is known from the urban landscapes.

c) Proposal of high conservation priority species for inclusion in Section 38 of Biological Diversity Act (Commercial / local consumption / poaching / pet trade / wildlife trade).

India was one of the largest frog legs exporting countries of the world during 1980's which was almost 4,000 tonnes of frog legs per annum (Anonymous, 1980; Abdulali, 1985; Pandian and Marian, 1986; Oza, 1990). The species of frogs involved in frog leg trade were *Rana tigerina* (now *Hoplobatrachus tigerinus*), *Rana crassa* (now *Hoplobatrachus crassus*) and *Rana hexadactyla (now Euphlyctis hexadactylus)* (Pandian and Marian, 1986; Soundarapandian et al., 2007) from India. The studies suggested that more than 60 million frogs were harvested for frog leg export and 3 to 18 million frogs (including the other species of were used for academic as well as research purposes (Pandian and Marian, 1986; Soman, 1990) included frogs from wild as well as cultivated for exports. From India *Rana tigerina* (now *Hoplobatrachus tigerinus)* was the most harvested species accounting to 75% of those days export (Pandian and Marian, 1986).

In the Convention on International Trade in Endangered Species of Wild Fauna and Flora Appendix II (CITES Appendix II includes species which are not necessarily endangered, but the trade of the species is not regulated owing to the decline in their populations) two edible frog species from India and Bangladesh (*Rana hexadactyla* and *Rana tigerina*) were included (Abdulali, 1985; Pandian and Marian, 1986; Dash and Mahanta, 1993). Due to problems in the taxonomic identity of the species mentioned above the species should be read as *Euphlyctis hexadactylus* and *Hoplobatrachus tigerinus* for India. For Kerala, under the CITES Appendix II the two species should be read as *Euphlyctis karaavali* and *Hoplobatrachus tigerinus* for the state as the taxonomic resolution for the *Euphlyctis* species is very recent (Dinesh et al., 2021).

In the Schedule list of India (The Wildlife Protection Act, 1972), amphibians are protected under Schedule II (one species) and Schedule IV (two species). The species of Salamander protected under Schedule II in India is not available in Kerala. The two species included under the Schedule IV were Fresh water Frogs (*Rana* spp.) and Viviparous toads (*Nectophyrynodes* sp.)

In the strict taxonomic sense there are no species of Rana available in India (Frost, 2021). In today's amphibian systematics the genus *Rana* is recognized under the family Ranidae with 53 species having their range of distribution in Eurasia (China) and western North America (Frost, 2020).

All the species of *Rana* referred during 1970's from India (Daniel, 1975) actually belong to the today's families Dicroglossidae (with 80 species from India), Ranidae (39 species from India) and Ranixalidae (18 species from India) (Dinesh, 2020).

From the perspective of frog leg trade ban and protection of the exploited species for trade and academics, the frog species of the family Dicroglossidae *Euphlyctis cyanophlyctis* complex) (entire India), *Euphlyctis aloysii* (Western India), *Euphlyctis hexadactylus* (from eastern coastal plains of India), *Euphlyctis karaavali* (from western coastal plains of India), *Hoplobatrachus tigerinus* (from entire India) and *Hoplobatrachus crassus* (from South and North east India) can be inferred under Schedule IV for Fresh water frogs (*Rana* sps.) proposed in 1972. In true sense we don't have any reported viviparous toads / frogs from India. The actual viviparous toads are *Nimbaphrynoides occidentalis, Nectophrynoides species, Eleutherodactylus jasperi,* and *Limnonectes larvaepartus,* having their distribution in Africa (Frost, 2020).

During 1970's taxonomy the present-day Malabar Tree Toad, *Pedostibes tuberculosus* from the Western Ghats was considered as *Nectophryne tuberculosa* (Daniel, 1963) and the present day *Bufoides kempi* from Meghalaya was considered as *Nectophryne kempi* (Frost, 2020). Since the Malabar Tree Toad is arboreal and phytotelmatic in habitat the present-day *Pedostibes tuberculosus* from the Western Ghats and *Bufoides kempi* from Megahalaya can be inferred under Schedule IV for Viviparous toads (*Nectophyrynodes* sp.) proposed in 1972. In the changing scenario of amphibian taxonomy and systematics the species names of amphibians listed in the schedule list are interpreted in a conventional way. Since there are reports of consumption of frogs (considered a delicacy, mainly fried, or made into a curry, and served by the innumerable toddy and arrack shops, http://bwcindia.org/Web/Awareness/LearnAbout/Frogs.html) and usage of few species of frogs in the academic purpose four species of frogs are proposed and discussed for inclusion in 'Section 38 of Biological Diversity Act' for Kerala below. The species include *Euphlyctis karaavali, Hoplobatrachus crassus* and *Hoplobatrachus tigerinus.*

1) *Euphlyctis karaavali*

Priti, Naik, Seshadri, Singal, Vidisha, Ravikanth, and Gururaja, 2016

Euphlyctis karaavali

Euphlyctis karaavali Priti, Naik, Seshadri, Singal, Vidisha, Ravikanth, and Gururaja, 2016. Euphlyctis karaavali Priti, Naik, Seshadri, Singal, Vidisha, Ravikanth, and Gururaja, Asian Herpetol. Res., 7:233.

Common name: Karaavali Skittering Frog

Global distribution: India (Frost, 2021).

India distribution: Western coastal plains of Karnataka and Kerala, more towards the fresh water bodies of the seashore lines (Dinesh et al., 2021; Dinesh, et al., in review)

Kerala distribution: Entire western coastal plains of Kerala, more towards the fresh water bodies of the seashore lines (Dinesh et al., 2021; Dinesh, et al., in review)

Habitat Ecology: Primarily aquatic to semiaquatic species, mostly active during night.

Population trend in Kerala Since 2000 (Stable, decreasing, increasing): No specific populations studies are available for the species as such. General observation suggests the decrease in population size due to shrinking favourable habitats.

Threats: Indiscriminate use of pesticides in the agricultural landscapes, water pollution around the homestead as well as industrialized areas and increasing temperature due to climate change.

Euphlyctis karaavali habitat

Habitat fragmentation is considered as one of the major threats for amphibian survival, as the habitat fragmentation due to human intervention other developmental activates separate the interaction of actively breeding populations creating a 'genetic bottlenecks.

General description: Large sized skittering frog, adult size ranges from 61 mm to 106 mm (SVL). Head width more than head length; snout pointed and slightly projected beyond mouth. Obtuse canthus rostralis concave. Nostrils closer to snout tip. Rounded tympanum more than half of the eye. Tibiotarsal articulation reaches back of eye when the hindlimb is kept parallel to the body. Toes fully webbed; inner metatarsal tubercle more than the length of first toe and outer metatarsal tubercle absent. Dorsum light green colored with alternate yellow and dark strips in the background. Ventral surface mottled. Among the paired adults' males are smaller than females; males with two dark blackish purple vocal sacs on the throat and in males first finger with nuptial pad.

Justification for proposal under 'Section 38 of Biological Diversity Act' for Kerala:

Although the 'Frog leg trade' is completely banned in India there are stray reports of local 'frog meat'

consumption during the active breeding seasons of these frogs (monsoon). To create awareness and to conserve the species at local level conservation protection is necessary.

2) *Hoplobatrachus crassus*

(Jerdon, 1853)

Hoplobatrachus crassus in its habitat

Hoplobatrachus crassus (Jerdon, 1853)

1853, *Rana malabarica* Kelaart, Prodr. Faunae Zeylan., 1: 191. 1853, *Rana crassa* Jerdon, J. Asiat. Soc. Bengal, 22: 531. 1863, *Hoplobatrachus ceylanicus* Peters, Monatsber. Preuss. Akad. Wiss. Berlin, 1863: 445-470.

Common name: Carnatic Bull frog

Global distribution: India, Nepal, Bangladesh, Myanmar, Bhutan and Sri Lanka

India distribution: Uttar Pradesh, Madhya Pradesh, Orissa, Andhra Pradesh, Karnataka, Kerala, Tamil Nadu, West Bengal, Assam, Arunachal Pradesh and Nagaland (Dutta, 1997, Dinesh et al., 2009, Frost, 2021)

Kerala distribution: Found in most of the marshy wet lands, stagnant water bodies and paddy fields of the entire state (below 400-meter elevations).

Habitat Ecology: Primarily aquatic to semiaquatic species, mostly active during night.

Population trend in Kerala Since 2000 (Stable, decreasing, increasing): No specific populations studies are available for the species as such. General observation suggests the decrease in population size due to shrinking favourable habitats.

Threats: Indiscriminate use of pesticides in the agricultural landscapes, water pollution around the homestead as well as industrialized areas and increasing temperature due to climate change. Habitat fragmentation is considered as one of the major threats for amphibian survival, as the habitat fragmentation due to human intervention other developmental activates separate the interaction of actively breeding populations creating a 'genetic bottlenecks.

Hoplobatrachus crassus in its habitat at Nenmara, Palaghat

General description: Large sized bull frog, adult size varies from 55 mm to 84 mm (SVL). Head longer than wide, snout pointed and slightly extended over the lower jaw. Rounded canthus rostralis and the loreal region concave. Nostrils closer to snout tip than to the anterior corner of eyes. Interorbital distance subequal to the diameter of upper eyelid. Rounded tympanum, 50% of the eye diameter. Tibiotarsal articulation reached only to the tympanum when the hindlimb is kept parallel to the body. Toes fully webbed, shovel shaped inner metatarsal tubercle almost 60% of the length of 1st toe length. Dorsal surface of the body yellowish green to olive or greyish brown with irregular dark spots. Dorsum with discontinuous longitudinal folds. Flank of the body grayish-brown with darker rounded spots. Limbs with incomplete dark bands. Ventral surface of the limbs white in colour, throat mottled with black and belly white. Among the paired adults' females are larger than the males and males have a sub-gular vocal sac in the throat region and nuptial pads on inner side of first finger.

Justification for proposal under 'Section 38 of Biological Diversity Act' for Kerala: Although the 'Frog leg trade' is completely banned in India there are stray reports of local 'frog meat' consumption during the active breeding seasons of these frogs (monsoon). To create awareness and to conserve the species at local level conservation protection is necessary.

3) *Hoplobatrachus tigerinus* (Daudin, 1802)

Hoplobatrachus tigerinus (Daudin, 1802)

1802. Rana tigerina Daudin, "An. XI", Hist. Nat. Rain. Gren. Crap., Quarto: 64.

1829. Rana picta Gravenhorst, Delic. Mus. Zool. Vratislav., 1: 39.

Common name: Indian Bull frog

Global distribution: Afghanistan, Pakistan, India, Nepal, Bhutan, Myanmar, Bangladesh and as an introduced species in the Andaman Islands and Madagascar (Frost, 2021)

India distribution: Throughout India in almost all the states (Dutta, 1997; Dinesh et al., 2009, Frost, 2021)

Kerala distribution: Found in most of the marshy wet lands, stagnant water bodies and paddy fields of the entire state (below 400-meter elevations). Also recorded near to sea shoreline fresh water bodies

Hoplobatrachus tigerinus

Habitat Ecology: Primarily aquatic to semiaquatic species, mostly active during night.

Population trend in Kerala Since 2000 (Stable, decreasing, increasing): No specific populations studies are available for the species as such. General observation suggests the decrease in population size due to shrinking favourable habitats.

Hoplobatrachus igerinus habitat at Melpadom, Alappuzha

Threats: Indiscriminate use of pesticides in the agricultural landscapes, water pollution around the homestead as well as industrialized areas and increasing temperature due to climate change. Habitat fragmentation is considered as one of the major threats for amphibian survival, as the habitat fragmentation due to human intervention other developmental activates separate the interaction of actively breeding populations creating a 'genetic bottlenecks.

General description: Large sized bull frog, adult size varies from 50 mm to 113 mm (SVL). Head longer than wide, pointed snout with slightly extended lower jaw. Obtuse canthus rostralis with oblique loreal region. Nostrils closer to tip of snout. Interorbital distance subequal to the diameter of upper eyelid. Rounded tympanum, 50% to 70% of the eye diameter. Tibiotarsal articulation reaches front of eyes when the hindlimb is kept parallel to the body. Toes fully webbed except 4th toe. Inner metatarsal tubercle shovel shaped, long, flattened and blunt at the base of 1st toe. Dorsal surface of the body yellowish green to olive or greyish brown in colour. Body patterns are irregular varying from dark olive to greyish brown or irregular spots. The region of flanks yellowish green. Mid dorsal line on the body present or absent. Limbs with incomplete dark bands. Ventral surface of the limbs white in colour, throat mottled with black and belly white. Among the paired adults' females are larger than the males and males have a blue coloured sub-gular vocal sac in the throat region.

Justification for proposal under 'Section 38 of Biological Diversity Act' for Kerala: Although the 'Frog leg trade' is completely banned in India there are stray reports of local 'frog meat' consumption during the active breeding seasons of these frogs (monsoon). To create awareness and to conserve the species at local level conservation protection is necessary.

Discussion

Population trend in Kerala Since 2000 (Sustainable population / threatened population in Kerala). There is limited information regarding the population level studies for the amphibians of Kerala as the new species documentation is still in progress. In one of the studies by Oomen et al., (2000) *Gegeneophis ramaswamii* was found to be abundant during their sampling in Thriuvananthapuram districts of Kerala. Kanagavel et al., (2018) reported the *Walkerana phrynoderma* to be rare compared to *Walkerana leptodactyla* based on their large-scale studies in the Anamalai hill ranges.

Cultural significance and associated traditional knowledge: There are reports of consumption of tadpoles by the indigenous communities as a part of traditional knowledge (Thomas and Biju, 2015).

Threats: Although most of the amphibians reported for the state are reported from the reserve as well as protected areas, habitat fragmentation is considered as one of the serious threats for the survival of amphibian species added with other threats. However, the amphibians reported from the homestead areas, agroecosystems and urban landscapes are facing threats from the common problems like pollution, release of effluents to freshwater bodies, indiscriminate use of fertilisers and pesticides in agroecosystems, littering of waste in the ecotourism areas and waste disposal alongside the roads passing through the forests. There are reports of chytrid fungus *Batrachochytrium dendrobatidis* (Bd) in the genus Indirana (Nair et al. 2011, Dahanukar et al. 2013, Molur et al. 2015) in the Western Ghats, but its presence and virulence in Kerala is yet to be ascertained.

Other Recommended conservation measures for amphibians of Kerala. The species *Indosylvirana urbis* described from the urban landscapes of Ernakulam is known to have distribution in the urban landscapes of Malappuram and Thrissur districts of Kerala and is not reported from any reserve forests or protected areas. There is a need to prioritise the conservation efforts for the species habitats as the species needs fresh water bodies for breeding and wet lands for their survival during non-breeding seasons. Breeding sites for the species *Indosylvirana urbis* should be identified and prioritised for the conservation of wetlands in the urban landscapes in the districts of Ernakulam, Malappuram and Thrissur. Since there is more potential of description of new species of amphibians from the state and exact distribution range for the newly described species are wanting, forest permits should be prioritised for the research explorations adhering to National Biodiversity Rules for the national research institutes.

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Appendix II IUCN Red List categories (based on 2004 to 2020 assessment) for the amphibians of Kerala (as on July 2020)		
Sl No	**Scientific name**	**IUCN Red List Code***
	CLASS: AMPHIBIA Gray	
	ORDER: ANURA Fischer von Waldheim	
	FAMILY: BUFONIDAE Gray	
1	*Duttaphrynus beddomii* (Gnther, 1875)	EN
2	*Duttaphrynus microtympanum* (Boulenger, 1882)	VU
3	*Ghatophryne ornata* (Gunther, 1876)	EN
4	*Ghatophryne rubigina* (Pillai and Pattabiraman, 1981)	VU
5	*Pedostibes tuberculosus* Gnther, 1875	EN
	FAMILY: DICROGLOSSIDAE Anderson	
6	*Euphlyctis karaavali* Priti, Naik, Seshadri, Singhal, Vidisha, Ravikanth and Guru-raja, 2016	EN
7	*Minervarya murthii* (Pillai, 1979)	CR
8	*Minervarya nilagirica* (Jerdon, 1854)	EN
9	*Minervarya sahyadris* Dubois, Ohler and Biju, 2001	EN
	FAMILY: MICRIXALIDAE Dubois, Ohler and Biju	
10	*Micrixalus gadgili* Pillai and Pattabiraman, 1990	EN
11	*Micrixalus nudis* Pillai, 1978	VU
12	*Micrixalus phyllophilus* (Jerden,1853)	
13	*Micrixalus saxicola* (Jerdon, 1853)	VU
	FAMILY: MICROHYLIDAE Günther	
14	*Melanobatrachus indicus* Beddome, 1878	EN
15	*Microhyla sholigari* Dutta and Ray, 2000	EN
16	*Uperodon mormoratus* (Rao, 1937)	EN
17	*Uperodon triangularis* (Gnther, 1875)	VU
	FAMILY: NASIKABATRACHIDAE Biju and Bossuyt	
18	*Nasikabatrachus sahyadrensis* Biju and Bossuyt, 2003	EN
	FAMILY: NYCTIBATRACHIDAE Blommers-Schlösser	
19	*Nyctibatrachus aliciae* Inger, Shaffer, Koshy and Bakde, 1984	EN
20	*Nyctibatrachus beddomii* (Boulenger, 1882)	EN
21	*Nyctibatrachus deccanensis* Dubois, 1984	VU
22	*Nyctibatrachus major* Boulenger, 1882	VU
23	*Nyctibatrachus minor* Inger, Shaffer, Koshy and Bakde, 1984	EN
24	*Nyctibatrachus vasanthi* Ravichandran, 1997	EN

	FAMILY: RANIDAE Batsch	
25	*Indosylvirana aurantiaca* (Boulenger, 1904)	VU
	FAMILY: RANIXALIDAE Dubois	
26	*Indirana brachytarsus* (Gnther, 1875)	EN
27	*Indirana gundia* (Dubois, 1986)	CR
28	*Walkerana diplosticta* (Gnther, 1876)	EN
29	*Walkerana leptodactyla* (Boulenger, 1882)	EN
30	*Walkerana phrynoderma* (Boulenger, 1882)	CR
	FAMILY: RHACOPHORIDAE Hoffman	
31	*Ghatixalus variabilis* (Jerdon, 1853)	EN
32	*Pseudophilautus wynaadensis* (Jerdon, 1853)	EN
33	*Raorchestes bobingeri* (Biju and Bossuyt, 2005)	VU
34	*Raorchestes chalazodes* (Gnther, 1876)	CR
35	*Raorchestes charius* (Rao, 1937)	EN
36	*Raorchestes chlorosomma* (Biju and Bossuyt, 2009)	CR
37	*Raorchestes chromasynchysi* (Biju and Bossuyt, 2009)	VU
38	*Raorchestes dubois* (Biju and Bossuyt, 2006)	VU
39	*Raorchestes glandulosus* (Jerdon, 1853)	VU
40	*Raorchestes graminirupes* (Biju and Bossuyt, 2005)	VU
41	*Raorchestes griet* (Bossuyt, 2002)	CR
42	*Raorchestes kaikatti* (Biju and Bossuyt, 2009)	CR
43	*Raorchestes marki* (Biju and Bossuyt, 2009)	CR
44	*Raorchestes munnarensis* (Biju and Bossuyt, 2009)	CR
45	*Raorchestes nerostagona* (Biju and Bossuyt, 2005)	EN
46	*Raorchestes ponmudi* (Biju and Bossuyt, 2005)	CR
47	*Raorchestes resplendens* Biju, Shouche, Dubois, Dutta and Bossuyt, 2010	CR
48	*Raorchestes signatus* (Boulenger, 1882)	EN
49	*Raorchestes sushili* (Biju and Bossuyt, 2009)	CR
50	*Raorchestes tinniens* (Jerdon, 1853)	EN
51	*Raorchestes travancoricus* (Boulenger, 1891)	EN
52	*Rhacophorus calcadensis* Ahl, 1927	EN
53	*Rhacophorus lateralis* Boulenger, 1883	EN
54	*Rhacophorus pseudomalabaricus* Vasudevan and Dutta, 2000	CR

*CR: Critically Endangered; EN: Endangered; VU: Vulnerable;

Threatened Amphibians of Kerala

Duttaphrynus beddomii — EN

തെക്കൻ ചൊറിത്തവള

Duttaphrynus microtympanum — VU

ചെറുചെവിയൻ

Blaira ornata — EN

തീവയറൻ അരുവിയൻ

Blaira rubigina — VU

ചെമ്പൻ അരുവിയൻ

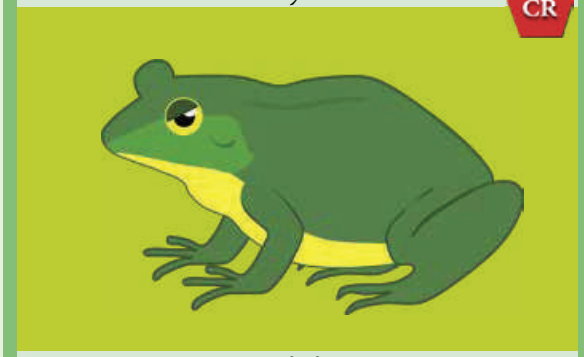
Pedostibes tuberculosus — EN

മരച്ചൊറിയൻ

Euphlyctis karaavali — EN

പൊന്മാൻ തവള

Minervarya murthii — CR



മൂർത്തി ചിലപ്പൻ

Minervarya nilagirica — EN

നിലഗിരി ചിലപ്പൻ

Minervarya sahyadris EN

ചിലു ചിലപ്പൻ

Micrixalus gadgili EN

ഗാഡ്ഗിൽ പിലിഗിരിയൻ

Micrixalus nudis VU

വയനാട് പിലിഗിരിയൻ

Micrixalus saxicola VU

വടക്കൻ പിലിഗിരിയൻ

Melanobatrachus indicus EN

ചൊലകറുമ്പി

Microhyla sholigari EN

ഷോളിഗാരി കുറിമുക്കൻ

Uperodon mormoratus EN

ചെങ്കൽ കുറിവായൻ

Uperodon triangularis VU

മലബാർ കുറിവായൻ

Nasikabatrachus sahyadrensis EN

പാതാള തവള

Nyctibatrachus aliciae EN

അലിസി രാത്തവള

Nyctibatrachus beddomii EN

ബെഡോം രാത്തവള

Nyctibatrachus deccanensis VU

ചോല രാത്തവള

Nyctibatrachus major VU

പെരും രാത്തവള

Nyctibatrachus minor EN

കേരളാ രാത്തവള

Nyctibatrachus vasanthi EN

കളക്കാട് രാത്തവള

Indosylvirana aurantiaca VU

ബൊലെഞ്ചർ സ്വർണത്തവള

Indirana brachytarsus EN

ആനമല പാറത്തവള

Indirana gundia CR

ഗുണ്ടിയ പാറത്തവള

Walkerana diplosticta EN

പുള്ളി പാറത്തവള

Walkerana leptodactyla CR

ബൊലെഞ്ചർ പാറത്തവള

Walkerana phrynoderma CR

ചൊറിയൻ പാറത്തവള

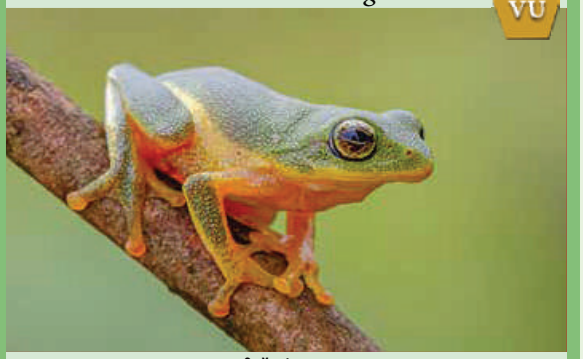
Ghatixalus variabilis EN

പച്ചച്ചോല മരത്തവള

Pseudophilautus wynaadensis EN

വയനാടൻ ഇലത്തവള

Raorchestes bobingeri VU



ബോബിന്ഗർ ഇലത്തവള

Raorchestes chalazodes CR

പച്ച ഈറ്റത്തവള

Raorchestes charius EN

ശേഷാചർ ഇലത്തവള

Raorchestes chlorosomma CR

പച്ചക്കണ്ണി ഇലത്തവള

Raorchestes chromasynchysi VU

സമ്മിശ്ര ഇലത്തവള

Raorchestes dubois VU

കൊടൈ ഇലത്തവള

Raorchestes glandulosus CR

മാനന്തവാടി ഇലത്തവള

Raorchestes graminirupes VU

പൊന്മുടി ഇലത്തവള

Raorchestes griet CR

ഗ്രിയറ്റ് ഇലത്തവള

Raorchestes kaikatti CR

കൈകൊട്ടി ഇലത്തവള

Raorchestes marki CR

മാർക്കി ഇലത്തവള

Raorchestes munnarensis CR

മൂന്നാർ ഇലത്തവള

Raorchestes nerostagona EN

മഴത്തുള്ളി തവള

Raorchestes ponmudi CR

വലിയ ഇലത്തവള

Raorchestes resplendens CR

ആനമുടി ഇലത്തവള

Raorchestes signatus EN

നക്ഷത്രക്കണ്ണി ഇലത്തവള

Raorchestes sushili CR

സുഷിലി ഇലത്തവള

Raorchestes tinniens EN

നീലഗിരി ഇലത്തവള

Raorchestes travancoricus EN

നീലക്കണ്ണി ഇലത്തവള

Rhacophorus calcadensis EN

കളക്കാട് പച്ചിലപ്പാറാൻ

Rhacophorus lateralis EN

വരയൻ പച്ചിലപ്പാറാൻ

Rhacophorus pseudomalabaricus CR

പുള്ളി പച്ചിലപ്പാറാൻ

CR Critically Endangered

EN Endangered

VU Vulnerable

Uperodon triangularis © Sujith V Gopalan

Wetlands
are habitats in which much of the threatened amphibian species survive outside the protected areas. The three species identified as the most threatened in this study (*Euphlyctis karaavali, Hoplobatrachus crassus,* and *Hoplobatrachus tigerinus*) thrive in the wetland habitats of the state. These species cannot be just conserved by the protection of the law under the wildlife protection act, but they have a better chance of surival if the habitat of the species is also conserved.

Euphlyctis karaavali © Sujith V opalan

FRESH WATER FISHES

Horaglanis krishnai © VK Anoop

Rajeev Raghavan, A. Biju Kumar, C. P. Shaji, Anvar Ali, V. K. Anoop, Anu Radhakrishnan, Smrithy Raj, Vishnu Raj, Arya Sidharthan,Dencin Rons Thampy & Josin Tharian

Local fisher with a catch of Anguilla bengalensis
©Rajeev Raghavan

Executive Summary

The streams and rivers flowing through the southern part of the Western Ghats encompassing the state of Kerala have been long considered an exceptional hotspot of freshwater biodiversity and endemism, with particular reference to freshwater fish. The diversity of microhabitats in the unique array of aquatic ecosystems in Kerala, the prehistoric position of this landmass in the Gondwana land, and the later migration of freshwater fish after the collation of Indian mainland with the Asian continent is the reason for this exceptional diversity of freshwater fish in Kerala. Since the late 1700s, Kerala's aquatic ecosystems and biodiversity have been of immense interest to naturalists, explorers, and ichthyologists. This has resulted in the region being comparatively well-studied and documented within the Western Ghats Hotspot. Despite more than 200 years of exploration and research, the freshwater fish fauna of the Kerala part of Western Ghats is still underestimated, as evident from the flurry of discovery and descriptions of new families, genera and species over the last ten years.

The Kerala part of Western Ghats is also one of the most heavily populated and modified regions within the Hotspot. The high human footprint and its resultant impacts have led to extensive loss of habitats, reducing populations and shrinking critical habitats of freshwater species, and pushing them to the brink of extinction. The current freshwater ichthyofaunal assemblage in Kerala is comprised of around 196 species (though this number may increase once current taxonomic inaccuracies are cleared) within 36 families and 84 genera. The uniqueness of this ichthyofaunal assemblage is in its endemism – 27% of the species (53 species) found in Kerala are found nowhere else on this planet. This endemism is not only restricted to the species level, as in the case of many regions of the world. The small state of Kerala is home to two endemic families (probably matched nowhere else in the world!) and seven endemic genera of which three are monotypic.

Kerala's freshwater fish fauna is currently threatened by a high level of natural and anthropogenic stressors, and will continue so for the years to come. Though no species are declared 'extinct', there are currently 52 species of threatened freshwater fishes in Kerala (7 critically endangered, 31 endangered and 14 vulnerable). The IUCN has not officially assessed an additional 35 species of freshwater fishes that were described since 2010, but available information on their distribution, population and threats suggests that many would trigger the criteria for threatened species on the IUCN Red List.

This report is a comprehensive and updated compilation of the status of threatened freshwater fishes of Kerala, including information on their diversity, distribution, threats and conservation. Information provided in this report will hopefully form the basis for raising the profile of freshwater fish in the state, and facilitate the development and implementation of future conservation action.

Local fishers preparing for monsoon floodplain (Ootha) fish © CP Shaji

Background

Freshwater biodiversity is in a state of global crisis [1]. Since 1900, the world has lost between 61–74% of its wetlands [2] and populations of freshwater dependent species have declined drastically compared to those in terrestrial and marine environments [3]. This has led to one in three freshwater-dependent species being assessed as threatened with extinction [4], and multiple anthropogenic stressors continuing to significantly impact critical habitats [5–6]. Despite this precarious state, there is very little awareness, attention and investment for freshwater biodiversity conservation [7–9], and it is also often overlooked in global assessments, investment mechanisms and targets (for e.g., CBD Aichi 2020 Targets and the Sustainable Development Goals/SDGs).

Freshwater fish are extremely diverse with 18,118 species [10] comprising a little more than 50% of the world's known fish species. This number is expected to only increase, as an average of close to 250 new species of freshwater fish continues to be described every year [11]. Freshwater fish are vital to global food security and livelihoods, particularly in the developing world. Global inland (primarily freshwater) fish catch is around 16 million tons, and equivalent to the total animal protein consumption of 36 million people [12] mostly in Low-Income Food Deficit Countries. Despite these striking statistics, freshwater fish have become one of the most threatened vertebrate groups on the planet. Of around 10,000 species of freshwater fish assessed by the IUCN, 80 species have already been declared extinct, and close to one-third threatened with extinction [13–14].

Scope and Definitions

The geographical scope of this report is the State of Kerala, and its political boundaries. Endemism is therefore defined in the context of the State of Kerala, and so are aspects like population status and trends (since the year 2000), habitat type and trends, levels of exploitation, other threats and conservation needs/requirements.

Freshwater fish has been defined as those species that spend their entire (or a significant part of) life including their spawning period in strict freshwater habitats, and catadromous species (such as anguillid eels) which perform obligatory migrations between freshwater and marine habitats (including using estuaries and backwater systems). Therefore, typical marine or estuarine fish species that intermittently enter freshwater habitats are excluded from this checklist. Also excluded are exotic/alien fishes that have been introduced either legally or illegally (which may or may not have become invasive).

Family level taxonomy follows the most recent work of Nelson and colleagues [15] and the updated version (May 2021) of Catalog of Fishes [10] with some exceptions. In the case of groups for which recent comprehensive taxonomic revisions are available, for e.g., loaches of the sub order Cobitoidea [16], Cypriniformes [17], these are followed. General definitions concerning taxonomy and nomenclature follow the work of Kottelat [16].

For information on distribution including those related to protected areas, only the state of Kerala has been considered - even in the case of species not endemic to the state.

We have excluded all 'species names' published in predatory 'open-access' journals from this report. Predatory journals are defined as fake, scam, unscholarly and deceptive journals that compromise the peer-review procedure and require authors to 'pay-to-publish', apparently the only criteria for publication [18–19]. For detailed discussion on the issue of predatory journals and their influence and impacts on Indian freshwater ichthyology (including those from Kerala), please refer to two important publications [20–21]. Please also refer to Annexure 1 for the species which were excluded.

The conservation status of fish species mentioned in this report follows the IUCN Red List of Threatened Species™ [13] unless otherwise mentioned.

Freshwater Fishes of Kerala – taxonomic overview

Total Orders: 14; Families: 36; Genera: 84; Species: 196.
Endemic Families: 2 (Aenigmachannidae; Kryptoglanidae)
Endemic Genera: 7 (8%) *(Aenigmachanna, Horaglanis, Kryptoglanis, Lepidopygopsis, Neochela, Pseudeutropius, Travancoria)*
Endemic Species: 53 (27%)
Monotypic Genera: 5 *(Dayella, Eechathalakenda, Ehirava, Lepidopygopsis, Neochela)*

Species in Focus I

Dragon Snakehead, *Aenigmachanna gollum*

An ancient (~100 million years) lineage of Gondwanan origin

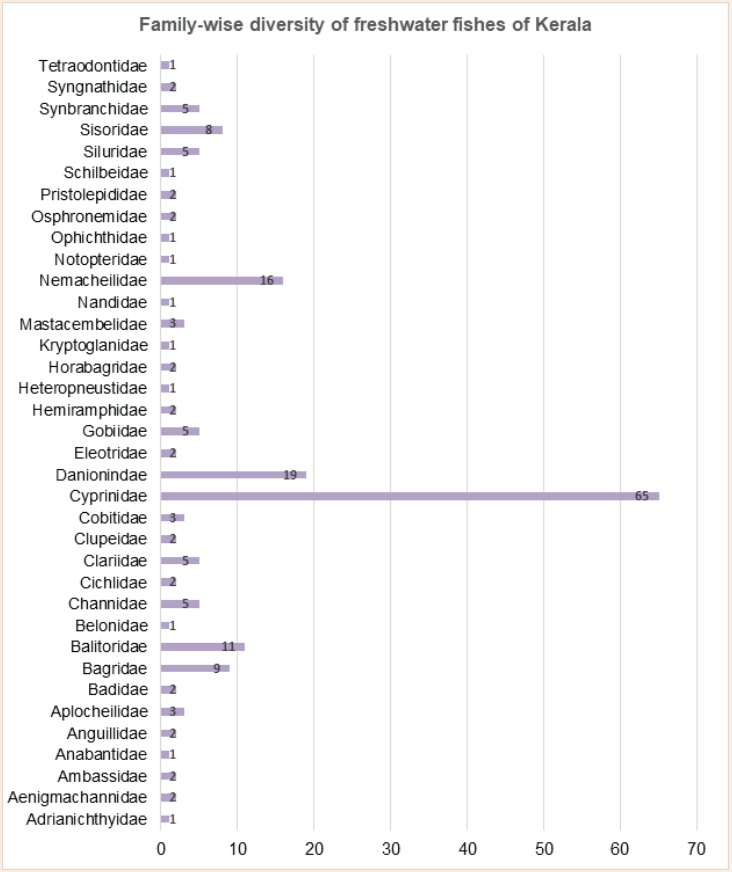
© Ralf Britz

Distribution: Kozhikode, Malappuram, Thrissur and Ernakulam Districts. Likely to exist as fragmented populations

Habitat: Known to occur in the floodplains and adjoining paddy fields, wetlands and agro-plantations. Likely to occur in lateritic aquifers and connected groundwater systems

Threats: Pollution, Reclamation of wetlands and paddy fields, unmanaged groundwater extraction

IUCN Red List Status: Not Assessed; Likely to qualify for a threatened category (Endangered) as a result of its fragmented distribution, ongoing threats and continuing decline to critical habitats, and a presumed low population size.



Species in Focus II

Peninsular Barb, *Lepidopygopsis typus*

A monotypic, evolutionarily distinct lineage of cyprinid fish

© VK. Anoop

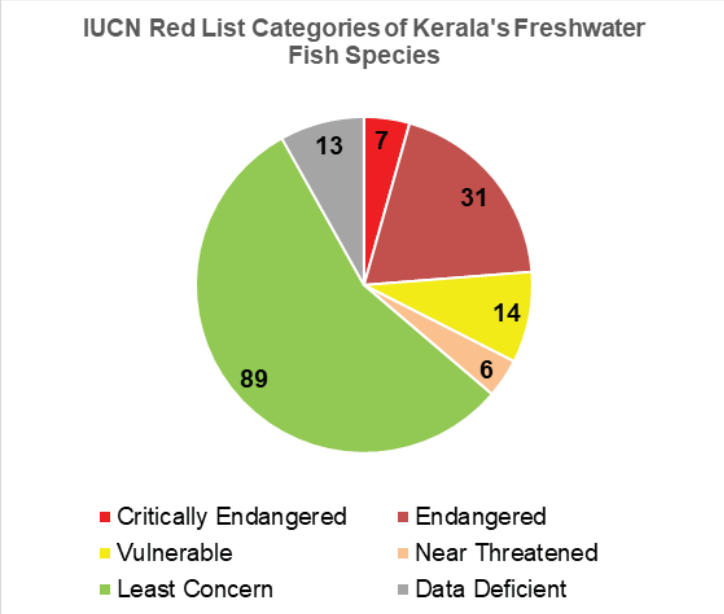
Distribution: Restricted to the upper reaches of the Periyar River inside the Periyar Tiger Reserve

Habitat: Fast-flowing streams and pool-riffles

Threats: Alien species and future impacts of climate change

IUCN Red List Status: Endangered

Threatened fishes of Kerala based on the IUCN Red List



All species of freshwater fishes occurring in Kerala described until the years 2009/2010 was assessed against the Categories and Criteria of the IUCN Red List in a project on the IUCN Red Listing of freshwater biodiversity of Western Ghats undertaken during 2010/2011. The conservation status of these species are available as detailed species accounts from www.iucnredlist.org. No species of freshwater fish found in Kerala are declared either 'Extinct' or 'Extinct in the Wild'. There are also no species that has been assessed as 'Critically Endangered with a tag that it is likely extinct'. Currently, there are 53 species of threatened freshwater fishes in Kerala.

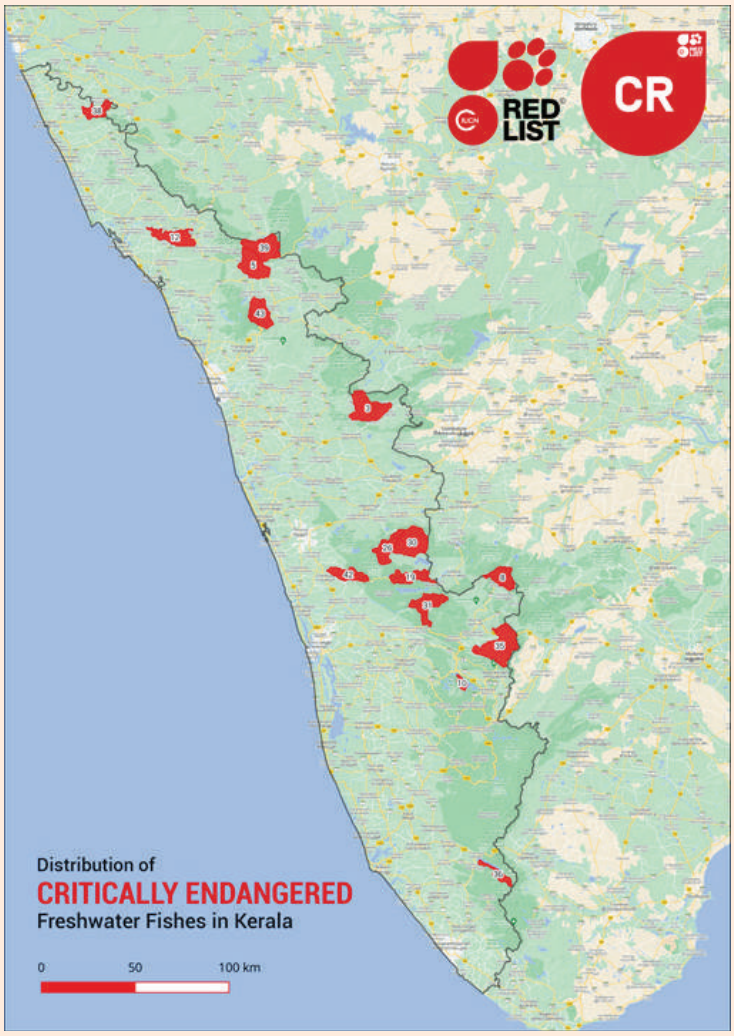
Subsequent to the IUCN Red List assessments in 2011, the literature on freshwater fishes of Kerala has increased both in quantity and quality. The conservation status of many species is now likely to be outdated (and changed) as a result of new data generated during the last ten years. These are discussed under the various species accounts.

Distribution of Critically Endangered Freshwater Fish Species*

Garra arunachalami (35), *Hemibagrus punctatus* (3,5,8), *Hypselobarbus thomassi* (10,12,30,31, 36,38,42)

Mesonoemacheilus herrei (19,26), *Neolissochilus wynaadensis* (5,39,43) , *Pethia pookodensis* (5,39,43)

Tor remadevii (3,5,8,39,43)



*Only those sub-basins containing major populations have been mapped**

***Garra arunachalami* (Cyprinidae)**
Critically Endangered

Malayalam Name: അരുണാചലം കല്ലൊട്ടി
Endemism: Kerala
Distribution in Kerala: Panniyar tributary of Periyar River; Districts: Idukki
Habitats: Small riffles, rocky streams and rivulets with swift to turbulent water flow
Population Status: Unknown; but likely to have declined as a result of continuous threats in its habitat
Threats: Pollution from nearby human settlements; use of pesticides in plantations; flow regulations as a result of water holding structures in plantations; alien species; run-off from the automobile workshops and other small-scale industries in the landscape.
Exploitation: Not known
Occurrence in Protected Area: Likely inside the Shola National Parks
WPA/CITES/CMS: No
Conservation status: Critically Endangered
Conservation needs: Maintaining minimum environmental flows; managing alien species; can be considered as a flagship fish species of the Shola National Parks and the Santhampara hill landscape so as to increase profile and bring in the required awareness among local communities
Stakeholders: Kerala State Forest and Wildlife Department (including Plantation Corporation of Kerala); Private Plantation Holdings; Kerala State Biodiversity Board
Traditional Knowledge: Local communities call the species as Ennapandian
Research needs: Population; Ecology

Hemibagrus punctatus (Bagridae)
Critically Endangered
Malayalam Name: ഏട്ടക്കൂരി, ഏട്ട
Endemism: Western Ghats
Distribution in Kerala: Bhavani, Kabini and Pambar Rivers, and adjoining reservoirs
Districts: Palakkad; Wayanad; Idukki
Habitats: Rapid rivers and clear water streams; also known to occur in midland areas with slow to moderate

flow, poor vegetation cover, and with mud, sand and gravel as the major substrates; confined to large rocky pools during summer and the day-time

Population Status: Declining

Threats: Indiscriminate fishing often using destructive methods; fishing of mature individuals during breeding season; changes in river flow including drying of pools in the summer

Exploitation: High levels of exploitation (as a food fish)

Occurrence in Protected Area: Wayanad WLS

WPA/CITES/CMS: No

Conservation status: Critically Endangered; this conservation status needs to be reassessed as new information on distribution and threats is available since the last IUCN Red List assessment in 2011. Likely to trigger the 'Endangered' category.

Conservation needs: Maintaining minimum environmental flows; development of a breeding technology; protecting large pools in rivers; enforcing catch-size and mesh restrictions through the inland fisheries act and penalization on violation.

Stakeholders: Kerala State Fisheries Department, Irrigation Department, Kerala State Forest and Wildlife Department; Kerala State Biodiversity Board

Traditional Knowledge: Not documented

Research needs: Population; Life history; Ecology

Hypselobarbus thomassi (Cyprinidae)

Critically Endangered

Malayalam Name: ചെമ്പൻ കൂരൽ

Endemism: Western Ghats

Distribution in Kerala: Not clearly known. Confirmed records are available from Chandragiri, Valapattanam, Chalakudy, Periyar and Kallada Rivers including reservoirs in these basins.

Districts: Kollam, Ernakulam, Thrissur, Idukki, Kannur, Kasargod

Habitats: Benthopelagic, inhabits large streams and rivers in pool-riffle and run and glide habitats (only juveniles) of fast to moderately flowing streams and rivers having riparian vegetation; adults of the species always dwell in moderately deep pools; also occur in the reservoirs of the major river systems where the species is found

Population Status: Declining

Threats: Indiscriminate fishing often using destructive methods; changes in river flow including drying of pools in the summer

Exploitation: High levels of exploitation particularly in reservoirs (as a food fish) in Chalakudy and Kallada

Occurrence in Protected Area: Aralam WLS, Shendurney WLS

WPA/CITES/CMS: No

Conservation status: Critically Endangered; this conservation status needs to be reassessed as new information on distribution and threats is available since the last IUCN Red List assessment in 2011. Likely to trigger the 'Vulnerable' category.

Conservation needs: Maintaining minimum environmental flows; strict enforcement of fisheries act through ensuring mesh size regulations and catch quotas; complete ban on fishing during the breeding season and regulation on collection of individuals below the size at first maturity based on recent research; develop conservation hatcheries

Stakeholders: Kerala State Fisheries Department, Kerala State Forest and Wildlife Department; Kerala **State Electricity Board;** Kerala State Tribal Department

Traditional Knowledge: Not documented

Research needs: Distribution; Population

Mesonoemacheilus herrei (Nemacheilidae)

Critically Endangered

Malayalam Name: ആനമല കൊയ്മ

Endemism: Western Ghats

Distribution in Kerala: Not clearly known. Confirmed records are available from the upper reaches of Bharathapuzha and Chalakudy. A morphologically similar 'species' is also known from the Bhavani.

Districts: Palakkad, Thrissur

Habitats: Stream with clear, fast-flowing water that is well-oxygenated, and a substrate made up of rock, cobbles, gravel, and sand; extremely sensitive to changes in water temperature and flow; prefer riparian canopy shade and an epilithic layer of microbes and debris; also found among the leaf litter trapped in between the cobbles and pebbles in the shore margins of fast flowing streams.

Population Status: Declining

Threats: Deterioration of water quality; run-off of pesticides from plantations; likely to be impacted by climate-change associated alterations to its habitats in the upper-reaches

Exploitation: Not known

Occurrence in Protected Area: Parambikulam WLS

WPA/CITES/CMS: No

Conservation status: Critically Endangered; this conservation status needs to be reassessed as new information on distribution and threats is available since the last IUCN Red List assessment in 2011. Likely to trigger the 'Endangered' category.

Conservation needs: Maintaining minimum environmental flows; ensuring pesticides do not reach critical habitats

Stakeholders: Kerala State Forest and Wildlife Department (including Plantation Corporation); Private Plantation Holdings; Kerala State Biodiversity Board

Traditional Knowledge: Not documented

Research needs: Distribution; Population; Minimum environmental flow.

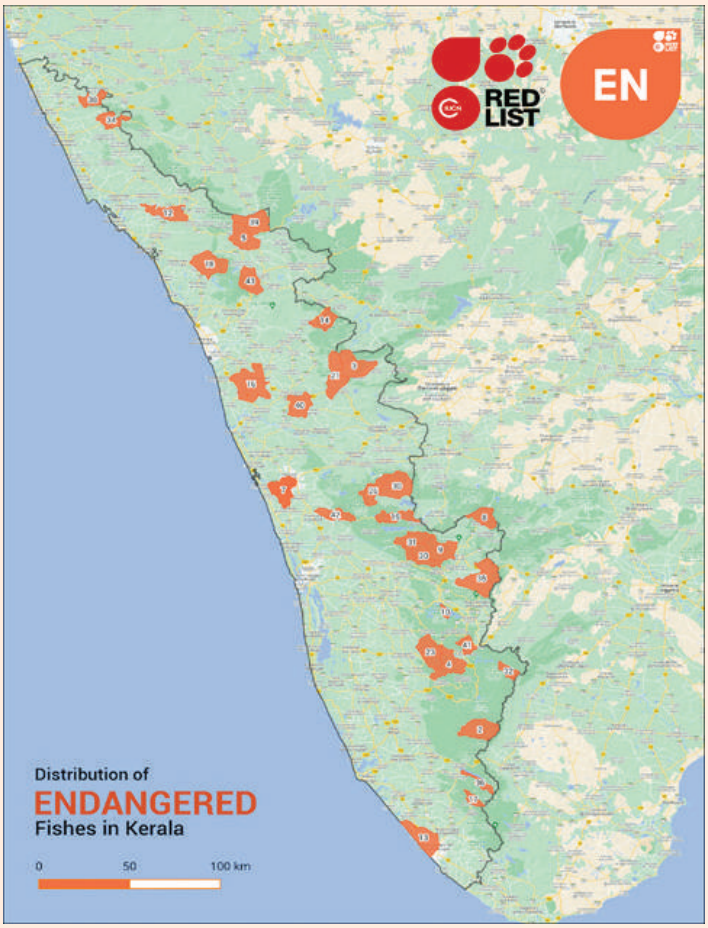
Neolissochilus wynaadensis (Cyprinidae)
Critically Endangered
Malayalam Name: മഞ്ഞ കടന്ന,
വയനാടൻ കുറുവ, വയനാടൻ പരൽ
Endemism: Western Ghats
Distribution in Kerala: Noolpuzha Stream of Kabini River inside the Wayanad Wildlife Sanctuary as well as streams near Vythiri in Wayanad. Also, from streams near Periya and Thirunelly
Districts: Wayanad
Habitats: Intermittent pools in the slow to moderately flowing streams with thick riparian cover; juveniles prefer the shallow marginal areas of the stream with canopy and instream habitat cover, where the silt, sand, gravel and pebbles being the chief substrates.
Population Status: Declining
Threats: Loss of critical habitats; poaching by local communities; alterations in flow regimes; future impacts to upstream habitats due to climate change
Exploitation: High (as food fish)
Occurrence in Protected Area: Wayanad WLS
WPA/CITES/CMS: No
Conservation status: Critically Endangered; this conservation status needs to be reassessed as new information on distribution and threats is available since the last IUCN Red List assessment in 2011. Likely to trigger the 'Endangered' category.
Conservation needs: Maintaining minimum environmental flows; riparian afforestation; enforcement of fishing laws and regulations; awareness among locals; development of captive breeding technology
Stakeholders: Kerala State Fisheries Department, Kerala State Forest and Wildlife Department; Kerala State Tourism Department; Kerala State Biodiversity Board
Traditional Knowledge: Not documented
Research needs: Distribution; Population; Ecology (migration)

Pethia pookodensis (Cyprinidae)
Critically Endangered
Malayalam Name: പൂക്കോടൻ പരൽ
Endemism: Kerala
Distribution in Kerala: Wayanad District; Districts: Wayanad
Habitats: Diverse habitats ranging from the shallow margins of the lakes, pools and still areas of the shoreline of streams and streamlets flowing at a moderate speed; among rooted aquatic vegetation in these habitats where the substrate type ranges from silt to pebbles.
Population Status: Stable.
Threats: No species-specific threats
Exploitation: Not known
Occurrence in Protected Area: Wayanad WLS
WPA/CITES/CMS: No
Conservation status: Critically Endangered; this conservation status needs to be reassessed as new information on distribution and threats is available since the last assessment in 2011. The species is now known to be common, and widely distributed throughout the ponds, lakes and rivers of Wayanad district. The conservation status of the species would need to be down-listed to 'Least Concern'.
Conservation needs: Monitoring of populations in known habitats
Stakeholders: Kerala State Fisheries Department, Kerala State Forest and Wildlife Department; Kerala State Tourism Department
Traditional Knowledge: Not documented
Research needs: Population; Ecology

Tor remadevii (Cyprinidae)
Critically Endangered
Malayalam Name: കുയിൽ മീൻ, കുയിൽ
Endemism: Western Ghats
Distribution in Kerala: Kabini, Bhavani, Pambar;
Districts: Idukki, Palakkad, Wayanad
Habitats: Adult individuals prefer moderate to deep pools in the fast-flowing streams whereas those of the juveniles are restricted to the cascades, glides and runs and slow riffles in the stream course; species has also adapted to the deep lotic habitats of the reservoirs where it performs lateral migration
Population Status: Declining
Threats: Poaching; Habitat loss; Pollution; Alien species
Exploitation: High (outside protected areas), medium (in buffer zones of PAs) – used as food fish
Occurrence in Protected Area: Wayanad WLS, Chinnar WLS
WPA/CITES/CMS: No
Conservation status: Critically Endangered
Conservation needs: As the rarest mahseer in the world and a species that has shown catastrophic declines in its range, this species needs immediate protection under the Indian Wildlife Protection Act; can be considered a flagship aquatic species of the Chinnar and Wayanad WLS so as to raise the profile of freshwater fish conservation; pilot-scale/controlled reintroduction programs based on international guidelines and regular monitoring
Stakeholders: Kerala State Fisheries Department, Kerala State Forest and Wildlife Department, Kerala Tourism Development Corporation
Traditional Knowledge: Considered sacred by forest-dwelling tribes
Research needs: Population; Ecology (migration); Life History; Population Genetics

Distribution of Endangered Freshwater Fish Species*

Dawkinsia arulius (5, 39, 43), Dawkinsia exclamatio (17), Devario neilgherriensis (5, 39,43), Eechathalakenda ophicephalus (4, 23,41), Garra hughi (8,9), Garra surendranathanii (2,4,30,31,41,42), Ghatsa montana (19, 26), Ghatsa santhamparaiensis (35), Glyptothorax anamalaiensis (14,19,26), Glyptothorax davissinghi (14), Glyptothorax housei (19, 26), Glyptothorax madraspatanus (3,5,39), Horabagrus nigricollaris (31, 42), Hypselobarbus dubius (5), Hypselobarbus micropogon (5), Hypselobarbus periyarensis (32), Lepidopygopsis typus (32), Mesonoemacheilus pulchellus (not mapped), Ophichthys fossorius (7, 11, 13, 16), Opsarius canarensis (12, 34, 38), Osteochilichthys longidorsalis (31,40,42), Pseudeutropius mitchelli (2,4,21,31,38,40,41,42), Pterocryptis wynaadensis (5,39,43), Puntius cauveriensis (5,39), Sahyadria denisonii (14,18,21,40). Sahyadria chalakkudiensis (2, 4, 23, 31, 42), Schistura striata (5,39),Tariqilabeo periyarensis (32), Tor malabaricus (12,14,18,21,38), Travancoria elongata (30,31,32,40),Travancoria jonesi (30, 31,40)



*Only those sub-basins containing major populations have been mapped**

Dawkinsia arulius (Cyprinidae)

Endangered

Malayalam Name: അറുളി പരൽ, ചിറ പുള്ളിച്ചി

Endemism: Western Ghats

Distribution in Kerala: Kabini Districts: Wayanad

Habitats: Moderate to fast flowing streams and streamlets with sand, pebbles and cobbles being the major substrates; affinity towards intermittent pools in the stream course and to the moderately deep bank areas of the stream with canopy cover; outside the forested areas, the species is found in clear-waters with rooted aquatic vegetation.

Population Status: Declining

Threats: Habitat loss; Pollution; loss of canopy cover and riparian vegetation

Exploitation: Low (for the aquarium trade)

Occurrence in Protected Area: Wayanad WLS

WPA/CITES/CMS: No

Conservation status: Endangered

Conservation needs: Monitoring of populations outside the protected area network; ensuring sustenance of riparian vegetation and prevention of bank erosion and alteration of substrates

Stakeholders: Kerala State Forest and Wildlife Department

Traditional Knowledge: Not documented

Research needs: Distribution; Population; Ecology; Captive breeding.

Dawkinsia exclamatio (Cyprinidae)

Endangered

Malayalam Name: ആശാരി പരൽ

Endemism: Kerala

Distribution in Kerala: Kallada River - Umayar and Kulathupuzhayar, including Thenmala and Shendurney

WLS; Districts: Kollam

Habitats: Middle reaches of rivers and likely in feeder canals of reservoirs; found in association with other filament-barbs of the region; hide in the crevices and intermittent pools in the stream course with moderate to fast flow and canopy cover. During the flooded season, it disperses to the low-lying areas.

Population Status: Unknown

Threats: Habitat loss; Pollution; Alien species; Exploitation

Exploitation: Low (as food fish, and for the aquarium trade)

Occurrence in Protected Area: Shendurney WLS

WPA/CITES/CMS: No

Conservation status: Endangered

Conservation needs: Monitoring of populations outside the protected area network.

Stakeholders: Kerala State Forest and Wildlife Department; Kerala State Fisheries Department; Kerala State Biodiversity Board

Traditional Knowledge: Not documented

Research needs: Distribution; Population; Ecology

Devario neilgherriensis (Danionidae)
Endangered
Endemism: Western Ghats
Distribution in Kerala: Kabini ; Districts: Wayanad
Habitats: Fast-flowing, clear water streams with dense canopy cover; sand, pebble, bedrock and boulder are the preferred substrates.
Population Status: Declining
Threats: Habitat loss; Pollution; Alien species
Exploitation: Not known
Occurrence in Protected Area: Wayanad WLS
WPA/CITES/CMS: No
Conservation status: Endangered
Conservation needs: Protection of river channels and riparian forests; enforcement of strict policies on sand mining; sewage disposal and river protection
Stakeholders: Kerala State Forest and Wildlife Department; Kerala State Biodiversity Board
Traditional Knowledge: Not documented
Research needs: Distribution; Population; Ecology

Eechathalakenda ophicephalus (Cyprinidae)
Endangered
Malayalam Name: ഈറ്റിലക്കണ്ട
Endemism: Western Ghats
Distribution in Kerala: Upper reaches of the Periyar, Pampa and Meenachil.
Districts: Idukki, Kottayam, Pathanamthitta
Habitats: Rocky pools in which decaying vegetation is present in large quantities; always found in the shallow- to moderately-deep bank areas of the streams and streamlets with thick canopy cover especially bamboo reeds; also found in the crevices and holes among the bamboo reed roots and the sinuous portions of the stream course, where the substrate ranges from silt-laden sand to cobbles; juveniles of the species are found to forage in the marginal areas of the streams but the adults hide in the crevices and pools where their body colour matches the surroundings.
Population Status: Unknown
Threats: Deforestation and loss of canopy cover; pollution
Exploitation: Low (mostly as bycatch)
Occurrence in Protected Area: Periyar NP
WPA/CITES/CMS: No
Conservation status: Endangered
Conservation needs: Monitoring of populations; managing riparian vegetation
Stakeholders: Kerala State Forest and Wildlife Department; Kerala State Biodiversity Board
Traditional Knowledge: Not documented
Research needs: Population; Life history; Ecology

Garra hughi (Cyprinidae)
Endangered
Malayalam Name: വെണ്ണക്കല്ലൊട്ടി
Endemism: Western Ghats
Distribution in Kerala: Periyar and Pambar Rivers. A morphologically similar species occurs in the Neyyar and Vamanapuram rivers, but their conspecificity to topotypic G. hughi needs to be determined.
Districts: Idukki
Habitats: Benthopelagic fish associated with mountain streams; juveniles occur in more clean waters closer to the banks and in pools and puddles along the course of the stream; adult individuals are found foraging on the epi-periphytonic mass on the cobbles and boulders of the wide, fast flowing wide streams.
Population Status: Unknown
Threats: Alterations in river flow; pollution from plantations and human settlements; future impacts of climate change in the upper reaches
Exploitation: Not known
Occurrence in Protected Area: Eravikulam NP, Chinnar WLS
WPA/CITES/CMS: No
Conservation status: Endangered
Conservation needs: Monitoring of populations; managing riparian vegetation
Stakeholders: Kerala State Forest and Wildlife Department (including Plantation Corporation); private plantation holdings; Kerala State Biodiversity Board
Traditional Knowledge: Not documented
Research needs: Distribution; Population; Life history; Ecology

Garra surendranathanii (Cyprinidae)
Endangered
Malayalam Name: കുറുമ്പൻ കല്ലൊട്ടി
Endemism: Kerala
Distribution in Kerala: Chalakudy, Periyar, Achankovil, Pamba;Districts: Thrissur, Idukki, Pathanamthitta
Habitats: Torrential streams where they inhabit stream reaches such as glides, runs, step pools, cascades, rapids and fast flowing riffles; during spawning season, it migrates to the upstream habitats through the glides and fast flowing riffles; juveniles usually found associated with sand and gravel in the riffles.
Population Status: Unknown
Threats: Habitat loss; Pollution; Collection for the aquarium trade
Exploitation: Low (for the aquarium trade)
Occurrence in Protected Area: Periyar NP, Parambikulam WLS
WPA/CITES/CMS: No
Conservation status: Endangered
Conservation needs: Maintenance of flow; restoration of riparian vegetation; monitoring of populations outside protected areas
Stakeholders: Kerala State Forest and Wildlife Department, Kerala State Biodiversity Board
Traditional Knowledge: None
Research needs: Population

Ghatsa montana (Balitoridae)
Endangered
Malayalam Name: പച്ച കൽനക്കി, കാടൻ കൽനക്കി, വെളുമ്പൻ കൽനക്കി
Endemism: Western Ghats
Distribution in Kerala: Chalakudy and Bharathapuzha;
Districts: Thrissur and Palakkad
Habitats: Torrential Mountain streams where they are seen attached to substrates such as pebbles, cobbles and small rocks; in the narrow streams and rivulets inside the plantations, the species is found associated with gravel and pebbles with rooted aquatic vegetation along the banks.
Population Status: Declining
Threats: Loss of critical habitats; pollution from plantations; alien species; future impacts of climate change in the upper reaches; landslides and associated stream habitat substrate alteration; removal of riparian vegetation and associated stream bank erosion
Exploitation: Not known
Occurrence in Protected Area: Parambikulam WLS
WPA/CITES/CMS: No
Conservation status: Endangered
Conservation needs: Maintenance of flow, monitoring of populations inside plantation-based streams; eradication of alien species from habitat; region specific afforestation programmes in river banks, and protection of canopy
Stakeholders: Kerala State Forest and Wildlife Department (including Plantation Corporation); private plantation holdings; Kerala State Biodiversity Board
Traditional Knowledge: Not documented
Research needs: Distribution; Population; Impact of plantation-based pollutants

Ghatsa santhamparaiensis (Balitoridae)
Endangered
Malayalam Name: കൽക്കാരി
Endemism: Kerala
Distribution in Kerala: Periyar (Panniyar tributary) ; Districts: Idukki
Habitats: torrential mountain streams where they are seen attached to substrates such as pebbles, cobbles and small rocks
Population Status: Declining
Threats: Pollution; use of pesticides in plantations; flow regulations as a result of water holding structures in plantations; alien species; future impacts of climate change on upstream habitats; erosion of stream banks resulting alteration of substrate structure and increased siltation.
Exploitation: Not known
Occurrence in Protected Area: Likely to occur in Shola National Parks
WPA/CITES/CMS: No
Conservation status: Endangered
Conservation needs: Maintenance of flow, monitoring of populations inside plantation-based streams; protection of riparian cover and stream bank stability; eradication of alien species maintaining minimum environmental flows; can be considered as a flagship fish species of the Shola National Parks and the Santhampara hill landscape so as to increase profile and bring in the required awareness among, and attention of local communities
Stakeholders: Kerala State Forest and Wildlife Department (including Plantation Corporation); private plantation holdings; Kerala State Biodiversity Board
Traditional Knowledge: Not documented
Research needs: Distribution; Population; Impact of plantation-based pollutants

Glyptothorax anamalaiensis (Sisoridae)
Endangered
Malayalam Name: വെള്ളിക്കെട്ടൻ പാറക്കൂരി, വെളുമ്പൻ കൽക്കാരി
Endemism: Western Ghats
Distribution in Kerala: Bharathapuzha, Chaliyar and Chalakudy. Records from other river systems (e.g., Achankovil, Pampa) need to be verified, and may comprise a distinct yet-to-be described species.
Districts: Malappuram, Palakkad, Thrissur
Habitats: Torrential Mountain streams where they occur in small cascades, rapids or riffle pools with boulders, and sometimes sand as the substrate; adults' dwell in streams with moderate to torrential flow chiefly with sand, gravel and pebbles as the substrate, while juveniles of the species prefer living buried in the sandy to gravely bed of the stream.
Population Status: Declining
Threats: Pollution; use of pesticides in plantations; flow regulations as a result of water holding structures in plantations; sand mining, stream bank erosion and water abstraction activities
Exploitation: Not known
Occurrence in Protected Area: Karimpuzha WLS, Parambikulam WLS
WPA/CITES/CMS: No
Conservation status: Endangered
Conservation needs: Maintenance of flow, monitoring of populations inside plantation-based streams; afforestation programmes to ensure canopy density and prevent stream bank erosion
Stakeholders: Kerala State Forest and Wildlife Department (including Plantation Corporation); Kerala State Biodiversity Board
Traditional Knowledge: Not documented
Research needs: Distribution; Population; Ecology

Glyptothorax davissinghi (Sisoridae)
Endangered
Malayalam Name: ഇരുളൻ പാറക്കൂരി
Endemism: Kerala
Distribution in Kerala: Chaliyar;
Districts: Malappuram
Habitats: Torrential streams, where they are found restricted to rapids, step pools, fast flowing riffles and cascades
Population Status: Not known
Threats: Mortality during destructive fishing practices for other large-bodied species; alteration of flow patterns
Exploitation: Medium (bycatch – plant poison-based fishing)
Occurrence in Protected Area: Karimpuzha WLS
WPA/CITES/CMS: No
Conservation status: Endangered
Conservation needs: Maintenance of flow; monitoring of populations
Stakeholders: Kerala State Forest and Wildlife Department
Traditional Knowledge: Not documented
Research needs: Distribution; Population; Ecology

Glyptothorax housei (Sisoridae)
Endangered
Malayalam Name: കൽക്കാരി
Endemism: Western Ghats
Distribution in Kerala: Chalakudy, Bharathapuzha. Records from Periyar and Pambar needs verification after comparisons to topotype; Districts: Palakkad, Thrissur
Habitats: Torrential streams, where they are found restricted to rapids, step pools, fast flowing riffles and cascades.
Population Status: Declining
Threats: Pollution; use of pesticides in plantations; flow regulations as a result of water holding structures in plantations; land use changes and stream bank erosion
Exploitation: Not known
Occurrence in Protected Area: Parambikulam WLS
WPA/CITES/CMS: No
Conservation status: Endangered
Conservation needs: Maintenance of flow; monitoring of populations inside plantation-based streams; afforestation programmes and protection of river banks
Stakeholders: Kerala State Forest and Wildlife Department (including Plantation Corporation); Kerala State Biodiversity Board
Traditional Knowledge: Not documented
Research needs: Taxonomy; Distribution; Population; Ecology

Glyptothorax madraspatanus (Sisoridae)
Endangered
Malayalam Name: മഞ്ഞവയറൻ പാറക്കൂരി, മഞ്ഞവളയൻ കൽക്കാരി
Endemism: Western Ghats
Distribution in Kerala: Bhavani and Kabini; Districts: Palakkad, Wayanad
Habitats: Torrential streams, where they are found restricted to rapids, step pools, fast flowing riffles and cascades; juveniles prefer fast flowing riffles with sandy to gravely substrate.
Population Status: Declining
Threats: Pollution; alterations in flow
Exploitation: Not known
Occurrence in Protected Area: Wayanad WLS, Silent Valley NP
WPA/CITES/CMS: No
Conservation status: Endangered
Conservation needs: Maintenance of flow; monitoring of populations; restoration of degraded stream habitats; stream habitat-specific afforestation programmes and prevention bank erosion.
Stakeholders: Kerala State Forest and Wildlife Department; Kerala State Biodiversity Board
Traditional Knowledge: Not documented
Research needs: Distribution; Population; Ecology

Horabagrus nigricollaris (Horabagridae)
Malayalam Name: കരിംകഴുത്തൻ മഞ്ഞക്കൂരി, കരിംകഴുത്തൻ മഞ്ഞളേട്ട
Endangered
Endemism: Western Ghats
Distribution in Kerala: Periyar and Chalakudy ;
Districts: Ernakulam and Thrissur
Habitats: Pools and riffles; prefer deep-pools in the middle part of the stream; nocturnal species preferring to hide in the deep pools; forage in the crevices of the stream bank vegetation, step pool reaches, as well as among the leaf litter in the shallow, sandy areas of the river bank.
Population Status: Declining
Threats: Indiscriminate fishing; alterations in flow
Exploitation: Medium (as food fish and for the aquarium trade)
Occurrence in Protected Area: No
WPA/CITES/CMS: No
Conservation status: Endangered
Conservation needs: Maintenance of flow; monitoring of populations; enforcement of fisheries laws and regulations; identification of deep-pools and protecting them with support of local communities
Stakeholders: : Kerala State Forest and Wildlife Department; Kerala State Tourism Department; Kerala State Biodiversity Board
Traditional Knowledge: Not documented
Research needs: Populatopn ecology

Hypselobarbus dubius (Cyprinidae)
Endangered
Malayalam Name: മാമ്പുൾ, കല്ലുരുട്ടി കൂരൽ
Endemism: Western Ghats
Distribution in Kerala: Kabini; likely to be present in Bhavani ; Districts: Wayanad, Palakkad
Habitats: Deep pools and in the main river channel with fast flowing water, having large boulders, sand and pebbles as substrate; recorded only from the reaches of the river with clear water and dense riparian canopy cover; longitudinal migration within the river channel during the winter period and is observed to collect pebbles with their mouth creating small heaps - presumably for spawning, hence the local name "Kallurutti kooral"; juveniles are found in shoals in the shallow sandy areas of the river bank with leaf litter and riparian cover; also inhabit the reservoirs
Population Status: Declining
Threats: Habitat loss due to river channel modification; substrate modification; deforestation; siltation; damming; over fishing and invasive species
Exploitation: High (outside protected areas), Low (inside protected areas) – as food fish
Occurrence in Protected Area: Wayanad WLS
WPA/CITES/CMS: No
Conservation status: Endangered
Conservation needs: Protection of river channels and riparian forests; enforcement of strict policies on sand mining, sewage disposal and river protection, land use changes and associated stream bank erosion and destructive fishing practices
Stakeholders: Kerala State Forest and Wildlife Department; Kerala State Biodiversity Board
Traditional Knowledge: Considered sacred by forest-dwelling tribes
Research needs: Populatopn ecology

Hypselobarbus micropogon (Cyprinidae)
Endangered
Malayalam Name: കോഴിമീൻ
Endemism: Western Ghats
Distribution in Kerala: Kabini River; however, the species is likely to be present in Bhavani River
Districts: Wayanad, Palakkad
Habitats: Main River channel with fast-flowing clear water, having large boulders- bedrock assemblages, with sand and pebbles as substrate and dense riparian canopy cover. The species is observed to collect pebbles with their mouth creating small heaps - presumably for spawning, hence the local name "Kallunthi"; juveniles forage in shoals in the shallow sandy marginal areas of the sinuous stream with leaf litter deposition and overhanging canopy; also found in reservoirs.
Population Status: Declining
Threats: Habitat loss due to river channel modification; substrate modification; deforestation; siltation; damming and alien species; intolerant to siltation and easily perish in regions with continuous disturbance to substrates; land use change associated stream bank erosion.
Exploitation: Medium (outside protected areas) – as food fish
Occurrence in Protected Area: Wayanad WLS
WPA/CITES/CMS: No
Conservation status: Endangered
Conservation needs: Protection of river channels and riparian forests; enforcement of strict policies on sand mining, sewage disposal and river protection.
Stakeholders: Kerala State Forest and Wildlife Department; Kerala State Biodiversity Board
Traditional Knowledge: Considered sacred by forest-dwelling tribes
Research needs: : Population; Distribution; Ecology

Hypselobarbus periyarensis (Cyprinidae)
Endangered
Malayalam Name: കരിയാൻ
Endemism: Kerala
Distribution in Kerala: Periyar ; Districts: Idukki
Habitats: Adults prefer moderate to deep pool habitats of the fast-flowing streams; juveniles in the shallow marginal areas of the streams as well as the riffle- step pool reaches of the streams with overhanging vegetation; also seen in the lacustrine system within the protected area.
Population Status: Stable
Threats: Bycatch; Alien species; Future impacts of climate change
Exploitation: Medium (as bycatch)
Occurrence in Protected Area: Periyar NP
WPA/CITES/CMS: No
Conservation status: Endangered
Conservation needs: Monitoring of habitats for alien species; managing bycatch; regulation of fishing practices and fixing of minimum legal size.
Stakeholders: Kerala State Forest and Wildlife Department
Traditional Knowledge: Not documented
Research needs: Impacts of alien species; Population; Ecology

Lepidopygopsis typus (Cyprinidae)
Endangered
Malayalam Name: ബ്രാഹ്മണകണ്ട
Endemism: Kerala
Distribution in Kerala: Periyar ; Districts: Idukki
Habitats: Adults inhabiting moderate to deep pools with sandy to bedrock substrate in the turbulent clear water streams; juveniles forage in shoal in shallow

marginal areas, glide and slow flowing riffle habitats of the streams with overhanging vegetation.
Population Status: Stable
Threats: Bycatch; Alien species; Future impacts of climate change
Exploitation: Low to medium (as bycatch)
Occurrence in Protected Area: Periyar NP
WPA/CITES/CMS: No
Conservation status: Endangered
Conservation needs: Monitoring of habitats for alien species; managing bycatch
Stakeholders: Kerala State Forest and Wildlife Department
Traditional Knowledge: Not documented
Research needs: Impacts of alien species; Population; Ecology

Mesonoemacheilus pulchellus (Nemacheilidae)
Endangered
Malayalam Name: സുന്ദരി കൊയ്മ
Endemism: Western Ghats
Distribution in Kerala: Not clearly known but likely to occur only in the Bhavani
Districts: Palakkad (Likely)
Habitats: Fast-flowing streams that are clear and well-oxygenated; sand, pebbles, cobbles, and boulders are preferred substrates
Population Status: Not known
Threats: Unknown. However general loss and deterioration of hillstream habitats due to pollution and flow alterations maybe applicable to this species as well.
Exploitation: Not known
Occurrence in Protected Area: Silent Valley NP (Likely)
WPA/CITES/CMS: No
Conservation status: Endangered
Conservation needs: Not known
Stakeholders: Kerala State Forest and Wildlife Department
Traditional Knowledge: Not documented
Research needs: Taxonomy; Distribution; Population
Remarks: No verifiable records of this species are available in the recent past. It may likely be that the species never existed in Kerala and all previous records are misidentifications. Otherwise, it is highly likely that this species is locally extinct in Kerala.

Ophichthys fossorius (Synbranchidae)
Endangered
Malayalam Name: കുഴിപുളവൻ, കട്ടപ്പുളവൻ
Endemism: Kerala
Distribution in Kerala: Not clearly known but is likely to occur throughout the lowlands of Kerala
Districts: All coastal districts (See above)
Habitats: Fossorial. Mostly encountered from paddy fields, wetlands, home gardens, irrigation channels of plantations and agro-based areas, dykes of ponds
Population Status: Not known
Threats: Reclamation of wetlands; paddy fields and other area; pollution; developmental activities
Exploitation: Not known
Occurrence in Protected Area: None
WPA/CITES/CMS: No
Conservation status: Endangered
Conservation needs: Protection of wetlands, paddy fields and other open areas; education and awareness of local communities
Stakeholders: Department of Agriculture; Department of Revenue; Department of Fisheries; Kerala State Biodiversity Board
Traditional Knowledge: Not documented
Research needs: Distribution; Population; Ecology; Impacts of anthropogenic threats

Opsarius canarensis (Danionidae)
Endangered
Endemism: Kerala
Distribution in Kerala: Not clearly known, but likely to occur in Chandragiri, Kuppam, Valapattanam and Anjarakandy rivers in northern Kerala (=Malabar); Districts: Kannur and Kasargod districts (Likely)
Habitats: Fast-flowing, clear-water streams in the middle to upper reaches with canopy cover; juveniles tend to aggregate in the slow-flowing riffle habitats and the undisturbed shallow marginal areas of the stream with sand and gravel as the substrate.
Population Status: Not known
Threats: Not known. However general threats to hill streams including pollution, loss of riparian cover and alterations in flow may likely impact this species. Land use changes associated stream bank erosion, and collection for the aquarium pet trade.
Exploitation: Low to medium (aquarium trade)
Occurrence in Protected Area: Aaralam WLS (Likely)
WPA/CITES/CMS: No
Conservation status: Endangered
Conservation needs: Monitoring of the likely habitats for the presence of the species. Stream habitat specific afforestation programmes and prevention of bank erosion.
Stakeholders: Department of Forest and Wildlife; Kerala State Biodiversity Board
Traditional Knowledge: Not documented
Research needs: Distribution; Population

Osteochilichthys longidorsalis (Cyprinidae)
Endangered
Malayalam Name: മോഡോൺ
Endemism: Kerala
Distribution in Kerala: Bharathapuzha, Chalakudy and Periyar ; Districts: Ernakulam, Palakkad and Thrissur
Habitats: Deep pools of the streams with sand and bedrock as the substrates; adult prefer deep pools of the stream with canopy whereas juveniles forage in groups the marginal areas of the stream with overhanging vegetation.

opulation Status: Declining
Threats: Bycatch; Pollution; Habitat loss; destructive fishing practices including dynamiting and poisoning
Exploitation: Medium to high (bycatch)
Occurrence in Protected Area: None
WPA/CITES/CMS: No
Conservation status: Endangered
Conservation needs: Monitoring and protection of deep pools; prevention of sand mining in critical habitats; development of a captive breeding technology
Stakeholders: Department of Forest and Wildlife; Department of Fisheries; Kerala State Biodiversity Board
Traditional Knowledge: Not documented
Research needs: Population; Ecology

Pseudeutropis mitchelli (Schilbeidae)
Endangered
Malayalam Name: വെള്ളിവാള
Endemism: Kerala
Distribution in Kerala: Chandragiri, Bharathapuzha, Chaliyar, Achankovil, Pampa, Chalakudy and Periyar
Districts: Kasargod, Palakkad, Malappuram, Ernakulam, Thrissur, Pathanamthitta
Habitats: a pelagic catfish appearing in groups in the fast-flowing streams after a heavy shower; usually seen in the marginal shallow areas of the streams with little water flow and overhanging vegetation; also prefers clear calm shallow waters with sand, silt and gravel as the chief substrates.
Population Status: Declining
Threats: Bycatch; Pollution; Habitat loss; Indiscriminate Fishing
Exploitation: Medium (Bycatch)
Occurrence in Protected Area: None
WPA/CITES/CMS: No
Conservation status: Endangered
Conservation needs: Monitoring and protection of deep pools; prevention of sand mining in critical habitats; development of a captive breeding technology
Stakeholders: Department of Forest and Wildlife; Department of Fisheries
Traditional Knowledge: Not documented
Research needs: Distribution, Population, Ecology, Threats

Pterocryptis wynaadensis (Siluridae)
Endangered
Malayalam Name: വയനാടൻ വാള, തുളുമ്പൻ വാള
Endemism: Western Ghats
Distribution in Kerala: Kabini, Kuttyadi, Valappatanam, Chandragiri, Kuppam
Districts: Wayanad, Kannur, Kasargod
Habitats: Adults are found in the rocky crevices and holes amongst roots of the riparian vegetation as well as between cobbles and pebbles; adults are strictly nocturnal and comes out of the hiding places and forage amongst the leaf litter accumulated on the marginal areas of stream with moderate velocity. In the rivers they prefer clear well oxygenated waters with sand, silt, gravel, pebble and cobble as the chief substrates. Adults are known to migrate from the hill streams to the low-lying paddy fields and other floodplain wetlands at the onset of rain. Young individuals above a 'finger-size' are found in plenty hiding under leaves, amongst roots and leaf litter in the shallow calm marginal areas of the stream.
Population Status: Declining
Threats: Bycatch; Pollution; Habitat loss; Indiscriminate Fishing
Exploitation: Medium to high (as food fish)
Occurrence in Protected Area: Wayanad WLS, Aralam WLS
WPA/CITES/CMS: No
Conservation status: Endangered
Conservation needs: Monitoring and protection of deep pools and riparian zones; education and awareness among local communities; captive breeding technology
Stakeholders: Department of Forest and Wildlife; Department of Fisheries
Traditional Knowledge: Not documented
Research needs: Population; Ecology; Threats

Puntius cauveriensis (Cyprinidae)
Endangered
Malayalam Name: കാവേരി പരൽ
Endemism: Western Ghats
Distribution in Kerala: Kabini; Districts: Wayanad
Habitats: Fast-flowing streams with dense canopy; Sand, boulders and bed-rock are the preferred substrates; usually seen hiding under submerged roots and marginal vegetation.
Population Status: Declining
Threats: Pollution; Habitat loss
Exploitation: Not known
Occurrence in Protected Area: Wayanad WLS
WPA/CITES/CMS: No
Conservation status: Endangered
Conservation needs: Monitoring of known populations; maintenance of flows and ensuring riparian cover in critical habitats
Stakeholders: Department of Forest and Wildlife
Traditional Knowledge: Not documented
Research needs: Distribution; Population; Ecology

Sahyadria denisonii (Cyprinidae)
Endangered
Malayalam Name: ചങ്കെണിയാൻ
Endemism: Western Ghats
Distribution in Kerala: The genus Sahyadria is a complex of several 'evolutionary distinct lineages'. The species boundaries are not clear, and therefore the distribution. However, the genus and its constituent lineages considered as 'Sahyadria denisonii' are present in major west-flowing rivers including Chandragiri, Kuppam, Anjarakandy, Valappatanam, Kuttyadi, Kadalundi, Chaliyar and Bharathapuzha.

Districts: Kasargod, Kannur, Kozhikode, Malappuram
Habitats: Shallow to moderately deep calm areas of the fast-flowing streams with clear, well-oxygenated water; juveniles forage in groups along the marginal areas of the stream with thick overhanging vegetation.
Population Status: Though local populations had declined significantly in the recent past, no current estimates are available.
Threats: Collections for the aquarium trade was the major threat to the species, but it is now known that the levels of off-take have reduced considerably. Large adults are also harvested for local household consumption; stream bank erosion and the pesticide pollution from the adjacent plantations, pollution from human settlements and tourism infrastructure are the other major threats
Exploitation: Medium (bycatch; for the aquarium trade)
Occurrence in Protected Area: Aaralam WLS, Malabar WLS
WPA/CITES/CMS: No
Conservation status: Endangered
Conservation needs: Monitoring of known populations; maintenance of flows and ensuring riparian cover in critical habitats; popularization of captive breeding technology that is currently available
Stakeholders: Department of Forest and Wildlife; Department of Fisheries
Traditional Knowledge: Not documented
Research needs: Distribution; Population; Impact of aquarium collections

Sahyadria chalakkudiensis **(Cyprinidae)**
Endangered
Malayalam Name: ചോരക്കണിയാൻ
Endemism: Western Ghats
Distribution in Kerala: The genus Sahyadria is a complex of several 'evolutionary distinct lineages'. The species boundaries are not clear, and therefore the distribution. However, the genus and its constituent lineages considered as 'Sahyadria chalakkudiensis' are present in major west-flowing rivers including Chalakudy, Periyar, Pampa, Achankovil and Manimala.
Districts: Ernakulam, Thrissur, Kottayam, Pathanamthitta
Habitats: Shallow to moderately deep calm areas of the fast-flowing streams with clear, well-oxygenated water; juveniles forage in groups along the marginal areas of the stream with thick overhanging vegetation.
Population Status: Though local populations had declined significantly in the recent past; no current estimates are available. Likely to be declining
Threats: Collections for the aquarium trade was the major threat to the species, but it is now known that the levels of off-take have reduced considerably. Large adults are also harvested for local household consumption; stream bank erosion and the pesticide pollution from the adjacent plantations, pollution from human settlements and tourism infrastructure are the other major threats
Exploitation: Medium (bycatch; for the aquarium trade; and rarely as food fish)
Occurrence in Protected Area: None
WPA/CITES/CMS: No
Conservation status: Endangered
Conservation needs: Monitoring of known populations; maintenance of flows and ensuring riparian cover in critical habitats; popularization of captive breeding technology that is currently available
Stakeholders: Department of Forest and Wildlife; Department of Fisheries
Traditional Knowledge: Not documented
Research needs: Distribution; Population; Impact of aquarium collections

Schistura striata **(Nemacheilidae)**
Endangered
Malayalam Name: ഓലിയവരൻ കൊയ്മ, വയനാടൻ കൊയ്മ, വരയൻ കൊയ്മ
Distribution in Kerala: Kabini; Districts: Wayanad
Habitats: Clear-water streams with sand, cobbles and pebbles and canopy cover; dwell in a highly vegetated aquatic stream with thicker leaf litter layers; seasonal variations in streamflow and depth are expected.
Population Status: Declining
Threats: Habitat loss particularly significant in first and second order streams; pollution from agro-based plantations especially tea plantations; climate change
Exploitation: Not known
Occurrence in Protected Area: Wayanad WLS
WPA/CITES/CMS: No
Conservation status: Endangered
Conservation needs: Monitoring of known populations; maintenance of flows and ensuring riparian cover in critical habitats
Stakeholders: Department of Forest and Wildlife; Kerala State Biodiversity Board
Traditional Knowledge: Not documented
Research needs: Distribution; Population; Ecology

Ariqilabeo periyarensis **(Cyprinidae)**
Endangered
Malayalam Name: കരിംപാച്ചി
Endemism: Kerala
Distribution in Kerala: Periyar; Districts: Idukki
Habitats: A typical rheophilic species preferring the cascades, step – pools, rapids and fast flowing riffles in the main stream channel; juveniles show affinity towards the slow flowing riffles and the shallow marginal areas of the adjoining streamlets with canopy.
Population Status: Stable
Threats: Bycatch; Alien species; Future impacts of climate change
Exploitation: Low (as bycatch)
Occurrence in Protected Area: Periyar NP

WPA/CITES/CMS: No
Conservation status: Endangered
Conservation needs: Monitoring of critical habitats; managing alien species
Stakeholders: Department of Forest and Wildlife
Traditional Knowledge: Not documented
Research needs: Population; Ecology; Impacts of alien species

Tor malabaricus (Cyprinidae)
Endangered
Malayalam Name: കറ്റികുയിൽ
Endemism: Western Ghats
Distribution in Kerala: Middle to upper reaches of all major west-flowing rivers above the Palghat Gap. Major areas of distribution are in the Valapattanam, Kuttyadi, Chaliyar and Bharathapuzha (Thootha). Records from rivers below Palghat Gap comprise a distinct species.
Districts: Kasargod, Kannur, Kozhikode, Malappuram, Palakkad
Habitats: Clear-water, well oxygenated streams; prefers cascades, pools and riffles deep pool habitats with canopy in the main stream channel; juveniles abound the clear, well oxygenated streams; also, in reservoirs
Population Status: Declining
Threats: Indiscriminate Fishing often using destructive methods, Loss of Habitats, Climate Change,water diversion and abstraction projects, land use associated bank erosions, pollution from plantations and human settlements, competition from transplanted and exotic species stocked for enhancing reservoir fish production. Targeted fishery exists in all the habitats where tourism is developed.
Exploitation: High (as a food fish)
Occurrence in Protected Areas: Aaralam WLS, Malabar WLS, Proposed Karimpuzha WLS
WPA/CITES/CMS: No
Conservation status: Endangered
Conservation needs: Extensive monitoring of local populations; development of a captive breeding technology
Stakeholders: Department of Forest and Wildlife; Department of Fisheries
Traditional Knowledge: Not documented
Research needs: Taxonomy; Population, Ecology; Threats

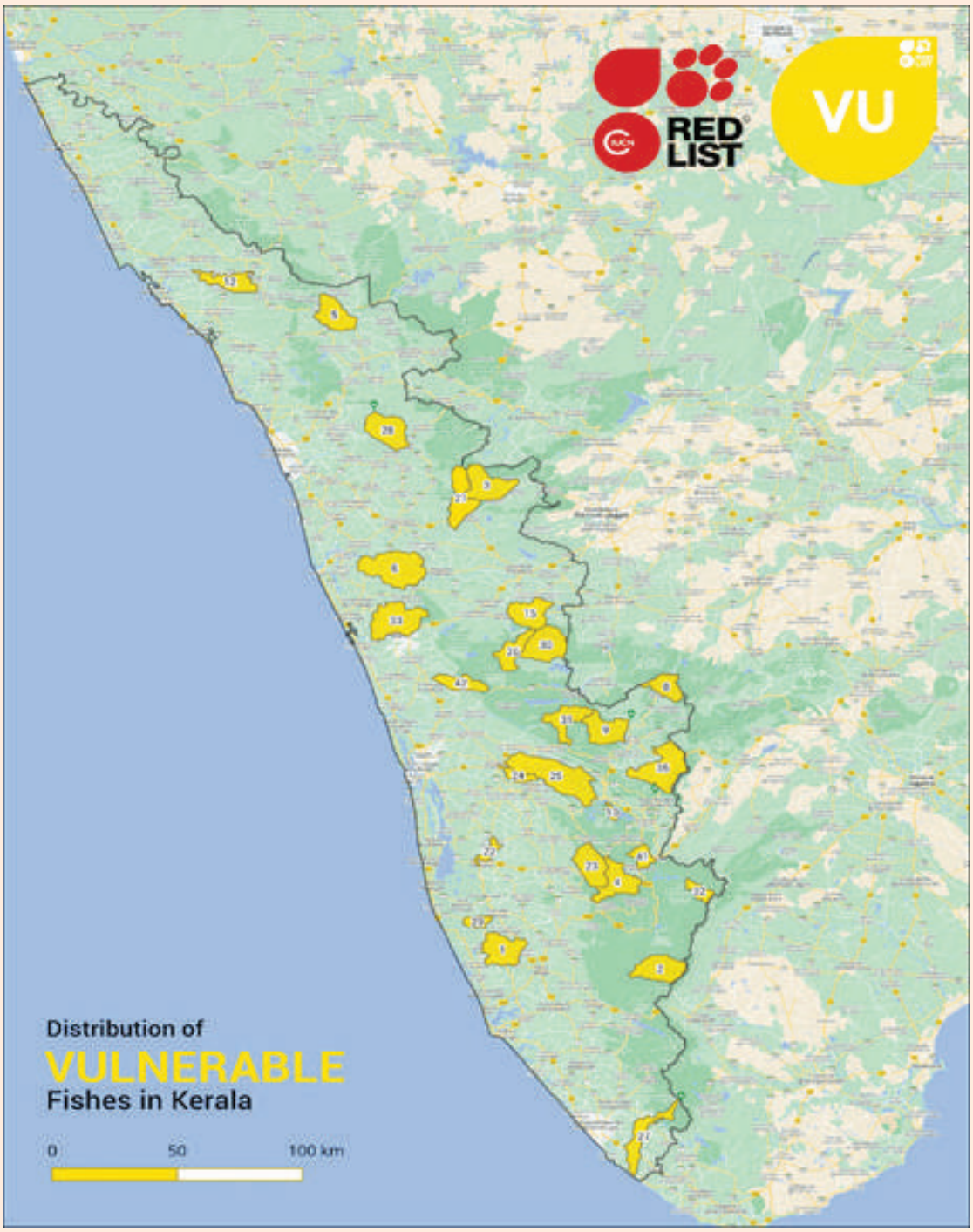
Travancoria elongata (Balitoridae)
Endangered
Malayalam Name: നെടും കൽക്കി, നീളൻ കൽപ്പൂളോൻ
Endemism: Kerala
Distribution in Kerala: Periyar and Chalakudy ;
Districts: Palakkad, Thrissur, Ernakulam, Idukki
Habitats: A typical reheophilic species inhabiting the cascades, step- pools, rapids and fast flowing riffle habitats in the stream channel.
Population Status: Declining
Threats: Loss of Habitats; Alterations in flow; pollution; future impacts of climate change; land use changes associated siltation; stream bank erosion and loss of canopy.
Exploitation: Very low (for the aquarium trade)
Occurrence in Protected Areas: Periyar NP, Parambikulam WLS, Idukki WLS
WPA/CITES/CMS: No
Conservation status: Endangered
Conservation needs: Extensive monitoring of local populations; ensuring critical habitats are intact and preventing pollution
Stakeholders: Department of Forest and Wildlife
Traditional Knowledge: Not documented
Research needs: Population; Ecology; Threats

Travancoria jonesi (Balitoridae)
Endangered
Malayalam Name: കുള്ളൻ കൽമനക്കി, , നീളൻ കൽപ്പൂളോൻ
Endemism: Kerala
Distribution in Kerala: Periyar and Chalakudy ;
Districts: Palakkad, Thrissur, Ernakulam, Idukki
Habitats: A typical reheophilic species inhabiting the cascades, step- pools, rapids and fast flowing riffle habitats in the stream channel.
Population Status: Declining
Threats: Loss of Habitats, Alterations in flow, pollution, future impacts of Climate Change. In plantation streams, the species face multiple threats including pesticide pollution, water abstraction and diversion structures altering stream ecology and habitat.

Exploitation: No
Occurrence in Protected Areas: Periyar NP, Parambikulam WLS, Eravikulam NP, Idukki WLS
WPA/CITES/CMS: No
Conservation status: Endangered
Conservation needs: Extensive monitoring of local populations; ensuring critical habitats are intact and preventing pollution
Stakeholders: Department of Forest and Wildlife
Traditional Knowledge: Not documented
Research needs: Population, Ecology; Threats

Vulnerable Freshwater Fish Species*≠

Balitora mysorensis (5), *Batasio travancoria* (2,4,10,23), *Channa diplogramma* (1,6,22,24,25,29), *Carinotetraodon travancoricus, Garra menoni* (37), *Garra periyarensis* (32), *Horabagrus brachysoma* (1,6,12,22, 24,29,31,42), *Hyporhamphus xanthopterus, Indoreonectes keralensis* (4,9,23,25,32,35,41) *Laubuka fasciata* (15,21,26,28,31,42), *Mesonoemacheilus menoni* (32), *Mesonoemacheilus pambarensis* (3,5,8), *Mesonoemacheilus periyarensis* (32), *Pseudosphromenus dayi* (2,22,23,41)



**Only those sub-basins containing major populations have been mapped; ≠distribution of C. travancoricus and H. xanthopterus have not been marked as they are wide ranging species found in lowland rivers across the State*

Species in Focus III

Blind Catfish, *Horaglanis krishnai*

blind, aquifer-dwelling catfish with uncertain affinities

Distribution: Thrissur, Ernakulam, Kottayam, Pathanamthitta and Alappuzha districts.

Habitat: Lateritic aquifers and associated groundwater and subterranean habitats. Often encountered in dug-out wells

Threats: Unmanaged groundwater extraction, pollution, alien species

IUCN Red List Status: Data Deficient

Balitora mysorensis **(Balitoridae)**
Vulnerable
Malayalam Name: മുത്തുച്ചൂടൻ
Endemism: Western Ghats
Distribution in Kerala: Kabini; Likely to occur in Bhavani and Pambar but requires verification
Districts: Wayanad; Palakkad, Idukki (see above)
Habitats: Clear-water, well oxygenated mountain streams; prefers cascades and riffles; often seen associated with hard substrates against the flow of water
Population Status: Declining
Threats: Loss of Habitats; Alterations in flow; pollution; future impacts of climate change
Exploitation: No
Occurrence in Protected Areas: Wayanad WLS, Silent Valley NP, Pambar WLS
WPA/CITES/CMS: No
Conservation status: Vulnerable
Conservation needs: Extensive monitoring of populations outside PAs; ensuring critical habitats are intact, and preventing pollution
Stakeholders: Department of Forest and Wildlife; Kerala State Biodiversity Board
Traditional Knowledge: None
Research needs: Population; Ecology; Threats

Batasio travancoria **(Bagridae)**
Vulnerable
Malayalam Name: നീലക്കൂരി, മീശയില്ലാക്കൂരി
Endemism: Western Ghats
Distribution in Kerala: Periyar, Chalakudy, Pampa, Manimala, Neyyar, Achankovil
Districts: Ernakulam, Thrissur, Kottayam, Pathanamthitta, Kollam, Thiruvananthapuram
Habitats: Shallow marginal areas of the main stream as well as the adjoining streamlets with moderate to thick canopy; finds shelter in the moderately deep pools with leaf litter, crevices and holes amongst the stream ward roots of the trees and bushes where the major substrates be silt, sand and gravel.
Population Status: Declining
Threats: Loss of Habitats; Alterations in flow; pollution; land use changes associated siltation; canopy loss and bank erosion.
Exploitation: Very low (bycatch)
Occurrence in Protected Areas: Parambikulam WLS, Neyyar WLS
WPA/CITES/CMS: No
Conservation status: Vulnerable
Conservation needs: Extensive monitoring of populations outside PAs; ensuring critical habitats are intact, and preventing pollution
Stakeholders: Department of Forest and Wildlife; Kerala State Biodiversity Board
Traditional Knowledge: None
Research needs: Distribution; Population, Ecology; Threats; captive breeding

Channa diplogramma (Channidae)
Vulnerable
Malayalam Name: പുലിവാക, മണൽ വാക
Endemism: Western Ghats
Distribution in Kerala: Microlevel distribution is still unclear. Known from certainty from Kallada, Achankovil, Pamba, Manimala, Meenachil, Muvvatupuzha, Periyar, Chalakudy, Bharathapuzha, Valapattanam
Districts: Kollam, Kottayam, Pathanamthitta, Ernakulam, Thrissur, Palakkad, Kannur
Habitats: Reservoirs, deep channels of rivers, floodplains, paddy fields and lower reaches of rivers; in association amongst rooted and floating aquatic weeds in lowland flood plain areas or associated with canopy cover in streams and reservoirs. prefer calm areas without human presence and forage with the young ones in the shallow weedy areas of the flood plain areas and the moderately deep to shallow marginal areas of the reservoirs.
Population Status: Declining
Threats: Indiscriminate fishing; loss of habitats; pollution, targeted fishing for food and recreational fishery, indiscriminate fishing of adult (parent) fishes, indiscriminate collection of juveniles for aquarium pet trade and small-scale aquafarming.
Exploitation: Very high (food fish, recreational catch-and-take fishery)
Occurrence in Protected Areas: Shendurney WLS, Neyyar WLS
WPA/CITES/CMS: No
Conservation status: Vulnerable
Conservation needs: Effective implementation and enforcement of fisheries acts; ensuring spawning habitats are protected; regulation on catch-and-take angling
Stakeholders: Department of Fisheries; Kerala State Biodiversity Board
Traditional Knowledge: None
Research needs: Distribution; Population, Ecology; Threats

Carinotetraodon travancoricus **(Tetraodontidae)**
Vulnerable
Malayalam Name: ആറ്റുണ്ട
Endemism: Western Ghats
Distribution in Kerala: Microlevel distribution is still unclear; but likely to be present in lowland areas of major west flowing rivers ; Districts: Likely to be found in all coastal districts
Habitats: Low-land rivers and its associated floodplain

area including the paddy fields and canals; always found moving in shoal along the shallow margins of the river bank or found associated in shoal amongst the rooted macro-vegetation, or below the floating aquatic weed mass where the substrates be silt and sand. Migrate to low saline areas for breeding.
Population Status: Declining
Threats: loss of habitats; pollution; targeted collection for aquarium pet trade
Exploitation: High (for aquarium trade)
Occurrence in Protected Areas: None
WPA/CITES/CMS: No
Conservation status: Vulnerable
Conservation needs: Effective implementation and enforcement of fisheries acts; preventing pollution
Stakeholders: Department of Fisheries; Kerala State Biodiversity Board
Traditional Knowledge: Not documented
Research needs: Distribution; Population, Ecology; Threats

Garra menoni **(Cyprinidae)**
Vulnerable
Malayalam Name: കുള്ളൻ കല്ലൊട്ടി, കല്ലുന്തി
Endemism: Kerala
Distribution in Kerala: Bharathapuzha. The record from Pambar needs verification as it is highly unlikely that a species found in the upper reaches of a west-flowing drainage above the Palghat Gap, will also occur in an east-flowing drainage below the Palghat Gap. ; Districts: Palakkad
Habitats: Fast-flowing clear water streams in the upper reaches
Population Status: Stable
Threats: Not Known; however, its distribution to the upper reaches of the Bharathapuzha makes it vulnerable to future impacts of climate change
Exploitation: None
Occurrence in Protected Areas: Silent Valley NP
WPA/CITES/CMS: No
Conservation status: Vulnerable
Conservation needs: Monitoring of populations
Stakeholders: Department of Forests and Wildlife
Traditional Knowledge: None
Research needs: Population, Ecology; Threats

Garra periyarensis **(Cyprinidae)**
Vulnera
Malayalam Name: പെരിയാർ കല്ലൊട്ടി, കല്ലുകാരി
Endemism: Kerala
Distribution in Kerala: Periyar; Districts: Idukki
Habitats: Fast-flowing clear streams in the upper reaches with riparian vegetation, where the substrates chiefly be the cobbles and bedrock; juveniles are found associated with the slow flowing riffles along the side of the main stream course.
Population Status: Stable
Threats: Alien species, Future impacts of climate change
Exploitation: Not known
Occurrence in Protected Area: Periyar NP
WPA/CITES/CMS: No
Conservation status: Vulnerable
Conservation needs: Monitoring of critical habitats; managing alien species
Stakeholders: Department of Forest and Wildlife
Traditional Knowledge: Not documented
Research needs: Population; Ecology; Impacts of alien species.

Horabagrus brachysoma **(Horabagridae)**
Vulnerable
Malayalam Name: മഞ്ഞക്കൂരി, മഞ്ഞളേട്ട
Endemism: Western Ghats
Distribution in Kerala: Lowland regions of all major west-flowing river systems
Districts: Likely in all districts except Idukki, Wayanad and Palakkad
Habitats: Deep pool habitats in midland streams to the low land rivers and its flood plains; migrate in shoals during the south west monsoon to the low-lying paddy fields and other inundated areas for breeding; chief substrates in the deep pool habitats of the stream are sand and bedrock whereas in the floodplain habitats it be the silt and sand; always found among rooted aquatic vegetation and below the floating aquatic mass; In the main stream it prefers moderately deep pools and hide in the crevices and holes along the stream banks with overhanging vegetation cover. Though a fish with intense nocturnal behavior, the juveniles of the species are found in shoals foraging in the shallow areas of the paddy fields and other floodplain wetlands.
Population Status: Declining
Threats: Targeted fishing, pollution, massive collection of broodstock during the breeding period, targeted collection of juveniles for aquarium pet trade and small-scale fish farming, destructive fishing practices including dynamiting and electric fishing and targeted fishing using traditional traps and under size banned seine nets.
Exploitation: Very high (food fish)
Occurrence in Protected Area: Karimpuzha WLS
WPA/CITES/CMS: No
Conservation status: Vulnerable
Conservation needs: Monitoring of critical habitats; enforcement of inland fisheries act
Stakeholders: Department of Fisheries
Traditional Knowledge: Mucous considered to have medicinal properties
Research needs: Population, Ecology; Threats

Hyporhamphus xanthopterus (Hemiramphidae)
Vulnerable
Malayalam Name: അറ്റുപുവൽപ്പൻ
Endemism: Kerala
Distribution in Kerala: Microlevel distribution is not clearly known; records are available from several lowland regions of major west-flowing river systems, and its associated backwaters
Districts: Likely in all districts (needs confirmation) except Idukki, Wayanad and Palakkad
Habitats: Lowland regions of major rivers including the interconnected backwater systems; reservoirs in the respective riverine systems where the species is known to occur.
Population Status: Not known
Threats: Bycatch - usually caught along with Xenentodon cancila; pollution
Exploitation: Medium (bycatch)
Occurrence in Protected Area: None
WPA/CITES/CMS: No
Conservation status: Vulnerable
Conservation needs: Monitoring of populations
Stakeholders: Department of Fisheries
Traditional Knowledge: Not documented
Research needs: Distribution; Population, Ecology; Threats.

Indoreonectes keralensis **(Nemacheilidae)**
Vulnerable
Malayalam Name: കേരള കൊയ്ത്ത,
കേരള കൊയ്മ, കൈരളി കൊയ്ത്ത
Endemism: Western Ghats
Distribution in Kerala: Periyar, Pampa, Meenachil, **Muvattupuzha; Districts:** Idukki, Kottayam, Pathanamthitta
Habitats: Middle and upper reaches of rivers including torrential hill-streams and first order streams. Known to migrate to first and second order streams for spawning. The species can survive in muddy environments with very little water usually found adjacent to the main stream.
Population Status: Not known
Threats: Loss of habitats; pollution from plantations; future impacts of climate change
Exploitation: Not known
Occurrence in Protected Area: Idukki WLS, Eravikulam NP, Periyar NP
WPA/CITES/CMS: No
Conservation status: Vulnerable
Conservation needs: Monitoring of populations and critical habitats
Stakeholders: Department of Forests and Wildlife (including Plantation Corporation)
Traditional Knowledge: Not documented
Research needs: Population; Ecology; Threats

Laubuka fasciata **(Cyprinidae)**
Vulnerable
Malayalam Name: വരയൻ ചീലൻ
Endemism: Kerala
Distribution in Kerala: Not clearly known. Reliable records are available from Periyar, Bharathapuzha, Chaliyar, Chalakudy, Meenachil, Muvattupuzha, Manimala, Pampa and Achankovil. It is likely that they occur in other major west-flowing rivers as well.
Districts: Palakkad, Malappuram, Thrissur, Ernakulam, Puzhakkal, Kechery, Kottayam, Pathanamthitta
Habitats: Inhabits the slow flowing, moderately deep stream channels with silt and sand as substrates. The species appear in shoals in the marginal areas of the stream under overhanging vegetation.
Population Status: Declining
Threats: Loss of habitats; pollution
Exploitation: Not known
Occurrence in Protected Area: Parambikulam WLS (likely)
WPA/CITES/CMS: No
Conservation status: Vulnerable
Conservation needs: Monitoring of populations
Stakeholders: Kerala State Biodiversity Board
Traditional Knowledge: Not documented
Research needs: Distribution; Population, Ecology; Threats

Mesonoemacheilus menoni **(Nemachelidae)**
Vulnerable
Malayalam Name: മേനോൻ കൊയ്മ
Endemism: Kerala
Distribution in Kerala: Periyar; Districts: Idukki
Habitats: Fast-flowing, clean, and well-oxygenated streams; substrate include sand, gravel, cobbles, and bedrock, with an epilithic layer of algae, diatoms, and other microorganisms and debris; prefer the shade provided by riparian plants
Population Status: Stable
Threats: Alien species; Future impacts of climate change
Exploitation: Not known
Occurrence in Protected Area: Periyar NP
WPA/CITES/CMS: No
Conservation status: Vulnerable
Conservation needs: Monitoring of populations; managing alien species
Stakeholders: Department of Forest and Wildlife
Traditional Knowledge: Not documented
Research needs: Population' Ecology; Impacts of alien species

Mesonoemacheilus pambarensis (Nemachelidae)
Vulnerable
Malayalam Name: കാവേരി കൊയ്മ
Endemism: Western Ghats
Distribution in Kerala: Kabini, Bhavani, Pambar; Districts: Wayanad, Palakkad, Idukki
Habitats: Fast-flowing, clean, and well-oxygenated run, riffle and glide habitats; substrate include sand, gravel, cobbles, and bedrock
Population Status: Stable
Threats: Habitat loss; pollution; removal of riparian cover
Exploitation: Not known
Occurrence in Protected Area: Wayanad WLS, Silent Valley NP, Chinnar WLS
WPA/CITES/CMS: No
Conservation status: Vulnerable
Conservation needs: Monitoring of populations; managing alien species
Stakeholders: Department of Forest and Wildlife
Traditional Knowledge: Not documented
Research needs: Population; Ecology; Impacts of alien species

Mesonoemacheilus periyarensis (Nemachelidae)
Vulnerable
Malayalam Name: പെരിയാർ കൊയ്മ
Endemism: Kerala
Distribution in Kerala: Periyar; Districts: Idukki
Habitats: Fast-flowing, clean, and well-oxygenated streams; substrate include sand, gravel, cobbles, and bedrock, with an epilithic layer of algae, diatoms, and other microorganisms and debris; prefer the shade provided by riparian plants. The juveniles of the species are found aggregating around and inside the leaf litter trapped in the slow flowing riffles.
Population Status: Stable
Threats: Alien species, Future impacts of climate change
Exploitation: Not known
Occurrence in Protected Area: Periyar NP
WPA/CITES/CMS: No
Conservation status: Vulnerable
Conservation needs: Monitoring of populations; managing alien species
Stakeholders: Department of Forest and Wildlife
Traditional Knowledge: Not documented
Research needs: Population; Ecology; Impacts of alien species

Pseudosphromenus dayi (Osphronemidae)
Vulnerable
Malayalam Name: ഡേയുടെ കരിങ്കണ
Endemism: Kerala
Distribution in Kerala: Microlevel distribution not clearly known; reliable records available from Periyar, Meenachil, Manimala, Achankovil. ; Districts: Idukki, Kottayam and Pathanamthitta
Habitats: A lowland species preferring calm waters and macro vegetation. Usually found associated with rooted aquatic plants and below the floating aquatic weed mats and also found in the small channels within the paddy fields where the chief substrate type been the silt and sand. The species always tend to congregate in the dead flow ends of the sinuous course the stream.
Population Status: Not known
Threats: Alien species, Loss of habitats
Exploitation: Not known
Occurrence in Protected Area: Not known
WPA/CITES/CMS: No
Conservation status: Vulnerable
Conservation needs: Currently not identified - can only be determined after information on distribution and threats become available
Stakeholders: Kerala State Biodiversity Board
Traditional Knowledge: Not documented
Research needs: Distribution; Population; Ecology; Impacts of alien species

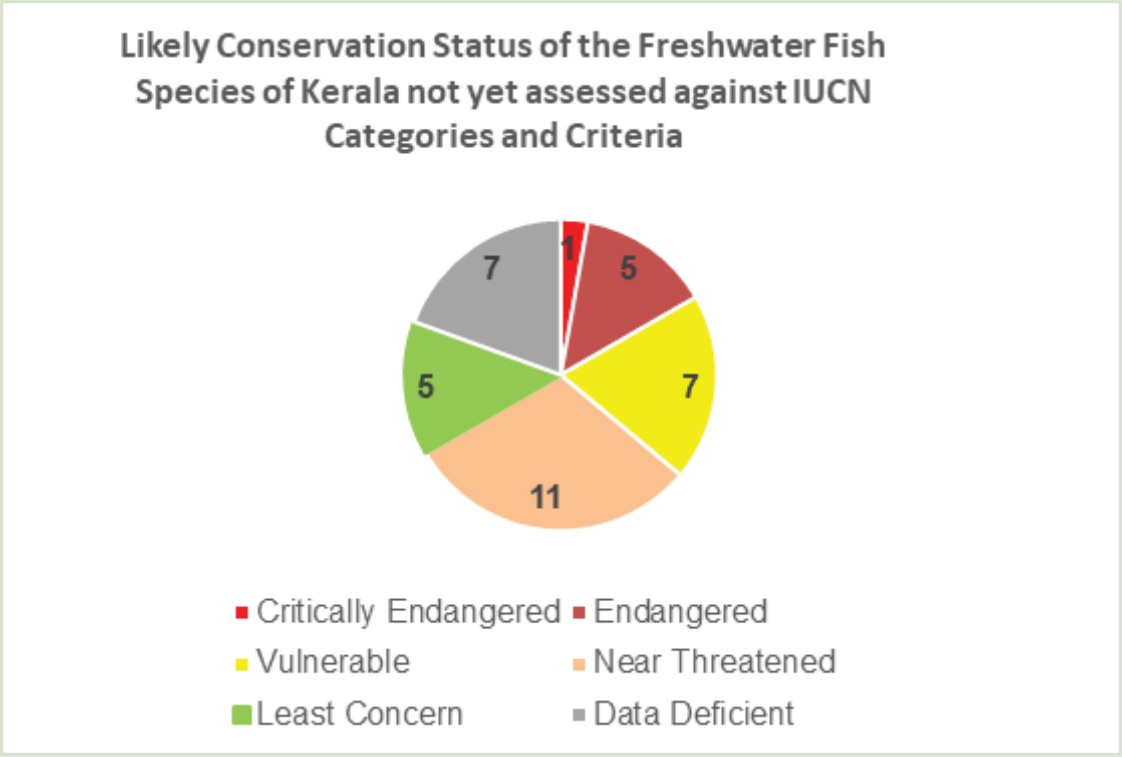
Extinction risk and 'proposed' conservation status of newly described (since 2010) freshwater fishes of Kerala (not currently assessed on the IUCN Red List)

Thirty-five species of fish have been described from Kerala (or described elsewhere, and having a distribution in Kerala) since the IUCN Assessment of Western Ghats freshwater fishes in 2010/2011. **Of these at least 14 trigger and fulfill the criteria of threatened species on the IUCN Red List.**

List of freshwater fishes of Kerala which have not been assessed for the IUCN Red List, their distribution, population status, threats and proposed conservation status

Species	Distribution	Population	Threats	Proposed Status
Aenigmachanna gollum	Fragmented	Not known	GE, PO, HL, IE	EN
Aenigmachanna mahabali	Single location	Not known	GE, PO, HL	EN
Aplocheilus parvus	Widespread	Stable	Not species-specific	LC
Balitora jalpalli	Fragmented	Not known	HL, PO, CC	VU
Bhavania annandalei	Restricted	Not known	HL, PO, CC	VU
Channa pseudomarulius	Widespread	Stable	Not species-specific	LC
Clarias dayi	Very restricted	Declining	IAS, HL	CR
Dario neela	Fragmented	Not known	HL, PO	NT
Dario urops	Restricted	Not known	HL, PO	NT
Dawkinsia austellus	Not known	Not known	Not known	DD
Dawkinsia lepida	Fragmented	Not known	HL, PO	NT
Dawkinsia rubrotinctus	Restricted	Not known	HL, PO	NT
Ehirava fluviatilis	Widespread	Stable	Not species-specific	LC
Garra emarginata	Single location	Not known	Not known	DD
Garra mlapparaensis	Single location	Not known	IAS, CC	VU
Ghatsa silasi	Single location	Not known	IAS, CC	VU
Glyptothorax elankadensis	Single location	Not known	HL, PO	NT
Horaglanis abdulkalami	Restricted	Not known	GE, PO, HL	EN
Kryptoglanis shajii	Restricted	Not known	GE, PO, HL	EN
Labeo nigriscens	Fragmented	Declining	HL, PO	NT
Laubuka trevori	Restricted	Not known	Not known	DD
Mastacembelus malabaricus	Not known	Not known	Not known	DD
Mesonoemacheilus tambaraparniensis	Restricted	Not known	HL, PO, CC	VU
Notopterus synurus	Restricted	Declining	HL, PO, IE	VU
Opsarius malabaricus	Restricted	Not known	HL, PO	NT
Oreichthys coorgensis	Restricted	Not known	HL, PO	NT
Oreichthys incognito	Very restricted	Not known	HL, PO	DD
Pangio bhujia	Restricted	Not known	GE, PO, HL	EN
Paracanthocobitis sinuate	Restricted	Not known	HL, PO	NT
Pethia nigripinna	Restricted	Not known	HL, PO	NT
Pristolepus rubripinnis	Fragmented	Declining	HL, PO	NT
Puntius madhusoodani	Not known	Not known	Not known	DD
Puntius melanostigma	Not known	Not known	Not known	DD
Rasbora dandia	Widespread	Stable	Not species-specific	LC
Rasbora neilgherriensis	Restricted	Declining	HL, PO	VU

HL: Habitat loss, PO: Pollution, IE: Indiscriminate Exploitation, IAS: Invasive Alien Species, CC: Climate Change, GE: Groundwater Extraction


Likely Conservation Status of the Freshwater Fish Species of Kerala not yet assessed against IUCN Categories and Criteria
1
5
7
11
5
7
Critically Endangered
Endangered
Vulnerable
Near Threatened
Least Concern
Data Deficient

Species in Focus V

Blind eel, *Rakthamichthys digressus*

A bizarre, blind worm eel occurring in lateritic aquifers

©VK Anoop

Distribution: Kasargod, Kannur, Kozhikode, Malappuram Districts

Habitat: Lateritic aquifers and associated groundwater and subterranean habitats. Often encountered in dug-out wells

Threats: Unmanaged groundwater extraction, pollution, alien species, human-fish conflicts

IUCN Red List Status: Data Deficient

Aenigmachanna gollum (Aenigmachannidae)
Not Evaluated
Malayalam Name: പാതാള വരാൽ
Endemism: Kerala
Distribution in Kerala: Kozhikode, Malappuram, Ernakulam districts
Districts: Kozhikode, Malappuram, Ernakulam districts
Habitats: Paddy fields, dug-out wells, wetlands, flood-plain areas, homestead ponds
Population Status: Not known
Threats: Reclamation of wetlands and paddy fields; groundwater extraction; pollution
Exploitation: Medium to high (recently emerged collection for the aquarium trade)
Occurrence in Protected Area: None
WPA/CITES/CMS: No
Conservation status: Currently Not Assessed; Triggers the Endangered Category
Conservation needs: Community based conservation and protection; strict laws against conversion of known habitats
Stakeholders: Kerala State Forest and Wildlife Department; Kerala State Biodiversity Board; Kerala State Agriculture Department
Traditional Knowledge: Not documented
Research needs: Distribution; Population; Ecology (migration and behaviour)

Aenigmachanna mahabali (Aenigmachannidae)
Not Evaluated
Malayalam Name: പാതാള വരാൽ
Endemism: Kerala
Distribution in Kerala: Peringara near Thiruvalla;
Districts: Pathanamthitta
Habitats: Dug-out well; also, likely to occur in adjoining wetlands and paddy fields
Population Status: Not known (only one specimen has ever been collected)
Threats: Reclamation of wetlands and paddy fields; groundwater extraction; pollution
Exploitation: Not known
Occurrence in Protected Area: None
WPA/CITES/CMS: No
Conservation status: Currently Not Assessed; Triggers the Endangered Category
Conservation needs: Community based conservation and protection; strict laws against conversion of wetlands and paddy fields
Stakeholders: Kerala State Forest and Wildlife Department; Kerala State Biodiversity Board; Kerala State Agriculture Department
Traditional Knowledge: Not documented
Research needs: Distribution; Population; Ecology (migration and behaviour)

Balitora jalpalli (Balitoridae)
Not Evaluated
Malayalam Name: ജലപ്പള്ളി കൽനക്കി
Endemism: Kerala
Distribution in Kerala: Bharathapuzha (Kunthi and Thootha) and Kabini
Districts: Palakkad and Wayanad
Habitats: Clear-water, well oxygenated mountain streams; prefers cascades, step pools and fast flowing riffles; often seen adhered to hard substrates such as bedrock and boulders.
Population Status: Unknown
Threats: Loss of Habitats; Alterations in flow; pollution; future impacts of Climate Change
Exploitation: Not known
Occurrence in Protected Areas: Wayanad WLS, Silent Valley NP
WPA/CITES/CMS: No
Conservation status: Not Assessed; Triggers the Vulnerable Category
Conservation needs: Extensive monitoring of populations outside PAs; ensuring critical habitats are intact, and preventing pollution
Stakeholders: Department of Forest and Wildlife; Kerala State Biodiversity Board
Traditional Knowledge: Not documented
Research needs: Distribution; Population, Ecology; Threats

Bhavania annandalei (Balitoridae)
Not Evaluated
Malayalam Name: കൽനക്കി
Endemism: Western Ghats
Distribution in Kerala: Neyyar, Vamanapuram, Kallada (also likely to occur in the upper reaches of all river systems draining the Agasthyamalai Biosphere Reserve)
Districts: Thiruvananthapuram, Kollam
Habitats: Clear-water, well oxygenated mountain streams; prefers cascades and riffles; often seen associated with hard substrates against the flow of water
Population Status: Unknown
Threats: Loss of Habitats; Alterations in flow; pollution; future impacts of climate change
Exploitation: Not known
Occurrence in Protected Areas: Neyyar WLS, Shendurney WLS, Peppara WLS
WPA/CITES/CMS: No
Conservation status: Not Assessed; Triggers the Vulnerable Category
Conservation needs: Extensive monitoring of populations outside PAs; ensuring critical habitats are intact, and preventing pollution
Stakeholders: Department of Forest and Wildlife
Traditional Knowledge: Not documented
Research needs: Distribution; Population; Ecology; Threats

Clarias dayi **(Clariidae)**
Not Evaluated
Malayalam Name: വയനാടൻ മുശി, വയനാടൻ മുഴി
Endemism: Western Ghats
Distribution in Kerala: Kabini; Districts: Wayanad
Habitats: Sluggish streams with canopy cover; also, in lacustrine systems; wetlands
Population Status: Declining – likely to have declined by over 90% since 1990
Threats: Not clearly known; but loss of critical habitats is an important threat
Exploitation: Not known (but maybe taken as bycatch)
Occurrence in Protected Areas: Wayanad WLS
WPA/CITES/CMS: No
Conservation status: Not Assessed; Triggers the Critically Endangered Category
Conservation needs: Systematic monitoring; development of a captive breeding technology; awareness and education among tribal communities; identification of spawning sites
Stakeholders: Department of Forest and Wildlife
Traditional Knowledge: Not documented
Research needs: Distribution; Population; Ecology; Threats

Garra mlapparaensis **(Cyprinidae)**
Not Evaluated
Malayalam Name: മ്ലാപ്പാറ കല്ലൊട്ടി
Endemism: Kerala
Distribution in Kerala: Periyar; Districts: Idukki
Habitats: Fast-flowing, clear, and well-oxygenated streams; with sand, pebbles, cobbles, boulders and bedrock as the substrates. Juveniles of the species are found associated with slow flowing riffles with sand and pebbles as the major substrates.
Population Status: Not known (only a few individuals have ever been recorded)
Threats: Alien species; Future impacts of climate change
Exploitation: Not known
WPA/CITES/CMS: No
Conservation status: Not Assessed; Triggers the Vulnerable Category
Conservation needs: Monitoring of populations; managing alien species
Stakeholders: Department of Forest and Wildlife
Traditional Knowledge: Not documented
Research needs: Distribution; Population, Ecology; Impacts of alien species

Horaglanis abdulkalami **(Clariidae)**
Not Evaluated
Malayalam Name: അബ്ദുൾകലാം കുരുടൻമുശി
Endemism: Kerala
Distribution in Kerala: multiple locations in Thrissur district; Districts: Thrissur
Habitats: Lateritic aquifers and associated subterranean channels; often encountered in dug-out wells
Population Status: Not known
Threats: Reclamation of wetlands and paddy fields; groundwater extraction; pollution
Exploitation: Not known
Occurrence in Protected Area: None
WPA/CITES/CMS: No
Conservation status: Currently Not Assessed; Triggers the Endangered Category
Conservation needs: Community based conservation and protection; strict laws against conversion of wetlands and paddy fields; protection of wells
Stakeholders: Kerala State Biodiversity Board
Traditional Knowledge: Not documented
Research needs: Distribution; Population; Ecology

Kryptoglanis shajii **(Kryptoglanidae)**
Not Evaluated
Malayalam Name: മിഡു
Endemism: Kerala
Distribution in Kerala: multiple locations in Thrissur district; Districts: Thrissur
Habitats: Lateritic aquifers and associated subterranean channels; often encountered in dug-out wells; also occurs in channels in plantations and small homestead ponds
Population Status: Not known
Threats: Reclamation of wetlands and paddy fields, groundwater extraction, pollution
Exploitation: No
Occurrence in Protected Area: None
WPA/CITES/CMS: No
Conservation status: Currently Not Assessed; Triggers the Endangered Category
Conservation needs: Community based conservation and protection; strict laws against conversion of wetlands and paddy fields; protection of wells
Stakeholders: Kerala State Biodiversity Board
Traditional Knowledge: None
Research needs: Distribution; Population; Ecology

Notopterus synurus **(Osteoglossidae)**
Not Evaluated
Malayalam Name: അമ്പട്ടൻ വാള
Endemism: Peninsular India
Distribution in Kerala: Kabini; reservoirs in Bharathapuzha; likely to occur in Bhavani and Pambar
Districts: Wayanad, Palakkad (Palakkad and Idukki – see above)

Habitats: Small rivulets, marginal areas of the low land rivers and associated floodplain areas where the substrate types being silt, sand, gravel and pebbles. The species is found to hide among the rooted macro vegetation and below the weedy mats.
Population Status: Declining
Threats: Habitat loss; sand mining; pollution; indiscriminate fishing
Exploitation: High (as food fish)
Occurrence in Protected Area: Wayanad WLS
WPA/CITES/CMS: No
Conservation status: Currently Not Assessed; Triggers the Vulnerable Category
Conservation needs:
Stakeholders: Kerala State Fisheries Department; Kerala State Forest and Wildlife Department; Kerala State Biodiversity Board
Traditional Knowledge: Not documented
Research needs: Distribution; Population; Ecology, Threats

Pangio bhujia (Cobitidae)
Not Evaluated
Malayalam Name: പാതാള പുന്നാരകൻ
Endemism: Kerala
Distribution in Kerala: Cherinjal (Kozhikode), Kondotty (Malappuram)
Districts: Kozhikode, Malappuram
Habitats: Lateritic aquifers and associated subterranean channels; often encountered in dug-out wells; also occurs in channels in plantations and small homestead ponds
Population Status: Not known
Threats: Reclamation of wetlands and paddy fields; groundwater extraction; pollution
Exploitation: Not known
Occurrence in Protected Area: None
WPA/CITES/CMS: No
Conservation status: Currently Not Assessed; Triggers the Endangered Category
Conservation needs: Community based conservation and protection; strict laws against conversion of wetlands and paddy fields; protection of wells
Stakeholders: Kerala State Biodiversity Board
Traditional Knowledge: Not documented
Research needs: Distribution; Population; Ecology

Rasbora neilgherriensis (Danionidae)
Not Evaluated
Malayalam Name: ഓരി
Endemism: Western Ghats
Distribution in Kerala: Kabini; likely to occur in Bhavani ; Districts: Wayanad, Palakkad
Habitats: Prefer the clear water streams and rivulets with moderate flow and canopy where the substrate types being silt, sand, gravel, pebbles and cobbles. The juveniles of the species are found associated with the marginal sinuous areas with low water velocity.
Population Status: Declining
Threats: Loss of critical habitats; bycatch; pollution
Exploitation: Low to medium (bycatch)
Occurrence in Protected Area: Wayanad WLS, Silent Valley NP
WPA/CITES/CMS: No
Conservation status: Currently Not Assessed; Triggers the Vulnerable Category
Conservation needs: Monitoring of critical habitats and populations; development of a captive breeding technology
Stakeholders: Kerala State Forest and Wildlife Department
Traditional Knowledge: Not documented
Research needs: Distribution; Population; Ecology

Species in Focus VI

Subterranean eel loach, *Pangio bhujia*

The first miniature subterranean eel-loach

Distribution: Kozhikode and Malappuram Districts

Habitat: Lateritic aquifers and associated groundwater and subterranean habitats. Also known to occur in small water channels of agro-based plantations. Often encountered in dug-out wells

Threats: Unmanaged groundwater extraction, pollution, alien species

IUCN Red List Status: Not Assessed

Key Fish Areas (KFAs) in Kerala

Given the lack of funding and investment for freshwater biodiversity conservation [8, 22], and the fact that many freshwater taxa around the world are living on the edge; there is an urgent need to identify and prioritise species and sites for conservation planning and action. Limited resources available make the single-species approach to conservation unrealistic [23], and encourages the prioritisation of sites/areas that if protected, will help conserve the greatest diversity [24].

The global protected area network, considered to be one of the most effective in situ management strategies to overcome biodiversity loss continues to grow. Yet, despite this expansion, protected areas cover only less than 25% of areas of importance for biodiversity. The true extent of the world's fresh waters contained in the protected area network remains largely unknown, as there are very few dedicated 'freshwater protected areas', and freshwater ecosystems are (generally) only protected incidentally through their incorporation into the terrestrial protected area network. Despite this the number of freshwater fish species that occur in some of these terrestrial protected areas probably far exceed those of mammals, birds and reptiles. Yet, protected areas for example in the Western Ghats rarely acknowledge the importance, or need for conserving fish. This is strange as some of these protected areas are potential freshwater 'Alliance for Zero Extinction (AZE)' sites, i.e., sites that harbour 95 % of the population of one or more 'Critically Endangered' and/or 'Endangered' species – which are global priorities for conservation [25]. On the other hand, there is also an issue that many endemic, and threatened freshwater-dependent taxa are poorly represented inside terrestrial protected areas.

While the IUCN Red List is the widely accepted standard for assessing global risk of extinction of species, a threshold-based criteria - the Key Biodiversity Area (KBA) approach has been developed for identifying and prioritizing sites of greatest conservation importance for ensuring species survival [26–28]. KBAs are extensions of the concept of Important Bird Areas (IBAs), the largest and most comprehensive network of sites that have been identified as significant for the global persistence of biodiversity [29]; derived from a set of criteria based on two key elements of systematic conservation planning, i.e. 'Vulnerability' (measure of scarcity of options in time for conserving biodiversity) and 'Irreplaceability' (measure of spatial options available for conservation of a particular species) [29, 30–31]. We have prioritised 12 areas/sites in the State of Kerala that can be prioritised for the implementation of 'Key Fish Areas/KFAs'.

1. Periyar Tiger Reserve [Thannikudy, Ummikuppanthodu, Mlappara]

Type of Area: IUCN Category II Protected Area (National Park)
River system: Periyar
Fish species: 40
Fish species endemic to the IFA: 8
Threatened fish species: 12
Major Threats: Alien species, fishery bycatch
Major Conservation interventions required: Regular monitoring of alien species; management of bycatch in the lake
Alliance for Zero Extinction Site: Yes
Priority species: Lepidopygopsis typus (EN), Tariqilabeo periyarensis (EN), Hypselobarbus periyarensis (EN), Garra periyarensis (VU), Mesonoemacheilus periyarensis (VU), Mesonoemacheilus menoni (VU), Garra mlapparaensis (NA) and Ghatsa silasi (NA)

2. Silent Valley National Park [Kunthi tributary]

Type of Area: IUCN Category II
Protected Area
River system: Bharathapuzha
Fish species: 40
Fish species endemic to the IFA: 3
Threatened fish species:
Major Threats: Climate Change
Major Conservation interventions required: Regular monitoring for occurrence of alien species
Alliance for Zero Extinction Site: No
Priority species: Ghatsa menoni (LC), Ghatsa pillaii (LC), Mesonoemacheilus remadevii (LC). Garra menoni (LC).

3. Chinnar Wildlife Sanctuary [Pambar River]

Type of Area: IUCN Category IV Protected Area
River system: Pambar
Fish species: 25
Fish species endemic to the IFA: 1 (*undescribed species of Ghatsa)*
Threatened fish species: 3
Major Threats: Loss of critical habitats due to flow alterations and climate change
Major Conservation interventions required: Regular monitoring of alien species
Alliance for Zero Extinction Site: No
Priority species: Tor remadevii (CR), Glyptothorax housei (EN), Garra hughi (EN)

4. Wayanad Wildlife Sanctuary [Kabini River and its tributaries – Noolpuzha, Kalindi, Nugu]

Type of Area: IUCN Category IV Protected Area
River system: Kabini

Fish species: 101
Fish species endemic to the IFA: 2
Threatened fish species: 18
Major Threats: Alien Invasive Species, Indiscriminate Fishing
Major Conservation interventions required: Regular monitoring of spread of alien species
Alliance for Zero Extinction Site: No
Priority species: Tor remadevii (CR), Hypselobarbus dubius (EN), Neolissochilus wynaadensis (CR), Hypselobarbus micropogon (EN), Hemibagrus punctatus (CR), Balitora mysorensis (VU), Schistura striata (EN), Dario neela (NA), Glytothorax madraspatanus (EN), Pethia nigripinna (NA), Garra mcclellandi (LC), Pterocryptis wynaadensis (EN), Puntius cauveriensis (VU), Devario neilgherriensis (EN), Rasbora neilgherriensis (NA)

5. Karimpuzha Wildlife Sanctuary [New Amarambalam Forests]

Type of Area: IUCN Category IV Protected Area
River system: Chaliyar
Fish species: 45
Fish species endemic to the IFA: 1
Threatened fish species: 6
Major Threats: Fishing using unsustainable methods
Major Conservation interventions required: Regular monitoring of habitat quality and populations of the endemic species; improving awareness among local tribal communities on the impacts of using plant poisons and other destructive fishing methods
Alliance for Zero Extinction Site: Yes
Priority species: Tor malabaricus (EN), Glyptothorax davissinghi (EN)

6. Chalakudy [Vettilapara to Poringal]

Type of Area: Reserved Forests
River system: Chalakudy
Fish species: 62
Fish species endemic to the IFA: 0
Threatened fish species: 15
Major Threats: Indiscriminate fishing, drying of pools during summer, flow regulation
Major Conservation interventions required: Regular patrol on the river banks and monitoring indiscriminate fishing
Alliance for Zero Extinction Site: No
Priority species: Tor malabaricus (EN), Travancoria elongata (EN), Sahyadria chalakkudiensis (EN), Osteochilichthys longidorsalis (EN), Horabagrus nigricollaris (EN), Garra surendranathanii (EN), Batasio travancoria (VU)Sahyadria chalakkudiensis (EN), Osteochilichthys longidorsalis (EN), Horabagrus nigricollaris (EN), Garra surendranathanii (EN), Batasio travancoria (VU)

7. Periyar [Pooyamkutty-Edamalayar-Maankulam]

Type of Area: Reserved Forests
River system: Periyar
Fish species: 54
Fish species endemic to the IFA: 1
Threatened fish species: 10
Major Threats: Indiscriminate Fishing
Major Conservation interventions required: Regular monitoring for indiscriminate fishing activities, and spread of alien species
Alliance for Zero Extinction Site: No
Priority species: Tor malabaricus (EN), Travancoria elongata (EN), Sahyadria chalakkudiensis (EN), Osteochilichthys longidorsalis (EN), Horabagrus nigricollaris (EN), Garra surendranathanii (EN), Batasio travancoria (VU), Garra emarginata (NA)

8. Santhampara hills [Panniyar stream]

Type of Area: Mosaic of forests and plantations of tea and cardamom
River system: Periyar
Fish species: 24
Fish species endemic to the IFA: 2
Threatened fish species: 5
Major Threats: Alien Invasive Species, Pollution, Habitat deterioration
Major Conservation interventions required: Monitoring for spread of alien species; routine water quality assessments and monitoring of pollutants; transforming plantations to organic farming
Alliance for Zero Extinction Site: Yes
Priority species: Garra hughi (EN), Garra arunachalami (CR), Ghatsa santhamparaiensis (EN), Travancoria jonesi (EN), Indoreonectes keralensis (VU)

9. Shendurney Wildlife Sanctuary and the adjoining aquascapes of the Kallada

Type of Area: IUCN Category IV Protected Area, and mosaic of human dominated landscape
River system: Kallada
Fish species: 35
Fish species endemic to the IFA: 1
Threatened fish species: 8
Major Threats: Fishing using unsustainable methods
Major Conservation interventions required: Monitoring of threatened fish populations; licensing and enforcement of management plans in the reservoir fishery
Alliance for Zero Extinction Site: Yes (only the range of Dawkinsia exclamatio)
Priority species: Travancoria jonesi (EN), Dawkinsia exclamatio (EN), Hypselobarbus thomassi (CR), Tor malabaricus (EN).

10. Upper reaches of Achankovil River

Type of Area: Reserved Forests
River system: Achankovil
Fish species: 40
Fish species endemic to the IFA: 0
Threatened fish species: 6
Major Threats: Loss of riparian cover
Major Conservation interventions required: monitoring for alien species, improving awareness among forest-dwelling communities Alliance for Zero Extinction Site: No Priority species: Tor malabaricus

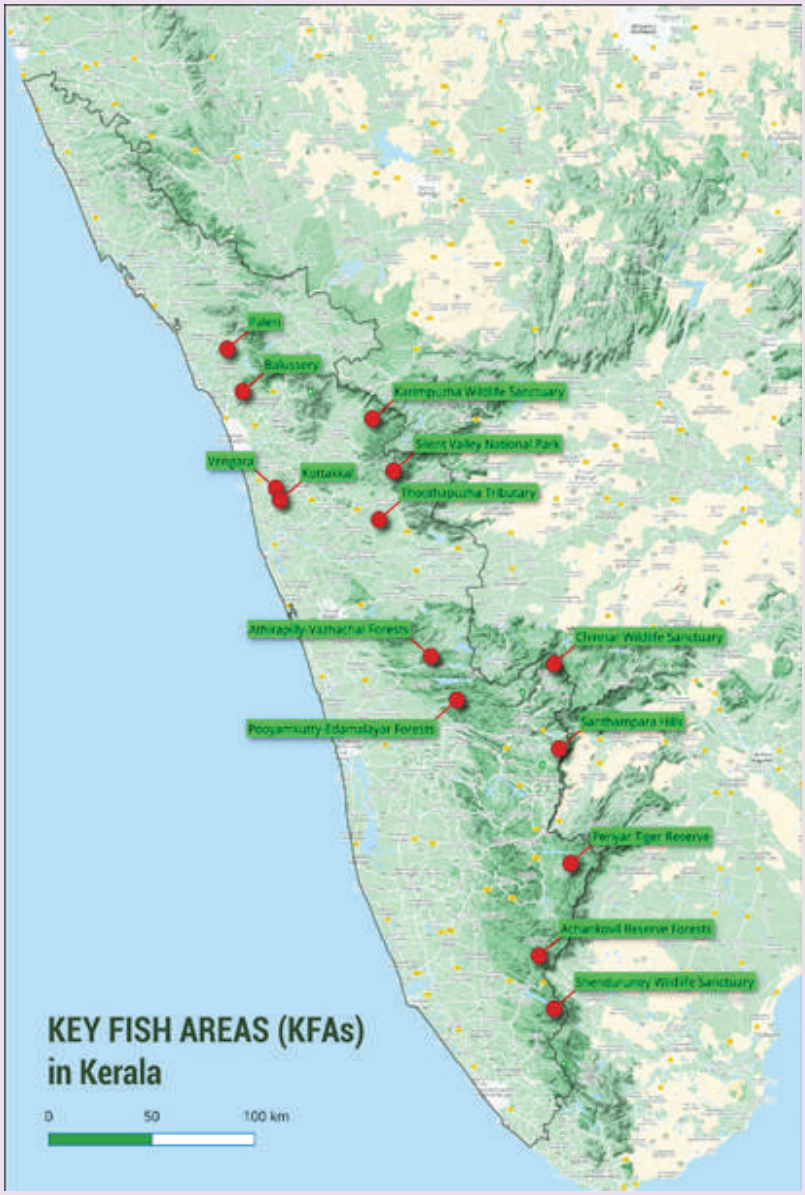
(EN), Sahyadria chalakkudiensis (EN), Glyptothorax anamalaiensis (EN), Garra surendranathanii (Endangered)

11. Thoothapuzha tributary from Vellinezhi to Mukkali

Type of Area: Mosaic of Reserved Forests, Agricultural land and Human Habitation
River system: Bharathapuzha
Fish species: 55
Fish species endemic to the IFA: 0
Threatened fish species: 7
Major Threats: Sand mining, Deterioration of habitats, flow regulation
Major Conservation interventions required: Monitoring of habitats with regard to sand mining issues; monitoring for spread of alien species
Alliance for Zero Extinction Site: No
Priority species: Osteochilichthys longidorsalis (EN), Pseudolaguvia austrina (NA), Sahyadria denisonii (EN), Glyptothorax anamalaiensis (EN)

12. Paddy fields/wetlands in Malappuram (Kottakal, Vengara, Kondotty)

Type of Area: Paddy fields, flood-plains, wetlands and human habited agricultural landscapes
Fish species: Detailed inventory not available
Fish species endemic to the IFA: 0 (but harbours a significant population of Aenigmachanna gollum – a living fossil)
Threatened fish species: 1
Major Threats: Alien Invasive Species, Pollution, Reclamation of paddy fields and wetlands
Major Conservation interventions required: Education and awareness programs, community-based conservation reserves, fish refugias
Alliance for Zero Extinction Site: No
Priority species: Aenigmachanna gollum (NA), Rakthamichthys digressus (DD), Ophichthys fossorius (EN), Pangio bhujia (NA)



Species in Focus VII

Imperial White Collared Catfish , *Horabagrus nigricollaris*

An enigmatic freshwater catfish of the family Horabagridae

©VK Anoop

Distribution: Periyar (Edamalayar-Pooyamkutty) and Chalakkudy (Vettilapara-Athirapilly) Rivers

Habitat: Riffles and deep pools

Threats: Indiscriminate fishing, Pollution, Habitat loss due to flow regulation

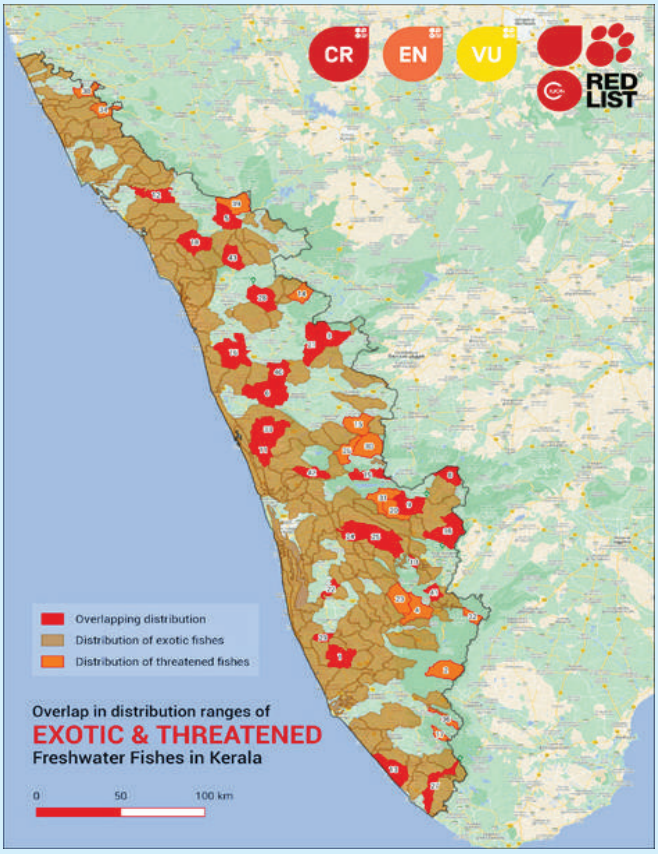
IUCN Red List Status: Endangered

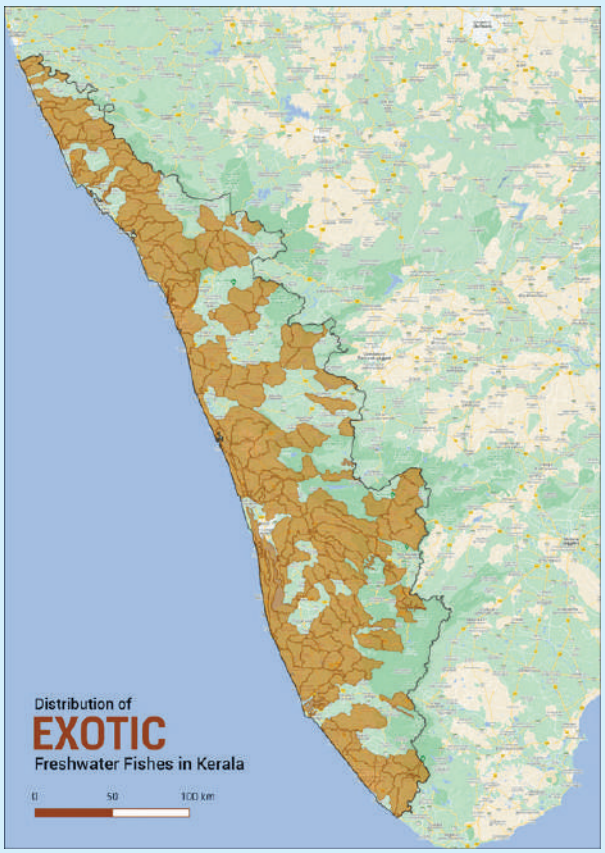
Alien species – major threat to freshwater fish species in Kerala

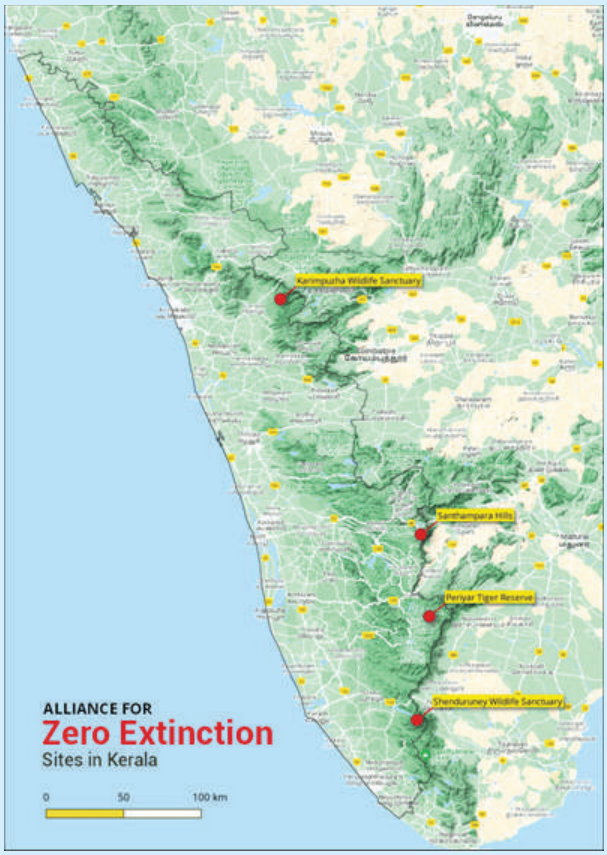
Alien species are recognized as the second major cause of global biodiversity decline. A total of 30 alien fish species are known from the Kerala part of the southern Western Ghats, posing severe threats to the native fish diversity through competition for shared resources, including food and predation. Of the 30 alien fish species recorded from the Kerala part of Western Ghats, 12 species – *Oreochromis mossambicus, O. niloticus, Pterygoplichthys pardalis, Clarias gariepinus, Cyprinus carpio, Poecilia reticulata, P. mexicana, Gambusia affinis, Trichopodus trichopterus, Oncorhynchus mykiss, Xiphophorus hellerii* and *X. maculatus* has established strong breeding populations in the wild, and seven of them have turned invasive. The occurrence of *Oreochromis mossambicus* and *Cyprinus* carpio in most water bodies both inside and outside the protected area network of the state have been overlooked by biodiversity managers, fisheries scientists and conservation biologists, and there is a huge lacuna in understanding the on-ground impacts caused by such invasive species. The Periyar and Chalakudy rivers, which were identified as 'Important Fish Areas' due to the presence of many endemic, and threatened fish species, harbours 17 and 15 alien fish, respectively. The North African catfish *Clarias gariepinus* has established substantial breeding populations in the reservoirs built across the Periyar and Kabini rivers, and in many of its tributaries. The abundance of large-sized predatory fishes such as the North African catfish in critical fish habitats, including within the protected areas, and breeding populations of common carp, a high competitor of native fish in most of the reservoirs and rivers with threatened fish species is clear evidence of lack of sound invasion biology studies and management. The common carp has also established breeding populations in rivers, especially in places such as Kulathupuzha and Aruvikkara, where the threatened *Tor* sp. is considered sacred and revered, and their abundance in the Periyar lake, an AZE site, is a concern for many threatened point endemic species. The presence of *Poecilia reticulata* in many high order streams of the WG is yet another concern for the high-altitude fish fauna, as they are voracious feeders of fish eggs and invertebrate larvae. *Pterygoplichthys pardalis*, is now known to compete strongly with native fish species for food and space; the species being a significant menace in the natural streams of the Karamana river in Thiruvananthapuram. Baseline data on distribution of alien fish species in Kerala is available, however what is lacking is the enforcement of policies, and on-ground management efforts. In critical habitats, management programmes including possible options for eradication need to be prioritised. Efforts to strengthen the knowledge base on invasion biology of alien species need to be put in place to safeguard the unique diversity of endemic fish species.

The exotic African catfish in Thiruvachira Sree Krishna Temple Pond, Kozhhikode. © Smrithy Ray

Exotic common carp (in red) with threatened mahseer species in the Kulathupuzha river. © Smrithy Ray







Alliance for Zero Extinction Sites (AZE)

The Alliance for Zero Extinction (AZE) was launched in the year 1995 to identify, effectively conserve and safeguard the most important sites for preventing global species extinctions (see www.zeroextinction.org). The Alliance for Zero Extinction (AZE) identifies and safeguards key sites, each one of which is the last remaining refuge of one or more Endangered (EN) or Critically Endangered (CR) species.

Table 2. List of freshwater fish-based Alliance for Zero Extinction (AZE) Sites in Kerala

Name of the area	Trigger Species
Periyar Tiger Reserve	*Lepidopygopsis typus, Tariqilabeo periyarensis, Hypselobarbus periyarensis*
New Amarambalam	*Glyptothorax davissinghi*
Santhampara	*Garra arunachalami, Ghatsa santhamparaiensis*
Kallada River	*Dawkinsia exclamation*

Fish species prioritised for Section 38 of Biological Diversity Act

The following nine species are prioritised for inclusion under the Section 38 of the Biological Diversity Act.

1. Hump-backed mahseer, *Tor remadevii*

Assessed as Critically Endangered on the IUCN Red List, Tor remadevii is the world's rarest mahseer whose global distribution has reduced by >90% over the last decades. The species is currently restricted to the tributaries of the Cauvery in Kerala including the Bhavani, Pambar and Kabini. Though much of its current distribution range in Kerala may fall inside protected areas or reserved forests, the migratory habit of the species could mean that they move out of the protected stretches during certain seasons. At such times, they are the target of indiscriminate fishing by local communities. This species needs to be included under Section 38 given its extremely high risk of extinction, small population size and the fact that it does not contribute a primary source of food security, income or livelihoods to the local riverine communities. Areas where strict enforcement and monitoring should be carried out include the areas outside the boundaries of the Chinnar Wildlife Sanctuary, Wayanad Wildlife Sanctuary and the Bhavani Forest Range of Silent Valley National Park.

Tor remadevii © Dencin Roms Thampy

2. Gollum Snakehead, *Aenigmachanna gollum*

A recently (2019) described species which comprises an evolutionary distinct lineage within the order Anabantiformes and a 'living fossil'. The family Aenigmachannidae to which the species belongs is endemic to Kerala, and is therefore of considerable conservation priority. Current known populations of this species occur in human-dominated landscapes such as paddy-fields, floodplain associated wetlands and channels in agro-plantations in Malappuram, Kozhikode, Thrissur and Ernakulam Districts. Though this species is not yet assessed for its IUCN Red List Status, this species needs to be included under Section 38 given its extremely unique evolutionary status, and increased demand from the international aquarium pet trade as a 'Feng Shui' fish, and most importantly because the distribution of this species overlaps with areas with high human footprint. There is also a dearth of information on the habitat requirements, population size and threats to this species.

3. Subterranean Catfish, *Kryptoglanis shajii*

Kryptoglanis shajii is an evolutionarily distinct fish belonging to the family Kryptoglanidae which is endemic to the State of Kerala. Though it was originally discovered from lateritic aquifers and dug-out wells in Thrissur District, subsequent surveys have shown that there is also an epigean population that lives in wetlands, channels in agro-based plantations, and ponds. The species has not received any research attention and therefore there is no baseline information on any aspect of its life history, ecology and population status. Though this species is not yet assessed for its IUCN Red List Status, this species needs to be included under Section 38 given its extremely unique evolutionary status, and because its distribution overlaps with areas with high human footprint, where anthropogenic pressures might likely lead to population declines.

4. Species of the blind catfish genus *Horaglanis (Horaglanis abdulkalami, H. alikunhii, H. krishnai)*

The genus Horaglanis comprises three species of evolutionarily distinct, blind catfishes endemic to Kerala, where they occur in lateritic aquifers and homestead dug-out wells in Thrissur, Ernakulam, Kottayam, Pathanamthitta and Alappuzha districts. Two species (H. alikunhii and H. krishnai) are assessed as Data Deficient on the IUCN Red List, while H. abdulkalami has not yet been assessed. These three species need to be included under Section 38 given its extremely unique evolutionary status, and because its distribution overlaps with areas with high human footprint, where anthropogenic pressures might likely lead to population declines. The lateritic aquifers are threatened by high levels of water extraction, and the connected dug-out wells through which the species are opportunistically sighted are threatened by the use of disinfectants and the occasional introduction of alien species including the predatory African Catfish, Clarias gariepinus.

5. Species of the blind synbranchid eel genus Rakthamichthys (Rakthamichthys digressus, R. indicus and R. roseni)

The recently established synbranchid genus *Rakthamichthys* comprises three species of evolutionarily distinct, blind eels occurring in lateritic aquifers, dug-out wells, and caves in Kasargod, Kannur, Kozhikode, Malappuram, Thrissur, Ernakulam, Kottayam, Pathanamthitta, Alappuzha and Kollam districts. Though all three species are assessed as Data Deficient on the IUCN Red List, these are potential candidates for inclusion under Section 38 given its unique evolutionary status, and because its distribution overlaps with areas of high human footprint, where anthropogenic pressures might likely lead to population declines. The lateritic aquifers are threatened by high levels of water extraction, and the connected dug-out wells through which the species are opportunistically sighted are threatened by the use of disinfectants and the occasional introduction of alien species including the predatory African Catfish, *Clarias gariepinus*. An emerging threat to these species is an interesting case of Human-Fish conflicts where the eels are killed as they superficially resemble snakes.

6. Highly exploited species that merits special mention

Several other species of freshwater fishes are facing high levels of threats, especially populations located outside the protected area network. These species are in particular threatened by indiscriminate fishing, often using destructive gears including fine-meshed nets, use of plant poisons, chemicals, and dynamite. These species are currently not being suggested for inclusion in Section 38 of the Biological Diversity Act because of the sole reason that they contribute significantly to local livelihoods and food security in many riverine and reservoir habitats of Kerala. These species need to be prioritised for regular monitoring by the Kerala State Fisheries Department, and the Kerala State Biodiversity Board with specific focus on their exploitation and trade.

Highly exploited species that merits special mention

1. *Channa diplogramma*	പുലിവാക [Highest Priority]
Areas to be monitored	Pampa, Achankovil, Muvattupuzha Rivers
2. *Hypselobarbus thomassi*	കെമ്പൻ കുരൽ
Areas to be monitored	Kallada (Thenmala), Chalakudy, Periyar
3. *Horabagrus brachysoma*	മഞ്ഞക്കൂരി
Areas to be monitored	Periyar, Chalakudy, Pampa, Achankovil, Muvattupuzha, Meenachil, Karuvanoor
4. *Tor malabaricus*	കറ്റി, ചുര
Areas to be monitored	Bharathapuzha, Chaliyar, Kuttyadi, Valapattanam
5. *Osteochilichthys longidorsalis*	മോഡോൺ
Areas to be monitored	Bharathapuzha, Chalakudy, Periyar
6. *Clarias dussumieri*	നാടൻമൂശി
Areas to be monitored	Kole wetlands, rivers and wetlands in Ernakulam, Idukki and Thrissur Districts
7. *Hypselobarbus dubius*	മാമുൾ
Areas to be monitored	Kabini
8. *Hypselobarbus micropogon*	കോഴിമീൻ, കോഴിമീൻ,
Areas to be monitored	Kabini
9. *Kantaka brevidorsalis*	കോഴിമീൻ,
Areas to be monitored	നീലമുള്ളൻ

10. *Hypselobarbus kurali* — കുഴികുത്തി കൂരൽ
Areas to be monitored — Malampuzha, Mullaperiyar and Idukki reservoirs

11. *Systomus sarana* — കുറുവാ പരൽ, കരിന്തലപ്പൻ
Areas to be monitored — Kole wetlands, Confluent rivers of Lake Vembanad

12. *Channa pseudomarulius* — ചേറൻ, ചേറുമീൻ
Areas to be monitored — Kole wetlands, Confluent rivers of Lake Vembanad

13. *Labeo dussumieri* — പുല്ലൻ, തൂളി
Areas to be monitored — Confluent rivers of Lake Vembanad

14. *Wallago attu* — ആറ്റുവാള
Areas to be monitored — Kole wetlands, Confluent rivers of Lake Vembanad

15. *Anguilla bengalensis* — പുള്ളിമലിഞ്ഞീൻ
Areas to be monitored — All major rivers, estuaries, and reservoirs

16. *Anguilla bicolor* — കറുത്തമലിഞ്ഞീൻ
Areas to be monitored — All major rivers, estuaries, and reservoirs

17. *Carinotetraodon travancoricus* — ആട്ടുണ്ട, തവളപ്പൊട്ടൻ
Areas to be monitored — Lowland areas of all major west-flowing rivers

Freshwater fish species of Kerala included under the Indian Wildlife (Protection) Act 1972

No species of freshwater fish are explicitly listed under the Indian Wildlife (Protection) Act 1972. However, a few species are included as a result of their 'family' listed under the Act.

Two species of freshwater fish found in Kerala are listed under the Schedule I of the Indian Wildlife (Protection) Act 1972 (IWPA). These include the freshwater pipefish, *Ichthyocampus carce* and the Crocodile Tooth Pipe Fish, *Microphis cuncalus* as both these species are members of the family Syngnathidae – all members of which are included under the highest schedule of the IWPA.

Ichthyocampus carce

Malayalam Name: ശുദ്ധജല പൈപ്പ് മത്സ്യം
Distribution in Kerala: Not clearly known; but likely to occur in lowland areas of major west-flowing river systems
Population Status: Not known
Threats: Loss of habitats especially shoreline vegetation and riparian cover; pollution
Conservation status: Least Concern (this however does not represent the status of the fish in Kerala which needs to be assessed once information becomes available)
Conservation needs: Systematic monitoring of known habitats and populations
Stakeholders: Kerala State Biodiversity Board; Department of Fisheries
Traditional Knowledge: None
Research needs: Distribution; Population, Ecology; Threats

Microphis cuncalus

Malayalam Name: മുതലപ്പല്ലൻ പൈപ്പ് മത്സ്യം, പൈപ്പ്മീൻ
Distribution in Kerala: Not clearly known; but likely to occur in lowland areas of major west-flowing river systems; verifiable records available from Periyar and Chalakudy
Population Status: Not known
Threats: Loss of habitats especially shoreline vegetation and riparian cover; pollution
Conservation status: Least Concern (this however does not represent the status of the fish in Kerala which needs to be assessed once information becomes available)
Conservation needs: Systematic monitoring of known habitats and populations
Stakeholders: Kerala State Biodiversity Board; Department of Fisheries
Traditional Knowledge: None
Research needs: Distribution; Population, Ecology; Threats

Threats to freshwater fishes of Kerala – a photo journey

Intensive fishing for spawners of *Labeo dussumieri,* known as "thooliyilakkam" – scene from Meenachil River, River fish-kills are becoming a common occurrence in many rivers of Kerala

Entire stretches of rivers are being lost as a result of a range of anthropogenic impacts – Scene

Pollution from agro-based sources particularly from plantations are a major threat to hillstream fishes of Kerala

A cascade of dams now alters free-flowing rivers in Kerala resulting in significant downstream impacts including loss of critical habitats for fish, Downstream impacts of dams in the Chalakudy River Fish kills in paddy fields following droughts. Such drought periods were common after catastrophic floods in Kerala over the last three years

Intensive fishing for spawners of Labeo dussumieri, known as "thooliyilakkam" – scene from Meenachil River. © Latha Cheriyan

River fish-kills are becoming a common occurrence in many rivers of Kerala.© CP Shaji

Entire stretches of rivers are being lost as a result of a range of anthropogenic impacts – Scene. © Rajeev Raghavan

Pollution from agro-based sources particularly from plantations are a major threat to hillstream fishes of Kerala. © Rajeev Raghavan

A cascade of dams now alters free-flowing rivers in Kerala resulting in significant downstream impacts including loss of critical habitats for fish © Rajeev Raghavan

Downstream impacts of dams in the Chalakudy River © Rajeev Raghavan

Fish kills in paddy fields following droughts. Such drought periods were common after catastrophic floods in Kerala over the last three years. © CP Shaji

Recommendations

The following are a set of brief recommendations for raising the profile, and improving freshwater fish conservation and management efforts in Kerala.

- Detailed exploratory studies to be carried out in every major river system of the state including inside protected areas to determine the actual fish diversity. Such studies should be undertaken in every tributary at all altitudes, and in different seasons of the year in order to get a better picture of freshwater fish diversity of the state and to prioritize conservation action

- Integrative taxonomic studies to be carried out on groups for which considerable ambiguities exist. State-of-the-art molecular techniques to be adopted.

- A repository for freshwater fishes of Kerala to be developed with properly curated voucher specimens. The collections should include both topotypes of the various species, and additional material from various locations. One such repository can be initiated in the Biodiversity Museum of KSBB

- An online interactive database on the freshwater fishes of Kerala to be developed, which would serve as an information dissemination platform and trigger studies and research, besides providing essential data for with extensive information of use to students, researchers, policy makers and the public.

- Research on various aspects of distribution, population, biology, ecology, and threats to various endemic and threatened species of the state to be carried out on an urgent basis. Priority research areas for various species have been explicitly mentioned in this report under the various species accounts.

- Long-term monitoring programs to be developed and implemented for threatened species, and those that are facing population decline due to exploitation and other causes. Species that require comprehensive monitoring are mentioned in this report.

- 'Key Fish Areas' to be implemented on the ground with necessary conservation plans and strategies for the endemic and threatened fish species. Areas outside protected area network to be given immediate priority, where co-management programmes may be envisaged with the participation of Biodiversity Management Committees.

- State-level quarantine and management plans to be developed and implemented for preventing alien fish species, especially in areas of high importance (Key Fish Areas, areas where threatened species occur). Promoting the use of advanced techniques such as e-DNA for detecting their presence in critical freshwater habitats/KFAs and inside protected areas. Few KFAs need to be prioritised for the management of invasive alien fish species, and management plans developed for urgent implementation

- Flagship species to be selected for prioritised areas to increase awareness among public. Targeted awareness programmes on freshwater fish diversity/freshwater biodiversity is to be launched by the KSBB to highlight the importance of freshwater fish among the public.

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- Complete ban on fishing during the breeding season including collection of fry and juveniles from the breeding grounds.

- Enforcement of the Inland Fisheries and Aquaculture Act during the mass migration of freshwater fishes during their spawning season (Ootha)

- The KSBB should take proactive steps to regulate the trade of endemic and threatened fish species (see species accounts for their exploitation and use information) with the support of BMCs, besides updating the list of freshwater fish species in the People's Biodiversity Register

Few KFAs outside the PA network – such as those in the wetlands and paddy fields of Malappuram District may be considered for protection as Heritage Sites by the KSBB, as these areas harbour unique species found nowhere else on the planet.

An anthropogenic study to understand the local knowledge, and interactions of local (mostly forest-dwelling) communities with freshwater fish species need to be initiated.

Awareness programs and classes on native freshwater fishes and their conservation issues to be undertaken in schools and colleges in the State, and to be included in the curriculum of courses in colleges and Universities offering fisheries and other aquatic-science related disciplines

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Species excluded from the report and reasons

The 2012 amendment to the International Code of Zoological Nomenclature (ICZN)[1] has made it easier for 'researchers' to publish taxonomic work in paid, open-access, and (mostly) poor-quality online journals that have been listed as 'potential predatory', 'suspicious' or 'predatory' [2], leading to a surge of low-quality papers (from mostly tropical countries) publishing 'supposedly new taxa' [3]. The 'new names' published in these poorly-written papers, however, becomes 'available' according to relevant codes of the ICZN. These names are subsequently picked up by the print media, listed in scientific databases such as the 'Eschmeyer's Catalog of Fishes', 'FishBase' and 'WORMS', and also integrated into national environment and biodiversity reports, including country reports to the Convention on Biological Diversity.

The 'principle of priority', one of the oldest principles of binomial nomenclature ensures that scientific names of taxa can have authorities/authors' names appended to them forever, and the relevant codes of ICZN guarantees that an available name cannot be ignored, altered or reverted, even if the diagnosis and description is extremely poor and invaluable; or even in case the taxon is unidentifiable [3-4]. This situation is apparently known to promote "taxonomic mihilism" [5], 'mihi itch' [6] or 'nominomania' [7] - securing an authorship of the species and thereby being immortalized [5].

Taxonomy is a rigorous science [8] involving extensive field surveys, examination of museum collections, and laboratory studies of morphology and anatomy, followed by critical analysis and hypothesis testing [9] to identify, diagnose and describe taxa. Every taxonomist should have their rationale clear as to why a new taxon is being proposed, and their proposals should always be supported by unambiguous data [10]. Taxonomic studies that can culminate in the description of a new taxon can in many cases take months, or years to complete based on the resources and funding required.

Since 2012/2013, several papers describing 'new' fish species have been published in 'predatory', pay-to-publish open-access journals, or in online-only journals in which the peer review has been severely compromised. Some of these recent 'low-quality papers' have in particular, been accused of using a "clutch at straws" or "science mimicry" approach to diagnose 'new' species, relying on minutiae and even story-telling [11]. Such practices, though not specifically referred to as 'unacceptable' in ICZN, would severely hamper the quality of taxonomic research and compound the taxonomic uncertainties prevailing in research, especially in the era of taxonomic impediment.

Most (if not all) of the Indian freshwater fish taxonomy papers (especially those dealing with description of new taxa) since 1990 have been published in reputed journals cited in either Scopus™ or the Science Citation Index™. These include journals such as Zootaxa, Ichthyological Exploration of Freshwaters, Journal of Fish Biology, Ichthyological Research, Copeia, Vertebrate Zoology, Raffles Bulletin of Zoology, Current Science, Journal of Threatened Taxa, Hydrobiologia, Environmental Biology of Fishes and the Indian Journal of Fisheries. Many papers have also been published in the Journal of the Bombay Natural History Society and Records of the Zoological Survey of India, which represent two of India's oldest natural history journals. In all these journals, ichthyologists with experience in freshwater fish taxonomy (including on Indian fishes) serve on the editorial board and peer-review the submitted manuscripts.

Therefore, all 'ambiguous' and 'unclear' names which have been published in 'online' pay and publish journals have been excluded from the list of freshwater fishes of Kerala, and from being mentioned anywhere in this report except in this annexure. There are also cases in which the same author has published several names in a taxonomy journal (e.g., Biosystematica) of which one is clearly a distinct species (Glyptothorax elankadensis), while the others (e.g., Mystus heoki and M. indicus) are not clearly diagnosed, and are no doubt a result of poor understanding of the concepts and practices of taxonomy. In this case, only the name considered to represent a clear, diagnosable species is added and the others are excluded.

We use this annexure in this report to bring attention to this practice of 'taxonomic vandalism', and highlight the need for maintaining clarity, integrity and ethics in taxonomy. The issue of predatory publications and its impact on Indian ichthyology has been discussed in detail by many authors of this report [12], as well as by leading taxonomists around the world [11].

Species excluded from the report

Species	Type locality	Authors	Journal
1. Barilius cyanochlorus	Chully	Plamoottil & Vineeth	Biodiversitas
2. Batasio flavus	Paduthode (Manimala)	Plamoottil	J. Res. Biol.
3. Garra palaruvica	Palaruvi	Arunachalam et al.	Int. J. Zool. Res.
4. Hypselobarbus keralaensis	Karamana Basin	Arunachalam et al.	Iran. J. Ichthyol
5. Hypselobarbus menoni	Mlappara	Arunachalam et al.	Species
6. Hypselobarbus vaigaiensis	Periyar Tiger Reserve	Arunachalam et al.	Species
7. Labeo filiferus	Edakadathy	Plamoottil & Zupancic	Biosci. Discovery
8. Macrognathus albus	Chenappady	Plamoottil & Abraham	Int. J. Pure Appl. Zool.
9. Macrognathus fasciatus	Karuthavaddaserikkara	Plamoottil & Abraham	J. Exp. Zool. Ind.
10. Mystus catapogon	Mavelikkara	Plamoottil	J. Res. Biol.
11. Mystus heoki	Elankadu	Plamoottil & Abraham	Biosystematica
12. Mystus indicus	Kuttoor	Plamoottil & Abraham	Biosystematica
13. Mystus keralai	Chenappady	Plamoottil & Abraham	Int. J. Pure. Appl. Zool.
14. Mystus menoni	Elankadu	Plamoottil & Abraham	Int. J. Pure. Appl. Zool.
15. Neolissochilus microphthalmos	Ambayathode	Arunachalam et al.	Fish Taxa
16. Olyra astrifera	Kottangal	Arunachalam et al	Int. J. Zool. Res
17. Pristolepis pentacantha	Bavali (Wayanad)	Plamoottil	Int. J. Sci. Res
18. Pristolepis procerus	Chaliyar	Plamoottil	Europ. J. Zool. Res.
19. Puntius dolichopterus	Kayamkulam	Plamoottil	Int. J. Pure. Appl. Zool
20. Puntius nelsoni	Kallumkal	Plamoottil	nt J. Fauna. Biol. Stud
21. Puntius euspilurus	Mananthavady	Plamoottil	Int. J. Res. Stud. Biosci.
22. Puntius kyphus	Thiruvalla	Plamoottil	J. Exp. Zool. Ind.
23. Puntius nigronotus	Mananthavady	Plamoottil	J. Res Biol
24. Puntius ocellus	Kasargod	Plamoottil & Vineeth	Egypt. Acad. J. Biol. Sci
25. Puntius viridis	Kallumkal	Plamoottil & Abraham	J. Res. Biol
26. Rasbora ataenia	Alappuzha	Plamoottil	Int. J. Innov. Stud. Aq. Biol. Fish

There is also a second group, which includes 'names' that were published in 'predatory', open-access journals and subsequently synonymized. These are provided below.

Name/Year	Location	Author/s	Journal
1. *Horabagrus melanosome* Currently a synonym of Horabagrus brachysoma (see Ali et al. 2014)	West Venpala	Plamoottil & Abraham	Int. J. Pure. Appl. Zool.
2. *Systomus chryseus* Currently a synonym of Systomus sarana (see Sudasinghe et al. 2020)	Keezhvaipur	Plamoottil	Int. J. Fauna. Biol. Stud.
3. *Systomus rufus* Currently a synonym of Systomus sarana (see Sudasinghe et al. 2020)	Venpala	Plamoottil	Int. J. Fauna. Biol. Stud.
4. *Systomus laticeps* Currently a synonym of Systomus sarana (see Sudasinghe et al. 2020)	Thiruvalla	Plamoottil	Int. J. Fauna. Biol. Stud

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BUTTERFLIES

Telinga oculus © Kalesh Sadasivan

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Introduction

Butterflies are the most fascinating and easily recognizable group of Insects. They belong to the insect order Lepidoptera. It is one of the largest orders of Insecta that includes moths and butterflies. A total of 326 species of butterflies belonging to 168 genera are recorded from the geographical boundary of Kerala. All the six families known from India are represented in the region. The family Nymphalidae dominated with 97 species (in 47 genera) followed by Lycaenidae (94 in 56 genera), Hesperiidae (82 in 46 genera), Pieridae (32 in 14 genera) Papilionidae (19 in 4 genera) and two species (in one genera) from the family Riodinidae.

All the 39 species (Table-1) of endemic butterflies known from Western Ghats are reported from the state of Kerala. Among the endemics, Nilgiri Clouded Yellow *Colias nilgiriensis*, Red-disc Bushbrown *Telinga oculus,* Red-eye Bushbrown *Telinga adolphei*, Palni-Bushbrown *Telinga davisoni*, Nilgiri Fourring *Ypthima chenui* Palni Fourring *Ypthima ypthimoides,* Palni Sailer *Neptis palnica,* Nilgiri Fritillary *Argynnis hybrida,* Palni Fritillary *Argynnis castetsi,* Nilgiri Tiger *Parantica nilgiriensis,* Yellow Striped Hedge Hopper *Baracus subditus,* Sitala Ace *Thoressa sitala,* and Evershed's Ace *Thoressa evershedi* are restricted to the high altitude montane shola grassland ecosystems of the region. Most of the endemics are in narrow distributional ranges and confined to small areas within the mountain system

Table. 1: Endemic butterflies of Western Ghats reported from Kerala

Sl.No.	Scientific Name	Common Name	Family
1.	*Graphium teredon*	Narrow-banded Bluebottle	Papilionidae
2.	*Pachliopta pandiyana*	Malabar Rose	Papilionidae
3.	*Papilio liomedon*	Malabar Banded Swallowtail	Papilionidae
4.	*Papilio dravidarum*	Malabar Raven	Papilionidae
5.	*Papilio buddha*	Buddha Peacock	Papilionidae
6.	*Appias wardii*	Lesser Albatross	Pieridae
7.	*Colias nilagiriensis*	Nilgiri Clouded Yellow	Pieridae
8.	*Eurema nilgiriensis*	Nilgiri Grass Yellow	Pieridae
9.	*Parantirrhoea marshalli*	Travancore Evening Brown	Nymphalidae
10.	*Mycalesis igilia*	Small Longbrand Bushbrown	Nymphalidae
11.	*Telinga oculus*	Red-disc Bushbrown	Nymphalidae
12.	*Telinga davisoni*	Palni Bushbrown	Nymphalidae
13.	*Telinga adolphei*	Red-eye Bushbrown	Nymphalidae
14.	*Zipaetis saitis*	Tamil Cat's Eye	Nymphalidae
15.	*Ypthima chenu*	Nilgiri Fourring	Nymphalidae
16.	*Ypthima ypthimoides*	Palni Fourring	Nymphalidae
17.	*Cethosia mahratta*	Tamil Lacewing	Nymphalidae
18.	*Neptis palnica*	Palni Dirty Sailer	Nymphalidae
19.	*Argynnis hybrida*	Nilgiri Fritillary	Nymphalidae
20.	*Argynnis castetsi*	Palni Fritillary	Nymphalidae
21.	*Parantica nilgiriensis*	Nilgiri Tiger	Nymphalidae
22.	*Idea malabarica*	Malabar Tree Nymph	Nymphalidae
23.	*Kallima horsfieldi*	Southern Blue Oakleaf	Nymphalidae
24.	*Celatoxia albidisca*	White disc Hedge Blue	Lycaenidae
25.	*Curetis siva*	Shiva Sunbeam	Lycaenidae
26.	*Arhopala alea*	Rosy or Kanara Oak Blue	Lycaenidae
27.	*Acytolepis lilacea*	Hampson's Hedge Blue	Lycaenidae
28.	*Celaenorrhinus fusca*	Tamil Spotted Flat	Hesperiidae
29.	*Baracus hampsoni*	Hampson's Hedge Hopper	Hesperiidae
30.	*Baracus subditus*	Yellow-striped Hedge Hopper	Hesperiidae
31	*Arnetta mercara*	Coorg Forest Hopper	Hesperiidae
32.	*Thoressa sitala*	Sitala Ace	Hesperiidae
33.	*Caltoris canaraica*	Kanara Swift	Hesperiidae
34.	*Thoressa evershedi*	Evershed's Ace	Hesperiidae
35.	*Sovia hyrtacus*	Bicolour Ace	Hesperiidae
36.	*Thoressa honorei*	Madras Ace	Hesperiidae
37.	*Thoressa astigmata*	Southern Spotted Ace	Hesperiidae
38.	*Quedara basiflava*	Golden Tree Flitter	Hesperiidae
39.	*Oriens concinna*	Tamil Dartlet	Hesperiidae

Unlike other animal groups, no Indian butterfly species was assessed for IUCN Red List category till date. The assessment of 326 speceis of butterflies of Kerala was mainly based on the reliable published and unpublilshed information available during the assessment process. Due to the prevailing covid situation and the paucity of time we tried to shortlist the threatened butterflies of the State mainly by sharing our experience earned through many years in the field. Following criteria and methodology were also adopted for shortlisting the threatened butterflies of the area.

1. By considering the conservation status, taxonomic distinctiveness, rarity, endemicity and the availability of the larval food plants or microhabitat preference of the butterflies

2.The population data available from the surveys conducted by Zoological Survey of India and the periodic surveys organized by NGOs throughout the State with the support of Kerala Forests & Wildlife Department during the last 20 years also considered.

3.Published records on butterflies of the State in various reports, books and journals.

4.Information from the Social media like WhatsApp, Facebook, Instagram, email discussion groups, etc.

5. Collection data available with the local museums of Zoological Survey of India, Western Ghat Regional Centre, Kozhikode, Kerala Forest Research Institute, Peechi, Govt. Museum, Thiruvananthapuram, etc.

6. Data accumulated and available in www.ifoundbutterflies.org, which compiles the data of spot records of butterflies uploaded from various parts of the country.

Considering the above criteria, a total of 49 species of butterflies are shortlisted in to various Threatened category of IUCN. Of the 49 speceis, the Palni Sailer, *Neptis palnica* is proposed to the Critically Endangered category owing to its narrow geographical range, 7 species are Endangered, 23 are Vulnerable and 15 species are in the Near Threatened category. Of the 49 threatened buttefly species, 10 are from the family Hesperiidae, 13 from Lycaenidae, 17 from Nymphalidae, 4 from Papilionidae and 5 represented the family Pieridae.

THREATENED BUTTERFLIES OF KEALA
SPECIES ACCOUNT

1. *Bibasis sena sena (Moore, [1866])* - Orange-tailed Awl

NOT ASSESSED


Photo © Dr Kalesh Sadasivan

Taxonomy:

Order: Lepidoptera
Family: Hesperiidae
Species: *Bibasis sena sena*(Moore, [1866])
Common Name: Orange-tailed Awl
Vernacular Name: Suvarna Aara
സുവർണ്ണ ആര

Distribution:

Global: India, Southeast India
India: Western Ghats, Western and Eastern sub-Himalayas
Kerala: Mainly distributed to northern part of Palakkad gap.
Habitat: Found mainly in the riparian patches, Evergreen forests and mixed forests at the foot of Ghats till about 600m

Conservation Status

WLPA: Schedule-II
IUCN: Not Assessed
CITES: Not Assessed

Population Status in Kerala: Possibly declining,
Threats: *Hiptage bengalensis* its larval hostplant is a riparian shrub, loss of river edges anthropogenic causes and flash floods.
Conservation Measures: River bank conservation, propagation of hostplant and planting along water courses.
Stakeholders: Kerala State Biodiversity Board, Kerala State Forest and Wildlife Department.
Remarks: Schedule- II species. Population declining in Kerala and elsewhere in Western Ghats

2. *Aeromachus dubius dubius* Elwes & Edwards, 1897-Dingy Scrub Hopper


Photo © Dr Kalesh Sadasivan

Taxonomy:

Family: Hesperiidae
Species: *Aeromachus dubius dubius* Elwes & Edwards, 1897
Common Name: Dingy Scrub Hopper
Vernacular Name: Kaatu Pulchandan
കാട്ടുപുൽച്ചാടൻ

Distribution:

Global: Western Ghats and Northeast India.
India: Western Ghats, Western and Eastern sub-Himalayas
Kerala: Western ghats north and south of Palghat gap
Habitat: Primary & secondary wetGrasslands of high elevations (>900m)

Conservation Status

WLPA: Not listed
IUCN: Not Assessed
CITES: Not Assessed

Population Status in Kerala: Stable
Threats: Ochlandra reed loss; Forest fires (natural, man-made, as a part of management practice) of primary grasslands.
Conservation Measures: Montane Shola Grassland conservation, relook at burning of grasslands; prevention of forest fires and grassland
Stakeholders: Kerala State Biodiversity Board, Kerala State Forest and Wildlife Department.
Remarks: Very local montane species; *A.dubius dubius* is reported from high altitude Shola grasslands of Anamalais and Palani Hills. Very patchy in distribution

3. *Baracus subditus Moore,* [1884]- Yellow Striped Hedgehopper


Photo © Dr Kalesh Sadasivan

Taxonomy:

Family:	Hesperiidae
Species:	*Baracus subditus* Moore, [1884]
Common Name:	Yellow Striped Hedgehopper
Vernacular Name:	Manja Varayan, മഞ്ഞവരയൻ

Distribution:

Global:	India, in Western Ghats south of Palakkad gap
India:	Western Ghats only
Kerala:	Distributed south of Palghat gap, but mainly in Munnar High Range
Habitat:	Confined to primary Grasslands at edges of Temperate Montane sholas and (>1800m)

Conservation Status

WLPA:	Not listed
IUCN:	Not Assessed
CITES:	Not Assessed

Population Status in Kerala: Declining
Threats: Ochlandra reed loss; Forest fires (natural, man-made, as a part of management practice) of primary grasslands of Munnar and Periyar.
Conservation Measures: Montane Shola Grassland conservation, relook at burning of grasslands; prevention of forest fires and grassland
Stakeholders: Kerala State Biodiversity Board, Kerala State Forest and Wildlife Department.
Remarks: Strictly endemic to Western Ghats; Very local and rare. A montane shola- grassland species

4. *Thoressa evershedi* (Evans, 1910)- Evershed's Ace


Photo © Dr Kalesh Sadasivan

Taxonomy:

Family:	Hesperiidae
Species:	*Thoressa evershedi* (Evans, 1910)
Common Name:	Evershed's Ace
Vernacular Name:	Anamala Sharavegan ആനമലശരവേഗൻ

Distribution:

Global:	India, in Western Ghats south of Palakkad gap
India:	Western Ghats only
Kerala:	Distributed to south of Palakkad gap.
Habitat:	Confined to Ochlandra reed brakes, Sub-tropical evergreen and edges of Temperate Montane sholas (>1200m)

Conservation Status

WLPA:	Not listed
IUCN:	Not Assessed
CITES:	Not Assessed

Population Status in Kerala: Declining
Threats: Ochlandra reed loss; Forest fires (natural, man-made,as a part of management practice) of primary grasslands of Munnar and Periyar.
Conservation Measures: Montane Shola Grassland conservation, relook at burning of grasslands; prevention of forest fires and grassland
Stakeholders: Kerala State Biodiversity Board, Kerala State Forest and Wildlife Department.
Remarks: Strictly endemic to southern Western Ghats; Very Rare. A montane shola- grassland species

5. *Thoressa sitala* (de Nicéville, 1885) — Sitala Ace


Photo © Jebin Jose

Taxonomy:

Family:	Hesperiidae
Species:	*Thoressa sitala* (de Nicéville, 1885)
Common Name:	Sitala Ace
Vernacular Name:	Nilagiri Sharavaegan നീലഗിരിശരവേഗൻ

Distribution:

Global:	India, in Western Ghats north of Palakkad gap
India:	Western Ghats only
Kerala:	Distributed north of Palghat gap, but mainly in Munnar High Range
Habitat:	Confined to primary Grasslands at edges of Temperate Montane sholas and (>1800m)

Conservation Status

WLPA:	Not listed
IUCN:	Not Assessed
CITES:	Not Assessed

Population Status in Kerala: Declining

Threats: Ochlandra reed loss; Forest fires (natural, man-made, as a part of management practice) of primary grasslands.

Conservation Measures: Montane Shola Grassland conservation, relook at burning of grasslands; prevention of forest fires and grassland

Stakeholders: Kerala State Biodiversity Board, Kerala State Forest and Wildlife Department.

Remarks: Very rare species, only few records north of Palghat gap. Narrow endemic. So far reported only from North of Palghat Gap up to Coorg. Reported from Kannur and Kozhikode districts in the State. Very rare. Depends mostly on Shola Grasslands.

6. *Zographetus ogygia ogygia* (Hewitson, [1866]) —Purple-spotted Flitter


Photo © Dr Kalesh Sadasivan

Taxonomy:

Family:	Hesperiidae
Species:	*Zographetus ogygia ogygia* (Hewitson, [1866])
Common Name:	Purple-spotted Flitter
Vernacular Name:	Neela Marathullan നീലമരത്തുള്ളൻ

Distribution:

Global:	India, Southeast Asia
India:	Western Ghats, Western and Eastern sub-Himalayas
Kerala:	All districts confined to Evergreen forests and mixed forests
Habitat:	Found mainly in the Evergreen forests and mixed forests at the foot of Ghats till below900m

Conservation Status

WLPA:	Not listed
IUCN:	Not Assessed
CITES:	Not Assessed

Population Status in Kerala: Possibly declining.

Threats: Loss of primary West coast Tropical rain forests and secondary forests, cash crops like Rubber in midlands.

Conservation Measures: Protection of West coast Tropical rain forests and secondary forests

Stakeholders: Kerala State Biodiversity Board, Kerala State Forest and Wildlife Department.

Remarks: Very rare species. Rediscovered in 2013 from Aralam WLS

7. *Suastus minuta bipunctus Swinhoe,* 1894 —Small Palm Bob


Photo © Dr Kalesh Sadasivan

Taxonomy:

Family:	Hesperiidae
Genus:	Suastus
Species:	*Suastus minuta bipunctus* Swinhoe, 1894
Common Name:	Sahyadri Small Palm Bob
Vernacular Name:	Kunhi kurumban കുഞ്ഞിക്കുറുമ്പൻ

Distribution:

Global:	India, Southeast Asia
India:	Western Ghats, Northeast India, Southeast Asia
Kerala:	Throughout the state in wet primary jungles
Habitat:	Found mainly in the Cane brakes (Calamus), riparian patches, Evergreen forests and mixed forests at the foot of Ghats till about 1200m where Calamus sps– its larval hostplant grows

Conservation Status

WLPA:	Not listed
IUCN:	Not Assessed
CITES:	Not Assessed

Population Status in Kerala: Declining
Threats: Loss of Cane brakes, extensive cane harvest (NTFP), and loss of rainforests due to anthropogenic factors.
Conservation Measures: Calamus (Cane) harvest to be controlled, Cane propagation and planting
Stakeholders: Kerala State Biodiversity Board, Kerala State Forest and Wildlife Department.
Remarks: Rare species, with very few records.

8. *Salanoemia sala (Hewitson,* [1866]) - Maculate Lancer


Photo © Dr Kalesh Sadasivan

Taxonomy:

Family:	Hesperiidae
Species:	*Salanoemia sala* (Hewitson, [1866])
Common Name:	Maculate Lancer
Vernacular Name:	Chekavan ചേകവൻ

Distribution:

Global:	India, Southeast Asia
India:	Western Ghats, Northeast India, Southeast Asia
Kerala:	Throughout the state in wet primary jungles
Habitat:	Found mainly in the Cane brakes, riparian patches, Evergreen forests and mixed forests at the foot of Ghats till about 1200m where Calamus sps– its larval hostplant grows

Conservation Status

WLPA:	Not listed
IUCN:	Not Assessed
CITES:	Not Assessed

Population Status in Kerala: Possibly declining
Threats: Loss of Cane brakes, extensive cane harvest (NTFP), and loss of rainforests due to anthropogenic factors.
Conservation Measures: Calamus (Cane) harvest to be controlled, Cane propagation and planting
Stakeholders: Kerala State Biodiversity Board, Kerala State Forest and Wildlife Department.
Remarks: Rare species, with very few records.

9. *Caltoris canaraica Moore,* [1884] - Kanara Swift

Taxonomy:

Family:	Hesperiidae
Species:	*Caltoris canaraica* (Moore, [1884])
Common Name:	Kanara Swift
Vernacular Name:	Kanara Sharashalabham കാനറാ ശരശലഭം

Distribution:

Global:	Western Ghats of India and adjoining Deccan
India:	Western Ghats, Western and Eastern sub-Himalayas
Kerala:	Mainly distributed to northern part of Palakkad gap.
Habitat:	Confined to Bamboo brakes and edges of Temperate Montane sholas (>600m)

Conservation Status

WLPA:	Not listed
IUCN:	Not Assessed
CITES:	Not Assessed

Population Status in Kerala: Declining

Threats: Loss of bamboo forests and Ochlandra reed brakes; invasive species like Senna and Chromolaena in Wayanad exacerbated by man-made fires and degradation of habitat

Conservation Measure s :Bamboo propagation and planting, invasive species control

Stakeholders: Kerala State Biodiversity Board, Kerala State Forest and Wildlife Department.

Remarks: Very few records from Kerala, Bamboo brakes of Wayanad has a good population

10. *Sarangesa purendra hopkinsi Evans,* 1921- Spotted Small Flat

Taxonomy:

Family:	Hesperiidae
Species:	*Sarangesa purendra hopkinsi* Evans, 1921
Common Name:	Spotted Small Flat
Vernacular Name:	Para parappan പാറപ്പരപ്പൻ

Distribution:

Global:	India
India:	Western Ghats, Western and Eastern sub-Himalayas
Kerala:	Mainly distributed to northern part of Palghat gap.
Habitat:	Confined to coastal laterite hills of northern Kerala

Conservation Status

WLPA:	Not listed
IUCN:	Not Assessed
CITES:	Not Assessed

Population Status in Kerala: Rare, local and Declining

Threats: Anthropogenic factors, mining of coastal laterite hills of northern Kerala

Conservation Measures: Conservation of coastal laterite hills

Stakeholders: Kerala State Biodiversity Board, Kerala State Forest and Wildlife Department.

Remarks: Population in Kerala confined to coastal laterite hills needing immediate protection

11. *Acytolepis lilacea, Hampson,* 1889 - Hampsons Hedge Blue


Photo © VK.Chandrasekharan

Taxonomy:

Family: Lycaenidae
Species: *Acytolepis lilacea lilacea*
Common Name: Hampsons Hedge Blue
Vernacular Name: Kattu Velineeli

Distribution:

Global: Indo-China and Srilanka
India: Sub species Liliacea is endemic to South India. Recorded from Kerala and Tamilnadu.
Kerala: Local populations reported from Parambikkulam Tiger Reserve (Palakkad), Neyyar, Agasthyamalais (Thiruvananthapuram), and Thrissur.
Habitat: Found in forested areas of lower to moderate elevations up to 1000 m, if its larval host plant *Cycus circinalis* is found in abundance.

Conservation Status

WLPA: Schedule-II
IUCN: Not Assessed
CITES: Not Assessed

Threats: Deforestation and threats to larval host plant, which is cut in large, for medicinal purposes,- from unprotected areas.
Conservation Measures: Protection of Larval host plant, *Cycus circinalis* and strict enforcement of Indian Wildlife (Protection) Act.
Stakeholders: Kerala State Biodiversity Board, Kerala State Forest and Wildlife Department.
Remarks: This species is very local and depends on the forests with a considerable population of Cycus circinalis. The pupae are infected with parasite wasps in large, and thus, this species has a key role in the life cycle of such wasps in the wild.

12.Celatoxia albidisca, Moore,1884- White-disc Hedgeblue


Photo© V. K.Chandrasekharan

Taxonomy:

Family: Lycaenidae
Species: *Celatoxia albidisca* Moore, 1884.
Common Name: White-disc Hedge Blue
Vernacular Name: Irulan Velineeli

Distribution:

Global: India
India: Endemic to the Western Ghats.
Kerala: Mainly distributed to the southern part of Palakkad gap and to Nilgiris.
Habitat: Found mostly in the edges of and openings with in the typical Montane shola forests of Western Ghats.

Conservation Status

WLPA: Not Listed
IUCN: Not Assessed
CITES: Not Assessed

Population Status in Kerala: Declining
Threats: Deforestation and increasing human invasion in to the unprotected montane grasslands and forested areas.
Conservation Measures: Protection of Montane grass lands and Sholas.Protection of unprotected and ecologically vulnerable montane habitats.
Stakeholders: Kerala State Biodiversity Board, Kerala State Forest and Wildlife Department.
Remarks: This species is endemic to Western ghats and one among the two species of its genus,distributed in India.A species depends on a fragile ecosystem.

13. *Arhopala alea*, Hewitson, 1862 - Kanara Oakblue


Photo© V. K.Chandrasekharan

Taxonomy:

Family: Lycaenidae
Species: *Arhopala alea,* Hewitson, 1862
Common Name: Kanara Oakblue
Vernacular Name: Rosy Thalirneeli

Distribution:

Global: India
India: Endemic to the Western Ghats. Recorded from Kerala, Karnataka and Goa states.
Kerala: Recorded from Aralam WLS ,(Kannur district), Silent valleyNP, (Palakkad),Shendurney WLS (Kollam district), Peppara WLS,(Thiruvananthapuram district),Kakkad (Kozhikode district), Nadukani (Malappuram district).

Habitat: A species depends mainly on the riparian ecosystem of lower to mid elevation forests.

Conservation Status

WLPA: Not listed
IUCN: Not Assessed
CITES: Not Assessed

Population Status in Kerala: Declining
Threats: Deforestation and threats to the riparian ecosystem in unprotected habitats.
Conservation Measures: Protection of riverine forests and strict enforcement of Wildlife (Protection) Act.
Stakeholders: Kerala State Biodiversity Board, Kerala State Forest and Wildlife Department.
Remarks: This species is endemic to Western ghats and its larval host plants belongs to the riverine forests. An uncommon and seasonal species depending on a fragile ecosystem.

14. *Rapala lankana,* Moore, 1879 - Malabar Flash


Photo© V. K.Chandrasekharan

Taxonomy:

Family: Lycaenidae
Species: *Rapala lankana,* Moore, 1879.
Common Name: Malabar Flash
Vernacular Name: Malabar minnan

Distribution:

Global: India, Sri Lanka
India: Recorded from Kerala, Tamilnadu and Karnataka states.
Kerala: Recorded from Kannur,Kozhikode,Malappuram,Ernakulam and Thiruvananthapuram districts.
Habitat: A species of lower to moderate elevation dense forests and occasionally seen in adjacent areas.

Conservation Status

WLPA: Not Listed
IUCN: Not Assessed
CITES: Not Assessed

Population Status in Kerala: Declining
Threats: Deforestation and threats to the riparian ecosystem in unprotected habitats.
Conservation Measures: Protection of unprotected forested areas
Stakeholders: Kerala State Biodiversity Board, Kerala State Forest and Wildlife Department.
Remarks: This species is endemic to Western ghats and its early stages have strong association with Red ants *(Oecophylla smaragdina)* and this association is found inevitable for the survival of this species in the wild. A rare species

15. *Prosotas noreia,* R.Felder, 1868- White-tipped Lineblue

Taxonomy

Family: Lycaenidae
Species: *Prosotas noreia hampsoni,* R.Felder, 1868
Common Name: White-tipped Lineblue
Vernacular Name: Vellivarayan Neeli

Distribution:

Global: South Asia, Java.
India: South India, NE India,Odisha, Madhya Pradesh
Kerala: Recorded from Kannur,Kozhikodeand Wayanad districts.
Habitat: A species of lower to moderate elevation forests and scrub jungles of plains.

Conservation Status

WLPA: Schedule. I
IUCN: Not Assessed
CITES: Not Assessed

Population Status in Kerala: Declining
Threats: Deforestation and threats to the scrubs due to human interference.
Conservation Measures: Protection of unprotected scrub jungles in open lands. Strict enforcement of Indian Wildlife (Protection) Act.
Stakeholders: Kerala State Biodiversity Board, Kerala State Forest and Wildlife Department.
Remarks: This species is rare in Kerala, and its early stages and larval host plant are yet to be recorded.

16. *Lonolyce helicon,* C.Felder, 1860 - Pointed Lineblue

Taxonomy

Family: Lycaenidae
Species: *Lonolyce helicon viola*, C.Felder, 1860
Common Name: Pointed Lineblue
Vernacular Name: Muna varayan Neeli

Distribution:

Global: Indo-Malayan Realm.
India: Western Ghats, NE India.
Kerala: Mainly recorded from Kannur, Kozhikode,Malappuram,Idukki andWayanad districts.
Habitat: A species of lower to moderate elevation forests up to 1000m.Often seen puddling on the banks of forest streams.Rare in Kerala

Conservation Status

WLPA: Schedule. II
IUCN: Not Assessed
CITES: Not Assessed

Population Status in Kerala: Declining
Threats: Deforestation and threats to the forest streams and the related riparian eco system.
Conservation Measures: Protection of forest streams and riverine forests.Strict enforcement of Indian Wildlife (Protection) Act.
Stakeholders: Kerala State Biodiversity Board, Kerala State Forest and Wildlife Department.
Remarks: This species is rare in Kerala with a few records, and its early stages and larval host plant are yet to be recorded from the state.Its affinity towards forest streams is often observed

17. *Spindasis abnormis,* Moore, 1883- Abnormal Silverline


Photo© Sujin.N S

Taxonomy

Family: Lycaenidae
Genus: *Spindasis,* Wallengren, 1857.
Species: Spindasis abnormis, Moore, 1883
Common Name: Abnormal Siverline
Vernacular Name: Apurva Vellivarayan

Distribution:

Global: Indo-Malayan Realm.
India: Western Ghats (Kerala,Maharashtra)
Kerala: One and only confirmed record from Brahmagiris, Wayanad
Habitat: A species of lower to moderate elevation forests up to 1500m and also in plains.

Conservation Status

WLPA: Not Listed
IUCN: Not Assessed
CITES: Not Assessed

Population Status in Kerala: Not Assessed
Threats: Deforestation and threats to evergreen shola forests.
Conservation Measures: Has to systematically assess the population of this very rare species in the state and to conserve such habitats.
Stakeholders: Kerala State Biodiversity Board, Kerala State Forest and Wildlife Department.
Remarks: This species is very rare in Kerala with a single record, and rare elsewhere. Its habitat preference and ecology yet to be studied from the state.

18. *Horaga viola,* Moore, 1882 - Brown Onyx


Photo© V. C.Balakrishnan

Taxonomy

Family: Lycaenidae.
Species: *Horaga viola,* Moore, 1882
Common Name: Brown Onyx
Vernacular Name: Kattu Gomedakam

Distribution:

Global: Indo-Malayan Realm.
India: Western Ghats (Kerala,Karnataka), NE India,Himachal Pradesh,Uttarakhand.
Kerala: So far multiple records from, Kannapuram, Kannur district only.
Habitat: Inhabits low land dense forests. In Kerala Midland laterite ecosystem may be another habitat.

Conservation Status

WLPA: Schedule II
IUCN: Not Assessed
CITES: Not Assessed

Population Status in Kerala: Not Assessed
Threats: Deforestation and threats to unprotected low land forests and laterite hills.
Conservation Measures: Has to systematically assess the population of this very rare species in the state and to conserve such habitats. Strict enforcement of Indian Wildlife (Protection) Act.
Stakeholders: Kerala State Biodiversity Board, Kerala State Forest and Wildlife Department.
Remarks: This species is very rare in Kerala with multiple records from a single spot since 2014. Its habitat preference,early stages and ecology have yet to be studied from the state.

19. *Hypolycaena nilgirica,* Moore, 1883- Nilgiri Tit


Photo© S.Jeevith

Taxonomy

Family:	Lycaenidae
Species:	*Hypolycaena nilgirica*, Moore, 1883.
Common Name:	Nilgiri Tit
Vernacular Name:	Neelagiri Neeli

Distribution:

Global:	India, Srilanka
India:	Western Ghats (Kerala,Tamilnadu).
Kerala:	Multiple records from, Chinnar WLS, Idukki district only.
Habitat:	Inhabits low land evergreen as well as decidous forests. Populations very local.Active at forest openings,and open stream banks.

Conservation Status

WLPA:	Schedule II
IUCN:	Not Assessed
CITES:	Not Assessed

Population Status in Kerala: Declining

Threats: Deforestation and human intervention as tourists in its habitats.

Conservation Measures: Has to systematically assess the population of this very rare species in the state ,discovering further hot spots of this species and conserve them.Since the larvae feed mostly on orchids, conservaton of such vuinerable micro habitats is also crucial. Strict enforcement of Indian Wildlife (Protection) Act.

Stakeholders: Kerala State Biodiversity Board, Kerala State Forest and Wildlife Department.

Remarks: This species very rare in Kerala with multiple records from a single place since 2015. Its habitat preference, early stages and flight periods etc, have yet to be studied from the state.

20. *Creon cleobis*, Godart, 1824- Broad-tail Royal


Photo© V.K.Chandrasekharan

Taxonomy

Family:	Lycaenidae
Species:	*Creon cleobis cleobis,* Godart, 1824.
Common Name:	Broad-tail Royal.
Vernacular Name:	Valan Neelambari.

Distribution:

Global:	South Asia
India:	Western Ghats(Goa southwards), NE India,Himachal Pradesh.
Kerala:	Recorded from, Kannur, Wayanad,Idukki and Thiruvananthapuramdistricts. Habitat:Inhabits lower to moderate elevation dense forests up to 2000m.

Conservation Status

WLPA:	Not Listed
IUCN:	Not Assessed
CITES:	Not Assessed

Population Status in Kerala: Declining

Threats: Deforestation and human intervention in unprotected foot hills of Western Ghats in the form of tourism, mining and constructions. In Kerala this species has been recorded from the foot hills in Kannur and Wayanad districts apart from the records from protected forests.Since the larvae feed on Loranthus sp., felling of trees on the foot hills cause serious threat to its survival.

Conservation Measures: The foot hills of Western Ghats are to be protected.

Stakeholders: Kerala State Biodiversity Board, Kerala State Forest and Wildlife Department.

Remarks: This species is rare in Kerala with a few records from four districts.In Kerala its presence is found from foot hills to shola forests up to 1600m, that too very seasonal.

21.*Tajuria maculata,* Hewitson, 1865- Spotted Royal


Photo© VC.Balakrishnan

Taxonomy

Family: Lycaenidae
Species: *Tajuria maculata,* Hewitson, 1865
Common Name: Spotted Royal
Vernacular Name: Pottu Vellambari.

Distribution:

Global: Asia
India: Western Ghats(Karnataka southwards),NE India.
Kerala: Recorded from, Kannur, Kozhikode, Palakkad, Idukki and Thiruvananthapuram districts.
Habitat: Mostly Inhabits dense forests and hills with heavy rainfall at lower to high elevation dense forests up to 1800m.

Conservation Status

WLPA: Schedule II
IUCN: Not Assessed
CITES: Not Assessed

Population Status in Kerala: Declining

Threats: Deforestation and human intervention at the foot hills of Western Ghats, due to mining, Tourism, and constructions.

Conservation Measures: The foot hills of Western Ghats are to be protected. Strict enforcement of Indian Wildlife (Protection) Act.

Stakeholders: Kerala State Biodiversity Board, Kerala State Forest and Wildlife Department.

Remarks: This species is very rare in Kerala with a few records from five districts. In Kerala its presence is found from unprotected hills as well as protected forests. Mostly this species is an inhabitant of hills with dense tree cover and the protection of this habitat is crucial for its survival.Ecology of this species in Western Ghats is yet to be well studied.

22. *Tajuria melastigma,* de Niceville, 1887- Branded Royal


Photo© Umesh Pavukandy

Taxonomy

Family: Lycaenidae
Species: *Tajuria melastigma*, de Niceville, 1887.
Common Name: Branded Royal
Vernacular Name: Varayan Neelambari.

Distribution:

Global: Indomalayan Realm
India: Western Ghats, NE India.
Kerala: Recorded fromWayanad, Palakkad, and Idukki districts.
Habitat: Mostly Inhabits dense forests and hills with heavy rainfall at lower to moderate elevation dense forests.

Conservation Status

WLPA: Schedule II
IUCN: Not Assessed
CITES: Not Assessed

Population Status in Kerala: Not assessed

Threats: Deforestation and human intervention in unprotected forested hills.

Conservation Measures: Unprotected, well wooded hills of Western Ghats are to be safeguarded. Strict enforcement of Indian Wildlife (Protection) Act.

Stakeholders: Kerala State Biodiversity Board, Kerala State Forest and Wildlife Department.

Remarks: This species is very rare in Kerala with a few records from three districts. In Kerala its presence is found from hills of dense forests. Mostly this species is an inhabitant of hills with dense tree cover and the protection of this habitat is crucial for its survival. Flight season of this species in Western Ghats is yet to be well studied.

23. *Ancema sudica,* Evans,1926.- Silver Royal

Taxonomy

Family:	Lycaenidae
Species:	*Ancema sudica* Evans, 1926.
Common Name:	Silver Royal
Vernacular Name:	Rajathambari

Distribution:

Global:	Indomalayan Realm
India:	Endemic to Western Ghats .
Kerala:	Recorded from, Kannur, Kozhikode and Wayanad, districts.
Habitat:	Mostly Inhabits forests at lower to moderate elevation.

Conservation Status

WLPA:	Not Listed
IUCN:	Not Assessed
CITES:	Not Assessed

Population Status in Kerala: Declining
Threats: Deforestation and human intervention in unprotected forested hills.
Conservation Measures: Unprotected, well wooded hills of Western Ghats are to be safeguarded.
Stakeholders: Kerala State Biodiversity Board, Kerala State Forest and Wildlife Department.
Remarks: This species is endemic to Western ghats and very rare in Kerala with a few records from three districts. In Kerala its presence was recorded from wild life sanctuaries and adjacent habitats. Protection of low land evergreen forests is a must for the survival of this rare butterfly.

24. I*dea malabarica* (Moore, 1877)- Malabar Tree Nymph

Taxonomy:

Family:	Nymphalidae
Species:	*Idea malbarica* (Moore, 1877)
Common Name:	Malabar Tree Nymph
Vernacular Name:	Vanadevata

Distribution:

Global:	India
India:	Endemic to Western Ghats south of Maharashtra Recorded from Kerala, Tamil Nadu, Karnataka, Goa and Maharashtra States.
Kerala:	Patchy in distribution.
Habitat:	The species is distributed to the evergreen patches of Western Ghats. Mainly seen in forest clearings and above the forest canopy.

Conservation Status

WLPA:	Not listed
IUCN:	Not Assessed
CITES:	Not Assessed

Population Status in Kerala: Locally declining
Threats: As it's a monophagous butterfly known to feed only the plant – *Thottea siliquosa*, the survival of the species is depend on the low land evergreen forest patches, which is already under threat from habitat degradation.
Conservation Measures: There should be check on human activities posing any further threat in its range of occurrence. Efforts should be made to raise this butterfly through ranching and captive breeding.
Stakeholders: Kerala State Biodiversity Board, Kerala State Forest and Wildlife Department.
Remarks: Larval Food Plants: *Aganosma cymosa* (Palavarikody), *Parsonsia albofavescens* (Malath-eelatha) (Family: Apocynaceae

25. *Parantica nilgiriensis* (Moore, 1877) -Nilgiri Tiger


Photo© Dr. Md. Jafer Palot

Taxonomy:

Family: Nymphalidae
Species: *Parantica nilgiriensis* (Moore, 1877)
Common Name: Nilgiri Tiger
Alternate Name: None
Vernacular Name: Nilgiri Kaduva

Distribution:

Global: India
India: Endemic to Southern Western Ghats south of Karnataka
Recorded from Kerala, Karnataka and Tamil Nadu States.
Kerala: Recorded from Higher reaches of Western Ghats, especially in higher reaches of Agasthayamalais, Periyar Tiger reserve, Silent Valley, Karimpuzha WLS, Wayanad WLS, Aralam WLS.

Habitat: Mostly distributed to the shola grassland ecosystem or montane tropical evergreen ecosystems in Western Ghats.

Conservation Status

WLPA: Not listed
IUCN: Not Assessed
CITES: Not Assessed

Population Status in Kerala: Locally declining

Threats: Degradation of montane shola or evergreen forest ecosystem due to forest fire, and the spread of invasive or exotic plant species.

Conservation Measures: There should be check on human activities posing any further threat in its range of occurrence.Efforts should be made to raise this butterfly through ranching and captive breeding.

Stakeholders: Kerala State Forest and Wildlife Department.

Remarks: A rare butterfly of the region. Known larval food plant of the species are *Tylophora indica* and *T. flexuosa*

26. *Argynnis castetsi Oberthür,* 1891- Palni Fritillary


Photo© Dr. Md. Jafer Palot

Taxonomy:

Family: Nymphalidae
Species: *Argynnis castetsi* Oberthür, 1891
Common Name: Nilgiri Fritillary
Vernacular Name: Palani Cholatheyyan

Distribution:

Global: India
India: Endemic to Southern Western Ghats south of Palakkad gap
Recorded from Kerala and Tamil Nadu States.
Kerala: Distributed to the higher reaches of Eravikulam NP, Pambadumshola NP, Anaimudishola NP, Mathikettan shola NP and Kurinjimala Sanctuary in Idukki district.

Habitat: Inhabits high land montane shola grassland ecosystem of southern Western Ghats.

Conservation Status

WLPA: Not listed
IUCN: Not Assessed
CITES: Not Assessed

Population Status in Kerala: Locally declining

Threats: As it's a monophagous butterfly known to feed only the plant – *Thottea siliquosa*, the survival of the species is depend on the low land evergreen forest patches, which is already under threat from habitat degradation.

Conservation Measures: There should be check on human activities posing any further threat in its range of occurrence. Efforts should be made to raise this butterfly through ranching and captive breeding.

Stakeholders: Kerala State Forest and Wildlife Department.

Remarks: Earlier treated as the subspecies of *Argynnis hyperbius* (Linnaeus, 1763).

27. *Argynnis hybrida Evans,* 1912- Nilgiri Fritillary


Photo@ V.C. Balakrishnan

Taxonomy:

Family:	Nymphalidae
Species:	*Argynnis hybrida* Evans, 1912
Common Name:	Nilgiri Fritillary
Vernacular Name:	Nilgiri Cholatheyyan

Distribution:

Global:	India
India:	Endemic to Southern Western Ghats north of Palakkad gap in Kerala and Tamil Nadu states
Kerala:	North of Palakkad gap mainly in the higher reaches of Silent Valley National Park and Karimpuzha WLS
Habitat:	Inhabits montane shola grassland ecosystem of southern Western Ghats

Conservation Status

WLPA:	Not listed
IUCN:	Not Assessed
CITES:	Not Assessed

Population Status in Kerala: Locally declining

Threats: Since it's a narrow endemic species and found in the high altitude montane shola grassland ecosystem, the degradation of this pristine mountains largely affectedthe species, Forest fire, extension of plantations in grasslands are the major threats.

Conservation Measures: The species should be enlisted in the Schedules of Indian Wildlife Protection Act. Atmost case should be taken to understand the habitat requirement of this narrow endemic species from the endangered mountain ecosystem of Nilgiris. Stakeholders: Kerala State Forest and Wildlife Department.

Remarks: The taxonomy of the species is not clear. Earlier, treatedas a subspecies of *Argynnis hyperbius* (Linnaeus, 1763).

28. *Neptis palnica* Eliot, 1969 Creamy Sailer


Photo © Dr Kalesh Sadasivan

Taxonomy:

Family:	Nymphalidae
Species:	*Neptis palnica* Eliot, 1969
Common Name:	Palni Sailer
Vernacular Name:	Palani Ponthachutan പളനി പൊന്തചുറ്റൻ

Distribution:

Global:	India (Western Ghats south of Palghat Gap)
India:	Endemic to Southern Western Ghats south of Palghat Gap
Kerala:	Distributed to Southern part of Palakkad gap Recorded from Pambadumchola N.P. Munnar, Idukki district. Kerala
Habitat:	Sub-tropical evergreen and Temperate Montane sholas (>1200m)

Conservation Status:

WLPA:	Schedule-II (Part-II)
IUCN:	Not Assessed
CITES:	Not Assessed

Population Status in Kerala: Not assessed

Threats: Forest fires (natural, man-made, as a part of management practice) Sub-tropical evergreen and Temperate Montane sholas

Conservation Measures: Very rare. Reported only from Idukky district.
Strict enforcement of Indian Wildlife (Protection) Act.

Stakeholders: Kerala State Biodiversity Board, Kerala State Forest and Wildlife Department.

Remarks: Very rare in Kerala

29. *Amathusia phidippus friderici Fruhstorfer,* 1904-Palmking


Photo © Dr Kalesh Sadasivan

Taxonomy:

Family: Nymphalidae
Species: *Amathusia phidippus* (Linnaeus, 1763
Common Name: Palmking
Vernacular Name: Olarajan
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Distribution:

Global:I ndia, Southeast Asia
India: Western Ghats(Kerala) and Andamans
Kerala: Records solely from Trivandrum, Kollam and Pattanamthitta Districts

Habitats: Human habitations, Primary evergreen, Cane brakes and plantations

Conservation Status:

WLPA Not Listed
IUCN: Not Assessed
CITES: Not Assessed

Population Status in Kerala: Not assessed
Threats: Habitat loss, Cane harvest (Calamus being a larval host)
Conservation Measures: Calamus (Cane) harvest to be controlled, Cane propagation and planting
Stakeholders: Kerala State Biodiversity Board, Kerala State Forest and Wildlife Department.
Remarks: Very rare in Kerala

30. P*arantirrhoea marshalli* Wood-Mason, 1881- Travancore Evening Brown


Photo © Dr Kalesh Sadasivan

Taxonomy:

Family: Nymphalidae
Species: *Parantirrhoea marshalli* Wood-Mason, [1881]
Common Name: Travancore Evening Brown
Vernacular Name: Eetasalabham ഈറ്റശലഭം

Distribution:

Global: India (Western Ghats south of Agumbe)
India: Western Ghats (Kerala, Tamil Nadu and Karnataka)
Kerala: Very local and confined to evergreen forests, Myristica swamps and dense Ochlandra vegetation. Lower Periyar Valley (Edamalayar, Pooyamkutti), Kulathupuzha and Palode reserve forests.

Habitats: Confined to Ochlandra reed brakes, primary evergreen forests, subtropical evergreen and Myristica swamps with Ochlandra reed. From foothills to 1000 metres.

Conservation Status

WLPA: Sch.II
IUCN: Not Assessed
CITES: Not Assessed

Population Status in Kerala: Not assessed
Threats: Ochlandara (Eeeta) harvest for paper mills and as NTFP, loss of habitat, most of the Ochlandra patches in low land are only Reserve forests with respect to legal status.
Conservation Measures: Ochlandara propagation and planting, Habitat conservation by incorporation of Ochlandra habitats under Protected areas network.
Stakeholders: Kerala State Biodiversity Board, Kerala State Forest and Wildlife Department.
Remarks: Narrow endemic.

31. *Mycalesis igilia Fruhstorfer,* 1911-Sahyadri Small Long-brand Bushbrown


Photo @V.K. Chandrasekharan

Taxonomy:
Family: Nymphalidae
Species: *Mycalesis igilia* Fruhstorfer, 1911
Common Name: Small Longbrand Bushbrown
Verna Vernacular Name: Thavitan തവിടൻ
Distribution:
Global : India
India : Western Ghats(Kerala,Tamil Nadu and Karnataka)
Kerala : Confined to moist deciduous forests, and bamboos brakes of WG north of Palghat gap in Nilgiri¬– Coorg stretch
Habitat: Rare and narrow endemic. Confined to moist deciduous forests and bamboos brakes of low to moderate elevations. Locally common in the Bamboo jungles of Nilgiris, Coorg, and Wayanad
Conservation Status :
WLPA:
IUCN: Not Assessed
CITES: Not Assessed

Population Status in Kerala: Declining
Threats: Loss of bamboo forests; invasive species like Senna and Chromolaena in Wayanad exacerbated by man-made fires and degradation of habitat
Conservation Measures: Bamboo propagation and planting, invasive species control
Stakeholders: Kerala State Biodiversity Board, Kerala State Forest and Wildlife Department.
Remarks: Endemic to WG

32. *Mycalesis orcha* Evans, 1912 - Pale-brand Bushbrown


Photo @V.K. Chandrasekharan

Taxonomy:
Family: Nymphalidae
Species: *Mycalesis orcha* Evans, 1912
Common Name: Pale-brand Bushbrown
Vernacular Name: Varayan Thavitan
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Distribution:
Global : India
India : Western Ghats (Kerala, Tamil Nadu and Karnataka)
Kerala : Endemic to Southern Western Ghats below Palghat Gap.
Habitat : Narrow Endemic. Prefer dense jungles and grasslands at moderate elevations.
Conservation Status :
WLPA: Not Listed
IUCN: Not Assessed
CITES: Not Assessed

Population Status in Kerala: Confined to Ochlandra reed brakes, grasslands at edges of Sub-tropical evergreen and edges of Temperate Montane sholas
Threats: Forest fires (natural, man-made, as a part of management practice) of primary grasslands of Parambikukam Munnar and Periyar.
Conservation Measures: Grassland conservation, relook at burning of grasslands; prevention of forest fires and grassland
Stakeholders: Kerala State Biodiversity Board, Kerala State Forest and Wildlife Department.

33. *Telinga adolphei* (Guérin-Méneville, 1843) -Red-eye Bushbrown

Taxonomy:

Family: Nymphalidae
Species: *Telinga adolphei* (Guérin-Méneville, 1843)
Common Name: Red-eye Bushbrown
Vernacular Name : Chekkannan Thavitan
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Distribution:

Global: India
India: Western Ghats (Kerala,Tamil Nadu and Karnataka)
Kerala: Confined to Montane shola forests and grasslands (>1200m) north of Palghat gap.

Habitat : Sub-tropical evergreen and edges of Temperate Montane sholas (>1200m)

Conservation Status :
WLPA: Not listed
IUCN: Not Assessed
CITES: Not Assessed

Population Status in Kerala: Declining in population.
Threats: Forest fires (natural, man-made,as a part of management practice) of primary grasslands.
Conservation measures : Montane Shola Grassland conservation, relook at burning of grasslands; prevention of forest fires and grassland
Stakeholders: Kerala State Biodiversity Board, Kerala State Forest and Wildlife Department
Remarks: Montane species Rare and Narrow endemic to WG

34. *Telinga davisoni* (Moore, [1891) - Palni Bushbrown

Taxonomy:

Family: Nymphalidae
Species: *Telinga davisoni* (Moore, [1891])
Common Name: Palni Bushbrown
Vernacular Name: Palani thavidan
പളനി തവിടൻ

Distribution:

Global: India
India: Western Ghats (Kerala and Tamil Nadu)
Kerala: Narrow endemic. Confined to the forests of high elevation in Eastern Anamalais and Palni hills.
Habitat: Confined to primary Grasslands at edges of Temperate Montane sholas and (>1800m) of Munnar (Kurinjimala, Chinnar, Marayur, Pampadumshola and Anamudi shola)

Conservation status:

WLPA:Not Lilsted
IUCN: Not Assessed
CITES: Not Assessed

Population Status in Kerala: Not assessed
Threats: Forest fires (natural, man-made, as a part of management practice) of primary grasslands of Munnar
Conservation measures : Montane Shola Grassland conservation, relook at burning of grasslands; prevention of forest fires and grassland
Stakeholders: Kerala State Biodiversity Board, Kerala State Forest and Wildlife Department.
Remarks: Rare and narrow endemic to WG

35. *Telinga oculus* (Marshall, 1881) -Red-disc Bushbrown


Photo © Dr Kalesh Sadasivan

Taxonomy:

Family: Nymphalidae
Species: *Telinga oculus* (Marshall, 1881)
Common Name: Red-disc Bushbrown
Vernacular Name: Theekkannan
തീക്കണ്ണൻ

Distribution:

Global: India
India: Western Ghats south of Palghat Gap (Kerala and Tamil Nadu)
Kerala: Reported from Munnar high ranges, Periyar, Palnis and Agasthyamalais
Habitat : Sub-tropical evergreen and edges of Temperate Montane sholas (>900m)

Conservation status:

WLPA: Not Listed
IUCN: Not Assessed
CITES: Not Assessed

Population Status in Kerala: Not assessed
Threats: Forest fires (natural, man-made, as a part of management practice) of primary grasslands of Munnar
Conservation measures: Montane Shola Grassland conservation, relook at burning of grasslands; prevention of forest fires and grassland
Stakeholders: Kerala State Biodiversity Board, Kerala State Forest and Wildlife Department.
Remarks: Rare and Endemic to WG Narrow endemic south of Palghat Gap

36. *Ypthima chenu* (Guérin-Méneville, 1843)- Nilgiri Fourring


Photo @Balakrishnan Valappil

Taxonomy:

Family: Nymphalidae
Species: *Ypthima chenu* (Guérin-Méneville, 1843)
Common Name: Nilgiri Four-ring
Vernacular Name: Neelagiri Naalkanni
നീലഗിരി നാൽക്കണ്ണി

Distribution:

Global: India
India: Endemic to Nilgiris & Anamalais. Prefer high elevation rocky grasslands. Rare..
Habitat: Confined to the Montane grasslands of Western Ghats

Conservation Status

WLPA: Not Assessed
IUCN: Not Assessed
CITES: Not Assessed

Population Status in Kerala: Need monitoring
Threats: Most of the habitats are protected areas, No immediate threat.
Conservation Measures: Stakeholders: Kerala State Biodiversity Board, Kerala State Forest and Wildlife Department.
Remarks: Need population assessment.

37. *Ypthima singala* R. Felder, 1868- Sinhalese Five-ring


Photo @ Ramaswamy S.R.K.

Taxonomy:

Family:	Nymphalidae
Species:	*Ypthima singala* R. Felder, 1868
Common Name:	Sinhalese Five-ring
Vernacular Name:	Chinnar Panchanethri ചിന്നാർ പഞ്ചനേത്രി

Distribution:

Global:	India
India:	Reported only from Chinnar WLS in Kerala. Other records are from Coimbatore and Sathyamangalam regions in TN. Also known from Sri Lanka. Rare..

Habitat: Dry Deciduous forests and thorny scrub forests

Conservation Status

WLPA:	Not Assessed
IUCN:	Not Assessed
CITES:	Not Assessed

Population Status in Kerala: Need monitoring

Threats: Most of the habitats are protected areas, No immediate threat.

Conservation Measures: Stakeholders: Kerala State Biodiversity Board, Kerala State Forest and Wildlife Department.

Remarks: Need population assessment.

38. *Ypthima striata* Hampson, [1889] -Striated Five-ring


Photo© Dr. Md Jafer Palot

Taxonomy:

Family:	Nymphalidae
Species:	*Ypthima striata* Hampson, [1889]
Common Name:	Striated Five-ring
Vernacular Name:	Rathna Panchanethri രത്ന പഞ്ചനേത്രി

Distribution:

Global:	India
India:	Records from Agasthyamalai hills and Anamalais. Other records from Tamil Nadu, Karnataka and also Andhra Pradesh (Eastern ghats). Endemic to South India.

Habitat: Confined to the Montane grasslands of Western Ghats and Eastern Ghats.

Conservation Status

WLPA:	Not Listed
IUCN:	Not Assessed
CITES:	Not Assessed

Population Status in Kerala: Need monitoring

Threats: Most of the habitats are protected areas, No immediate threat.

Conservation Measures: Stakeholders: Kerala State Biodiversity Board, Kerala State Forest and Wildlife Department.

Remarks: Need population assessment.

39 *Ypthima ypthimoides* (Moore, 1881)- Palni Four-ring


Photo© Balakrishnan Valappil

Taxonomy:

Family:	Nymphalidae
Species:	*Ypthima ypthimoides*(Moore, 1881)
Common Name:	Palni Four-ring
Vernacular Name:	Palani naalkanni പളനി നീലക്കണ്ണി

Distribution:

Global:	India
India:	Tamil Nadu and Kerala. Narrow endemic (Anamalais, Palni hills & Agasthyamalai hills). Found in small colonies and prefer rocky grasslands at high elevation..
Habitat:	Confined to the Montane grasslands of Western Ghats in the states of Kerala and Tamil Nadu, at high elevations

Conservation Status

WLPA:	Not Listed
IUCN:	Not Assessed
CITES:	Not Assessed

Population Status in Kerala: Need monitoring
Threats: Most of the habitats are protected areas, No immediate threat.
Conservation Measures:
Stakeholders: Kerala State Biodiversity Board, Kerala State Forest and Wildlife Department.
Remarks: Need population assessment.

40. *Ypthima tabella* (Marshall,1883)- Baby Five-ring


Photo @ V.K. Chandrasekharan

Taxonomy:

Family:	Nymphalidae
Species:	*Ypthima tabella* (Marshall,1883)
Common Name:	Baby Five-ring
Vernacular Name:	Cheru panchanethri ചെറു പഞ്ചനേത്രി

Distribution:

Global:	India
India:	Maharashtra, Karnataka, Kerala, Tamil Nadu.
Habitat:	Only a few colonies reported from Mangaladevi of Periyar Tiger Reserve in Kerala. Another report from Meghamalais and from MH. In Kerala, confined to Montane Grasslands..

Conservation Status

WLPA:	Not Listed
IUCN:	Not Assessed
CITES:	Not Assessed

Population Status in Kerala: Need monitoring
Threats: Most of the habitats are protected areas, No immediate threat.
Stakeholders: Kerala State Biodiversity Board, Kerala State Forest and Wildlife Department.
Remarks: Need population assessment.

41. *Papilio buddha* Westwood, 1872 - Buddha Peacock


Photo @Vinayaraj

Taxonomy:

Family:	Papilionidae
Species:	*Papilio buddha* Westwood, 1872
Common Name:	Buddha Peacock
Vernacular Name:	Buddha Mayoori ബുദ്ധമയൂരി

Distribution:

Global:	India
India:	Endemic to the Western Ghats south of Maharashtra. Recorded from Kerala, Karnataka, Goa and Maharashtra States.
Kerala:	Mainly distributed to northern part of Palakkad gap. Flight period is from July to December or January.
Habitat:	Found mainly in the midland laterite hillocks and the foothills of Western Ghats, where its larval food plant Indian Prickly Ash Tree *(Zanthoxylum rhetsa)* grown Also distributed to the sacred groves of northern Kerala

Conservation Status

WLPA:	Schedule-II (Part-II)
IUCN:	Not Assessed
CITES:	Not Assessed

Population Status in Kerala: Declining

Threats: This iconic and charismatic butterfly faces serious threat of losing its habitat in Kerala. Deforestation in midland laterite hills causes threats to the survival of its only known larval food plant, *Zanthoxylum rhetsa*. A most sought-after species in illegal trade.

Conservation Measures: Protection of midland laterite hillocks and the habitats of *Zanthoxylum rhetsa* tree. Strict enforcement of Indian Wildlife (Protection) Act.

Stakeholders: Kerala State Biodiversity Board, Kerala State Forest and Wildlife Department.

Remarks: The species is designated as State Butterfly of Kerala in 2018 by the Government of Kerala.

42. *Papilio liomedon* Moore, 1875- Malabar banded Swallowtail


Photo© Dr. Md Jafer Palot

Taxonomy:

Family:	Papilionidae
Species:	*Papilio liomedon* Moore, 1875
Common Name:	Buddha Peacock
Vernacular Name:	Pulli Vaalan പുള്ളിവാലൻ

Distribution:

Global:	India
India:	Endemic to Southern Western Ghats south of Goa. Recorded from Kerala, Karnataka, Goa and Tamil Nadu States.
Kerala:	Fairly common. Found during wet season from June to November or December.
Habitat:	Mainly distributed to the forested tracts of the Western Ghats or well wooded midland laterite hillocks or plains of Kerala.

Conservation Status

WLPA:	Schedule-I (Part-IV)
IUCN:	Not Assessed
CITES:	Not Assessed

Population Status in Kerala: Declining

Threats: Even though a prolific breeder, the mortality mainly due to parasitic attack on early stages is very high in the species. A few individuals survive after the parasitic attack. Habitat degradation, the pressure on the larval foodplants and the changes in the rainfall pattern also affected the population of this rare butterfly.

Conservation Measures: There should be check on human activities posing any further threat in its range of occurrence. Efforts should be made to raise this butterfly through ranching and captive breeding.

Stakeholders: Kerala State Biodiversity Board, Kerala State Forest and Wildlife Department.

Remarks: One of the rarest Papilionids in the region. Known larval foodplants of the species are *Acronychia pedunculata* (Mootta naari), *Melicope lunu-ankenda* (Kaattu Rubber or Kanala) (Family: Rutaceae)

43. *Pachliopta pandiyana* (Moore, 1881)- Malabar Rose

Taxonomy:
Family: Papilionidae
Species: *Pachliopta pandiyana* (Moore, 1881)
Common Name: Malabar Rose
Vernacular Name: Malabar Rose
Distribution:
Global: India
India: Endemic to Southern Western Ghats south of Goa.
Recorded from Kerala, Karnataka, Goa and Tamil Nadu States.
Kerala: Locally common.
Habitat: Mostly distributed to the evergreen patches of Western Ghats or well wooded areas where the larval food plant *Thottea siliquosa* grown.
Conservation Status
WLPA: Not listed
IUCN: Not Assessed
CITES: Not Assessed

Population Status in Kerala: Locally declining
Threats: As it's a monophagous butterfly known to feed only the plant – *Thottea siliquosa,* the survival of the species is depend on the low land evergreen forest patches, which is already under threat from habitat degradation.
Conservation Measures: There should be check on human activities posing any further threat in its range of occurrence. Efforts should be made to raise this butterfly through ranching and captive breeding.
Stakeholders: Kerala State Biodiversity Board, Kerala State Forest and Wildlife Department.
Remarks: A rare butterfly of the region.

44. *Papilio dravidarum* Woodmason, 1881- Malabar Raven

Taxonomy:
Family: Papilionidae
Species: *Papilio dravidarum* Woodmason, 1881
Common Name: Malabar Raven
Vernacular Name: Pullikaruppan
Distribution:
Global: India
India: Endemic to the Western Ghats south of Maharashtra.
Recorded from Kerala, Tamil Nadu, Karnataka, Goa and Maharashtra States.
Kerala: Widely distributed all along the State
Habitat: Found mainly in the forested tracts of Western Ghats, rarely to the country well-wooded country side and sacred groves in midland laterite hillocks of northern Kerala
Conservation Status
WLPA: Not Listed
IUCN: Not Assessed
CITES: Not Assessed

Population Status in Kerala: PossiblyDeclining
Threats: Deweeding and removal of herbs and shrubs from the countryside is major threat to its larval food plants. Indescriminate use of herbicides also detrimental to the population.
Conservation Measures: Totally ban the usage of herbicides in the villages and the protection of low land evergreen forests.
Stakeholders: Kerala State Biodiversity Board, Kerala State Forest and Wildlife Department.
Remarks: Known larval food plants from Kerala are *Clausena heptaphylla* and *Glycosmis pentaphylla*

45. *Eurema nilgiriensis* (Yata, 1990)-Nilgiri Grass Yellow


Photo@ Balakrishnan Valappil

Taxonomy:

Family: Pieridae
Species: *Eurema nilgiriensis* (Yata, 1990)
Common Name: Nilgiri Grass Yellow
Vernacular Name: Neelagiri paappaaththi
നീലഗിരി പാപ്പാത്തി

Distribution:

Global: India.
India: Endemic to the Western Ghats south of Maharashtra.
Recorded from Kerala, TamilNadu, Karnataka, Goa, Maharashtra.
Kerala: Throughout Kerala.

Habitat: A widespread low to midland endemic. Inhabits dense. evergreen riparian forests. Only one host plant for larvae, recorded, ie Ventilago bombaiensis.

Conservation Status

WLPA: Not Listed.
IUCN: Not Assessed.
CITES: Not Assessed.

Population Status in Kerala: Possibly declining.
Threats: The Endemic uncommon butterfly is mostly seen near mid-elevation riparian habitats in Kerala. Deforestation of the habitats are a threat to its only known larval food plant, *Ventilago bombaiensis.*

Conservation Measures: Protection of midland streams and its host plant Ventilago bombaie. Popularising conservation importance.
Stakeholders: Kerala State Biodiversity Board, Kerala State Forest and Wildlife. Department.

46. *Eurema andersonii* (Moore,1886)- One Spot Grass Yellow


Photo@ Balakrishnan Valappil

Taxonomy:

Family: Pieridae
Species: *Eurema andersonii* (Moore,1886)
Common Name: One Spot Grass Yellow
Vernacular Name: Chola paappaathi
ചോല പാപ്പാത്തി

Distribution:

Global: India, Other countries inSoutheast Asia.
India: *Eurema andersonii* has three subspecies in India.
(1) *Eurema andersonii shimai* Yata & Gaonkar, 1999 Endemic to Western Ghats.
(2) *Eurema andersonii jordani* Corbet & Pendlebury, 1932
North India and Northeast India.
3) *Eurema andersonii evansi* Corbet & Pendelbury, 1932 Andamans.
Kerala: Subspecies *Eurema andersonii shimai* Yata & Gaonkar, 1999 is very rare in Kerala.

Habitat: Reports from Marayur and Chinnar only.

Conservation Status

WLPA: Not in any schedule.
IUCN: Not Assessed.
CITES: Not Assessed.

Population Status in Kerala: Very rare.
Threats: Though rare, Most of the habitats are in protected areas. Deforestation of the surrounding areas is a threat to the population.
Conservation Measures: Protection of the host-plants *Zanthoxylum rhetsa* and *Ventilago maderaspatana.*
(Rhamnaceae) and its habitat are required.
Stakeholders: Kerala State Biodiversity Board, Kerala State Forest and Wildlife Department.
Remarks: Need population and distribution assessment

47. *Appias lalage* (Doubleday, 1842)- Spotted Puffin


Photo@ Balakrishnan Valappil

Taxonomy:

Family: Pieridae
Species: *Appias lalage* (Doubleday, 1842)
Common Name: Spotted Puffin
Vernacular Name: Pulli paffin
പുള്ളി പഫിൻ

Distribution:

Global: India, Indochina and Hainan.
India: North India, Northeast India and Kerala.
Kerala: Known only from Idukki, Palakkad, Pathanamthitta& Trivandrum districts.
Habitat: Reported from higher elevations.

Conservation Status

WLPA: Not Listed
IUCN: Not Assessed.
CITES: Not Assessed.

Population Status in Kerala: Possibly declining
Threats: Deforestation in its habitat.
Conservation Measures:

Stakeholders: Kerala State Biodiversity Board, Kerala State Forest and Wildlife Department.
Remarks: Need population monitoring.

48. *Appias wardii* (Moore, [1884])- Lesser Albatross


Photo@ Balakrishnan Valappil

Taxonomy:

Family: Pieridae
Species: *Appias wardii* (Moore, [1884])
Common Name: Lesser Albatross
Vernacular Name: Pulli Albatross
പുള്ളി ആൽബട്രോസ്

Distribution:

Global: India
India: Rare endemic. Sympatric with A. albina (Common Albatross).
Data deficient due to difficulty in differentiating from female A.albina.
Reported from Karnataka, Kerala, and Tamil Nadu.
Kerala: Seen throughout Kerala along with Common Albatross at mid-elevations and above.
Habitat: Found mainly in the midland laterite hillocks and the foothills of the Western Ghats, where its larval food plant Indian Prickly Ash Tree *(Zanthoxylum rhetsa)* grown. Also distributed to the sacred groves of northern Kerala.

Conservation Status

WLPA: Schedule II
IUCN: Not Assessed
CITES: Not Assessed

Population Status in Kerala: Need Assessment
Threats: Deforestation in its habitat.
Conservation Measures: Protection of habitat.

Stakeholders: Kerala State Biodiversity Board, Kerala State Forest and Wildlife Department.
Remarks: Endemic to the Western Ghats.

49. *Colias nilagiriensis* (C. & R. Felder, (1859) -Nilgiri Clouded Yellow

Taxonomy:

Family:	Pieridae
Species:	*Colias nilagiriensis* (C. & R. Felder, (1859)
Common Name:	Nilgiri Clouded yellow
Vernacular Name:	Peethambaran പീതാംബരൻ

Distribution:

Global:	India
India:	Narrow endemic to the Sothern Western Ghats Recorded from Kerala, and Tamil Nadu (Nilgiris, Palni Hills, and Anamalais) States.
Kerala:	Malappuram, Palakkad, Idukki districts.
Habitat:	Confined to the Montane grasslands of Western Ghats in the states of Kerala and Tamil Nadu, at high elevations where its larval food plant *Parochetus communis* and *Trifolium repens* are grown.

Conservation Status

WLPA:	Not Listed
IUCN:	Not Assessed
CITES:	Not Assessed

Population Status in Kerala: Need monitoring
Threats: Most of the habitats are protected areas, No immediate threat.

Stakeholders: Kerala State Biodiversity Board, Kerala State Forest and Wildlife Department.
Remarks: Need population assessment.

Conservation of Buttterflies

The important butterfly habitats of the state have been facing lot of threats in the recent period. The original pristine habitats are cleared for the construction of dams, roads and railway lines. The extensive agricultural activities, indiscriminate use of pesticides and agrochemicals, monoculture plantations, mining, forest fire and pollution further deteriorated the natural habitats of the state. The climate change, illegal trade in butterflies, the spread of invasive species, clearing of road side flora in the name of beautification and the unplanned tourism activities also contributed to the decline of certain population of butterflies in the region.

Among The insets, butterflies have been a major element in the illegal trade in the past. In Kerala, some of the beautiful species such as Peacocks *(Papilio* spp) were largely collected during the British period. Small quantities of butterflies are still collected for global trade. There were reports of butterflies and beetles confiscated by forest or custom officials from Kerala.

In recent years, considerable attention has been given by the government in the conservation of butterflies. In 2018, Kerala Government designated Buddha Peacock *Papilio buddha* as the state butterfly for the state.

The Indian Wildlife Protection Act, 1972 was the first step towards the conservation of insects as it included "Butterflies and moths" without reference to any particular species. The Act was amended in 1980 and included a large number of species/subspecies of butterflies under three Schedules. Accordingly, 128 species of butterflies were included in the Schedule- I, 307 species in Schedule- II and 19 in Schedule -IV of the Act. Among the Scheduled list of Kerala butterflies, species such as the Crimson Rose (*Pachliopta hector)*, Malabar Banded Swallowtail *(Papilio liomedon),* Orchid Tit *(Hypolycaena othona)*, White- tipped Lineblue *(Prosotas noreia)*, Blue Nawab *(Eriboea schreiberi)* and the Danaid Eggfly (*Hypolimnas misippus)* are listed in the Schedule-I of the Act; 32 species are listed in the Schedule –II (and 11 species categorized in to the Schedule-IV of the Act. But, many of the rare and endemic butterflies of the country have not been included in the scheduled list.

Table- 3: Butterflies listed in Schedule-II of Indian Wildlife (Protection) Act of 1972

S.No	Species	Family
1.	Paris Peacock *Papilio paris* (Linnaeus, 1758)	Papilionidae
2.	Malabar Banded Peacock/ Buddha Peacock *Papilio buddha* (Westwood, 1872)	Papilionidae
3.	Lesser Gull *Cepora nadina* (Lucas, 1852)	Pieridae
4.	Striped Albatross *Appias libythea* (Fabricius, 1775)	Pieridae
5.	Plain Puffin *Appias indra* (Moore, 1858)	Pieridae
6.	Southern Duffer/ Sahyadri Blue Banded Duffer *Discophora lepida* (Moore, 1858)	Nymphalidae
7.	Great Evening Brown *Melanitis zitenius* (Herbst, 1796)	Nymphalidae
8.	Travancore Evening Brown *Parantirrhoea marshalli* Wood-Mason, 1881	Nymphalidae
9.	White-bar Bushbrown *Mycalesis anaxias* (Hewitson, 1862)	Nymphalidae
10.	Small Leopard *Phalanta alcippe* (Stoll, 1782)	Nymphalidae
11.	Clear Sailer *Neptis nata* (Moore, 1858)	Nymphalidae
12.	Clipper *Parthenos sylvia* (Cramer, 1775)	Nymphalidae
13.	Grey Count *Tanaecia lepidea* (Butler, 1868)	Nymphalidae
14.	Black-vein Sergeant *Athyma ranga* (Moore, 1858)	Nymphalidae
15.	Painted Courtesan *Euripus consimilis* (Westwood, 1851)	Nymphalidae
16.	Blue Oakleaf *Kallima horsfieldii* (Kollar, 1844)	Nymphalidae
17.	King Crow *Euploea klugii* (Moore, 1858)	Nymphalidae
18.	Gram Blue *Euchrysops cnejus* (Fabricius, 1798)	Lycaenidae
19.	Hampson's Hedge Blue/ Lilac Hedge Blue *Acytolepis lilacea* (Hampson, 1889)	Lycaenidae
20.	Pea Blue *Lampides boeticus* (Linnaeus, 1767)	Lycaenidae
21.	Pointed Lineblue *Lonolyce helicon* (C & R Felder, 1860)	Lycaenidae
22.	Scarce Shot Silverline *Spindasis elima* (Moore, 1877)	Lycaenidae
23.	Long-banded Silverline *Spindasis lohita* (Horsfield, 1829)	Lycaenidae
24.	Silver -streaked Acacia Blue *Zinaspa todara* (Moore, 1884)	Lycaenidae
25.	Many-tailed Oakblue *Thaduka multicaudata* (Moore, 1879)	Lycaenidae
26.	Tamil or Dusted Oakblue *Arhopala bazaloides* (Hewitson, 1878)	Lycaenidae
27.	Peacock Royal *Tajuria cippus* (Fabricius, 1798)	Lycaenidae
28.	Banded Royal *Rachana jalindra* (Horsfield, 1829)	Lycaenidae
29.	White Tufted Royal *Pratapa deva* (Moore, 1858)	Lycaenidae
30.	Branded Royal *Tajuria melastigma de* Niceville, 1887	Lycaenidae
31.	Common Onyx *Horaga onyx* (Moore, 1858)	Lycaenidae
32.	Indigo Flash *Rapala varuna* (Horsfield, 1829)	Lycaenidae

Table-4: Butterflies listed in Schedule-IV of Indian Wildlife (Protection) Act of 1972

S.No	Species	Family
1.	Painted Sawtooth *Prioneris sita* (C&R Felder, 1865)	Pieridae
2.	Striped Albatross *Appias libythea* (Fabricius, 1775)	Pieridae
3.	Gaudy Baron *Euthalia lubentina* (Cramer, 1777)	Nymphalidae
4.	Red Spot Duke *Dophla evelina* (Stoll, 1790)	Nymphalidae
5.	Dark Pierrot *Tarucus ananda* (de Niceville, 1884)	Lycaenidae
6.	Plain Banded Awl *Hasora vitta* (Butler1, 870)	Hesperiidae
7.	Paint Brush Swift/ Complete Paint Brush Swift *Baoris farri* (Moore, 1878)	Hesperiidae
8.	Contiguous Swift *Polytremis lubricans* (Herrich- Schaffer, 1869)	Hesperiidae
9.	Madras Ace/ Sahyadri Orange Ace *Thoressa honorei* (de Niceville, 1887)	Hesperiidae
10.	Tree Flitter *Hyarotis adrastus* (Stoll, 1780)	Hesperiidae
11.	Tamil Dartlet/ Sahyadri Dartlet *Oriens concinna* (Edwards, 1897)	Hesperiidae

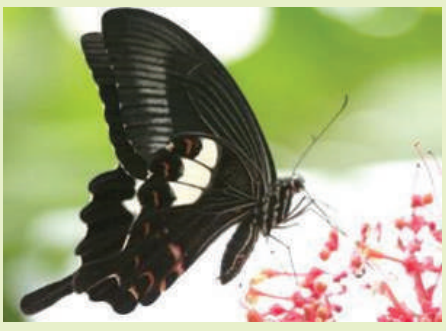
Unfortunately, many of the endemic species or species which are in illegal trade not being listed in any of the schedules of the Indian Wildlfie (Protection) Act of 1972. Hence, we are proposing following five species vulnerable to illegal trade to include in the Section- 38 under Biological Diversity Act of 2002 (Table-5).

Table-5: Butterfly species prioritised for Section 38 of Biological Diversity Act

Sl. No	Scientific Name	Common Name	Family	Justification
1	*Troides minos* (Cramer, [1779])	Southern Birdwing	Papilionidae	Showy attractive butterfly. Largest butterfly in India.
2	*Papilio crinoFabricius*, 1793	Common Banded Peacock	Papilionidae	One of the beautiful butterfly species in the region. Reported from very few localities in Kerala. A popular species in illegal trade
3	*Papilio helenus Linnaeus,* 1758	Red Helen	Papilionidae	One of the largest butterflies in the region. Reported in the illegal trade
4	*Cethosia mahrattaMoore*, 1872	Tamil Lacewing	Nymphalidae	A rare and beautiful endemic species of the Western Ghats. Rarely reported in the illegall trade
5	*Idea malabarica* (Moore, 1877)	Malabar Tree Nymph	Nymphalidae	A rare endemic species of the Western Ghats. Reported from the illegal trade

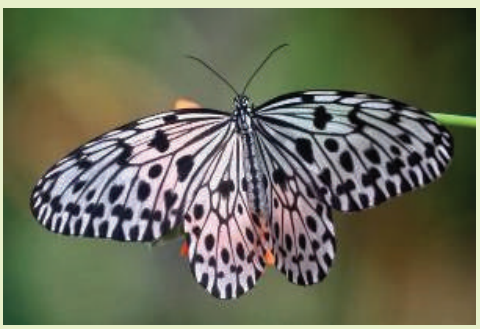
Troides minos (Cramer, [1779])

Papilio crinoFabricius, 1793



Papilio helenus Linnaeus, 1758

Cethosia mahrattaMoore, 1872



Idea malabarica (Moore, 1877)

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DRAGON FLIES AND DAMSEL FLIES

Chlorogomphus xanthoptera © Thomas Saburaj

KA Subramanian, Muhamed Jafer Palot, David V Raju
Vivek Chandran, Sujith Gopalan and Mohammad Sharief

Introduction

Order Odonata, commonly known as dragonflies and damselflies, are aquatic insects associated with freshwater wetlands and surrounding landscape. The larvae are aquatic and the adults are terrestrial. Their evolutionary history dates back to Permian (250 million years BP) era, making them one of the oldest insect orders.

Globally 6308 species in 685 genera of odonates are known. In India, 504 species and subspecies in 153 genera and 17 families are known (Subramanian and Babu, 2020; Kalkman et al., 2020; Subramanian and Babu unpublished data). In the Western Ghats 201 species are reported of which 174 species are known to occur in Kerala. High diversity is found in hill streams, and forested riverine habitats and most of the endemic species are restricted to this habitat. Habitats like ponds, lakes, coastal marshes, irrigation canals and paddy fields have common and wide spread species. In Kerala, the hill streams of Wayanad, Nilgiris, Anamalais, Cardamom Hills and Agasthyamalai are rich in endemic species (Subramanian, 2007; Subramanian et al., 2018). The families such as Gomphidae, Platystictidae and genera such as Macromia (Macromiidae) and *Idionyx* (Genera Incertae sedis) are rich in endemic species.

Odonates utilize both running and standing waters for breeding and foraging. They complete their lifecycle in freshwater habitats and only a few species can tolerate brackish waters. They are highly specific to particular aquatic habitat, and this specificity makes them an ideal insect model to monitor freshwater ecosystems health and study diverse questions in ecology, evolutionary biology and biogeography.

Ecological Significance

Odonates are important invertebrate predators of wetlands and surrounding terrestrial landscapes. In their larval and adult stages, they prey upon a variety of invertebrates including several species of insect pests and disease vectors such as mosquitoes. They are highly specific to their breeding and foraging habitat and very sensitive to changes in habitat. Being an apex invertebrate predator in wetlands, they are good indicators of wetland health. Several species of odonata inhabiting in human dominated landscapes such as paddy fields, plantations, agroecosystems, rural and urban habitations are important biocontrol agents of agricultural pests and disease vectors.

Odonata Diversity of Kerala

The odonate diversity of Kerala is relatively well documented when compared to other Indian states. Currently 174 species are recorded from the state. High diversity and endemism are reported from the streams and rivers of the Western Ghats region. However recent discoveries of new species such as Platylestes kiranai Emiliyamma, palot and Charesh, 2020 from the coastal wetlands highlight the importance of these threatened habitats which lie outside the protected area network and are fast disappearing due to agricultural expansion and urbanization.

Threatened Odonata of Kerala

As per International Union for Conservation of Nature (IUCN) assessment nine species are listed under threatened list. Among them one species is endangered, four are Near Threatened and four are Vulnerable (IUCN, 2021, Subramanian et al., 2011). This assessment is ten years old and need to be updated with current data on distribution and threats. With this objective, based on current published information and field studies the threat assessment of odonates of Kerala is carried out.

Assessment Methodology

The current assessment of threatened odonates of Kerala was carried out based on published IUCN threat assessment (IUCN, 2021; Subramanian et al., 2011), literature and field work carried out by the authors in different parts of the state. The georeferenced data from the Atlas of Odonata of the Western Ghats (Subramanian et al., 2018) was updated to identify geographic regions for high diversity and conservation prioritization. Online expert consultation was also carried out as part of this exercise to prioritize the species.

Results

Odonata diversity is not uniformly distributed in the state. High diversity is reported from streams and rivers flowing through evergreen forests of the Western Ghats. Here 160 species are reported compared to moist deciduous and coastal zone where 115 and 120 species are reported respectively (Map-01). Across river basins, high diversity is reported from Kabani, Chaliyar, Chalakudi, Periyar and Pamba. These river basins have more than 75 species (Map-2).

A total of 38 species were prioritized for threat assessment from a total of 174 odonate species reported from Kerala by consid-

ering the criteria of endemicity, rarity, IUCN Red List status and microhabitat specificity.

Based on this assessment species are divided into (1) species recommended under Section 38 of BD Act (2002) for conservation action (2) high conservation priority species (3) species with conservation concern. Two species of damselflies *Calocypha laidlawi* and *Disparoneura apicalis* are recommended for listing under Section 38 of BD Act. The global population of *D. apicalis* is currently known to occur only in Kuruva islands of Wayanad and *C. laidlawi* is reported from few localities in the mid altitude forest wetlands of southern Kerala. The habitat of both the species are high threatened and require immediate conservation action. Species under high threat (Table-2) and conservation concern (Table-3) also require conservation attention. However, more data is required to assess the conservation status of species under these two categories.

Calocypha laidlawi © Reji Chandran

Phylloneura westermanni © Hari Krishnan

Table-2: Species Recommended for listing under Section 38 of BD Act (2002) for conservation action

Sl No	Family	Species	Justification
1	Chlorocyphidae	*Calocypha laidlawi* (Fraser, 1924)	Endemic to the Southern Western Ghats, recorded only from Kerala and Karnataka till date. Mostly restricted to Myristica swamps and associated streams. IUCN Red List Status: .
2	Platycnemididae	*Disparoneura apicalis* (Fraser, 1924)	Endemic to riparian habitats in the Western Ghats, reported only from Kodagu in Karnataka and Kuruva Islands, Wayanad, Kerala till date. IUCN Red List S tatus: Data Deficient.

Table-3: High Priority Threatened Species

Sl No	Family	Species	Justification
1	Chlorogomphidae	*Chlorogomphus xanthoptera* (Fraser, 1919)	Endemic to the Western Ghats, found only in high altitude forests south of the Palghat Gap. IUCN Red List Status: Vulnerable.
2	*Genera Incertae Sedis*	*Idionyx galeata* Fraser,1924	Endemic to the Western Ghats, known only from Wayanad, Nilgiris and Kodagu till date. Occurs only in high altitude forests, breeding in hill streams. IUCN Red List Status: Endangered.
3	Gomphidae	*Davidioides martini* Fraser, 1924	Endemic to the Southern Western Ghats, recorded only from a few locations in Kerala till date. Breeds only in montane forest streams. IUCN Red List Status: Data Deficient
4	Gomphidae	*Megalogomphus superbus* Fraser, 1931	Endemic to the Southern Western Ghats, very few records in recent times. Breeds only in forested hill streams that are perennial. IUCN Red List Status: Data Deficient
5	Lestidae	*Platylestes kirani* Emiliyamma, Jafer & Charesh 2020	Restricted to wetlands in the plains of west coast of India. Described only in 2020 based on specimens from Kannur. Other records are from Thrissur district and Maharashtra. All records outside the Protected Area network. IUCN Red List Status: Not Assessed.
6	Libellulidae	*Lyriothemis acigastra* (Selys, 1878)	Distribution and ecology unclear, first reported from Kerala in 2013 only. Occurs as colonies, very patchily distributed in Kerala. Other records are from Assam and West Bengal. Highly seasonal with very short flight season (June to August). IUCN Red List Status: Data Deficient
7	Libellulidae	*Lyriothemis flava* Oguma, 1915	Shows high microhabitat specificity, breeding only in phytotelmata (water collected in tree holes) in evergreen and semi-evergreen forests. First report from Kerala was from Silent Valley National Park in 2013. Very few records thereafter. Other records are from Assam, West Bengal and some other Asian countries like China, Bangladesh, Japan and Myanmar. IUCN Red List Status: Least Concern
8	Platycnemididae	*Caconeura gomphoides* (Rambur, 1842)	Endemic to the Western Ghats. Till date, known only from high altitude peat bogs and grassy uplands in the Nilgiri landscape. IUCN Red List Status: Data Deficient
9	Platycnemididae	*Melanoneura bilineata* Fraser, 1922	Endemic to the Southern Western Ghats. Restricted to hill streams with good forest cover. IUCN Red List Status: Near Threatened. IUCN Red List Status:
10	Platycnemididae	*Phylloneura westermanni* (Selys, 1860)	Endemic to the Southern Western Ghats. Seen mostly in Myristica swamps and associated streams. IUCN Red List Status: Near Threatened.
11	Platystictidae	*Indosticta deccanensis* (Laidlaw, 1915)	Endemic to the Western Ghats, found only in slow-flowing streams with dense vegetation in southern Western Ghats. IUCN Red List Status: Vulnerable.
12	Platystictidae	*Protosticta monticola* Emiliyamma & Palot, 2016	Endemic to the Southern Western Ghats. Low dispersal ability. Discovered only in 2016. Known only from a few locations in Anamalai Hills, Idukki. Occurs only in Shola forests above 1600 metres. IUCN Red List Status: Not Assessed
13	Platystictidae	*Protosticta sholai* Subramanian & Babu 2020	Endemic to the Southern Western Ghats. Low dispersal ability. Discovered only in 2020. Known only from a few locations in Periyar Tiger Reserve and adjacent areas of Tamil Nadu. Occurs only in Shola forests above 1500 metres. IUCN Red List Status: Not Assessed

Melanoneura bilineata © Reji Chandran

Megalogomphus superbu © Gopal Krishnan

Table 4: Species of Conservation Concern

Sl No	Family	Species	Justification
1	*Genera Incertae Sedis*	*Idionyx minima* Fraser, 1931	Endemic to the Western Ghats, very rare, recorded only from a few high-altitude forest sites in Kerala. IUCN Red List Status: Data Deficient
2	*Genera Incertae Sedis*	*Idionyx travancorensis* Fraser, 1931	Endemic to the Southern Western Ghats, recorded only from Kerala and Tamil Nadu till date. Breeds in high altitude mountain streams. IUCN Red List Status: Data Deficient
3	Gomphidae	*Acrogomphus fraseri* Laidlaw, 1925	Endemic to the Southern Western Ghats. Till date, recorded only from the Agasthyamalai landscape. Breeds only in montane perennial streams. IUCN Red List Status: Data Deficient
4	Gomphidae	*Chlorogomphus campioni* (Fraser, 1924)	Endemic to the Western Ghats, recorded only from high altitude hill streams in the Nilgiri landscape. IUCN Red List Status: Least Concern
5	Gomphidae	*Cyclogomphus flavoannulatus Rangnekar et al 2019*	Endemic to the Western Ghats, recently discovered and known to occur in few places in Kerala and Goa. IUCN Red List Status: Not Assessed
6	Gomphidae	*Cyclogomphus heterostylus* Selys, 1854	Endemic to the Western Ghats, rare and seasonal. Breeds in marshlands along rivers and lakes, mostly in unprotected areas. IUCN Red List Status: Data Deficient
7	Gomphidae	*Heliogomphus promelas* (Selys, 1873)	Endemic to forested areas of Western Ghats and found in unpolluted streams. IUCN Red List Status: Near Threatened
8	Gomphidae	*Megalogomphus hannyngtoni* (Fraser, 1923)	Endemic to the Western Ghats, rare and restricted to hill streams. IUCN Red List Status: Near Threatened
9	Gomphidae	*Melligomphus acinaces* (Laidlaw, 1922)	Endemic to the Western Ghats, rare and restricted to hill streams. IUCN Red List Status: Data Deficient
10	Gomphidae	*Nychogomphus striatus* (Fraser, 1924)	Endemic to the Western Ghats, rare and restricted to hill streams. IUCN Red List Status: Data Deficient
11	Lestidae	*Indolestes pulcherrimus* Fraser, 1924	Endemic to the Western Ghats, recorded only from Coorg in Karnataka, Masinagudi in Tamil Nadu and recently, from Wayanad Wildlife Sanctuary in Kerala. Breeds in submontane marshes and ponds. IUCN Red List Status: Data Deficient
12	Libellulidae	*Epithemis mariae* (Laidlaw, 1915)	Endemic to the Western Ghats, found in marshes associated with hill streams. IUCN Red List Status: Least Concern
13	Macromidae	*Macromia annaimalaiensis* Fraser,1931	Endemic to the Southern Western Ghats. Recorded only from forested hill streams south of the Palghat Gap. Very few recent records. IUCN Red List Status: Not Assessed

14	Macromidae	*Macromia bellicosa* Fraser, 1924	Endemic to the Southern Western Ghats. Breeds only in submontane streams. Recorded only from Kerala and Tamil Nadu till date. IUCN Red List Status: Least Concern
15	Macromidae	*Macromia irata* Fraser, 1924	Endemic to the Western Ghats. Recorded only from Kerala and Karnataka till date. Breeds in hill streams. IUCN Red List Status: Least Concern
16	Platycnemididae	*Elattoneura souteri* (Fraser, 1924)	A rare endemic species restricted to southern Western Ghats. IUCN Red List Status: Data Deficient
17	Platycnemididae	*Esme longistyla* Fraser, 1931	Endemic to the Western Ghats and closely associated with hill streams. IUCN Red List Status: Least Concern
18	Platycnemididae	*Esme cyaneovittata* Fraser, 1922	Endemic to the Western Ghats and found in undisturbed hill streams. IUCN Red List Status: Data Deficient
19	Platystictidae	*Protosticta antelopoides* Fraser, 1931	Endemic to the Western Ghats. The species is currently known to occur only in Kozhikode and Wayanad districts. IUCN Red List Status:
20	Platystictidae	*Protosticta mortoni* Fraser, 1924	Endemic to the Western Ghats. The species is currently known to occur only from very few localities. IUCN Red List Status: Data Deficient
21	Platystictidae	*Protosticta ponmudiensis* Kiran, Kalesh & Kunte, 2015	Endemic to the Western Ghats. The species is currently known to occur only from Ponmudi hills. IUCN Red List Status: Data Deficient
22	Platystictidae	*Protosticta rufostigma* Kimmins, 1958	Endemic to the Western Ghats. The species was recently rediscovered and is currently known to occur only from few localities. IUCN Red List Status: Data Deficient

Recommendations for Conservation

Based on rapid threat assessment of odonates of Kerala following recommendations are provided.

1. Populations of species outside protected areas face several anthropogenic threats such as habitat destruction, habitat alteration, pesticide pollution.
2. Through People's Biodiversity Register, important wetlands at panchayat level need to be identified and mapped for conservation of odonates and their wetland habitats.
3. Long term monitoring of threatened odonates through citizens science programmes may be initiated.
4. Biology and ecology of threatened odonates of Kerala may be studied in collaboration with colleges, universities and research organizations.
5. Incorporate odonate studies in wetland conservation and monitoring programmes.

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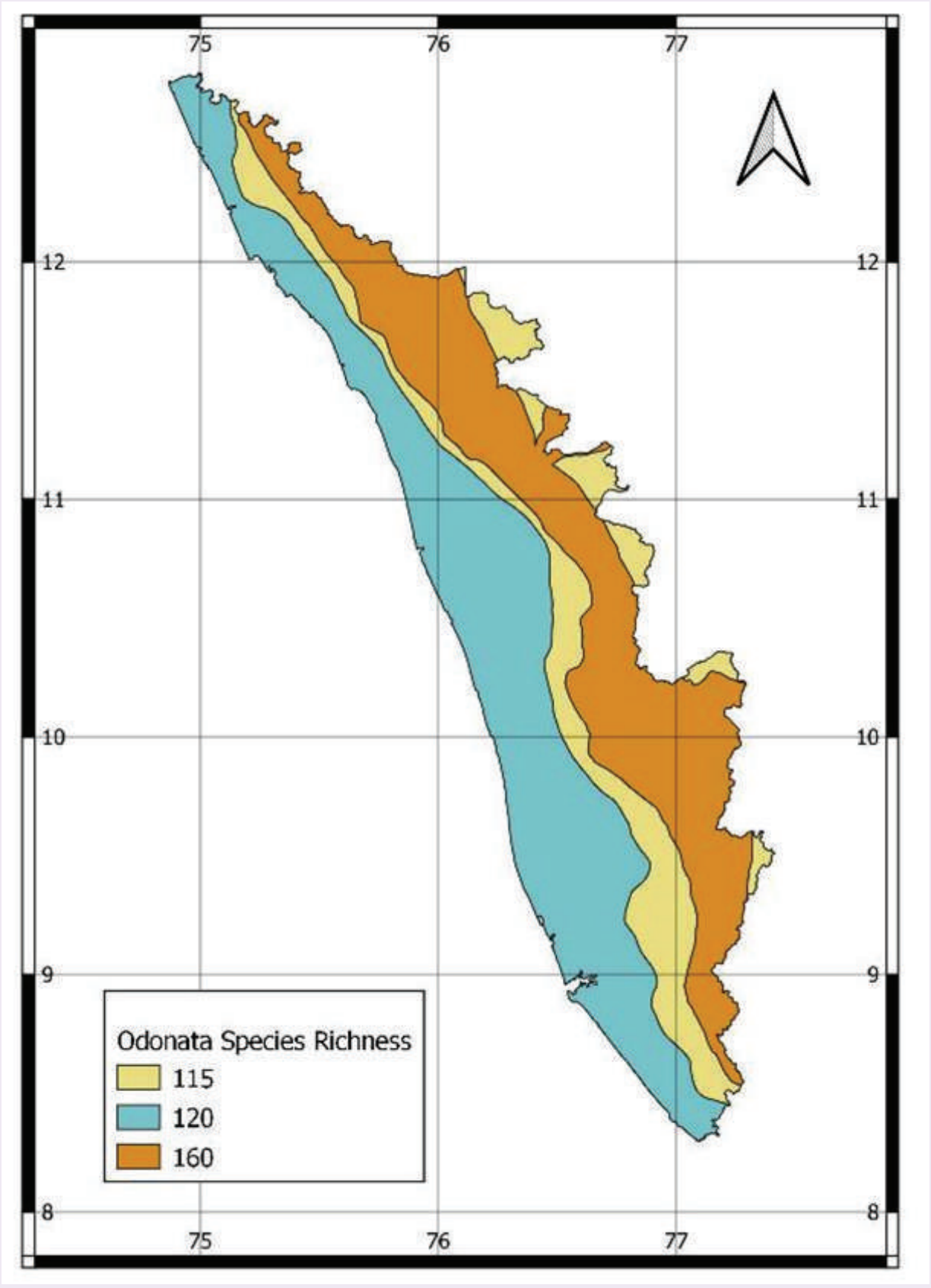
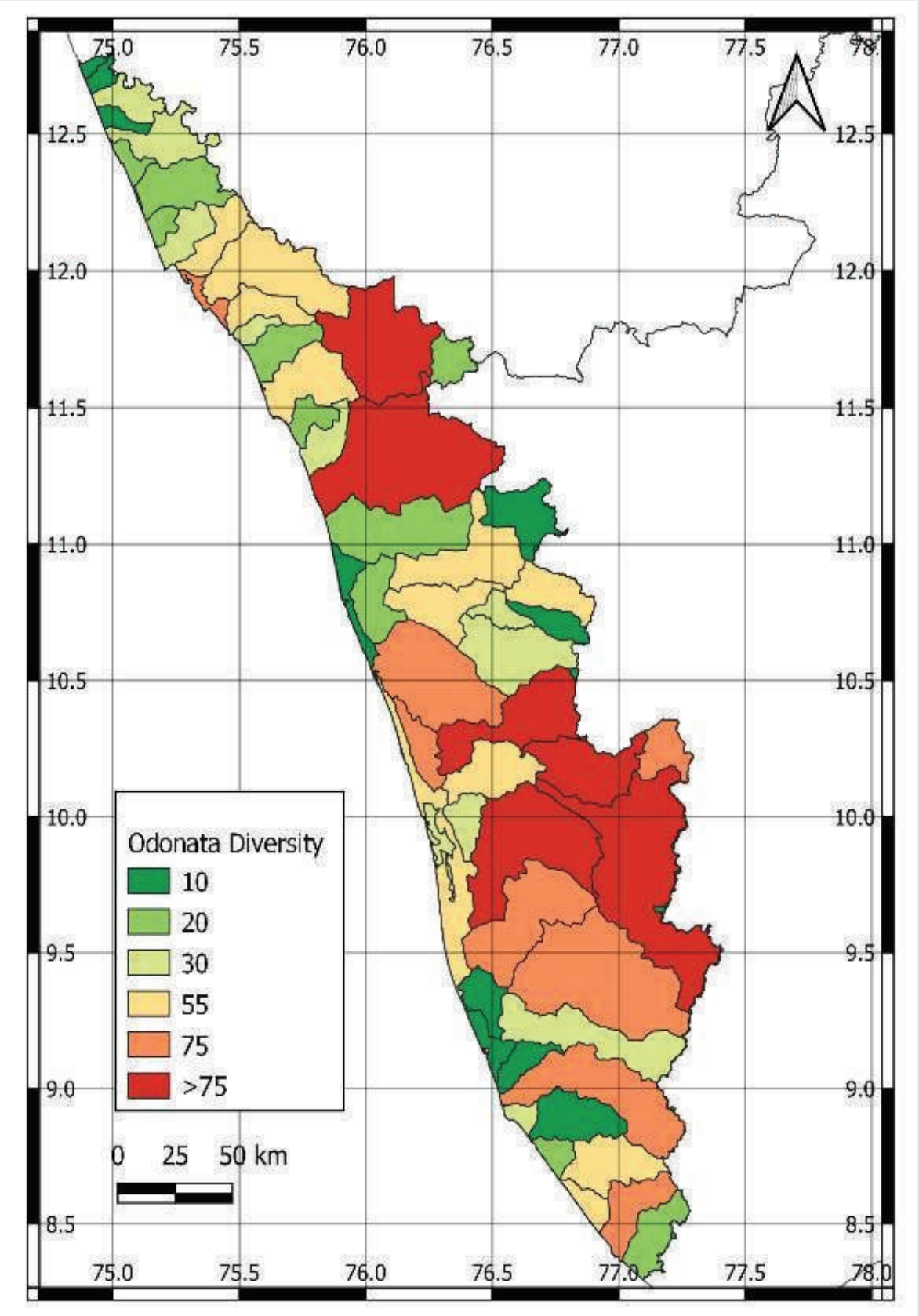
Map-01. Diversity of odonates across ecoregions of Kerala



Map-02. Diversity of odonates across riverbasins of Kerala



MYGALOMORPH SPIDERS

Sunil Jose K & Souvik Sen

Introduction

Usually, people see spiders as ugly and useless animals with very little place in existence. In preserving our biodiversity, their role has never been fully understood. Spiders have many uses in medicine and industry, despite being overlooked and seldom appreciated by humanity. Worldwide, 49235 species of spiders are known (World Spider Catalog, 2021), and 1856 species (Caleb and Sankaran, 2021) have been recorded in India so far.

They are the largest order of class Arachnida. Except for Antarctica, spiders are present in every continent. Spiders have many uses in medicine and industry. Their silk have wonderful properties and used in bulletproof clothing, artificial ligament etc. Spider venom is equally important and used to produce painkillers and to treat chronic visceral pain caused by irritable bowel syndrome.

The purpose of this study is to prepare a list of threatened spiders of Kerala that are on the verge of extinction owing to anthropogenic influences and habitat loss. A comprehensive report on such threatened spiders is prepared using our observations and pertinent data from the literatures.

Methodology

For the Threatened spiders of Kerala, we have considered only Mygalomorph spiders and followed the IUCN Red List categories, wherein the last assessment for the species of India was in 2008 (Molur et al., 2008a). The data on the species distribution and abundance were also obtained from personal observation and from the information provided by researchers, tribal and forest people. CITES database has also been checked for the purpose.

Results

Off the 18 species of mygalomorph reported from Kerala, four species could be categorized as Threatened species and seven species as Data Deficient. All the red listed mygalomorphs are belonging to the family Theraphosidae, known for 'Tarantula spiders'. Among these, three species of the genus Poecilotheria are also listed in the Appendix II of CITES. Based on the literature review and our field explorations it has been observed that most of the threatened species are reported from the protected areas

Appendix A: Regional Redlist Assessment

***Haploclastus kayi* Gravely, 1915**
Endangered

Common name (English): Parambikulam Large Burrowing Spider; Local names (Malayalam): Urambuli.

Distribution: Tamil Nadu: Indira Gandhi Wildlife Sanctuary (Molur et al., 2008b); Kerala: Parambikulam Wildlife Sanctuary, Nilambur (Jose, 2017a), Chimmini Wildlife Sanctuary (Aswathy et al., 2020).

Habitat and ecology: This Southern Western Ghats endemic was reported from moist deciduous forest and evergreen rainforest (Molur et al., 2008b) and lives in burrows along the embankment of the road and also on the forest floor. These tarantulas remain at burrow entrances to catch their prey.

Threats: Habitat loss and degradation are major threats for the species (Molur et al., 2008b).Lack of specific habitats may be the primary reason for its absence from the majority of forests. The species is also threatened due to collection by international pet traders (Molur et al., 2008b).

Conservation status: Its burrow in the forest is extremely difficult to locate. The species may require intact forest areas as well as unique habitats. Even in the forest where the species is prevalent, they are restricted to a few locations. This species must be included in the CITES Appendix II to protect it from international pet traders.

Poecilotheria regalis Pocock, 1899
Status: Least Concern

Common names (English): Indian ornamental tarantula, Regal Parachute Spider; Local names (Malayalam): Oorambuli, Iruli, Kaduvachilanthi.
Distribution: Tamil Nadu, Andhra Pradesh, Karnataka, Maharashtra, Kerala: Parambikulam Wildlife Sanctuary (Molur et al., 2008c), Siruvani, Palakkad (Jose, 2011).
Habitat and ecology: The species was reported from deciduous forest in Kerala, Karnataka and Tamil Nadu and live in the holes of tress, which they line with silk. They prey mainly on insects which wander near their burrow. They are usually found with many individuals living in the same burrow. This communal habit might have been developed because of the shortage of good holes in the trees. They are more commonly observed outside the tree burrow after the rains. They enter houses near the forest, searching for proper holes to live. They are nocturnal and capture prey during the night. Informations are also available on their breeding biology in captivity (Molur et al., 2008c).
Threats: Habitat loss and degradation along with pet trading are the present threats for the species (Molur et al., 2008c).
Conservation status: In India, the species can be found in the Western Ghats as well as in few locations in the Eastern Ghats. The species has a wide range and inhabits a large area, and although threats to the habitat and population are present.

Poecilotheria rufilata Pocock, 1899
Status: Endangered
Common names (English): Red slate ornamental tarantula, Reddish Parachute Spider, Rufus Parachute Spider; Local Names (Malayalam): Oorambuli, Iruli, Kaduvachilanthi.
Distribution: Kerala: Agasthyavanam Biosphere Reserve, Bonakadu, Shenthurnney, Peppara Dam, Kallar, and Ponmudi (Charpentier, 1996).

endemic species was found in the degraded moist deciduous and evergreen forest. It has also been reported from teak plantations and sometimes enters human settlements (Siliwal et al., 2008a). It is an arboreal species that spends most of its existence hidden underneath loose bark of trees. When compared to other tiger spiders, this species is extremely flighty and nervous.
Threats: Other than habitat loss and degradation, the species is also threatened as there is a pressure from pet traders in smuggling it out of the country (Siliwal et al., 2008a).
Conservation status: This species is one of the least known Poecilotheria species in Kerala. They are now known only from Thiruvananthapuram and Kollam districts in Kerala.

Poecilotheria striata Pocock, 1895
Status: Vulnerable

Common names: Mysore Ornamental tarantula, Striated Parachute Spider, Striped Parachute Spider. Local Names (Malayalam): Oorambuli, Iruli, Kaduvachilanthi.

Distribution: Tamil Nadu, Karnataka, Kerala:Kozhikode, Kannur (Siliwal et al., 2008b), Parambikulam Wild life sanctuary (Siliwal et al., 2008b; Jose, 2011), Thattekkad, Muvattupuzha, Achenkovil, Kulathupuzha, Chinnar, Kaduthuruthy (Jose, 2011).

Habitat and ecology: The searboreal spiders live in cracks or holes in the bark of trees. Both moist and dry deciduous forests support the species. It has a strong resemblance to Poecilotheria regalis in terms of habit. They exhibit gregarious behaviour, which most likely originated as a result of a scarcity of nesting holes in forest trees.

Threats: Habitat loss and degradation along with collection for international pet trade are major threats for the species (Siliwal et al., 2008b). Tree harvesting and forest fires are significant factors in their population reduction.

Conservation status: This species is the most frequent of the three *Poecilotheria* species found in Kerala. Because they are restricted to a few specific trees with suitable nesting holes, therefore, forest fires and tree logging may have a negative impact on their habitat. Humans occasionally kill these spiders when they enter their homes.

Data Deficient (DD)

Seven endemic mygalomorphs of Kerala with inadequate information have been kept under the Data Deficient category.

Family Barychelidae

1. *Sasonichus sullivani* Pocock, 1900

Family Theraphosidae

2. *Annandaliella ernakulamensis* Jose & Sebastian, 2008
3. *Annandaliella travancorica* Hirst, 1909
4. *Haploclastus devamatha* Prasanth & Jose, 2014
5. *Neoheterophrictus bhori* (Gravely, 1915)
6. *Neoheterophrictus chimminiensis* Jose, 2020
7. *Sahydroaraneus sebastiani* Jose, 2017

Population trend in Kerala

The level of data is not adequate to suggest any kind of population level assessment of the listed threatened mygalomorphs. The decrease of forest cover and urbanisation is responsible to a general reduction in the diversity of mygalomorph spiders.

Level of Exploitation

Many spiders do not face any direct threats from humans for any financial benefits. However, tarantulas such as *Poecilotheria* and *Haploclastus* species are often illegally obtained by pet dealers in Europe and America. Europeans' curiosity about these vibrant and wild animals facilitates their trade. There are many websites on the internet that market these animals to pet owners in Europe and the United States. Breeders may say that their animals are raised in the laboratories, but breeding is difficult in many species.

Recommended conservation measures in Kerala

One of the first steps needed for protection is to encourage public knowledge that spiders are not detrimental to their lives. Reducing forest invasions and enhancing forest management will reduce the extinction of spider especially mygalomorphs.

Arboreal mygalomorphs, like Poecilotheria are vulnerable to forest fires and tree destruction. We don't have enough data to assess the extent of damage caused by recent flooding to these species' habitats and populations. Minimising tree damage and avoiding landscape alteration for development can help them to survive.

Conservation priority area in Kerala

In the case of mygalomorph spiders, Southern Kerala has been recorded to have more species diversity. Compared to the north of Kerala, this may be attributed to greater forest cover in the south. There is a greater species diversity and population of threatened tarantulas in south Kerala.

Cultural significance and associated traditional knowledge

Poecilotheria species are considered extremely dangerous by the tribals of Kerala, and they believe their bite can make the victim crawl like a spider. Tribal's fear may help to prevent the destruction of tree species, where tarantulas inhabit.

Acknowledgements

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FRESH WATER CRABS

Cylindrotelphusa breviphallus © Pati et al 2017

Sameer Kumar Pati

INTRODUCTION

Freshwater crabs are the decapod crustaceans and exclusively belong to the infraorder Brachyura. Globally, 1589 species of crabs in five families (Gecarcinucidae, Potamidae, Potamonautidae, Pseudothelphusidae, and Trichodactylidae) are known to exist in tropical and subtropical freshwater ecosystems (WoRMS Editorial Board, 2020). These crabs spend their entire life in freshwater and never return to the sea. The life cycle with direct development is characteristic to them.

Freshwater crabs dwell in various freshwater bodies, including rivers, streams, lakes, ponds, swamps, and rice fields (Yeo et al., 2008). They also occupy some semi-terrestrial and terrestrial habitats like phytotelmata, leaf litter in the forest floor, and crevices of laterite boulders (Bahir & Yeo, 2007; Kumar et al., 2017; Pati & Thackeray, 2018). The various ecological and economic role played by freshwater crab made them an important animal group. Their roles include ecosystem functioning, support in small-scale fisheries or aquarium trade, acting as a pest of paddy crops, hosting human disease-causing parasites, involvement in the preparation of medicines, etc. (Ng, 1988; Yeo et al., 2008; Cumberlidge et al., 2009; Kumar et al., 2017).

A very high level of endemism is seen in freshwater crabs, especially for the highland species (Cumberlidge et al., 2009; Klaus et al., 2014). Cumberlidge et al. (2009) argued that the conservation of freshwater crabs is as important as that of reef-building corals, birds, odonates, reptiles, freshwater fishes, and mammals. The secretive habitats of freshwater crabs, however, challenge studies related to biodiversity and conservation.

The present report deals with the assessment of threats to the species of freshwater crabs in Kerala and recommends the species that can be considered as threatened under Section 38 of the Biological Diversity Act, 2002.

METHODOLOGY

The following information on each species of freshwater crabs in Kerala is gathered from published literature (Milne Edwards, 1853; Heller, 1862; Alcock, 1909a, 1909b, 1910; Henderson, 1912, 1913; Roux, 1931; Pillai, 1951; Bott, 1970; Ng & Tay, 2001; Bahir & Yeo, 2005, 2007; Srivastava, 2005; Dev Roy et al., 2009; Pati & Sharma, 2011, 2013; Pati et al., 2014, 2017, 2019a, 2019b, 2019c; Pati & Sudha Devi, 2015a, 2015b; Kumar et al., 2017; Raj et al., 2017; Rajesh et al., 2017; Bhaskar et al., 2019; Pati & Vargila, 2019): geographic distribution; habitat and ecology; conservation status; population trend in Kerala since 2000; geographic location/habitat of sustainable and threatened population in Kerala; level of exploitation; threats; conservation priority areas in Kerala; BMC and stakeholders responsible for conservation and sustainable utilization; cultural significance and associated traditional knowledge (see Appendix).

The conservation status of each crab species was verified from the IUCN Red List of Threatened Species at the global level (IUCN, 2020). While the information currently available for the freshwater crabs of Kerala in the IUCN Red List of Threatened Species was based on an older version [Version 3.1 (2008)], some 12 species were never evaluated by IUCN. It is now necessary to reassess the status of all the species of freshwater crabs in Kerala using the latest criteria [Version 14 (2019)]. Since the present document aims to provide information on the threatened species of freshwater crabs in Kerala, the regional IUCN Red List Assessment is carried out by following the recommended criteria (IUCN, 2012a) and guidelines (IUCN, 2012b; IUCN Standards and Petitions Committee, 2019). The species with an extinction risk and falls one of the threatened categories (Critically Endangered, Endangered, or Vulnerable) as an outcome of the regional IUCN Red List Assessment is regarded as a threatened species. Among those threatened species, only a few species are recommended as threatened under Section 38 of the Biological Diversity Act, 2002, because they are either on the verge of extinction or more likely to become extinct in the near future.

Procedure for regional IUCN Red List Assessment

Decision on freshwater crab species and populations to be assessed:

Crab species that are extant and native to Kerala are considered for the present assessment. An extant species is here defined as the species that is known in the area where locality records were originated during the past three decades (1991–2020) and the suitable habitats are still exist. It is also ensured that the extant species must have a native breeding population within Kerala and lack a non-breeding visitor population. The calculation of Extension of Occurrence (EOO) and Area of Occupancy (AOO) are based only on the extant range of a species, which were achieved using QGIS and GeoCAT, respectively.

The range of a species is considered as "possibly extinct" when that species was formerly known to occur in Kerala but now most likely extirpated from there due to one or more threats, and if there is no confirmed recent record despite repeated searches. The possibly extinct range is not used here for calculation of EOO. The species with a possible extinct range, however, is considered for assessment. Among the freshwater crabs of Kerala, only a lone species has a possibly extinct range, i.e., *Cylindrotelphusa granulata* (Pillai, 1951).

Species with uncertain presence in Kerala were not considered for the present assessment because the taxon has been wrongly identified previously or the locality information is incorrect. In Kerala, the presence of two species is uncertain, i.e., *Spiralothelphusa hydrodroma* (Herbst, 1794), and *Spiralothelphusa wuellerstorfi* (Heller, 1862).

Preliminary estimation of extinct risk:

Only regional population of a crab species were assessed for initial estimation of extinction risk following IUCN Red List criteria. If the species is endemic to Kerala then the preliminary estimation is the final regional assessment, which is also be considered as the final global IUCN Red List Assessment for that species. Interestingly, 24 species of freshwater crabs are endemic to the state. If the species is non-endemic then a final estimation of extinct risk is required after applying the IUCN regional guidelines.

Final estimation of extinct risk:

The final estimation of extinct risk was achieved by considering two major issues affecting regional assessments, i.e., breeding population and visiting population. Visiting population is nevertheless seen in none of the crab species of Kerala. The breeding population is further affected by immigration. It is nevertheless unknown whether the regional population of all the non-endemic species experience any significant immigration of propagules likely to reproduce in the region or not. Therefore, there is no change in the preliminary estimation (see IUCN, 2012b: fig. 3, table 1).

RESULTS AND DISCUSSION

In India, 128 species of freshwater crabs in two families (91 gecarcinucid species and 37 potamid species) are currently known (cf. Pati & Thackeray, 2018; Mitra, 2019, 2020; Pati et al., 2019a, 2020; Mitra et al., 2020). Among the Indian states, Kerala has the highest diversity of freshwater crabs with 35 gecarcinucid species in 14 genera (Rajesh et al., 2017; Pati et al., 2019b) (Table 1) (see Appendix); this excludes two species (Spiralothelphusa hydrodroma and Spiralothelphusa wuellerstorfi) whose presence is uncertain. The state is home to 24 endemic species (69% species of Kerala) (Table 1) (see Appendix). As many as 31 species of Kerala are known from the Western Ghats (see Appendix).

According to the global IUCN Red List of Threatened Species, only two species of Kerala were in a threatened category (Vulnerable) and six species in the Least Concern .The remaining 27 species of Kerala were either Data Deficient or not being evaluated by IUCN . The present regional IUCN Red List Assessment, however, recognized five species as Critically Endangered, including one possibly extinct species; four species as Endangered; four species as vulnerable; two species as Near Threatened; one species as Least Concern; and 19 species as Data Deficient (Table 1) (see Appendix).

Threatened species of freshwater crabs in Kerala

In total, 13 species of freshwater crabs in Kerala come under one or the other threatened categories (Critically Endangered, Endangered, or Vulnerable) according to the present regional IUCN Red List Assessment (see Table 1 and Appendix). Among them, the following four species may be considered to notify them as threatened according to Section 38 of the Biological Diversity Act, 2002, because of the reasons specified for each species.

1) Arcithelphusa tumpikkai Pati, Sujila & Sudha Devi, 2019

Reasons: The highland species, *Arcithelphusa tumpikkai,* is endemic to Wayanad district of Kerala and hitherto unknown from any protected areas. The species is qualified for the "Endangered B1ab(iii)+2ab(iii)" category according to the present regional IUCN Red List Assessment. The species is facing continuing decline in the extent and quality of its habitat due to habitat degradation and agrarian development. The species is more likely to become extinct in the near future because currently no conservation action is being taken.

Image after Pati et al. (2019a)

2) *Cylindrotelphusa breviphallus* Pati, Rajesh, Raj, Sheeja, Kumar & Sureshan, 2017

Reasons: The highland species, *Cylindrotelphusa breviphallus,* is endemic to Thiruvananthapuram district of Kerala and is so far known from none of the protected areas. The species is qualified for the "Critically Endangered B2ab(iii)" category according to the present regional IUCN Red List Assessment. The species is facing continuing decline in the extent and quality of its

Image after Pati et al. (2017)

habitat due to habitat degradation and pesticide pollution. The species is more likely to become extinct in the near future because currently no conservation action is being taken.

3) Cylindrotelphusa granulata (Pillai, 1951)

Reasons: Cylindrotelphusa granulata is a lowland species and previously known only from the type locality, North Paravur in Ernakulam district of Kerala. According to the present regional IUCN Red List Assessment, the species is qualified for the "Critically Endangered (Possibly Extinct) B1ab(iii)+2ab(iii)" category. The species was known to dwell in low-lying paddy fields, which have been converted into aquaculture ponds. There is no recent report the species. The species seems to be extirpated from the unprotected area due to habitat conversion. The species might be now on the verge of extinction.

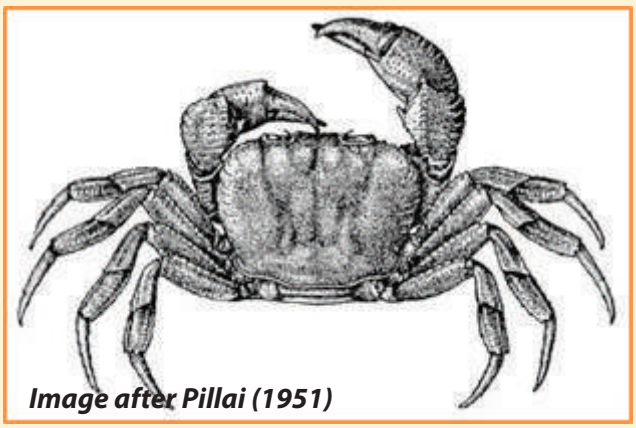

Image after Pillai (1951)

4) Vela virupa Bahir & Yeo, 2007

Reasons: The highland species, Vela virupa, is endemic to Idukki district of Kerala and is so far unrecorded from any protected areas. The species is qualified for the "Endangered B1ab(iii)+2ab(iii)" category according to the present regional IUCN Red List Assessment. The species is facing continuing decline in the extent and quality of its habitat due to habitat degradation and pollution. The species is more likely to become extinct in the near future because currently no conservation action is being taken

SUMMARY

Kerala possesses 35 species of freshwater crabs in 14 genera of the lone family Gecarcinucidae, including 24 endemic species and 31 species from its Western Ghats mountains.

The information on the freshwater crab species of Kerala available in the IUCN Red List of Threatened Species was based on an older version [Version 3.1 (2008)]. During the last decade, another 12 species of freshwater crabs have been recorded from the state. The regional IUCN Red List Assessment is, therefore, carried out on the freshwater crabs of Kerala by following the latest criteria [Version 14 (2019)] and recommended guidelines.

The present regional IUCN Red List Assessmentrecognizedfive species as Critically Endangered, including one possibly extinct species; four species as Endangered; four species as vulnerable; two species as Near Threatened; one species as Least Concern; and 19 species as Data Deficient.

Among the crab species with a threatened category (Critically Endangered, Endangered, or Vulnerable), only four species are recommended here for inclusion as threatened species under Section 38 of the Biological Diversity Act, 2002, viz., Arcithelphusa tumpikkai Pati, Sujila & Sudha Devi, 2019, Cylindrotelphusa breviphallus Pati, Rajesh, Raj, Sheeja, Kumar & Sureshan, 2017, *Cylindrotelphusa granulata* (Pillai, 1951), and Vela virupa Bahir & Yeo, 2007

Assessment of threats to the species of freshwater crabs in Kerala.

Arcithelphusa cochleariformis
Pati & Sudha Devi, 2015

Taxonomy

Phylum Arthropoda

Class	Malacostraca
Order	Decapoda
Family	Gecarcinucidae

Species *Arcithelphusa cochleariformis* Pati & Sudha Devi, 2015

Local name (Malayalam): Kundan [for dwarf] njandu (കുണ്ടൻ ഞണ്ട്)

Common name (English) Greater box-shaped crab (proposed herein)

Distribution

Global	India only
India	Endemic to Kerala; Western Ghats only
Kerala	Endemic to Wayanad district; Western Ghats only

Image after Pati et al. (2014)

Habitat/ecology:

The species is a semi-terrestrial crab and mainly dwells in shallow to deep burrows adjacent to water channels of betel nut plantations, which were once rice fields. Forest or grasslands were the natural habitats for the new species before their conversion to rice fields. They also live away from the water channels in open or shaded areas of banana and betel nut plantations. Individuals can also be located in marshy lands and along paddy field embankments. The species is omnivore and mainly feeds on a wide range of plant material, earthworms and insects. The species also feeds on decaying leaves and detritus. These crabs are mainly nocturnal and very rarely forage during the day time. Herons, egrets, wild boars, mongooses and cats are their predators.

Conservation status

WPA (1972):	None
IUCN (Global Assessment):	Not evaluated (IUCN,2020)
IUCN (Regional Assessment):	Vulnerable B1ab(iii)+2ab(iii)
CITES	None
CMS	None

Population trend in Kerala since 2000: Seems to be stable

Geographic location/habitat of sustainable population in Kerala: Wayanad district; Wayanad Wildlife Sanctuary; Western Ghats

Geographic location/habitat of threatened population in Kerala: Wayanad district; Western Ghats

Level of exploitation

Commercial	None
Local consumption	None
Poaching	None
Pet trade	None
Wildlife trade	None

Threats

No threat is documented. Possible anthropogenic threats include habitat degradation and pesticide pollution in unprotected areas.

Recommended conservation measures in Kerala

Pesticide application in agricultural plantations should be minimized because it has an adverse effect on freshwater crabs.

Conservation priority area in Kerala: Wayanad district; Wayanad Wildlife Sanctuary; Western Ghats

BMC responsible for conservation and sustainable utilization: Forest and Wildlife Department; local government bodies (Panchayats)

Stakeholders responsible for conservation and sustainable utilization: Local farmers; tribal community

Cultural significance and associated traditional knowledge: Unknown

Remarks: The species is endemic to Wayanad district of Kerala and found only in the Western Ghats. The species is also known from a protected area. Its extent of occurrence (EOO) is 2196 km^2, and area of occupancy (AOO) is 44 km^2. The number of locations for the species is 8, which was calculated based on the most likely threat that may affect the currently-unaffected areas in the future and the number of subpopulations in the unaffected areas. There is a continuing decline in the extent and quality of its habitat due to habitat degradation and agrarian development. The species, therefore, qualifies for the "Vulnerable B1ab(iii)+2ab(iii)" category as per the recommended criteria and guidelines for the Regional IUCN Red List Assessment.

Arcithelphusa tumpikkai Pati, Sujila & Sudha Devi, 2019

Taxonomy

Species *Arcithelphusa tumpikkai* Pati, Sujila & Sudha Devi, 2019

Local name (Malayalam): Kundan [for dwarf] njandu (കുണ്ടൻ ഞണ്ട്) or Kunjan [for small] njandu (ചെറിയ കുണ്ടൻ ഞണ്ട്)

Common name (English): Lesser box-shaped crab (proposed herein)

Image after Pati et al. (2019a)

Distribution

Global	India only
India	Endemic to Kerala; Western Ghats only
Kerala	Endemic to Wayanad district; West ern Ghats only

Habitat/ecology

The species dwells in Shola forests, mountainous streams, natural springs, rice fields, and banana/betel nut/cassava plantations. Crabs live in shallow burrows under small and moist boulders. Individuals also inhabit muddy banks along the water channels of paddy fields and various plantations. These crabs generally prefer to stay near water bodies or moist places. The species seems to be locally abundant in rather elevated areas of Wayanad district.

Conservation status

WPA (1972): None

IUCN (Global Assessment): Not evaluated (IUCN, 2020)

IUCN (Regional Assessment) Endangered B1ab(iii)+2ab(iii)

CITES	None
CMS	None

Population trend in Kerala since 2000: Seems to be stable

Geographic location/habitat of sustainable population in Kerala: Wayanad district; Western Ghats

Geographic location/habitat of threatened population in Kerala: Wayanad district; Western Ghats

Level of exploitation

Commercial	None
Local consumption	None
Poaching	None
Pet trade	None
Wildlife trade	None

Threats

No threat is documented. Possible anthropogenic threats include habitat degradation and pesticide pollution. Also, the species is unknown from any protected areas.

Recommended conservation measures in Kerala: Pesticide application in agricultural plantations should be minimized because it has an adverse effect on freshwater crabs.

Conservation priority area in Kerala: Wayanad district; Western Ghats

BMC responsible for conservation and sustainable utilization: Forest and Wildlife Department; local government bodies (Panchayats)

Stakeholders responsible for conservation and sustainable utilization: Local farmers

Cultural significance and associated traditional knowledge: Unknown

Remarks: The species is endemic to Wayanad district of Kerala and found only in the Western Ghats. The species is unknown from any protected areas. Its extent of occurrence (EOO) is 472 km^2, and area of occupancy (AOO) is 16 km^2. The number of locations for the species is 2, which was calculated based on the most likely threat that may affect the currently-unaffected areas in the future. There is a continuing decline in the extent and quality of its habitat due to habitat degradation and agrarian development. The species, therefore, qualifies for the "Endangered B1ab(iii)+2ab(iii)" category as per the recommended criteria and guidelines for the Regional IUCN Red List Assessment.

Baratha peena Bahir & Yeo, 2007

Taxonomy

Species *Baratha peena* Bahir & Yeo, 2007

Local name (Malayalam): No specific name; all crabs are locally known as njandu (ഞണ്ട്)

Common name (English): Fat Indian crab (proposed herein)

Distribution:

Global	India only
India	Endemic to Kerala; Western Ghats only
Kerala	Endemic to Idukki district; Western Ghats only

Habitat/ecology: The species dwells in muddy soil on the margin of streamlets.

Conservation status

WPA (1972): None

IUCN (Global Assessment): Data Deficient (Cumberlidge, 2008) [Version 3.1 (2008)]

IUCN (Regional Assessment): Data Deficient

CITES	None
CMS	None

Population trend in Kerala since 2000: Unknown
Geographic location/habitat of sustainable population in Kerala: Idukki district; Western Ghats
Geographic location/habitat of threatened population in Kerala: Unknown
Level of exploitation

Commercial	None
Local consumption	None
Poaching	None
Pet trade	None
Wildlife trade	None

Threats: No threat is documented.
Recommended conservation measures in Kerala: No conservation measure is recommended because the data on species' long-term threats are insufficient.
Conservation priority area in Kerala: Idukki district; Western Ghats
BMC responsible for conservation and sustainable utilization: Forest and Wildlife Department; local government bodies (Panchayats)
Stakeholders responsible for conservation and sustainable utilization: Local people
Cultural significance and associated traditional knowledge: Unknown
Remarks: The species is endemic to Idukki district of Kerala and so far known only from two adjacent localities in the Western Ghats. Both the localities are unprotected. The data on its extent of occurrence, ecological requirements, population size, population trends, and long-term threats are insufficient. The species, therefore, qualifies for the "Data Deficient" category as per the recommended criteria and guidelines for the Regional IUCN Red List Assessment

Baratha pushta Bahir & Yeo, 2007

Taxonomy
Species *Baratha pushta* Bahir & Yeo, 2007
Local name (Malayalam): No specific name; all crabs are locally known as njandu ഞണ്ട്

Common name (English): Swollen Indian crab (proposed herein)
Distribution:

Global	India only
India	Endemic to Kerala; Western Ghats only
Kerala	Endemic to Idukki district; Western Ghats only

Habitat/ecology: The species dwells in muddy banks of rocky streams.
Conservation status:
WPA (1972): None
IUCN (Global Assessment): Data Deficient (Esser & Cumberlidge, 2008) [Version 3.1 (2008)]
IUCN (Regional Assessment): Data Deficient

CITES	None
CMS	None

Population trend in Kerala since 2000: Unknown
Geographic location/habitat of sustainable population in Kerala: Idukki district; Western Ghats
Geographic location/habitat of threatened population in Kerala: Unknown

Level of exploitation

Commercial	None
Local consumption	None
Poaching	None
Pet trade	None
Wildlife trade	None

Threats
No threat is documented.
Recommended conservation measures in Kerala: No conservation measure is recommended because the data on species' long-term threats are insufficient.
Conservation priority area in Kerala: Idukki district; Western Ghats
BMC responsible for conservation and sustainable utilization: Forest and Wildlife Department; local government bodies (Panchayats)
Stakeholders responsible for conservation and sustainable utilization: Local people
Cultural significance and associated traditional knowledge: Unknown
Remarks: The species is endemic to Idukki district of Kerala and so far known only from the type locality in the Western Ghats. The type locality is an unprotected area. The data on its extent of occurrence, ecological requirements, population size, population trends, and long-term threats are insufficient. The species, therefore, qualifies for the "Data Deficient" category as per the recommended criteria and guidelines for the Regional IUCN Red List Assessment

Barytelphusa cunicularis (Westwood in Sykes, 1836)

Taxonomy

Species *Barytelphusa cunicularis* (Westwood in Sykes, 1836)

Local name (Malayalam): Kari [for black] njandu (കരിഞ്ഞണ്ട്)

Common name (English): Burrowing heavy crab (proposed herein)

Distribution

Global: India only

India: Andhra Pradesh; Goa; Gujarat; Jharkhand; Karnataka; Kerala; Madhya Pradesh; Maharashtra; Odisha; Rajasthan; Tamil Nadu; Telangana; Uttar Pradesh; Uttarakhand; West Bengal; Puducherry Union Territory; Western Ghats

Kerala: Ernakulam, Idukki, Kannur, Kasaragod, Kollam, Kottayam, Kozhikode, Malappuram, Palakkad, Pathanamthitta, Thiruvananthapuram, Thrissur and Wayanad districts; Western Ghats

Habitat/ecology

The species is primarily an aquatic crab and dwells under boulders in shallow or deep streams and rivers. It can be also found on land away from water bodies. These crabs are omnivores and feed on various animal and vegetation matters. The species can occupy both low-lying areas and highlands. It generally prefers deep forested areas.

Conservation status

WPA (1972): None

IUCN (Global Assessment) Least Concern (Cumberlidge, 2008) [Version 3.1 (2008)]

IUCN (Regional Assessment): Least Concern

CITES	None
CMS	None

Population trend in Kerala since 2000: Stable

Geographic location/habitat of sustainable population in Kerala: Ernakulam, Idukki, Kannur, Kasaragod, Kollam, Kottayam, Kozhikode, Malappuram, Palakkad, Pathanamthitta, Thiruvananthapuram, Thrissur and Wayanad districts; Thattekkad Bird Sanctuary; Aralam Wildlife Sanctuary; Chimmoni Wildlife Sanctuary; Chinnar Wildlife Sanctuary; Idukki Wildlife Sanctuary; Malabar Wildlife Sanctuary; Parambikulam Wildlife Sanctuary; Peppara Wildlife Sanctuary; Shendurney Wildlife Sanctuary; Periyar Tiger Reserve; Western Ghats

Geographic location/habitat of threatened population in Kerala: None

Level of exploitation

Commercial	Low
Local consumption	Medium
Poaching	None
Pet trade	None
Wildlife trade	None

Threats

No threat is documented. Overexploitation could be the potential reason for depletion of the species in the wild, especially from the unprotected areas.

Recommended conservation measures in Kerala: No major conservation issue for the species because it is a very common species with a stable population. The species is also found in several protected areas.

Conservation priority area in Kerala: Thattekkad Bird Sanctuary; Aralam Wildlife Sanctuary; Chimmoni Wildlife Sanctuary; Chinnar Wildlife Sanctuary; Idukki Wildlife Sanctuary; Malabar Wildlife Sanctuary; Parambikulam Wildlife Sanctuary; Peppara Wildlife Sanctuary; Shendurney Wildlife Sanctuary; Periyar Tiger Reserve; Western Ghats

BMC responsible for conservation and sustainable utilization: Forest and Wildlife Department; local government bodies (Panchayats)

Stakeholders responsible for conservation and sustainable utilization: Local fishermen; tribal community

Cultural significance and associated traditional knowledge: These crabs have medicinal properties.

Remarks

The species is the largest among Indian crabs. It is widely distributed in India and very common in Kerala. Tribal people of Kerala used to collect large-sized crabs for food. The species is also known from several protected areas of Kerala. The species has been given the status of "Least Concern" in the global IUCN Red List of Threatened Species because of its wide distribution and presumed large population, and the species is unlikely to be declining fast enough. In Kerala, its extent of occurrence (EOO) is 57410 km^2, and area of occupancy (AOO) is 288 km^2. The species does not meet any criteria for a threatened category.

Also, there is no decline in the EOO, AOO, area, extent and/or quality of habitat, or number of locations. The species, therefore, qualifies for the "Least Concern" category as per the recommended criteria and guidelines for the Regional IUCN Red List Assessment.

Cylindrotelphusa breviphallus Pati, Rajesh, Raj, Sheeja, Kumar & Sureshan, 2017

Taxonomy

Species *Cylindrotelphusa breviphallus* Pati, Rajesh, Raj, Sheeja, Kumar & Sureshan, 2017

Image after Pati et al. (2017)

Local name (Malayalam): No specific name; all crabs are locally known as njandu ഞണ്ട്

Common name (English): Highland humped crab (proposed herein)

Image after Pati et al. (2017)

Distribution

Global	India only
India	Endemic to Kerala; Western Ghats only
Kerala	Endemic to Thiruvananthapuram district; Western Ghats only

Habitat/ecology

The species dwells under stones of steep hill streams, in shallow burrows in wet soil adjoining shaded areas of streams, and under the roots of large trees above the ground level. These crabs can also be found in tea gardens. The species is generally active during the daylight. The population size of the species appears to be low within its distributional range.

Conservation status

WPA (1972)	None
IUCN (Global Assessment)	Not evaluated (IUCN, 2020)
IUCN (Regional Assessment)	Critically Endangered B2ab(iii)
CITES	None
CMS	None

Population trend in Kerala since 2000

Seems to be decreasing

Geographic location/habitat of sustainable population in Kerala: Ponmudi in Thiruvananthapuram district; Western Ghats

Geographic location/habitat of threatened population in Kerala: Ponmudi in Thiruvananthapuram district; Western Ghats

Level of exploitation

Commercial	None
Local consumption	None
Poaching	None
Pet trade	None
Wildlife trade	None

Threats: No threat is documented. Possible anthropogenic threats include habitat degradation and pesticide pollution. Also, the species is unknown from any protected areas.

Recommended conservation measures in Kerala: Pesticide application in tea gardens should be minimized because it has an adverse effect on freshwater crabs.

Conservation priority area in Kerala: Ponmudi in Thiruvananthapuram district; Western Ghats.

MC responsible for conservation and sustainable utilization: Forest and Wildlife Department; local government bodies (Panchayats)

Stakeholders responsible for conservation and sustainable utilization: Local farmers; local people

Cultural significance and associated traditional knowledge: Unknown

Remarks

The species is endemic to Thiruvananthapuram district of Kerala and so far known only from two adjacent localities in the Western Ghats. Both the localities are unprotected. Its population size appears to be low in Ponmudi and adjacent areas. Its extent of occurrence (EOO) is 472 km^2, and area of occupancy (AOO) is 8 km^2. The number of locations for the species is 1, which was calculated based on the most likely threat that may affect the currently-unaffected areas in the future. There is a continuing decline in the extent and quality of its habitat due to habitat degradation and pesticide pollution. The species, therefore, qualifies for the "Critically Endangered B2ab(iii)" category as per the recommended criteria and guidelines for the Regional IUCN Red List Assessment.

Cylindrotelphusa granulata (Pillai, 1951)

Taxonomy

Species *Cylindrotelphusa granulata* (Pillai, 1951)

Local name (Malayalam): No specific name; all crabs are locally known as njandu ഞണ്ട്

Common name (English): Granular humped crab (proposed herein)

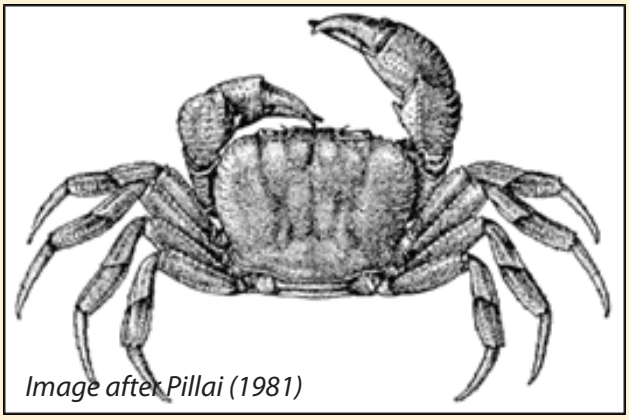

Image after Pillai (1981)

Distribution

Global	India only
India	Endemic to Kerala
Kerala	Endemic to Ernakulam district

Habitat/ecology

The species was once reported to occur abundantly on drylands and adjacent low-lying paddy fields. These crabs can make deep burrows that reach the water level.

Conservation status

WPA (1972): None

IUCN (Global Assessment): Not evaluated (IUCN, 2020)

UCN (Regional Assessment): Critically Endangered (Possibly Extinct) B1ab(iii)+2ab(iii)

CITES	None
CMS	None

Population trend in Kerala since 2000: No crab population is reported since 1944.

Geographic location/habitat of sustainable population in Kerala: None

Geographic location/habitat of threatened population in Kerala: North Paravur of Ernakulam district, Kerala

Level of exploitation

Commercial	None
Local consumption	None
Poaching	None
Pet trade	None
Wildlife trade	None

Threats

The species might have been extirpated from the only known locality (North Paravur of Ernakulam district, Kerala) due to the conversion of its habitat (low-lying paddy fields) into aquaculture pond.

Recommended conservation measures in Kerala: Unauthorized habitat conversion should be restricted because it can affect the existence of freshwater crabs. Extensive surveys must be conducted in the known localities and possible habitats of the species.

Conservation priority area in Kerala: North Paravur of Ernakulam district

BMC responsible for conservation and sustainable utilization: Local government bodies (Panchayats)

Stakeholders responsible for conservation and sustainable utilization: Local people

Cultural significance and associated traditional knowledge: Unknown

Remarks

The species is so far known only from the type locality (North Paravur in Ernakulam district of Kerala), which is an unprotected area. The habitat of the species, i.e., the low-lying paddy fields have been converted into aquaculture ponds. Recent attempts to collect data on the species were unsuccessful because these crabs might be extirpated from the area due to habitat conversion. Its extent of occurrence (EOO) is 73 km^2, and area of occupancy (AOO) is 4 km^2. The number of locations for the species is 1, which was calculated based on the most serious plausible threat (habitat loss) that can rapidly eliminate the population. The species, therefore, qualifies for the "Critically Endangered (Possibly Extinct) B1ab(iii)+2ab(iii)" category as per the recommended criteria and guidelines for the Regional IUCN Red List Assessment.

Cylindrotelphusa longiphallus Pati, Rajesh, Raj, Sheeja, Kumar & Sureshan, 2017

Cylindrotelphusa steniops (Alcock, 1909)

Image after Pati et al. (2017)

Species *Cylindrotelphusa longiphallus* Pati, Rajesh, Raj, Sheeja, Kumar & Sureshan, 2017
Local name (Malayalam): No specific name; all crabs are locally known as njandu ഞണ്ട്
Common name (English): Narrow-faced crab (proposed herein)

Distribution
Global: India only
India: Endemic to Kerala
Kerala: Endemic to Thrissur district
Habitat/ecology: The species dwells in deep interconnected burrows along paddy field embankments in shaded or open areas. Crabs are common at the type locality.
Conservation status
WPA (1972): None
IUCN (Global Assessment): Not evaluated (IUCN, 2020)
IUCN (Regional Assessment: Critically Endangered B2ab(iii)
CITES: None
CMS: None
Population trend in Kerala since 2000: Seems to be stable: Geographic location/habitat of sustainable population in Kerala: Kuzhikattusseri in Thrissur district
Geographic location/habitat of threatened population in Kerala: Kuzhikattusseri in Thrissur district
Level of exploitation

Commercial	None
Local consumption	None
Poaching	None
Pet trade	None
Wildlife trade	None

Threats: No threat is documented. Possible anthropogenic threats include pesticide pollution. Also, the species is unknown from any protected areas.
Recommended conservation measures in Kerala: Pesticide application in paddy fields should be minimized because it has an adverse effect on freshwater crabs.
Conservation priority area in Kerala: Kuzhikattusseri in Thrissur district
BMC responsible for conservation and sustainable utilization: Local government bodies (Panchayats)
Stakeholders responsible for conservation and sustainable utilization: Local farmers
Cultural significance and associated traditional knowledge: Unknown
Remarks: The species is endemic to Thrissur district of Kerala. These crabs are common at the type locality. Unfortunately, the species is so far not reported from any protected areas. Its extent of occurrence (EOO) is 236 km^2, and area of occupancy (AOO) is 4 km^2. The number of locations for the species is 1, which was calculated based on the most likely threat that may affect the currently-unaffected areas in the future. There is a continuing decline in the extent and quality of its habitat due to habitat degradation and pesticide pollution. The species, therefore, qualifies for the "Critically Endangered B2ab(iii)" category as per the recommended criteria and guidelines for the Regional IUCN Red List Assessment.

Cylindrotelphusa steniops (Alcock, 1909)
Taxonomy

Species *Cylindrotelphusa steniops* (Alcock, 1909)
Local name (Malayalam): No specific name; all crabs are locally known as njandu ഞണ്ട്
Common name (English): Narrow-faced crab (proposed herein)

Distribution
Global: India only
India: Kerala; Tamil Nadu; Western Ghats
Kerala: Idukki, Kollam, Kozhikode, Pathanamthitta, Thiruvananthapuram and Thrissur districts; Western Ghats

Habitat/ecology: The species dwells in deep burrows adjacent to or away from streams in shaded or open areas. These crabs make deep burrows in loose soil on wet forest floor, near riverbanks, and paddy fields. Crabs have a deep carapace, which might be an adaptation to survive in the habitat with very low oxygen level.

Conservation status
WPA (1972): None
IUCN (Global Assessment) Least Concern (Cumberlidge, 2008) [Version 3.1 (2008)]
IUCN (Regional Assessment) Near Threatened, nearly meeting VU B1b(iii)+2b(iii)
CITES None
CMS None

Population trend in Kerala since 2000: Stable
Geographic location/habitat of sustainable population in Kerala: Idukki, Kollam, Kozhikode, Pathanamthitta, Thiruvananthapuram and Thrissur districts; Malabar Wildlife Sanctuary; Shendurney Wildlife Sanctuary, Peppara Wildlife Sanctuary; Western Ghats
Geographic location/habitat of threatened population in Kerala: Kollam, Kozhikode, Pathanamthitta, Thiruvananthapuram and Thrissur districts; Western Ghats

Level of exploitation

Commercial	None
Local consumption	None
Poaching	None
Pet trade	None
Wildlife trade	None

Threats
No threat is documented. Possible anthropogenic threats include habitat conversion and pesticide pollution in agricultural field.
Recommended conservation measures in KeralaL
Unauthorized habitat conversion should be restricted, and pesticide application in paddy fields should be minimized because both the threats severely affect freshwater crabs.
Conservation priority area in Kerala: Kollam, Kozhikode, Pathanamthitta, Thiruvananthapuram and Thrissur districts; Malabar Wildlife Sanctuary; Shendurney Wildlife Sanctuary, Peppara Wildlife Sanctuary; Western Ghats
BMC responsible for conservation and sustainable utilization: Forest and Wildlife Department; local government bodies (Panchayats)
Stakeholders responsible for conservation and sustainable utilization: Local farmers; local people; tribal community
Cultural significance and associated traditional knowledge: Unknown

Remarks
The species has been given the status of "Least Concern" in the global IUCN Red List of Threatened Species because it is widely dispersed, known from 10 locations and collected recently, and there were no known threats. In Kerala, its extent of occurrence (EOO) is 19949 km^2, and area of occupancy (AOO) is 48 km^2. The number of locations for the species in Kerala is 11, which was calculated based on the most likely threat that may affect the currently-unaffected areas in the future and the number of subpopulations in the unaffected areas. The species meets the area requirements under criterion B1 and B2 for Vulnerable (EOO < 20,000 km^2 and AOO < 2,000 km^2) and occurs at more than 10 locations. Also, there is a continuing decline in the extent and quality of its habitat due to habitat loss/degradation and pesticide pollution. The species, therefore, qualifies for the "Near Threatened nearly meeting VU B1b(iii)+2b(iii)" category as per the recommended criteria and guidelines for the Regional IUCN Red List Assessment.

Kani maranjandu Kumar, Raj & Ng, 2017

Taxonomy
Species *Kani maranjandu* Kumar, Raj & Ng, 2017
Local name (Malayalam): Mara [for tree] njandu (മരഞ്ഞണ്ട്)
Common name (English): Kani tree crab (proposed herein)


Image credit: Smrithy Raj

Distribution
Global: India only
India: Endemic to Kerala; Western Ghats only
Kerala: Endemic to Thiruvananthapuram district; Western Ghats only

Habitat/ecology
The species is an arboreal crab and dwells in trees holes of different trees from ground level to 10 m high. Crab are found only those trees, which are clearly away from streams. Younger individuals take shelter in canopy. The species uses phytotelms for water and food. These crabs usually feed on leaves, seeds, slugs, worms and insects on trees. Mongooses

and owls are their known predators. The post-monsoon (September–October) is the breeding season for this species.

Conservation status
WPA (1972): None
IUCN (Global Assessment): Not evaluated (IUCN, 2020)
IUCN (Regional Assessment): Data Deficient
CITES: None
CMS: None
Population trend in Kerala since 2000: Unknown
Geographic location/habitat of sustainable population in Kerala: Kottoor Reserve Forest, Thiruvananthapuram district; Western Ghats
Geographic location/habitat of threatened population in Kerala: Kottoor Reserve Forest, Thiruvananthapuram district; Western Ghats

Level of exploitation

Commercial	None
Local consumption	Low
Poaching	None
Pet trade	None
Wildlife trade	None

Threats: The species is found in the degraded forest areas of the Kottoor Reserve Forests, Agasthyamala Biological Park. Habitat degradation poses potential threat on these arboreal crabs.
Recommended conservation measures in Kerala: Conservation of larger trees in the degraded forest ecosystems of the Western Ghats has been suggested.
Conservation priority area in Kerala: Kottoor Reserve Forest, Thiruvananthapuram district; Western Ghats
BMC responsible for conservation and sustainable utilization: Forest and Wildlife Department
Stakeholders responsible for conservation and sustainable utilization: Tribal community
Cultural significance and associated traditional knowledge: The "Kani" tribe occasionally catch these tree crabs to prepare an oil for treating skin diseases and ear ache. The tribesmen do not catch females that bear eggs or carry juveniles during the breeding season of the crab.

Remarks
The species is endemic to the Western Ghats and known only from the type locality in Thiruvananthapuram district of Kerala. The type locality is an unprotected area, the species was found in degraded forest areas. The arboreal nature of the species makes it a highly stenotopic crab with a restricted population. Its extent of occurrence (EOO) is 165 km^2, and area of occupancy (AOO) is 4 km^2. The number of locations for the species can not be used because more than half of the species' range is in an unaffected area. Although the species was found in a degraded forest, there is no evidence of its direct impact on the species. The species, therefore, qualifies for the "Data Deficient" category as per the recommended criteria and guidelines for the Regional IUCN Red List Assessment.

Karkata ghanarakta
Pati, Rajesh, Raj, Sheeja, Kumar & Sureshan, 2017

Taxonomy
Species *Karkata ghanarakta* Pati, Rajesh, Raj, Sheeja, Kumar & Sureshan, 2017
Local name (Malayalam): No specific name; all crabs are locally known as njandu (ഞണ്ട്)
Common name (English): Maroon Kerala crab (proposed herein)


Image after Pati et al. (2017)

Distribution
Global: India only
India: Endemic to Kerala; Western Ghats only
Kerala: Ernakulam and Idukki districts; Western Ghats only

Habitat/ecology
The species dwells only in a degraded semi-evergreen forest patch in rocky terrain with almost no undergrowth or water flow. Crabs are found in the crevices underneath boulders of the rocky terrain.

Conservation status
WPA (1972) None
IUCN (Global Assessment) Not evaluated (IUCN, 2020)
IUCN (Regional Assessment) Data Deficient
CITES None
CMS None

Population trend in Kerala since 2000: Seems to be stable

Geographic location/habitat of sustainable population in Kerala: Ernakulam district; Thattekkad Bird Sanctuary; Western Ghats

Geographic location/habitat of threatened population in Kerala: None

Level of exploitation

Commercial	None
Local consumption	None
Poaching	None
Pet trade	None
Wildlife trade	None

Threats

Although the species was found in a degraded semi-evergreen forest patch of the Thattekkad Bird Sanctuary, the degraded forest may not have direct impact on the species.

Recommended conservation measures in Kerala: Conservation action should be taken to protect the forest habitats of the Thattekkad Bird Sanctuary.

Conservation priority area in Kerala: Ernakulam district; Thattekkad Bird Sanctuary; Western Ghats

BMC responsible for conservation and sustainable utilization: Forest and Wildlife Department; local government bodies (Panchayats)

Stakeholders responsible for conservation and sustainable utilization: Local people

Cultural significance and associated traditional knowledge: Unknown

Remarks

The species is endemic to the Western Ghats and so far known only from two neighbouring districts of Kerala. The species is very common in the Thattekkad Bird Sanctuary, a protected area. Its extent of occurrence (EOO) is 411 km^2, and area of occupancy (AOO) is 20 km^2. The number of locations for the species can not be used because more than half of the species' range is in an unaffected area. Although the species was found in a degraded forest, there is no evidence of its direct impact on the species. The species, therefore, qualifies for the "Data Deficient" category as per the recommended criteria and guidelines for the Regional IUCN Red List Assessment.

Karkata kusumbha
Pati, Rajesh, Raj, Sheeja, Kumar & Sureshan, 2017

Taxonomy

Species *Karkata kusumbha* Pati, Rajesh, Raj, Sheeja, Kumar & Sureshan, 2017

Local name (Malayalam): No specific name; all crabs are locally known as njandu (ഞണ്ട്)


Image after Pati et al. (2017)

Distribution

Global: India only

India: Endemic to Kerala; Western Ghats only

Kerala: Endemic to Idukki district; Western Ghats only

Habitat/ecology

The species dwells under cobblestones of small streams and in burrows on loose soil away from water bodies. Crabs wander on the ground when their burrows get flooded during the rainy season. The species is not very common at the type locality.

Conservation status

WPA (1972) None

IUCN (Global Assessment) Not evaluated (IUCN, 2020)

IUCN (Regional Assessment) Data Deficient

CITES	None
CMS	None

Population trend in Kerala since 2000: Unknown

Geographic location/habitat of sustainable population in Kerala: Thaalumkandam in Idukki district; Western Ghats

Geographic location/habitat of threatened population in Kerala: Unknown

Level of exploitation

Commercial	None
Local consumption	None
Poaching	None
Pet trade	None
Wildlife trade	None

Threats: No threat is documented.

Recommended conservation measures in Kerala: No conservation measure is recommended because the data on species' long-term threats are insufficient.

Conservation priority area in Kerala: Thaalumkandam in Idukki district; Western Ghats
BMC responsible for conservation and sustainable utilization: Forest and Wildlife Department; local government bodies (Panchayats)
Stakeholders responsible for conservation and sustainable utilization: Local people
Cultural significance and associated traditional knowledge: Unknown

Remarks
The species is endemic to Idukki district of Kerala and so far known only from the type locality in the Western Ghats. The type locality is an unprotected area. These crabs are not very common at the type locality. The data on its extent of occurrence, ecological requirements, population size, population trends, and long-term threats are insufficient. The species, therefore, qualifies for the "Data Deficient" category as per the recommended criteria and guidelines for the Regional IUCN Red List Assessment.

Lamella lamellifrons (Alcock, 1909)

Taxonomy

Species *Lamella lamellifrons* (Alcock, 1909)
Local name (Malayalam): No specific name; all crabs are locally known as njandu (ഞണ്ട്)
Common name (English): Flat crab (proposed herein)

Distribution
Global: India only
India: Endemic to Kerala; Western Ghats
Kerala Ernakulam, Idukki, Kannur, Kollam, Kottayam, Kozhikode, Pathanamthitta, Thiruvananthapuram and Thrissur districts; Western Ghats

Habitat/ecology
The species is predominantly aquatic crab and spends all the time in shallow or deep streams and adjacent pools. Although the species is endemic to Kerala, it is very common with wider distribution. These crabs prefer clean and fast flowing waters.

Conservation status
WPA (1972): None
IUCN (Global Assessment): Least Concern (Cumberlidge, 2008) [Version 3.1 (2008)]
IUCN (Regional Assessment): Near Threatened, nearly meeting VU B2b(iii)
CITE: None
CMS: None

Population trend in Kerala since 2000: Stable
Geographic location/habitat of sustainable population in Kerala: Ernakulam, Idukki, Kannur, Kollam, Kottayam, Kozhikode, Pathanamthitta, Thiruvananthapuram and Thrissur districts; Thattekkad Bird Sanctuary; Malabar Wildlife Sanctuary; Peppara Wildlife Sanctuary; Western Ghats
Geographic location/habitat of threatened population in Kerala: Idukki, Kannur, Kollam, Kottayam, Kozhikode, Pathanamthitta and Thrissur districts; Western Ghats

Level of exploitation

Commercial	None
Local consumption	None
Poaching	None
Pet trade	None
Wildlife trade	None

Threats
Since the species prefers clean fast flowing waters and the geographical area of its existence is growing and developing, habitat degradation due to anthropogenic activities and pollution pose threat on these crabs.
Recommended conservation measures in Kerala: Habitat degradation and pollution need to be curtailed in streams where these crabs reside.
Conservation priority area in Kerala: Idukki, Kannur, Kollam, Kottayam, Kozhikode, Pathanamthitta and Thrissur districts; Thattekkad Bird Sanctuary; Malabar Wildlife Sanctuary; Peppara Wildlife Sanctuary; Western Ghats
BMC responsible for conservation and sustainable utilization: Forest and Wildlife Department; local government bodies (Panchayats)

Stakeholders responsible for conservation and sustainable utilization: Local people; tribal community
Cultural significance and associated traditional knowledge: Unknown

Remarks
The species is endemic to Kerala but very common and widely distributed in the state. The species is also known from three protected areas of Kerala. The species, however, has been given the status of "Least Concern" in the global IUCN Red List of Threatened Species because of its wide distribution and presumed large population, and the species is unlikely to be declining fast enough. Its extent of occurrence (EOO) is 23791 km^2, and area of occupancy (AOO) is 84 km^2. The number of locations for the species in Kerala is 20, which was calculated based on the most likely threat that may affect the currently-unaffected areas in the future and the number of subpopulations in the unaffected areas. The species meets the area requirements under criterion B2 for Vulnerable (AOO < 2,000 km^2) and occurs at many more than 10 locations. Also, there is a continuing decline in the extent and quality of its habitat due to habitat degradation and pollution. The species, therefore, qualifies for the "Near Threatened nearly meeting VU B2b(iii)" category as per the recommended criteria and guidelines for the Regional IUCN Red List Assessment

Oziotelphusa biloba Bahir & Yeo, 2005

Taxonomy
Species *Oziotelphusa biloba Bahir & Yeo,* 2005
Local name (Malayalam): No specific name; all crabs are locally known as njandu (ഞണ്ട്)
Common name (English): Bilobed swamp crab (proposed herein)

Distribution

Global	India only
India	Endemic to Kerala; Western Ghats
Kerala	Kozhikode, Malappuram, Palakkad and Thrissur districts; Western Ghats

Habitat/ecology
The species dwells in shallow to deep burrows along muddy banks of rice-field embankments. It can be also found underneath the granite fences bordering the paddy fields. Crabs can be seen in large numbers in those habitats.

Conservation status

WPA (1972)	None
IUCN (Global Assessment)	Vulnerable (Esser & Cumberlidge, 2008) [Version 3.1 (2008)]
IUCN (Regional Assessment)	Vulnerable B1ab(iii)+2ab(iii)
CITES	None
CMS	None

Population trend in Kerala since 2000: Seems to be stable
Geographic location/habitat of sustainable population in Kerala: Kozhikode, Malappuram, Palakkad and Thrissur districts; Western Ghats
Geographic location/habitat of threatened population in Kerala: Kozhikode, Malappuram, Palakkad and Thrissur districts

Level of exploitation

Commercial	None
Local consumption	None
Poaching	None
Pet trade	None
Wildlife trade	None

Threats
No threat is documented. Possible anthropogenic threats include habitat loss/degradation and pesticide pollution.
Recommended conservation measures in Kerala: Pesticide application in paddy fields should be minimized because it has an adverse effect on freshwater crabs.
Conservation priority area in Kerala: Kozhikode, Malappuram, Palakkad and Thrissur districts; Western Ghats
BMC responsible for conservation and sustainable utilization: Forest and Wildlife Department; local government bodies (Panchayats)
Stakeholders responsible for conservation and sustainable utilization: Local farmers
Cultural significance and associated traditional knowledge: Unknown

Remarks
The species is endemic to Kerala but can be seen in arge numbers in the known localities. The species is also known from a protected area. Its extent of occurrence (EOO) is 8204 km^2, and area of occupancy (AOO) is 36 km^2. The number of locations for the species is 9, which was calculated based on the most likely threat that may affect the currently-unaffected areas in the future and the number of subpopulations in the unaffected areas. There is a continuing decline in the extent and quality of its habitat due to habitat loss/degradation and pesticide pollution. The species, therefore, qualifies for the "Vulnerable B1ab(iii)+2ab(iii)" category as per the recommended criteria and guidelines for the Regional IUCN Red List Assessment.

Oziotelphusa kerala Bahir & Yeo, 2005

Taxonomy
Species *Oziotelphusa kerala* Bahir & Yeo, 2005
Local name (Malayalam): No specific name; all crabs are locally known as njandu (ഞണ്ട്)
Common name (English): Kerala swamp crab (proposed herein)

Distribution
Global: India only
India: Endemic to Kerala
Kerala: Kollam district

Habitat/ecology
The species dwells in burrows along rice-field embankments and margins of adjacent streams. Its population size is unknown.

Conservation status
WPA (1972): None
IUCN (Global Assessment): Data Deficient (Cumberlidge, 2008) [Version 3.1 (2008)]
IUCN (Regional Assessment): Data Deficient
CITES: None
CMS: None
Population trend in Kerala since 2000: Unknown

Geographic location/habitat of sustainable population in Kerala: Kollam district
Geographic location/habitat of threatened population in Kerala: None

Level of exploitation

Commercial	None
Local consumption	None
Poaching	None
Pet trade	None
Wildlife trade	None

Threats: No threat is documented. Possible anthropogenic threats include habitat loss/degradation and pesticide pollution. Also, the species is unknown from any protected areas.
Recommended conservation measures in Kerala: Pesticide application in paddy fields should be minimized because it has an adverse effect on freshwater crabs.
Conservation priority area in Kerala: Kollam district
BMC responsible for conservation and sustainable utilization: Local government bodies (Panchayats)
Stakeholders responsible for conservation and sustainable utilization: Local farmers
Cultural significance and associated traditional knowledge: Unknown

Remarks: The species is endemic to Kollam district of Kerala and so far known only from few specimens, which were collected from two adjacent localities. Unfortunately, the species is so far not reported from any protected areas. Its population size is unknown. Its extent of occurrence (EOO) is 118 km^2, and area of occupancy (AOO) is 8 km^2. The number of locations for the species can not be used because more than half of the species' range is in an unaffected area. Currently, there is no evidence of a continuing decline in the extent and quality of its habitat though the species is likely to face threats from habitat loss/degradation and pesticide pollution. The species, therefore, qualifies for the "Data Deficient" category as per the recommended criteria and guidelines for the Regional IUCN Red List Assessment.

Oziotelphusa wagrakarowensis (Rathbun, 1904)

Taxonomy

Species *Oziotelphusa wagrakarowensis* (Rathbun, 1904)

Local name (Malayalam): Kochu [for small] njandu (കൊച്ചു ഞണ്ട്)

Common name (English): Vajrakarur swamp crab (proposed herein)

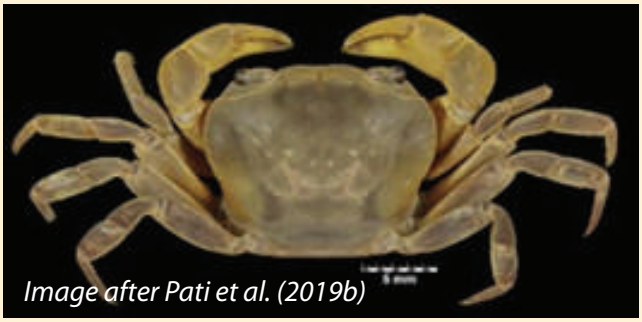

Image after Pati et al. (2019b)

Distribution

Global: India only

India: Andhra Pradesh; Karnataka; Kerala; Maharashtra; Western Ghats

Kerala: Wayanad district; Western Ghats only

Habitat/ecology: The species dwells in burrows along rice-field embankments and margins of shallow slow-flowing rocky streams. In Kerala, the species mainly feeds on insects associated with paddy fields (Md. Jafer Palot, personal communication). Its population size is unknown.

Conservation status

WPA (1972)	None
IUCN (Global Assessment) (Esser & Cumberlidge, 2008) [Version 3.1 (2008)]	Vulnerable
IUCN (Regional Assessment)	Critically Endangered B2ab(iii)
CITES	None
CMS	None

Population trend in Kerala since 2000: Unknown

Geographic location/habitat of sustainable population in Kerala: Wayanad district; Western Ghats

Geographic location/habitat of threatened population in Kerala: Wayanad district; Western Ghats

Level of exploitation

Commercial	None
Local consumption	None
Poaching	None
Pet trade	None
Wildlife trade	None

Threats: No threat is documented. Possible anthropogenic threats include habitat degradation and pesticide pollution. Also, the species is unknown from any protected areas.

Recommended conservation measures in Kerala: Pesticide application in paddy fields should be minimized because it has an adverse effect on freshwater crabs. Excessive pesticide application also eradicates insects associated with paddy fields. In Kerala, the species primarily feeds on those insects.

Conservation priority area in Kerala: Wayanad district; Western Ghats

BMC responsible for conservation and sustainable utilization: Forest and Wildlife Department; local government bodies (Panchayats)

Stakeholders responsible for conservation and sustainable utilization: Local people; tribal community

Cultural significance and associated traditional knowledge: Tribal people of Wayanad district in Kerala believe crabs of this species controls insect pests of paddy fields by feeding on them (Md. Jafer Palot, personal communication).

Remarks: The species has been given the status of "Vulnerable" in the global IUCN Red List of Threatened Species because it was previously known from two locations with a restricted population. In fact, the species is widely distributed and now known from 27 localities in Andhra Pradesh, Karnataka, Kerala and Maharashtra. All these localities, however, are unprotected. In Kerala, its extent of occurrence (EOO) is 190 km^2, and area of occupancy (AOO) is 4 km^2. The number of locations for the species in Kerala is 1, which was calculated based on the most likely threat that may affect the currently-unaffected areas in the future. There is a continuing decline in the extent and quality of its habitat due to habitat loss/degradation and pesticide pollution. The species, therefore, qualifies for the "Critically Endangered B2ab(iii)" category as per the recommended criteria and guidelines for the Regional IUCN Red List Assessment.

Pilarta anuka Bahir & Yeo, 2007

Taxonomy

Species *Pilarta anuka* Bahir & Yeo, 2007

Local name (Malayalam): No specific name; all crabs are locally known as njandu (ഞണ്ട്)

Common name (English): Small hairy crab (proposed herein)

Image after Rajesh et al. (2017)

Distribution

Global: India only

India: Endemic to Kerala; Western Ghats only

Kerala: Endemic to Thiruvananthapuram district; Western Ghats only

Habitat/ecology

The species dwells under small stones in moist soil of dry streams. These crabs can be also found among leaf litters on forest floor. These crabs camouflage in wet soil and leaf litter due to their densely setose ambulatory legs that accumulate sand particles. Its population size is unknown.

Conservation status

WPA (1972): None

IUCN (Global Assessment): Data Deficient (Cumberlidge, 2008) [Version 3.1 (2008)]

IUCN (Regional Assessment): Data Deficient

CITES: None

CMS: None

Population trend in Kerala since 2000: Unknown

Geographic location/habitat of sustainable population in Kerala: Ponmudi in Thiruvananthapuram district; Western Ghats

Geographic location/habitat of threatened population in Kerala: None

Level of exploitation

Commercial	None
Local consumption	None
Poaching	None
Pet trade	None
Wildlife trade	None

Threats: No threat is documented.

Recommended conservation measures in Kerala: No conservation measure is recommended because the data on species' long-term threats are insufficient.

Conservation priority area in Kerala: Ponmudi in Thiruvananthapuram district; Western Ghats

BMC responsible for conservation and sustainable utilization: Forest and Wildlife Department; local government bodies (Panchayats)

Stakeholders responsible for conservation and sustainable utilization: Local people

Cultural significance and associated traditional knowledge: Unknown

Remarks: The species is endemic to Thiruvananthapuram district of Kerala and so far known only from two adjacent localities in the Western Ghats. Both the localities are unprotected. The data on its extent of occurrence, ecological requirements, population size, population trends, and long-term threats are insufficient. The species, therefore, qualifies for the "Data Deficient" category as per the recommended criteria and guidelines for the Regional IUCN Red List Assessment.

Pilarta aroma Pati, Rajesh, Raj, Sheeja, Kumar & Sureshan, 2017

Taxonomy

Species *Pilarta aroma* Pati, Rajesh, Raj, Sheeja, Kumar & Sureshan, 2017

Local name (Malayalam): No specific name; all crabs are locally known as njandu (ഞണ്ട്)

Common name (English): Hairless crab (proposed herein)

Image after Pati et al. (2017)

Distribution

Global: India only

India: Endemic to Kerala; Western Ghats only

Kerala: Endemic to Thiruvananthapuram district; Western Ghats only

Habitat/ecology: The species dwells underneath cobblestones in highland streams with clear and cold water. These crabs are stenotopic. Its population size is unknown
WPA (1972): None
IUCN (Global Assessment): Not evaluated (IUCN, 2020)
IUCN (Regional Assessment): Data Deficient
CITES: None
CMS: None
Population trend in Kerala since 2000: Unknown
Geographic location/habitat of sustainable population in Kerala: Pongalappara in Thiruvananthapuram district; Agasthyamala Biosphere Reserve; Western Ghats
Geographic location/habitat of threatened population in Kerala: None

Level of exploitation

Commercial	None
Local consumption	None
Poaching	None
Pet trade	None
Wildlife trade	None

Threats: No threat is documented.
Recommended conservation measures in Kerala: No conservation measure is recommended because the data on species' long-term threats are insufficient.

Conservation priority area in Kerala: Pongalappara in Thiruvananthapuram district; Agasthyamala Biosphere Reserve; Western Ghats
BMC responsible for conservation and sustainable utilization: Forest and Wildlife Department
Stakeholders responsible for conservation and sustainable utilization: Tribal community
Cultural significance and associated traditional knowledge: Unknown

Remarks: The species is endemic to Thiruvananthapuram district of Kerala and so far known only from the type locality in the Western Ghats. The type locality is a protected area. The data on its extent of occurrence, ecological requirements, population size, population trends, and long-term threats are insufficient. The species, therefore, qualifies for the "Data Deficient" category as per the recommended criteria and guidelines for the Regional IUCN Red List Assessment.

Pilarta punctatissima Pati, Rajesh, Raj, Sheeja, Kumar & Sureshan, 2017

Species *Pilarta punctatissima* Pati, Rajesh, Raj, Sheeja, Kumar & Sureshan, 2017
Local name (Malayalam): No specific name; all crabs are locally known as njandu (ഞണ്ട്)
Common name (English): Punctate crab (proposed herein)


Image after Pati et al. (2017)

Distribution
Global: India only
India: Endemic to Kerala; Western Ghats only
Kerala: Endemic to Ernakulam district; Western Ghats only
Habitat/ecology: The species was reported from a stream flowing across a marshy area in a degraded semi-evergreen forest patch with abundant aquatic vegetation. These crabs can be found in rocky crevices along the course of stream. Its population size appears to be low.

Conservation status
WPA (1972): None
IUCN (Global Assessment): Not evaluated (IUCN, 2020)
IUCN (Regional Assessment): Data Deficient
CITES: None
CMS: None
Population trend in Kerala since 2000: Seems decreasing
Geographic location/habitat of sustainable population in Kerala: Thattekkad Bird Sanctuary in Ernakulam district; Western Ghats
Geographic location/habitat of threatened population in Kerala: None

Level of exploitation

Commercial	None
Local consumption	None
Poaching	None
Pet trade	None
Wildlife trade	None

Threats: Although the species was found in a degraded semi-evergreen forest patch of the Thattekkad Bird Sanctuary, the degraded forest may not have direct impact on the species.

Recommended conservation measures in Kerala: Conservation action should be taken to protect the forest habitats of the Thattekkad Bird Sanctuary.
Conservation priority area in Kerala: Thattekkad Bird Sanctuary in Ernakulam district; Western Ghats
BMC responsible for conservation and sustainable utilization: Forest and Wildlife Department
Stakeholders responsible for conservation and sustainable utilization: Tribal community
Cultural significance and associated traditional knowledge: Unknown

Remarks: The species is endemic to Ernakulam district of Kerala and so far known only from the type locality in the Western Ghats. The type locality, however, is a protected area. The population of the species is low and only restricted to the Thattekkad Bird Sanctuary. Its extent of occurrence (EOO) is 308 km^2, and area of occupancy (AOO) is 8 km^2. The number of locations for the species can not be used because more than half of the species' range is in an unaffected area. Although the species was found in a degraded forest, there is no evidence of its direct impact on the species. The species, therefore, qualifies for the "Data Deficient" category as per the recommended criteria and guidelines for the Regional IUCN Red List Assessment.

Snaha aruna Bahir & Yeo, 2007

Taxonomy
Species *Snaha aruna* Bahir & Yeo, 2007
Local name (Malayalam): No specific name; all crabs are locally known as njandu (ഞണ്ട്)
Common name (English): Red smooth crab (proposed herein

Distribution
Global: India only
India: Endemic to Kerala; Western Ghats only
Kerala: Endemic to Idukki district; Western Ghats only
Habitat/ecology: The species dwells under stones of shallow streamlets. Its population size is unknown.
Conservation status
WPA (1972): None
IUCN (Global Assessment): Data Deficient (Esser & Cumberlidge, 2008) [Version 3.1 (2008)]
IUCN (Regional Assessment: Data Deficient
CITES: None
CMS: None
Population trend in Kerala since 2000: Unknown
Geographic location/habitat of sustainable population in Kerala: Nayamakad Tea Estate in Idukki district; Western Ghats
Geographic location/habitat of threatened population in Kerala: None
Level of exploitation

Commercial	None
Local consumption	None
Poaching	None
Pet trade	None
Wildlife trade	None

Threats: No threat is documented.
Recommended conservation measures in Kerala: No conservation measure is recommended because the data on species' long-term threats are insufficient.
Conservation priority area in Kerala: Nayamakad Tea Estate in Idukki district; Western Ghats
BMC responsible for conservation and sustainable utilization: Forest and Wildlife Department; local government bodies (Panchayats)
Stakeholders responsible for conservation and sustainable utilization: Local farmers; local people
Cultural significance and associated traditional knowledge: Unknown
Remarks: The species is endemic to Idukki district of Kerala and so far known only from the type locality in the Western Ghats. Unfortunately, the type locality is an unprotected area. The data on its extent of occurrence, ecological requirements, population size, population trends, and long-term threats are insufficient. The species, therefore, qualifies for the "Data Deficient" category as per the recommended criteria and guidelines for the Regional IUCN Red List Assessment.

Spiralothelphusa gibberosa Pati & Sudha Devi, 2015

Species *Spiralothelphusa gibberosa* Pati & Sudha Devi, 2015

Local name (Malayalam): No specific name; all crabs are locally known as njandu (ഞണ്ട്)

Common name (English): Humped swamp crab (proposed herein)

Image after Pati & Sudha Devi (2015b)

Distribution

Global: India only

India: Endemic to Kerala

Kerala: Endemic to Thrissur district

Habitat/ecology: The species dwells in shallow burrows along rice-field bunds and canal embankments. Its population was high at the type locality.

Conservation status

WPA (1972): None

IUCN (Global Assessment): Not evaluated (IUCN, 2020)

IUCN (Regional Assessment): Critically Endangered B2ab(iii)

CITES: None

CMS: None

Population trend in Kerala since 2000: Seems to be stable

Geographic location/habitat of sustainable population in Kerala: Kizhoor near Kunnamkulam in Thrissur district

Geographic location/habitat of threatened population in Kerala: Kizhoor near Kunnamkulam in Thrissur district

Level of exploitation

Commercial	None
Local consumption	None
Poaching	None
Pet trade	None
Wildlife trade	None

Threats: No threat is documented. Possible anthropogenic threats include pesticide pollution. Also, the species is unknown from any protected areas.

Recommended conservation measures in Kerala: Pesticide application in paddy fields should be minimized because it has an adverse effect on freshwater crabs.

Conservation priority area in Kerala: Kizhoor near Kunnamkulam in Thrissur district

BMC responsible for conservation and sustainable utilization: Local government bodies (Panchayats)

Stakeholders responsible for conservation and sustainable utilization: Local farmers

Cultural significance and associated traditional knowledge: Unknown

Remarks: The species is endemic to Thrissur district of Kerala and so far known only from the type locality. Its population was high at the type locality. Unfortunately, the type locality is an unprotected area. Its extent of occurrence (EOO) is 237 km^2, and area of occupancy (AOO) is 4 km^2. The number of locations for the species is 1, which was calculated based on the most likely threat that may affect the currently-unaffected areas in the future. There is a continuing decline in the extent and quality of its habitat due to habitat loss/degradation and pesticide pollution. The species, therefore, qualifies for the "Critically Endangered B2ab(iii)" category as per the recommended criteria and guidelines for the Regional IUCN Red List Assessment.

Travancoriana charu Bahir & Yeo, 2007

Taxonomy

Species *Travancoriana charu* Bahir & Yeo, 2007

Local name (Malayalam): No specific name; all crabs are locally known as njandu (ഞണ്ട്)

Common name (English): Beautiful Travancore crab (proposed herein

Distribution

Global: India only

India: Endemic to Kerala; Western Ghats only

Kerala: Endemic to Thiruvananthapuram district; Western Ghats only

Habitat/ecology: The species dwells under boulders of streamlets in well-shaded area. Its population size is unknown.

Conservation status

WPA (1972): None

IUCN (Global Assessment): Data Deficient (Esser & Cumberlidge, 2008) [Version 3.1 (2008)]

IUCN (Regional Assessment): Data Deficient

CITES: None

CMS: None

Population trend in Kerala since 2000: Unknown

Geographic location/habitat of sustainable population in Kerala: Ponmudi in Thiruvananthapuram district; Western Ghats

Geographic location/habitat of threatened population in Kerala: None

Level of exploitation

Commercial	None
Local consumption	None
Poaching	None
Pet trade	None
Wildlife trade	None

Threats: No threat is documented.

Recommended conservation measures in Kerala: No conservation measure is recommended because the data on species' long-term threats are insufficient.

Conservation priority area in Kerala: Ponmudi in Thiruvananthapuram district; Western Ghats

BMC responsible for conservation and sustainable utilization: Forest and Wildlife Department; local government bodies (Panchayats)

Stakeholders responsible for conservation and sustainable utilization: Local people

Cultural significance and associated traditional knowledge: Unknown

Remarks: The species is endemic to Thiruvananthapuram district of Kerala and so far known only from the type locality in the Western Ghats. Unfortunately, the type locality is an unprotected area. The data on its extent of occurrence, ecological requirements, population size, population trends, and long-term threats are insufficient. The species, therefore, qualifies for the "Data Deficient" category as per the recommended criteria and guidelines for the Regional IUCN Red List Assessment.

Travancoriana convexa (Roux, 1931)

Taxonomy

Species *Travancoriana convexa* (Roux, 1931)

Local name (Malayalam): No specific name; all crabs are locally known as njandu ഞണ്ട്)

Common name (English): Convex Travancore crab (proposed herein)

Distribution

Global: India only

India: Karnataka; Kerala; Tamil Nadu; Western Ghats only

Kerala: Idukki, Kollam and Thrissur districts; Western Ghats only

Habitat/ecology: The species mainly dwells under boulders of shallow and small streams. These crabs can be also found in paddy field and muddy canals. Its population size is unknown.

Conservation status

WPA (1972): None

IUCN (Global Assessment): Least Concern (Esser & Cumberlidge, 2008) [Version 3.1 (2008)]

IUCN (Regional Assessment): Vulnerable B1ab(iii) +2ab(iii)

CITES: None

CMS: None

Population trend in Kerala since 2000: Stable

Geographic location/habitat of sustainable population in Kerala: Idukki, Kollam and Thrissur districts; Shendurney Wildlife Sanctuary; Periyar Tiger Reserve; Western Ghats

Geographic location/habitat of threatened population in Kerala: Idukki and Thrissur districts; Western Ghats

Level of exploitation

Commercial	None
Local consumption	None
Poaching	None
Pet trade	None
Wildlife trade	None

Threats: No threat is documented. Possible anthropogenic threats include habitat degradation and pesticide pollution.

Recommended conservation measures in Kerala: Pesticide application in paddy fields should be minimized because it has an adverse effect on freshwater crabs.

Conservation priority area in Kerala: Idukki, Kollam and Thrissur districts; Shendurney Wildlife Sanctuary; Periyar Tiger Reserve; Western Ghats

BMC responsible for conservation and sustainable utilization: Forest and Wildlife Department; local

government bodies (Panchayats)
Stakeholders responsible for conservation and sustainable utilization: Local farmer; local people; tribal community
Cultural significance and associated traditional knowledge: Unknown
Remarks: The species has been given the status of "Least Concern" in the global IUCN Red List of Threatened Species because of its wide distribution and presumed large population, and the species is unlikely to be declining fast enough. The species is so far known from nine localities in the Western Ghats of Karnataka, Kerala and Tamil Nadu. In Kerala, its extent of occurrence (EOO) is 6076 km^2, and area of occupancy (AOO) is 8 km^2. The number of locations for the species in Kerala is 7, which was calculated based on the most likely threat that may affect the currently-unaffected areas in the future and the number of subpopulations in the unaffected areas. There is a continuing decline in the extent and quality of its habitat due to habitat loss/degradation and pesticide pollution. The species, therefore, qualifies for the "Vulnerable B1ab(iii)+2ab(iii)" category as per the recommended criteria and guidelines for the Regional IUCN Red List Assessment.

Travancoriana granulata Pati & Sharma, 2013

Taxonomy
Species *Travancoriana granulata* Pati & Sharma, 2013
Local name (Malayalam): No specific name; all crabs are locally known as njandu (ഞണ്ട്)
Common name (English): Granular Travancore crab (proposed herein)

Distribution
Global: India only
India: Endemic to Kerala; Western Ghats only
Kerala: Endemic to Idukki district; Western Ghats only
Habitat/ecology: The species is restricted only to the high and isolated mountain plateau (altitude 1708–2472 m) of the Western Ghats in Idukki district of Kerala. These crabs inhabit swampy water bodies and streams in addition to the shola forest. A large population was noticed previously. The species, however, is not recorded since 1995, and its current population size is unknown.
Conservation status
WPA (1972): None
IUCN (Global Assessment): Not evaluated (IUCN, 2020)
IUCN (Regional Assessment): Data Deficient
CITES: None
CMS: None
Population trend in Kerala since 2000: Unknown
Geographic location/habitat of sustainable population in Kerala: Eravikulam National Park of Idukki district; Western Ghats
Geographic location/habitat of threatened population in Kerala: None
Level of exploitation
Commercial: None
Local consumption: None
Poaching: None
Pet trade: None
Wildlife trade: None
Threats: The species is found in a protected area, and anthropogenic threats are less likely there. There is nevertheless a long instance of burning of grasslands in the national park for providing food for an endemic herbivorous mammal. The effect of habitat degradation due to burning of grasslands, however, may not have direct impact on this species.
Recommended conservation measures in Kerala: Management of grasslands in the Eravikulam National Park should be done carefully by considering its impact on other animals, including freshwater crabs.
Conservation priority area in Kerala: Eravikulam National Park of Idukki district; Western Ghats
BMC responsible for conservation and sustainable utilization: Forest and Wildlife Department
Stakeholders responsible for conservation and sustainable utilization: Tribal community
Cultural significance and associated traditional knowledge: Unknown
Remarks: The species is endemic to Idukki district of Kerala and so far known only from the Eravikulam National Park in the Western Ghats. Its extent of occurrence (EOO) is 1324 km^2, and area of occupancy (AOO) is 24 km^2. The number of locations for the species can not be used because more than half of the species' range is in an unaffected area. Although there is a long instance of burning of grasslands in the national park, there is no evidence of its direct impact on the species. The species, therefore, qualifies for the "Data Deficient" category as per the recommended criteria and guidelines for the Regional IUCN Red List Assessment.

Travancoriana kuleera Bahir & Yeo, 2007

Taxonomy

Species *Travancoriana kuleera* Bahir & Yeo, 2007

Local name (Malayalam): No specific name; all crabs are locally known as njandu (ഞണ്ട്)

Common name (English): Small Travancore crab (proposed herein)

Distribution

Global: India only

India: Kerala; Tamil Nadu; Western Ghats only

Kerala: Kozhikode and Malappuram districts; Western Ghats only

Habitat/ecology: The species dwells under small stones of very shallow streams in well-shaded area. Its population size is unknown.

Conservation status

WPA (1972): None

IUCN (Global Assessment): Data Deficient (Esser & Cumberlidge, 2008) [Version 3.1 (2008)]

IUCN (Regional Assessment): Data Deficient

CITES: None

CMS: None

Population trend in Kerala since 2000: Unknown

Geographic location/habitat of sustainable population in Kerala: Kozhikode and Malappuram districts; Malabar Wildlife Sanctuary; Western Ghats

Geographic location/habitat of threatened population in Kerala: None

Level of exploitation

Commercial	None
Local consumption	None
Poaching	None
Pet trade	None
Wildlife trade	None

Threats: No threat is documented.

Recommended conservation measures in Kerala: No conservation measure is recommended because the data on species' long-term threats are insufficient.

Conservation priority area in Kerala: Kozhikode and Malappuram districts; Malabar Wildlife Sanctuary; Western Ghats

BMC responsible for conservation and sustainable utilization: Forest and Wildlife Department; local government bodies (Panchayats)

Stakeholders responsible for conservation and sustainable utilization: Local people; tribal community

Cultural significance and associated traditional knowledge: Unknown

Remarks: The species is known from two localities in Kerala, with sustainable population in Kozhikode and Malappuram districts. One of the localities is within a protected area. Its extent of occurrence (EOO) is 979 km^2, and area of occupancy (AOO) is 8 km^2. The data on its population size, population trends, and long-term threats in Kerala are insufficient. The species, therefore, qualifies for the "Data Deficient" category as per the recommended criteria and guidelines for the Regional IUCN Red List Assessment.

Travancoriana pollicaris (Alcock, 1909)

Taxonomy

Species *Travancoriana pollicaris* (Alcock, 1909)

Local name (Malayalam): No specific name; all crabs are locally known as njandu (ഞണ്ട്)

Common name (English): Arch-thumbed Travancore crab (proposed herein)

Image after Rajesh et al. (2017)

Distribution

Global: India only

India: Karnataka; Kerala; Tamil Nadu; Western Ghats

Kerala: Kannur, Palakkad and Thiruvananthapuram districts; Western Ghats

Habitat/ecology: The species dwells under boulders of small rocky streams. Its population size is unknown.

onservation status

WPA (1972): None

IUCN (Global Assessment): Data Deficient (Cumberlidge, 2008) [Version 3.1 (2008)]

IUCN (Regional Assessment: Data Deficient

CITES: None

CMS: None

Population trend in Kerala since 2000: Unknown

Geographic location/habitat of sustainable population in Kerala: Kannur, Palakkad and Thiruvananthapuram districts; Aralam Wildlife Sanctuary; Parambikulam Wildlife Sanctuary; Peppara Wildlife Sanctuary; Western Ghats

Geographic location/habitat of threatened population in Kerala: None

Level of exploitation

Commercial	None
Local consumption	None
Poaching	None
Pet trade	None
Wildlife trade	None

Threats: No threat is documented.
Recommended conservation measures in Kerala: No conservation measure is recommended because the data on species' long-term threats are insufficient.
Conservation priority area in Kerala: Kannur, Palakkad and Thiruvananthapuram districts; Aralam Wildlife Sanctuary; Parambikulam Wildlife Sanctuary; Peppara Wildlife Sanctuary; Western Ghats
BMC responsible for conservation and sustainable utilization: Forest and Wildlife Department; local government bodies (Panchayats)
Stakeholders responsible for conservation and sustainable utilization: Tribal community
Cultural significance and associated traditional knowledge: Unknown

Remarks: The species is precisely known from three localities in Kerala, with sustainable population in Kannur, Palakkad and Thiruvananthapuram districts. All three localities are within the protected areas. Its extent of occurrence (EOO) is 12489 km^2, and area of occupancy (AOO) is 12 km^2. The data on its population size, population trends, and long-term threats in Kerala are insufficient. The species, therefore, qualifies for the "Data Deficient" category as per the recommended criteria and guidelines for the Regional IUCN Red List Assessment.

Travancoriana schirnerae Bott, 1969

Taxonomy
Species *Travancoriana schirnerae* Bott, 1969
Local name (Malayalam): No specific name; all crabs are locally known as njandu (ഞണ്ട്)
Common name (English): Schirner's Travancore crab (proposed herein)


Image after Bahir & Yeo (2007)

Distribution
Global: India only
India: Karnataka; Kerala; Tamil Nadu; Puducherry Union Territory; Western Ghats
Kerala: Idukki and Thiruvananthapuram districts; Western Ghats
Habitat/ecology: The species dwells under boulders of small rocky streams. These crabs can be also found on wet soil under large boulders in tea gardens. The species are seen in shaded or open areas.

Conservation status
WPA (1972): None
IUCN (Global Assessment): Least Concern (Cumberlidge, 2008) [Version 3.1 (2008)]
IUCN (Regional Assessment): Data Deficient
CITES: None
CMS: None
Population trend in Kerala since 2000: Stable
Geographic location/habitat of sustainable population in Kerala: Idukki and Thiruvananthapuram districts; Peppara Wildlife Sanctuary; Western Ghats
Geographic location/habitat of threatened population in Kerala: None

Level of exploitation

Commercial	None
Local consumption	None
Poaching	None
Pet trade	None
Wildlife trade	None

Threats: No threat is documented.
Recommended conservation measures in Kerala: No conservation measure is recommended because the data on species' long-term threats are insufficient.
Conservation priority area in Kerala: Idukki and Thiruvananthapuram districts; Peppara Wildlife Sanctuary; Western Ghats
BMC responsible for conservation and sustainable utilization: Forest and Wildlife Department; local government bodies (Panchayats
Stakeholders responsible for conservation and sustainable utilization: Local farmers; tribal community
Cultural significance and associated traditional knowledge: Unknown

Remarks: The species has been given the status of "Least Concern" in the global IUCN Red List of Threatened Species because of its wide distribution and presumed large population, and the species is unlikely to be declining fast enough. The species seems to be widely distributed and common in South India. In Kerala, its extent of occurrence (EOO) is 5942 km^2, and area of occupancy (AOO) is 12 km^2. The data on its population size, population trends, and long-term threats in Kerala are insufficient. The species, therefore, qualifies for the "Data Deficient" category as per the recommended criteria and guidelines for the Regional IUCN Red List Assessment.

Vanni ashini Bahir & Yeo, 2007

Taxonomy

Species *Vanni ashini* Bahir & Yeo, 2007

Local name (Malayalam): No specific name; all crabs are locally known as njandu (ഞണ്ട്)

Common name (English): Discoverer forest crab (proposed herein)

Distribution

Global: India only

India: Endemic to Kerala; Western Ghats only

Kerala: Palakkad and Thiruvananthapuram districts; Western Ghats only

Habitat/ecology: The species dwells under stones in moist soil of dry steam margins in shaded area. The species seems to be uncommon in the type locality and adjacent areas.

Conservation status

WPA (1972): None

IUCN (Global Assessment): Data Deficient (Esser & Cumberlidge, 2008) [Version 3.1 (2008)]

IUCN (Regional Assessment): Data Deficient

CITES: None

CMS: None

Population trend in Kerala since 2000: Unknown

Geographic location/habitat of sustainable population in Kerala: Ponmudi in Thiruvananthapuram district; Western Ghats

Geographic location/habitat of threatened population in Kerala: None

Level of exploitation

Commercial	None
Local consumption	None
Poaching	None
Pet trade	None
Wildlife trade	None

Threats: No threat is documented.

Recommended conservation measures in Kerala: No conservation measure is recommended because the data on species' long-term threats are insufficient.

Conservation priority area in Kerala: Ponmudi in Thiruvananthapuram district; Western Ghats

BMC responsible for conservation and sustainable utilization: Forest and Wildlife Department; local government bodies (Panchayats)

Stakeholders responsible for conservation and sustainable utilization: Local people

Cultural significance and associated traditional knowledge: Unknown

Remarks: The species is endemic to Kerala and previously known from two localities in the Western Ghats, which are some 240 km apart. One of these localities is in the Nilgiri Biosphere Reserve. The sustainable population of the species only exists at Ponmudi of Thiruvananthapuram district. The data on its extent of occurrence, ecological requirements, population size, population trends, and long-term threats are insufficient. The species, therefore, qualifies for the "Data Deficient" category as per the recommended criteria and guidelines for the Regional IUCN Red List Assessment.

Vanni deepta Bahir & Yeo, 2007

Taxonomy

Species *Vanni deepta* Bahir & Yeo, 2007

Local name (Malayalam): No specific name; all crabs are locally known as njandu (ഞണ്ട്)

Common name (English): Golden forest crab (proposed herein)

Distribution
Global: India only
India: Endemic to Kerala; Western Ghats only
Kerala: Endemic to Idukki district; Western Ghats only

Habitat/ecology: The species dwells in moist soil and under stones adjacent to drying streams. Its population size is unknown.

Conservation status
WPA (1972): None
IUCN (Global Assessment): Data Deficient (Esser & Cumberlidge, 2008) [Version 3.1 (2008)]
IUCN (Regional Assessment): Data Deficient
CITES: None
CMS: None
Population trend in Kerala since 2000: Unknown
Geographic location/habitat of sustainable population in Kerala: Idukki district; Western Ghats
Geographic location/habitat of threatened population in Kerala: None

Level of exploitation

Commercial	None
Local consumption	None
Poaching	None
Pet trade	None
Wildlife trade	None

Threats: No threat is documented.
Recommended conservation measures in Kerala: No conservation measure is recommended because the data on species' long-term threats are insufficient.
Conservation priority area in Kerala: Idukki district; Western Ghats
BMC responsible for conservation and sustainable utilization: Forest and Wildlife Department; local government bodies (Panchayats)
Stakeholders responsible for conservation and sustainable utilization: Local people
Cultural significance and associated traditional knowledge: Unknown

Remarks: The species is endemic to Idukki district of Kerala and so far known only from the type locality in the Western Ghats. Unfortunately, the type locality is an unprotected area. The data on its extent of occurrence, ecological requirements, population size, population trends, and long-term threats are insufficient. The species, therefore, qualifies for the "Data Deficient" category as per the recommended criteria and guidelines for the Regional IUCN Red List Assessment.

Vanni giri Bahir & Yeo, 2007

Taxonomy
Species *Vanni giri* Bahir & Yeo, 2007
Local name (Malayalam): No specific name; all crabs are locally known as njandu (ഞണ്ട്)
Common name (English): Highland forest crab (proposed herein)

Distribution
Global: India only
India: Karnataka; Kerala; Western Ghats only
Kerala: Idukki district; Western Ghats only

Habitat/ecology: The species dwells in moist soil and under stones adjacent to streamlets. Its population size is unknown.
Conservation status
WPA (1972): None
IUCN (Global Assessment): Data Deficient (Esser & Cumberlidge, 2008) [Version 3.1 (2008)]
IUCN (Regional Assessment): Data Deficient
CITES: None
CMS: None

Population trend in Kerala since 2000: Unknown
Geographic location/habitat of sustainable population in Kerala: Idukki district; Western Ghats
Geographic location/habitat of threatened population in Kerala: None

Level of exploitation

Commercial	None
Local consumption	None
Poaching	None
Pet trade	None
Wildlife trade	None

Threats: No threat is documented. The species, however, was previously recorded from an unprotected area.
Recommended conservation measures in Kerala: No conservation measure is recommended because the data on species' long-term threats are insufficient.
Conservation priority area in Kerala: Idukki district; Western Ghats
BMC responsible for conservation and sustainable utilization: Forest and Wildlife Department; local government bodies (Panchayats)
Stakeholders responsible for conservation and sustainable utilization: Local people
Cultural significance and associated traditional knowledge: Unknown

Remarks: The species is known from one locality in Kerala, with sustainable population in Idukki district. Its extent of occurrence (EOO) is 444 km^2, and area of occupancy (AOO) is 4 km^2. The data on its extent of occurrence, ecological requirements, population size, population trends, and long-term threats are insufficient. The species, therefore, qualifies for the "Data Deficient" category as per the recommended criteria and guidelines for the Regional IUCN Red List Assessment.

Vanni malabarica (Henderson, 1912)

Taxonomy
Species *Vanni malabarica* (Henderson, 1912)
Local name (Malayalam): No specific name; all crabs are locally known as njandu (ഞണ്ട്)
Common name (English): Malabar forest crab (proposed herein)


Image after Pati et al. (2014)

Distribution
Global: India only
India: Endemic to Kerala; Western Ghats only
Kerala: Kozhikode, Palakkad and Thrissur districts; Western Ghats only

Habitat/ecology: The species dwells underneath stones along stream margins or inside streams. Large-sized crabs can be found between plant roots along banks of fast flowing streams. The species seems to be common in the known localities.
Conservation status
WPA (1972): None
IUCN (Global Assessment): Data Deficient (Cumberlidge, 2008) [Version 3.1 (2008)]
IUCN (Regional Assessment): Vulnerable B1ab(iii) +2ab(iii)
CITES: None
CMS: None
Population trend in Kerala since 2000: Seems to be stable
Geographic location/habitat of sustainable population in Kerala: Kozhikode and Thrissur districts; Chimmini Wildlife Sanctuary; Malabar Wildlife Sanctuary; Peechi-Vazhani Wildlife Sanctuary; Western Ghats
Geographic location/habitat of threatened population in Kerala: Kozhikode and Thrissur districts; Western Ghats

Level of exploitation

Commercial	None
Local consumption	None
Poaching	None
Pet trade	None
Wildlife trade	None

Threats: No threat is documented. Possible anthropogenic threats include habitat degradation and pollution, especially in the unprotected areas.
Recommended conservation measures in Kerala: Habitat degradation and pollution need to be curtailed in streams where these crabs reside.
Conservation priority area in Kerala: Kozhikode and Thrissur districts; Chimmini Wildlife Sanctuary; Malabar Wildlife Sanctuary; Peechi-Vazhani Wildlife Sanctuary; Western Ghats
BMC responsible for conservation and sustainable utilization: Forest and Wildlife Department; local government bodies (Panchayats)
Stakeholders responsible for conservation and sustainable utilization: Local people; tribal community
Cultural significance and associated traditional knowledge: Unknown

Remarks: The species has been given the status of "Data Deficient" by the IUCN because it was previously known only from the type locality and the absence of information on its extent of occurrence, ecological requirements, population size, population trends, and long-term threats. The species is endemic to Kerala but now known from 9 localities with sustainable populations in 6 localities of Kozhikode and Thrissur districts. Four out of six subpopulations of the species are within three protected areas. Its extent of occurrence (EOO) is 4720 km^2, and area of occupancy (AOO) is 24 km^2. The number of locations for the species is 6, which was calculated based on the most likely threat that may affect the currently-unaffected areas in the future and the number of subpopulations in the unaffected areas. There is a continuing decline in the extent and quality of its habitat due to habitat degradation and pollution. The species, therefore, qualifies for the "Vulnerable B1ab(iii)+2ab(iii)" category as per the recommended criteria and guidelines for the Regional IUCN Red List Assessment.

Vanni nilgiriensis (Roux, 1931)

Taxonomy

Species *Vanni nilgiriensis* (Roux, 1931)

Local name (Malayalam): No specific name; all crabs are locally known as njandu (ഞണ്ട്)

Common name (English): Nilgiri forest crab (proposed herein)

Image after Pati et al. (2019b)

Distribution

Global: India only

India: Karnataka; Kerala; Tamil Nadu; Western Ghats only

Kerala: Wayanad district; Western Ghats only

Habitat/ecology: The species dwells under stones or boulders and among leaf litters along stream margins in the forest (P.S. Sujila, personal communication).

Conservation status

WPA (1972): None

IUCN (Global Assessment): Data Deficient (Cumberlidge, 2008) [Version 3.1 (2008)]

IUCN (Regional Assessment: Endangered B1ab(iii)+2ab(iii)

CITES: None

CMS: None

Population trend in Kerala since 2000: Seems to be stable

Geographic location/habitat of sustainable population in Kerala: Wayanad district; Western Ghats

Geographic location/habitat of threatened population in Kerala: Wayanad district; Western Ghats.

Level of exploitation

Commercial	None
Local consumption	None
Poaching	None
Pet trade	None
Wildlife trade	None

Threats: No threat is documented. Possible anthropogenic threats include habitat degradation and pollution.

Recommended conservation measures in Kerala: Habitat degradation and pollution need to be curtailed in streams where these crabs reside.

Conservation priority area in Kerala: Wayanad district; Western Ghats

BMC responsible for conservation and sustainable utilization: Forest and Wildlife Department; local government bodies (Panchayats)

Stakeholders responsible for conservation and sustainable utilization: Local people

Cultural significance and associated traditional knowledge: Unknown

Remarks: The species is known from two localities in Kerala, with sustainable population in Wayanad district. Its extent of occurrence (EOO) is 190 km^2, and area of occupancy (AOO) is 8 km^2. The number of locations for the species is 2, which was calculated based on the most likely threat that may affect the currently-unaffected areas in the future. There is a continuing decline in the extent and quality of its habitat due to habitat degradation and pollution. It is unknown whether the regional population experience any significant immigration of propagules likely to reproduce in the region or not. The species, therefore, qualifies for the "Endangered B1ab(iii)+2ab(iii)" category as per the recommended criteria and guidelines for the Regional IUCN Red List Assessment.

Vanni travancorica (Henderson, 1913)

Taxonomy

Species *Vanni travancorica* (Henderson, 1913)

Local name (Malayalam): No specific name; all crabs are locally known as njandu (ഞണ്ട്)

Common name (English): Travancore forest crab (proposed herein)

Distribution

Global: India only

India: Karnataka; Kerala; Tamil Nadu; Western Ghats only

Kerala: Kollam and Thiruvananthapuram districts; Western Ghats only

Habitat/ecology: The species dwells under leaf litters in shady areas, underneath stones and logs in wet soil, and in shallow burrows along stream margins. The species is very common at the type locality, Ponmudi and adjacent areas.

Conservation status

WPA (1972): None

IUCN (Global Assessment): Data Deficient (Esser & Cumberlidge, 2008) [Version 3.1 (2008)]

IUCN (Regional Assessment): Data Deficient

CITES: None

CMS: None

Population trend in Kerala since 2000: Seems to be stable

Geographic location/habitat of sustainable population in Kerala: Kollam and Thiruvananthapuram districts; Peppara Wildlife Sanctuary; Shendurney Wildlife Sanctuary; Western Ghats

Geographic location/habitat of threatened population in Kerala: None

Level of exploitation

Commercial	None
Local consumption	None
Poaching	None
Pet trade	None
Wildlife trade	None

Threats: No threat is documented. More than half of the species' range is in an unaffected area.

Recommended conservation measures in Kerala: No conservation measure is recommended because the data on species' long-term threats are insufficient.

Conservation priority area in Kerala: Kollam and Thiruvananthapuram districts; Peppara Wildlife Sanctuary; Shendurney Wildlife Sanctuary; Western Ghats

BMC responsible for conservation and sustainable utilization: Forest and Wildlife Department; local government bodies (Panchayats)

Stakeholders responsible for conservation and sustainable utilization: Local people; tribal community

Cultural significance and associated traditional knowledge: Unknown

Remarks: The species is known from four localities in Kerala, with sustainable population in Kollam and Thiruvananthapuram districts. Its extent of occurrence (EOO) is 1143 km^2, and area of occupancy (AOO) is 16 km^2. The number of locations for the species can not be used because more than half of the species' range is in an unaffected area. The data on its population size, population trends, and long-term threats are insufficient. The species, therefore, qualifies for the "Data Deficient" category as per the recommended criteria and guidelines for the Regional IUCN Red List Assessment.

Vela carli (Roux, 1931)

Taxonomy

Species *Vela carli* (Roux, 1931)

Local name (Malayalam): Vella [for white] njandu (വെള്ള ഞണ്ട്) or Pal [for milk] njandu (പാൽ ഞണ്ട്)

Common name (English): Carl's marsh crab (proposed herein

Image after Pati et al. (2014)

Distribution

Global	India only
India	Kerala; Tamil Nadu; Western Ghats only
Kerala districts;	Kozhikode, Palakkad and Wayanad Western Ghats only

Habitat/ecology

The species was originally collected from a stream pool. These crabs can be also found in burrows along paddy field embankments (Md. Jafer Palot, personal communication).

Conservation status

WPA (1972): None
IUCN (Global Assessment): Data Deficient (Cumberlidge, 2008) [Version 3.1 (2008)]
IUCN (Regional Assessment): Endangered B1ab(iii) +2ab(iii)
CITES: None
CMS: None
Population trend in Kerala since 2000: Unknown
Geographic location/habitat of sustainable population in Kerala: Kozhikode and Wayanad districts; Malabar Wildlife Sanctuary; Western Ghats
Geographic location/habitat of threatened population in Kerala: Wayanad district; Western Ghats

Level of exploitation

Commercial	None
Local consumption	None
Poaching	None
Pet trade	None
Wildlife trade	None

Threats: No threat is documented. Possible anthropogenic threats include habitat degradation and pesticide pollution.
Recommended conservation measures in Kerala: Habitat degradation and pollution need to be curtailed in streams, which are the only known habitat of the species.
Conservation priority area in Kerala: Kozhikode and Wayanad districts; Malabar Wildlife Sanctuary; Western Ghats
BMC responsible for conservation and sustainable utilization: Forest and Wildlife Department; local government bodies (Panchayats)
Stakeholders responsible for conservation and sustainable utilization: Local farmer; local people; tribal community
Cultural significance and associated traditional knowledge: Unknown

Remarks: The species is known from four localities in Kerala, with sustainable population in Kozhikode and Wayanad districts. Its extent of occurrence (EOO) is 1975 km^2, and area of occupancy (AOO) is 12 km^2. The number of locations for the species is 3, which was calculated based on the most likely threat that may affect the currently-unaffected areas in the future and the number of subpopulations in the unaffected areas. There is a continuing decline in the extent and quality of its habitat due to habitat degradation and pesticide pollution. It is unknown whether the regional population experience any significant immigration of propagules likely to reproduce in the region or not. The species, therefore, qualifies for the "Endangered B1ab(iii)+2ab(iii)" category as per the recommended criteria and guidelines for the Regional IUCN Red List Assessment.

Vela virupa Bahir & Yeo, 2007

Taxonomy

Species *Vela virupa* Bahir & Yeo, 2007
Local name (Malayalam): No specific name; all crabs are locally known as njandu (ഞണ്ട്)
Common name (English): Brownish marsh crab (proposed herein

Distribution

Global: India only
India: Endemic to Kerala; Western Ghats only
Kerala: Endemic to Idukki district; Western Ghats only

Habitat/ecology: The species dwells in deep burrows along paddy field embankments and muddy stream margins at high elevations (1050–1140 m altitude). Its population size is unknown.

Conservation status

WPA (1972): None
IUCN (Global Assessment): Data Deficient (Cumberlidge, 2008) [Version 3.1 (2008)]

IUCN (Regional Assessment): Endangered B1ab(iii) +2ab(iii)
CITES: None
CMS: None

Population trend in Kerala since 2000: Unknown
Geographic location/habitat of sustainable population in Kerala: Idukki district; Western Ghats
Geographic location/habitat of threatened population in Kerala: Idukki district; Western Ghats

Level of exploitation

Commercial	None
Local consumption	None
Poaching	None
Pet trade	None
Wildlife trade	None

Threats: No threat is documented. Possible anthropogenic threats include habitat degradation and pollution due to increase in human population, industrial development and agrarian development.
Recommended conservation measures in Kerala: Habitat degradation and pollution need to be curtailed in streams and paddy fields where these crabs reside.
Conservation priority area in Kerala: Idukki district; Western Ghats
BMC responsible for conservation and sustainable utilization: Forest and Wildlife Department; local government bodies (Panchayats)
Stakeholders responsible for conservation and sustainable utilization: Local farmer; local people
Cultural significance and associated traditional knowledge: Unknown

Remarks: The species has been given the status of "Data Deficient" by the IUCN because it is known only from two adjacent localities and the absence of information on its extent of occurrence, ecological requirements, population size, population trends, and long-term threats. The species, however, has a restricted population at a higher elevation of the Western Ghats in Idukki district of Kerala. Both the known locations are unprotected areas. Rapid increase in human population and industrial or agrarian development pose most likely threat in future. Its extent of occurrence (EOO) is 415 km^2, and area of occupancy (AOO) is 8 km^2. The number of locations for the species is 2, which was calculated based on the most likely threat that may affect the currently-unaffected areas in the future. There is a continuing decline in the extent and quality of its habitat due to habitat degradation and pollution. The species, therefore, qualifies for the "Endangered B1ab(iii)+2ab(iii)" category as per the recommended criteria and guidelines for the Regional IUCN Red List Assessment.

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NON-MARINE MOLLUSCA

Corilla anax © Aravind

N. A. Aravind

Introduction

Non-marine molluscs include both freshwater as well as terrestrial (=land) molluscs. They are inhabitants of almost all kind of terrestrial and freshwater habitats. Majority of the diversity is found in the terrestrial molluscs compared to freshwater molluscs. The Western Ghats hotspot has nearly 300 species and subspecies of terrestrial molluscs and around 65 species of freshwater molluscs. Much of the diversity occurs in the southern parts of the Ghats (below 12 0N).

The assessment for IUCN red list has been carried out only for freshwater molluscs of India. Of the 200 and odd species of freshwater molluscs of India, only nine species are threatened (four species are Endangered and five species are Vulnerable). None of the terrestrial snails were assessed till data. Hence the status of terrestrial snails is unknown.

A very few studies from Kerala on non-marine molluscs, most of which are concentrated on the listing of the species in a given habitat or random collection from different places. There are no systematic studies that looked at the population changes, distribution patterns and threats for both freshwater as well as for terrestrial molluscs of the Western Ghats in general and Kerala in particular. The Kerala state has 68 terrestrial snails and 28 freshwater molluscs. Of the 28 freshwater molluscs, 21 species of freshwater molluscs are Gastropods and seven species are bivalves. Of the 96 species of non-marine molluscs, 75 species are endemic to Kerala state and most of the endemism occurs in terrestrial snails. None of the freshwater mollucs reported from Kerala are threatened and none of the species are either listed in WPA or in the CITIES.

Assessment

Draft assessment was carried out based on the available literature and from the field surveys of the author. Based on this, I classify *Corilla anax* (Benson 1865) as Endangered. This species was reported first from "Hills near Kottayam", but I failed to locate any population in that area. The habitat loss is the main threat to this species. This species is seen in Valparai plateau with good numbers. Hence categorized as Endangered. The two species *Beddomea calcadensis* (Blanford 1870), *Apatetes bourdillon*i (Theobald 1876) has been classified as Near Threatened due to the loss of Evergreen forests in southern part of Kerala, where this species is exclusively found. Among 28 freshwater molluscs, five are Data Deficient and 23 are Least Concern. Many species are known only from a few localities.

Conclusion

Only one species is provisionally assigned to threatened (Endangered) category based on the available data. Most of the freshwater molluscs are either common or the status in unknown. More intensive survey is required to assess the distribution range, threats and population trends. A few freshwater mollucs are edible, they are *Lamellidens corrianus* (Lea, 1834), *Lamellidens marginalis* (Lamarck, 1819), *Corbicula striatella* Deshayes, 1854 and *Villorita cyprinoides* (Gray, 1825). Among these *Villorita cyprinoides* is collected/harvested from wild population in large quantities from Vembanad lake. This species deserve to be mentioned in the list. The complete list of non-marine molluscs of Kerala state is given in the table

REDLIST ASSESSSMENT

Endangered

***Corilla anax* (Benson 1865)**

(Family Corillidae)

This species is the sole member of the genus Corilla in India. There are about 10 species in the same genus from Sri Lanka. This species inhabits forest floor with thick litter and high moisture in the evergreen forests of Kerala and Tamil Nadu. The type locality is "Mavillicurray" in the "Travancore hills as per Benson. Several attempt to find this species in and around this region was unsuccessful. There is a good population thriving in Valparai. The threats to this species is habitat loss Beddomea calcadensis (Blanford 1870) (Family Camaenidae)

This species is reported from Kalakkad in Tamil Nadu and from base of Ponmudi, near Trivandrum in Kerala. They are semi arboreal species found on shrubs and herbs in highly shaded part of Evergreen forests. The threats to this species is habitat loss

Near Threatened

***Apatetes bourdilloni* (Theobald 1876)**

(Family Camaenidae)

This species is reported from base of Ponmudi, near Trivandrum in Kerala. They are semi arboreal species found on shrubs and herbs in highly shaded part of Evergreen forests. Nothing else is known for this species. The threats to this species is habitat loss.

Table 1: The complete list of non-marine molluscs of Kerala assessed for its conservation status for Kerala Biodiversity Board. *indicates draft assessment for land snails for KBA

Family	Genus	IUCN	Kerala*	Priority
Terrestrial molluscs		NA	DD	
Streptaxidae	*Streptaxis footei* W. & H. Blanford 1860	NA	DD	
Streptaxidae	*Streptaxis watsoni* W. & H. Blanford 1860	NA	DD	
Streptaxidae	*Streptaxis beddomii* Blanford 1899	NA	DD	
Streptaxidae	*Streptaxis personatus* Blanford 1880	NA	DD	
Streptaxidae	*Huttonella bicolor* (Hutton 1834)	Invasive	Invasive	Low
Ariophantidae	*Ariophanta thyreus* Benson 1852	NA	DD	
Ariophantidae	*Ariophanta belangeri* Desh. 1834	NA	DD	
Ariophantidae	*Ariophanta basilessa* (Blanford, 1880)	NA	DD	
Ariophantidae	*Ariophanta basileus* (Benson, 1861)	NA	DD	
Ariophantidae	*Ariophanta beddomii* Blanford 1874	NA	DD	
Ariophantidae	*Ariophanta grassii* Blanford 1901	NA	DD	
Ariophantidae	*Indrella ampulla* Godwin-Austen, 1901	NA	DD	
Ariophantidae	*Euplecta semidecussata* Pfeiffer, 1851	NA	LC	
Ariophantidae	*Euplecta subcastor* Beddome, 1891	NA	DD	
Ariophantidae	*Euplecta travancorica* Benson, 1865	NA	DD	
Ariophantidae	*Euplecta indica* Pfeiffer, 1846	NA	LC	
Ariophantidae	*Euplecta acuducta* Benson 1850	NA	DD	
Ariophantidae	*Euplecta ? orbiates* Blanford 1901	NA	DD	
Ariophantidae	*Macrochlamys indica* Benson 1832	NA	LC	
Ariophantidae	*Macrochlamys ? woodiana* Pfeiffer 1851	NA	DD	
Ariophantidae	*Macrochlamys ? vallicola* Pfeiffer, 1854	NA	DD	
Ariophantidae	*Macrochlamys ? prava* Blanford, 1904	NA	DD	
Helicarionidae	*Mariaella dussumieri* Gray 1855	NA	LC	
Helicarionidae	*Mariaella beddomei* Godwin-Austen, 1888	NA	DD	
Helicarionidae	*Pseudaustenia atra* Godwin-Austen, 1888	NA	DD	

Cerastidae	***Rachisellus pulcher* (Gray 1825)**	**NA**	**DD**	
Subulinidae	*Glessula tornensis* Blanford 1870	NA	DD	
Subulinidae	*Glessula textilis* (Blanford 1866)	NA	DD	
Subulinidae	*Glessula subserena* Beddome 1906	NA	DD	
Subulinidae	*Glessula senator* (Hanley 1875)	NA	DD	
Subulinidae	*Glessula subperrotteti* Beddome 1906	NA	DD	
Subulinidae	*Glessula anamullica* (Blanford 1866)	NA	DD	
Subulinidae	*Glessula subinornata* Beddome 1906	NA	DD	
Subulinidae	*Glessula travancorica* Gude 1914	NA	DD	
Subulinidae	*Glessula malabarica* Gude 1914	NA	DD	
Subulinidae	*Glessula filosa* Blanford 1870	NA	DD	
Cyclophoridae	*Craspedotropis bilirata* (Beddome 1875)	NA	DD	
Cyclophoridae	*Micralaux scabra* Theobald 1876	NA	DD	
Cyclophoridae	*Ditropis beddomei* (Blanford 1869)	NA	LC	
Cyclophoridae	*Ditropis convexa* (Blanford 1869)	NA	DD	
Cyclophoridae	*Ditropis planorbis* (Blanford 1869)	NA	DD	
Cyclophoridae	*Cyclophorus nilagiricus* (Besnson 1852)	NA	DD	
Cyclophoridae	*Pterocyclus pseudocumingi* Möllendorff 1897	NA	DD	
Cyclophoridae	*Pearsonia travancorica* (Blanford 1880)	NA	DD	
Cyclophoridae	*Cyathopoma latilabre* Beddome 1875	NA	DD	
Cyclophoridae	*Cyathopoma travancoricum* Beddome 1875	NA	DD	
Cyclophoridae	*Cyathopoma wynaadense* Blanford 1868	NA	DD	
Cyclophoridae	*Cyathopoma procerum* Blanford 1868	NA	DD	
Cyclophoridae	*Mychopoma hirsutum* Blanford 1869	NA	DD	
Cyclophoridae	*Dicharax footei* (Blanford 1861)	NA	DD	
Cyclophoridae	*Nicida nitidula* (Blanford 1868)	NA	DD	
Cyclophoridae	*Opisthostoma macrostoma* Blanford 1869	NA	DD	
Cyclophoridae	*Cyclotopis subdiscoidea* (Sowerby 1850)	NA	DD	
Achatinidae	*Lissachatina fulica* (Férussac, 1821)	Invasive	Invasive	Low
Verocinidae	*Laevicaulis alte* (Férussac, 1822)	Invasive	Invasive	Low
Freshwater molluscs				

Paludomindae	***Paludomus transchauricus* (Gmelin, 1771)**	**LC**	**LC**	**Moderate**
Paludomindae	*Paludomus sulcatus* Reeve, 1847	LC	LC	Moderate
Paludomindae	*Paludomus stomatodon* Benson, 1862	LC	LC	Moderate
Lynimidae	*Radix rufescens* (Lamarck, 1822)	LC	LC	Low
Lynimidae	*Racesina luteola* (Lamarck, 1822)	LC	LC	Low
Ancyclidae	*Ferrissia tenuis* (Bourguignat, 1862).	LC	LC	Low
Ancyclidae	*Ferrissia verruca* (Benson, 1855).	LC	LC	Low
Planorbidae	*Indoplanorbis exustus* (Desbayes, 1834).	LC	LC	Low
Planorbidae	*Gyraulus convexiusculus* (Hutton, 1849)	LC	LC	Low
Unionidae	*Lamellidens consobrinus* (Lea, 1859)	LC	LC	Moderate
Unionidae	*Lamellidens corrianus* (Lea, 1834)	LC	LC	Moderate
Unionidae	*Lamellidens marginalis* (Lamarck, 1819)	LC	LC	Moderate
Corbiculidae	*Corbicula annandalei* Prashad, 1928	LC	LC	Moderate
Corbiculidae	*Corbicula striatella* Deshayes, 1854.	LC	LC	Moderate
Corbiculidae	*Villorita cyprinoides* (Gray, 1825)	LC	LC	High

Checklist of species

Checklist of Terrestrial mammals of Kerala

Order/Family Species	Common Name
Order: Proboscidea	
Family Elephantidae	
1. *Elephas maximus* (Linnaeus, 1758)	Asian Elephant (Indian Elephant)
Order: Scandentia	
Family Tupaiidae	
2. *Anathana ellioti* (Waterhouse, 1850)	Madras Treeshrew (South Indian Tresshrew)
Order: Primates	
Family Lorisidae	
3. *Loris lydekkerianus* (Cabrera, 1908)	Gray Slender Loris (Grey Slender Loris)
Family Cercopithecidae	
4. *Macaca radiata* (E. Geoffroy, 1812)	Bonnet Macaque
5. *Macaca silenus* (Linnaeus, 1758)	Lion-tailed Macaque
6. *Semnopithecus hypoleucos* (Blyth, 1841)	Black-footed Gray Langur (Black footed Gray Langur, Malabar sacred Langur)
7. *Semnopithecus johnii* (J. Fischer, 1829)	Nilgiri Langur
8. *Semnopithecus priam* (Blyth, 1844)	Tufted Gray Langur (Tufted Gray Langur, Coromandel Sacred Langur)
Order: Rodentia	
Family Sciuridae	
9. *Ratufa indica* (Erxleben, 1777)	Malabar Giant Squirrel (Indian Giant Squirrel)
10. *Ratufa macroura* (Pennant, 1769)	Grizzled Giant Squirrel (Sri Lankan Giant Squirrel)
11. *Petaurista philippensis* (Elliot, 1839)	Indian Giant Flying Squirrel (Large Brown Flying Squirrel)
12. *Petinomys fuscocapillus* (Jerdon, 1847)	Travancore Flying squirrel
13. *Funambulus palmarum* (Linnaeus,1766)	Three-striped Palm Squirrel (Indian Palm Squirrel)
14. *Funambulus sublineatus* (Waterhouse, 1838)	Nilgiri Palm Squirrel
15. *Funambulus tristriatus* (Waterhouse, 1837)	Jungle Palm Squirrel (Western Ghats Stripped Squirrel)
Family Platacanthomyidae	
16. *Platacanthomys lasiurus* (Blyth, 1859)	Spiny Tree Mouse (Spiny Dormouse)
Family Muridae	

17. *Bandicota bengalensis* (Gray, 1835, in 1830-1835)	Lesser Bandicoot-rat (Indian mole-rat)
18. *Bandicota indica* (Bechstein, 1800)	Greater Bandicoot-rat
19. *Golunda ellioti* (Gray, 1837)	Indian Bush Rat
20. *Madromys blanfordi* (Thomas, 1881)	Blanford's Madromys (White-taled Wood-rat)
21. *Mus booduga* (Gray, 1837)	Little Indian Field Mouse
22. *Mus famulus* (Bonhote, 1898)	Bonhote's Mouse (Servant Mouse)
23. *Mus musculus* (Linnaeus, 1758)	House Mouse
24. *Mus platythrix* (Bennett, 1832)	Brown Spiny Mouse (Flat haired Mouse)
25. *Rattus norvegicus* (Berkenhout, 1769)	Brown Rat
26. *Rattus ranjiniae* (Agarwal & Ghosal, 1969)	Ranjini's Field Rat (Kerala Rat)
27. *Rattus rattus* (Linnaeus, 1758)	House Rat (Roof Rat)
28. *Rattus satarae* (Hinton, 1918)	Sahyadris Forest Rat
29. *Tatera indica* (Hardwicke, 1807)	Indian Gerbil
30. *Vandeleuria nilagirica* (Jerdon, 1867)	Nilgiri Vandeleuria (Nilgiri Long tailed Tree Mouse)
Family Hystricidae	
31. *Hystrix indica* (Kerr, 1792)	Indian Crested Porcupine
Order: Lagomorpha	
Family Leporidae	
32. *Lepus nigricollis* (F. Cuvier, 1823)	Black-naped Hare (Indian Hare)
Order: Erinaceomorpha	
Family Erinaceidae	
33. *Paraechinus nudiventris* (Horsfield, 1851)	Bare-bellied Hedgehog (Madras Hedgehog)
Order: Soricomorpha	
Family Soricidae	
34. *Feroculus feroculus* (Kelaart, 1850)	Kelaart's Long-clawed Shrew
35. *Suncus dayi* (Dobson, 1888)	Day's Shrew
36. *Suncus murinus* (Linnaeus, 1766)	House Shrew (Gray Musk Shrew)
37. *Suncus niger* (Horsfield, 1851)	Hill Shrew (Indian Highland Shrew)
38. *Suncus etruscus* (Savi, 1822)	Pygmy White-toothed Shrew
Order: Chiroptera	
Family Pteropodidae	
39. *Cynopterus brachyotis* (Muller, 1838)	Lesser Dog-faced Fruit Bat
40. *Cynopterus sphinx* (Vahl, 1797)	Short-nosed Fruit Bat (Greater Short-nosed Fruit Bat)
41. *Eonycteris spelaea* (Dobson, 1871)	Dawn Bat (Lesser Dawn Bat)
42. *Pteropus giganteus* (Brunnich, 1782)	Indian Flying Fox
43. *Rousettus leschenaultia* (Desmarest, 1820)	Fulvous Fruit Bat (Leschenault's Rousette)

Family Emballonuridae	
44. *Saccolaimus saccolaimus* (Temminck, 1838)	Pouch-bearing Bat (Naked-rumped Pouch Bat)
45. *Taphozous melannopogon* (Temminck, 1841)	Bearded Sheath-tailed Bat (Black-bearded Tomb Bat)
46. *Taphozous longimanus* (Hardwicke, 1825)	Long-armed Sheath-tailed Bat (Long-winged Tomb Bat)
Family Megadermatidae	
47. *Megaderma Lyra* (E. Geoffroy, 1810)	Greater False-vampire Bat
48. *Megaderma spasma* (Linnaeus, 1758)	Lesser False-vampire Bat
Family Rhinolophidae	
49. *Rhinolophus beddomei* (Andersen, 1905)	Lesser Woolly Horseshoe Bat (Beddomme's Horseshoe Bat)
50. *Rhynolophus lepidus* (Blyth, 1844)	Blyth's Horseshoe Bat
51. *Rhynolophus pusillus* (Temminck, 1834)	Least Horseshoe Bat
52. *Rhynolophus rouxii* (Temminck, 1835)	Rufous Horseshoe Bat
Family Hipposideridae	
53. *Hipposideros ater* (Templeton, 1848)	Dusky Leaf-nosed Bat
54. *Hipposideros fulvus* (Gray, 1838)	Fulvus Leaf-nosed Bat
55. *Hipposideros speoris* (Schneider, 1800)	Schneider's Leaf-nosed Bat
56. *Hipposideros galeritus* Cantor,1846	Cantor's leaf-noed Bat
57. *Hipposideros Pomona* Anderson, 1918	Anderson's leaf-noed Bat
Family Molossidae	
58. *Tadarida aegyptiaca* (E. Geoffroy, 1818)	Egyptian Free-tailed Bat
Famly Rhinopomatidae	
59. *Rhinopoma hardwickii* Gray,1831	Lesser Mouse-tailed Bat
Family Vespertilionidae	
60. *Harpiocephalus harpia* (Temminck, 1840)	Hairy-winged Bat (Lesser Hairy-winged Bat)
61. *Kerivoula picta* (Pallas, 1767)	Painted Bat (Painted Woolly Bat)
62. *Myotis horsfieldii* (Temminck, 1840)	Horsfield's Mouse-eared Bat (Horsfield's Myotis)
63. *Myotis peytoni* Wroughton and Riley,1913	Peyton's Whiskered Bat
64. *Falsistrellus affinis* (Dobson, 1871)	Chocolate Bat
65. *Pipistrellus ceylonicus* (Kelaart, 1852)	Kelaart's Pipistrelle
66. *Pipistrllus tenuis* (Temminck, 1840)	Least Pipistrelle
67. *Scotozous dormeri* (Dobson, 1875)	Dormer's Bat
68. *Scotophilus heathii* (Horsfield, 1831)	Greater Asiatic Yellow House Bat
69. *Scotophilus kuhlii* (Leach, 1821)	Lesser Asiatic Yellow Bat
70. *Tylonycteris pachypus* (Temminck, 1840)	Bamboo Bat
Family Miniopteridae	
71. *Miniopterus fuliginosus* Hodgson,1835	Eastern Bentwing Bat
Order: Pholidota	
Family Manidae	
72. *Manis crassicaudata* (E. Geoffiroy, 1803)	Indian Pangolin

Order: Carnivora

Family Canidae

73. *Vulpes bengalensis* (Shaw, 1800)	Bengal Fox
74. *Canis aureus* (Linnaeus, 1758)	Golden Jackal
75. *Cuon alpinus* (Pallas, 1811)	Indian Wild Dog (Dhole)

Family Ursidae

76. *Melursus ursinus* (Shaw, 1791)	Sloth Bear

Family Mustelidae

77. *Martes gwatkinsi* (Horsfield, 1851)	Nilgiri Marten
78. *Aonyx cinerea* (Illiger, 1815)	Asian SmalL-clawed Otter (Clawless Otter)
79. *Lutrogale perspicillata* (I. Geoffroy Saint-Hilaire, 1826)	Smooth-coated Otter (Indian Smooth –coated Otter)

Family Viverridae

80. *Viverra civettina* Blyth,1862	Malabar Civet
81. *Viverricula indica* (E. Geoffiroy Saint-Hilaire, 1818)	Small Indian Civet
82. *Paradoxurus hermaphroditus* (Pallas, 1777)	Common Palm Civet (Toddy Cat)
83. *Paradoxurus jerdoni* (Blanford, 1885)	Brown Palm Civet (Jerdon's Palm Civet)

Family Herpestidae

84. *Herpestes fuscus* (Gray, 1837)	Brown Mongoose
85. *Herpestes edwardsii* (E. Geoffroy Saint-Hilaire, 1818)	Indian Gray Mongoose
86. *Hrepestes smithii* (Gray, 1837)	Ruddy MongoosE
87. *Herpestes vitticollis* (Bennet, 1835)	Stripe-necked Mongoose

Family Felidae

88. *Felis chaus* (Schreber, 1777)	Jungle Cat
89. *Prionailurus bengalensis* (Kerr, 1792)	Leopard Cat
90. *Prionailurus rubiginosus* (I. Geoffroy Saint-Hilaire, 1831)	Rusty-spotted Cat
91. *Prionailurus viverrinus* (Bennett,1833)	Fishing Cat
92. *Panthera pardus* (Linnaeus, 1758)	Leopard
93. *Panthera tigris* (Linnaeus, 1758)	Tiger

Order: Artiodactyla

Family Suidae

94. *Sus scrofa* (Linnaeus, 1758)	Wild Boar (Wild Pig)

Family Tragulidae

95. *Moschiola indica* (Gray, 1852)	Indian Chevrotain (Mouse Deer)

Family Cervidae

96. *Axis axis* (Erxleben, 1777)	Spotted Deer (Chital)
97. *Muntiacus muntjak* (Zimmermann, 1780)	Barking Deer (Indian Muntjac)
98. *Rusa unicolor* (Kerr, 1792)	Sambar Deer

Family Bovidae

99. *Bos gaurus* (Smith, 1827)	Gaur (Indian Gaur)
100. *Tetracerus quadricornis* (de Blainville, 1816) (Chousingha)	Four-horned Antelope
101. *Nilgiritragus hylocrius* (Ogilby, 1838)	Nilgiri Tahr

Checklist of birds of Kerala

Order/Family Species	Common Name
Order: Anseriformes	
Family Anatidae	
1. *Dendrocygna javanica* (Horsfield, 1821)	Lesser Whistling Duck
2. *Anser indicus* (Latham, 1790)	Bar-headed Goose
3. *Tadorna ferruginea* (Pallas, 1764)	Ruddy Shelduck
4. *Aythya nyroca* (Guldenstadt, 1770)	Ferruginous Duck
5. *Aythya fuligula* (Linnaeus, 1758)	Tufted Duck
6. *Spatula querquedula* (Linnaeus, 1758)	Garganey
7. *Spatula clypeata* (Linnaeus, 1758)	Northern Shoveler
8. *Mareca strepera* (Linnaeus, 1758)	Gadwall
9. *Mareca Penelope* (Linnaeus, 1758)	Eurasian Wigeon
10. *Anas poecilorhyncha* (Forster, JR, 1781)	Indian Spot-billed Duck
11. *Anas acuta* (Linnaeus, 1758)	Northern Pintail
12. *Anas crecca* (Linnaeus, 1758	Common Teal (Eurasian Teal, Green-winged Teal)
13. *Sarkidiornis melanotos* (Pennant, 1769)	Comb Duck (Knob-billed Duck)
14. *Nettapus coromandelianus* (Gmelin, JF, 1789)	Cotton Teal (Cotton Pygmy-Goose)
Order: Galliformes	
Family Phasianidae	
15. *Pavo cristatus* (Linnaeus, 1758)	Indian Peafowl
16. *Coturnix coromandelica* (Gmelin, JF, 1789)	Rain Quail
17. *Perdicula asiatica* (Latham, 1790)	Jungle Bush Quail
18. *Perdicula erythrorhyncha* (Sykes, 1832)	Painted Bush Quail
19. *Francolinus pondicerianus* (Gmelin, JF, 1789)	Gray Francolin
20. *Gallus sonneratii* (Temminck, 1813)	Gray Junglefowl
21. *Galloperdix lunulata* (Gemelin, JF, 1789)	Red Spurfowl
22. *Galloperdix lunulata* (Valenciennes, 1825)	Painted Spurfowl
Order: Phoenicopteriformes	
Family Phoenicopteridae	
23. *Phoenicopterus roseus* (Pallas, 1811)	Greater Flamingo
Family Podicipedidae	
24. *Tachebaptus ruficollis* (Pallas, 1764)	Little Grebe
Order: Columbiformes	
Family Columbidae	
25. *Columba livia* (Gmelin, JF, 1789)	Rock Pigeon (Rock Dove)
26. *Columba elphinstonii* (Sykes, 1832)	Nilgiri Wood Pigeon
27. *Streptopelia orientalis* (Latham, 1790)	Oriental Turtle Dove
28. *Streptopelia decaocto* (Frivaldszky, 1838)	Eurasian Collared Dove

29. *Streptopelia tranquebarica* (Hermann, 1804)	Red Collared Dove (Red Turtle Dove)
30. *Streptopelia chinensis* (Scopoli, 1786)	Spotted Dove
31. *Streptopelia senegalensis* (Linnaeus, 1766)	Laughing Dove
32. *Treron bicinctus* (Jerdon, 1840)	Orange-breasted Green Pigeon
33. *Treron pompadora* (Gmelin, 1789)	Pompadour Green Pigeon (Gray-fronted Green Pigeon)
34. *Treron phoenicopterus* (Latham, 1790)	Yellow-legged Green Pigeon (Yellow-footed Green Pigeon)
35. *Chalcophaps indica* (Linnaeus, 1758)	Emerald Dove
36. *Ducula aenea* (Linnaeus, 1766)	Green Imperial Pigeon
37. *Ducula badia* (Raffles, 1822)	Mountain Imperial pigeon (Nilgiri Imperial Pigeon)
Order: Pterocliforemes	
Family Pteroclidae	
38. *Pterocles exustus* (Temminck, 1825)	Chestnut-bellied Sandgrouse
Order: Phaethontiformes	
Family Phaethontidae	
39. *Phaethon aethereus* (Linnaeus, 1758)	Red-billed Tropicbird
40. *Phaethon lepturus* (Daudin, 1802)	White-tailed Tropicbird
Order: Caprimulgiformes	
Family Podargidae	
41. *Batrachostomus moniliger* (Blyth, 1849)	Sri Lanka Frogmouth
Family Caprimulgidae	
42. *Lyncornis macrotis* (Vigors, 1831)	Great Eared Nightjar
43. *Caprimulgus indicus* (Latham, 1790)	Gray Nightjar (Jungle Nightjar)
44. *Caprimulgus atripennis* (Jerdon, 1845)	Jerdon's Nightjar
45. *Caprimulgus asiaticus* (Latham, 1790)	Indian Nightjar
46. *Caprimulgus affinis* (Horsfield, 1821)	Savanna Nightjar
Family Apodidae	
47. *Hemiprocne coronate* (Tickell, 1833)	Crested Treeswift
48. *Zoonavena sylvatica* (Tickell, 1846)	White-rumped Spinetail (White-rumped Needletail)
49. *Hirundapus giganteus* (Temminck, 1825)	Brown-backed Needletail
50. *Aerodramus unicolor* (Jerdon, 1840)	Indian Swiftlet
51. *Cypsiurus balasiensis* (Gray, JE, 1829)	Asian Palm Swift
52. *Tachymarptis melba* (Linnaeus, 1758)	Alpine Swift
53. *Apus pacificus* (Blyth, 1845)	Pacific Swift (Blyth's Swift)
54. *Apus affinis* (Gray, JE, 1830)	Indian House Swift (Little Swift)
55. *Apus apus* (Linnaeus, 1758)	Common Swift
Order: Cuculiformes	
Family Cuculidae	
56. *Centropus sinensis* (Stephensm, 1815)	Greater Coucal

57. *Centropus bengalensis* (Gemlin, JF, 1788)	Lesser Coucal
58. *Taccocua leschenaultii* (Lesson, 1830)	Sirkeer Malkoha
59. *Phaenicophaeus viridirostris* (Jerdon, 1840)	Blue-faced Malkoha
60. *Clamator jacobinus* (Boddaert, 1783)	Pied Cuckoo (Pied Crested Cuckoo, Jacobian Cuckoo)
61. *Clamator coramandus* (Linnaeus, 1766)	Chestnut-winged Cuckoo
62. *Eudynamys scolopaceus* (Linnaeus, 1758)	Asian Quail
63. *Cocomantis sonneratii* (Latham, 1790)	Banded Bay Cuckoo
64. *Cocomantis passerinus* (Vahl, 1797)	Gray-bellied Cuckoo
65. *Surniculus lugubris* (Horsfield, 1821)	Drongo Cuckoo (Fork-tailed Drongo Cuckoo)[7]
66. *Hierococcyx sparverioides* (Vigors, 1832)	Large Hawk Cuckoo
67. *Hierococcyx varius* (Vahl, 1797)	Common Hawk Cuckoo
68. *Cuculus micropterus* (Gould,1838)	Indian Cuckoo
69. *Cuculus canorus* (Linnaeus, 1758)	Common Cuckoo
70. *Cuculus poliocephalus* (Latham, 1790)	Lesser Cuckoo
Order: Gruiformes	
Family Rallidae	
71. *Rallina eurizonoides* (Lafresnaye, 1845)	Slaty-legged Crake
72. *Lewinia striata* (Linnaeus, 1766)	Slaty-breasted Rail
73. *Zapornia fusca* (Linnaeus, 1766)	Ruddy-breasted Crake
74. *Zapornia pusilla* (Pallas, 1776)	Bailon's Crake
75. *Amaurornis phoenicurus* (Pennant)	White-breasted Waterhen
76. *Gallicrex cinerea* (Gmelin, JF, 1789)	Watercock
77. *Porphyrio porphyrio* (Linnaeus, 1758)	Purple Swamphen (Gray-headed swamphen)
78. *Gallinula chloropus* (Linnaeus, 1758)	Common Moorhen (Eurasian Moorhen)
79. *Fulica atra* (Linnaeus, 1758)	Common Coot (Eurasian Coot)
Order: Otidiformes	
Family Otidiae	
80. *Sypheotides inidcus* (Miller, JF, 1782)	Lesser Florican
81. *Chlamydotis macqueenii* (Gray, JE, 1832)	Macqueen's Bustard (Asian Houbara)
Order: Procellariiformes	
Family Oceanitidae	
82. *Oceanites oceanicus* (Kuhl, 1820)	Wilson's Strom-petrel
83. *Pelagodroma marina* (Latham, 1790)	White-faced Strom-petrel
84. *Hydrobates monorhis* (Swinhoe, 1867)	Swinhoe's Strom-petrel
Family Procellariidae	
85. *Ardenna pacifica* (Gmelin, JF, 1789)	Wedge-tailed Shearwater
86. *Ardenna tenuirostris* (Temminck, 1835)	Short-tailed Shearwater
87. *Ardenna carneipes* (Gould, 1844)	Flesh-footed Shearwater
88. *Calonectris leucomelas* (Temminck, 1836)	Streaked Shearwater

89. *Calonectris borealis* (Cory, 1881)	Cory's Shearwater
90. *Puffinus bailloni* (Bonaparte, 1857)	Tropical Shearwater
91. *Bulweria fallax* (Jouanin, 1955)	Jouanin's petrel
Order: Pelecaniformes	
Family Ciconiidae	
92. *Leptoptilos javanicus* (Horsfield, 1821)	Lesser Adjutant
93. *Mycteria leucocephala* (Pennant, 1769)	Painted Stork
94. *Anastomus oscitans* (Boddaert, 1783)	Asian Openbill
95. *Ciconia nigra* (Linnaeus, 1758)	Black Stork
96. *Ciconia episcopus* (Boddaert, 1783)	Woolly-necked Stork (Asian Woollyneck)
97. *Ciconia ciconia* (Linnaeus, 1758)	European White Stork
Family Ardeidae	
98. *Pelecanus onocrotalus* (Linnaeus,1758)	Great White Pelican
99. *Pelecanus philippensis* (Gmelin, JF, 1789)	Spot-billed Pelican
Family Ardeidae	
100. *Botaurus stellaris* (Linnaeus, 1758)	Eurasian Bittern (Great Bittern)
101. *Lxobrychus minutus* (Linnaeus, 1766)	Little Bittern
102. *Lxobrychus sinensis* (Gmelin, JF, 1789)	Yellow Bittern
103. *Lxobrychus cinnamomeus* (Gmelin, JF, 1789)	Cinnamon Bittern
104. *Ixobrychus flavicollis* (Latham, 1790)	Black Bittern
105. *Gorsachius melanolophus* (Raffles, 1822)	Malayan Night Heron
106. *Nycticorax nycticorax* (Linnaeus, 1758)	Black-crowned Night Heron
107. *Butorides striata* (Linnaeus, 1758)	Striated Heron (Green-backed Heron, Little Heron)
108. *Ardeola grayii* (Sykes, 1832)	Indian Pond Heron
109. *Bubulcus ibis* (Boddaert, 1783)	Cattle Egret
110. *Ardea cinerea* (Linnaeus, 1758)	Gray Heron
111. *Ardea purpurea* (Linnaeus, 1766)	Purple Heron
112. *Ardea alba* (Linnaeus, 1758)	Great Egret
113. *Ardea intermedia* (Wagler, 1829)	Intermediate Egret
114. *Egretta garzetta* (Linnaeus, 1766)	Little Egret
115. *Egretta gularis* (Bosc, 1792)	Western Reef Egret (Western Reef Heron)
Family Threskiornithidae	
116. *Threskiornis melanocephalus* (Latham, 1790)	Black-headed Ibis
117. *Platalea leucorodia* (Linnaeus, 1758)	Eurasian Spoonbill
118. *Pseudibis papillosa* (Temminck, 1824)	Indian Black Ibis (Red-naped Ibis)
119. *Plegadis falcinellus* (Linnaeus, 1766)	Glossy Ibis
Family Fregatidae	
120. *Fregata ariel* (Gray,GR, 1845)	Lesser Frigatebird
121. *Frigata minor* (Gmelin, JF, 1789)	Great Frigatebird
122. *Fregata andrewsi* (Mathews, 1914)	Christmas Island Frigatebird

Family Sulidae

123. *Sula sula* (Linnaeus, 1766)	Red Footed Booby
124. *Sula dactylatra* (Lesson, 1831)	Masked Booby

Family Phalacrocoracidae

125. *Microcarbo niger* (Vieillot, 1817)	Little Cormorant
126. *Phalacrocorax carbo* (Linnaeus, 1758)	Great Cormorant
127. *Phalacrocorax fuscicollis* (Stephens, 1826)	Indian Cormorant
128. *Anhinga melanogaster* (Pennant, 1769)	Oriental Darter

Order: Charadriiformes

Family Burhinidae

129. *Burhinus oedicnemus* (Salvadori, 1865)	Eurasian Thick-knee (Indian Stone-curlew, Indian Thick-knee)
130. *Esacus recurvirostris* (Curvier, 1829)	Great Thick-knee (Great Stone-curlew)

Family Haematopodidae

131. *Haematopus ostralegus* (Linnaeus, 1758)	Eurasian Oystercatcher

Family Recurvirostridae

132. *Recurvirostra avosetta* (Linnaeus, 1758)	Pied Avocet
133. *Himantopus himantopus* (Linnaeus, 1758)	Black Winged Stilt

Family Charadriidae

134. *Pulvialis squatarola* (Linnaeus, 1758)	Gray Plover (Black-bellied Plover)
135. *Pulvialis fulva* (Gmelin, JF, 1789)	Pacific Golden Plover
136. *Charadrius hiaticula* (Linnaeus, 1758)	Common Ringed Plover
137. *Charadrius dubius* (Scopoli, 1786)	Little Ringed Plover
138. *Charadrius alexandrinus* (Linnaeus, 1758)	Kentish Plover
139. *Charadrius mongolus* (Pallas, 1776)	Lesser sand Plover
140. *Charadrius leschenaultia* (Lesson, 1826)	Greater Sand Plover
141. *Charadrius asiaticus* (Pallas, 1773)	Caspian Plover
142. *Venellus malabaricus* (Boddaert, 1783)	Yellow-wattled Lapwing
143. *Venellus cinereus* (Blyth, 1842)	Gray-headed Lapwing
144. *Vanellus indicus* (Boddaert, 1783)	Red-wattled Lapwing
145. *Vanellus gregarious* (Pallas, 1771)	Sociable Lapwing
146. *Vanellus leucurus* (Lichtenstein, MHK, 1823)	White-tailed Lapwing

Family Rostratulidae

147. *Rostratula benghalensis* (Linnaeus, 1758)	Greater Painted-snipe

Family Jacanidae

148. *Hydrophasianus chirurgus* (Scopoli, 1786)	Pheasant-tailed Jacana
149. *Metapidius indicus* (Latham, 1790)	Bronze-winged Jacana

Family Scolopacidae

150. *Numenius phaeopus* (Linnaeus, 1758)	Whimbrel
151. *Numenius arquata* (Linnaeus, 1758)	Eurasian Curlew
152. *Limosa lapponica* (Linnaeus, 1758)	Bar-tailed Godwit
153. *Limosa limosa* (Linnaeus, 1758)	Black-tailed Godwit
154. *Arenaria interpres* (Linnaeus, 1758)	Ruddy Turnstone
155. *Calidris tenuirostris* (Horsfield, 1821)	Great Knot

156. *Calidris canutus* (Linnaeus, 1758) Red Knot
157. *Calidris pugnax* (Linnaeus, 1758) Ruff
158. *Calidris falcinellus* (Pontoppidan, 1763) Board-billed Sandpiper
159. *Calidris ferruginea* (Pontoppidan, 1763) Currlew Sandpiper
160. *Calidris temminckii* (Leisler, 1812) Temminck's Stint
161. *Calidris subminitua* (Middendorff, 1853) Long-toed Stint
162. *Calidris alba* (Pallas, 1764) Sanderling
163. *Calidris alpine* (Linnaeus, 1758) Dunlin
164. *Calidris minuta* (Leisler, 1812) Little Stint
165. *Calidris subruficollis* (Vieillot, 1819) Buff-breasted Sandpiper
166. *Calidris melanotos* (Vieillot, 1819) Pectoral Sandpiper
167. *Scolopax rusticola* (Linnaeus, 1758) Eurasian Woodcock
168. *Gallinago nemoricola* (Hodgson, 1836) Wood Snipe
169. *Gallinago stenura* (Bonaparte, 1831) Pintail Snipe
170. *Gallinago megala* (Swinhoe, 1861) Swinhoe's snipe
171. *Gallinago gallinago* (Linnaeus, 1758) Common Snipe
172. *Lymnocryptes minimus* (Brunnich, 1764) Jack Snipe
173. *Xenus cinereus* (Guldenstadt, 1775) Terek Sandpiper
174. *Actitis hypoleucos* (Linnaeus, 1758) Common Sandpiper
175. *Tringa ochropus* (Linnaeus, 1758) Green Sandpiper
176. *Tringa erythropus* (Pallas, 1764) Spotted Redshank
177. *Tringa nebularia* (Gunnerus, 1767) Common Greenshank
178. *Tringa tetanus* (Linnaeus, 1758) Common Redshank
179. *Tringa galreola* (Linnaeus, 1758) Wood Sandpiper
180. *Tringa stagnatilis* (Bechstein, 1803) Marsh Sandpiper
181. *Phalaropus lobatus* (Linnaeus, 1758) Red-necked Phalarope

Family Turnicidae

182. *Turnix tanki* (Blyth, 1843) Yellow-legged Buttonquail
183. *Turnix suscitator* (Gmelin, JF, 1789) Barred Buttoquail

Family Dromadidae

184. *Dromas ardeola* (Paykull, 1805) Crab-plover

Family Glareolidae

185. *Cursorius coromandelicus* (Gmelin, JF, 1789) Indian courser
186. *Glareola pratincola* (Linnaeus, 1766) Collared Pratincole
187. *Glareola maldivarum* (Forster, JR, 1795) Oriental Pratincole
188. *Glareola lacteal* (Temminck, 1820) Little Prantincole (Small Pratincole)

Family Stercorariidae

189. *Stercorarius longicaudus* (Vieillot, 1819) Long-tailed Skua (Long-tailed Jaeger)
190. *Stercorarius parasiticus* (Linnaeus, 1758) Arctic Suka (Parasitic Jaeger)
191. *Stercorarius pomarinus* (Temminck, 1815) Pomarine Skua (Pomarine Jaeger)
192. *Stercorarius maccormicki* (Saunders, H, 1893) South Polar Skua
193. *Stercorarius antarcticus* (Lesson, 1831) Brown Skua

Family Laridae

194. *Anous stolidus* (Linnaeus, 1758)	Brown Noddy
195. *Anous tenuirostris* (Temminck, 1823)	Lesser Noddy
196. *Gygis alba* (Sparrman, 1786)	White tern
197. *Rissa tridactyla* (Linnaeus, 1758)	Black-legged Kittiwake
198. *Xema sabini* (Sabine, 1819)	Sabine's Gull
199. *Chroicocephalus genei* (Breme, 1839)	Slender-billed Gull
200. *Chroicocephalus brunnicephalus* (Jerdon, 1840)	Brown-headed Gull
201. *Chroicocephalus ridibundus* (Linnaeus, 1766)	Black-headed Gull
202. *Ichthyaetus ichthyaetus* (Pallas, 1773)	Pallas's Gull
203. *Larus fuscus* (Linnaeus, 1758)	Lesser Black-backed Gull
204. *Onychoprion fuscatus* (Linnaeus, 1766)	Sooty Tern
205. *Onychoprion anaethetus* (Scopoli, 1786)	Bridled Tern
206. *Sternula albifrons* (Pallas, 1764)	Little Tern
207. *Gelochelidon nilotica* (Gmelin, JF, 1789)	Gull-billed Tern
208. *Hydroprogne caspia* (Pallas, 1770)	Caspian Tern
209. *Chlidonias leucopterus* (Pallas, 1811)	Whiskered Tern
210. *Chlidonias leucopterus* (Temminck, 1815)	White-winged Tern
211. *Sterna aurantia* (Gray, JE, 1831)	River Tern
212. *Sterna dougallii* (Montagu, 1813)	Roseate Tern
213. *Sterna hirundo* (Linnaeus, 1758)	Common Tern
214. *Sterna repressa* (Hartert, 1916)	White-cheeked Tern
215. *Sterna acuticauda* (Gray, JE, 1831)	Black-bellied Tern
216. *Thalasseus sandvicensis* (Lesson, 1831)	Lesser Crested Tern
217. *Thalasseus sandvicensis* (Latham, 1787)	Sandwich Tern
218. *Thalasseus bergii* (Lichtenstein, MHK, 1823)	Greater Crested Tern

Order: Accipitriformes

Family Pandionidae

219. *Pandion haliaetus* (Linnaeus, 1758)	Osprey

Family Accipitridae

220. *Elanus caeruleus* (Desfontaines, 1789)	Black-winged Kite (Black-shouldered Kite)
221. *Pernis ptilorhynchus* (Temminck, 1821)	Oriental Honey Buzzard (Crested Honey Buzzard)
222. *Aviceda jerdoni* (Blyth, 1842)	Jerdon's Baza
223. *Aviceda leuphotes* (Dumont, 1820)	Black Baza
224. *Neophron percnopterus* (Linnaeus, 1758)	Egyptian Vulture
225. *Spilornis cheela* (Latham, 1790)	Crested Serpent Eagle
226. *Circaetus gallicus* (Gmelin, JF, 1788)	Short-toed Snake Eagle (Short-toed Eagle)
227. *Sarcogyps calvus* (Scopoli, 1786)	Red-headed Vulture
228. *Gyps himalayensis* (Hume, 1869)	Himalayan Vulture (Himalayan Griffon)
229. *Gyps bengalensis* (Gmelin, JF, 1788)	White-rumped Vulture
230. *Gyps indicus* (Scopoli, 1786)	Indian Vulture

231. *Aegypius monachus* (Linnaeus, 1766)	Cinereous Vulture
232. *Nisaetus nipalensis* (Hodgson, 1836)	Mountain Hawk Eagle (Legge's Hawk Eagle)
233. *Nisaetus cirrhatus* (Gmelin, JF, 1788)	Changeable Hawk Eagle (Crested Hawk Eagle)
234. *Lophotriorchis kienerii* (de Sparre, 1835)	Rufous-bellied Eagle (Rufous-bellied Hawk Eagle)
235. *Ictinaetus malaiensis* (Temminck, 1822)	Black Eagle
236. *Clanga hastata* (Lesson, 1831)	Indian Spotted Eagle
237. *Clanga clanga* (Pallas, 1811)	Greater Spotted Eagle
238. *Aquila nipalensis* (Hodgson, 1833)	Steppe Eagle
239. *Aquila heliacal* (Savigny, 1809)	Eastern Imperial Eagle
240. *Aquila fasciata* (Vieillot, 1822)	Bonelli's Eagle
241. *Hieraaetus pennatus* (Gmelin, JF, 1788)	Booted Eagle
242. *Circus aeruginosus* (Linnaeus, 1758)	Western Marsh Harrier (Eurasian Marsh-Harrier)
243. *Circus cyaneus* (Linnaeus, 1766)	Hen Harrier
244. *Circus macrourus* (Gmelin, SG, 1770)	Pallid Harrier
245. *Circus melanoleucos* (Pennant, 1769)	Pied Harrier
246. *Circus pygargus* (Linnaeus, 1758)	Montagu's Harrier
247. *Accipiter trivirgatus* (Temminck, 1824)	Crested Goshawk
248. *Accipiter badius* (Gmelin, JF, 1788)	Shikra
249. *Accipiter virgatus* (Temminck, 1822)	Besra
250. *Accipiter nisus* (Linnaeus, 1758)	Eurasian Sparowhawk
251. *Haliaeetus leucogaster* (Gmelin, JF, 1788)	White-bellied Sea Eagle
252. *Haliaeetus albicilla* (Linnaeus, 1758)	White-tailed Sea Eagle
253. *Icthyophaga humilis* (Muller, S & Schlegel, 1841)	Lesser Fish Eagle
254. *Icthyophaga ichthyaetus* (Horsfiled, 1821)	Gray-headed Fish Eagle
255. *Haliastur indus* (Boddaert, 1783)	Brahminy Kite
256. *Milvus migrans* (Boddaert, 1783)	Black Kite
257. *Butastur teesa* (Franklin, 1831)	White-eyed Buzzard
258. *Buteo buteo* (Linnaeus, 1758)	Common Buzzard (Eurasian Buzzard)
Order: Strigiformes	
Family Tytonidae	
259. *Phodilus badius* (Horsfield, 1821)	Bay Owl (Sri Lanka Bay Owl)
260. *Tyto longimembris* (Jerdon, 1839)	Eastern Grass Owl
261. *Tyto alba* (Scopoli, 1769)	Common Barn Owl
Family Strigidae	
262. *Ninox scutulata* (Raffles, 1822)	Brown Hawk Owl (Brown Boobook)
263. *Glaucidium radiatum* (Tickell, 1833)	Jungle Owlet
264. *Athene brama* (Temminck, 1821)	Spotted Owlet
265. *Otus brucei* (Hume, 1873)	Pallid Scopes Owl
266. *Otus sunia* (Hodgson, 1836)	Oriental Scope Owl

267. *Otus bakkamoena* (Pennant, 1769)	Collared Scopes Owl (Indian Scops Owl)
268. *Asio flammeus* (Pontoppidan, 1763)	Short-eared Owl
269. *Strix ocellata* (Lesson, 1839)	Mottled Wood Owl
270. *Strix leptogrammica* (Temminck, 1832)	Brown Wood Owl
271. *Bubo bengalensis* (Franklin, 1831)	Indian Eagle Owl (Rock Eagle Owl)
272. *Bubo nipalensis* (Hodgson, 1836)	Spot-bellied Eagle Owl
273. *Ketupa zeylonensis* (Gmelin, JF, 1788)	Brown Fish Owl
Order: Trogoniformes	
Family Trogonidae	
274. *Hrapactus fasciatus* (Pennant, 1769)	Malabar Trogon
Order: Bucerotiformes	
Family Bucerotidae	
275. *Buceros bicornis* (Linnaeus, 1758)	Great Hornbill
276. *Anthracoceros coronatus* (Boddaert, 1783)	Malabar Pied Hornbill
277. *Ocyceros griseus* (Latham, 1790)	Malabar Gray Hornbill
278. *Ocyceros birostris* (Scopoli, 1786)	Indian Gray Hornbill
Family Upupidae	
279. *Upupa epops* (Linnaeus, 1758)	Common Hoopoe (Eurasian Hoopoe)
Order: Piciformes	
Family Picidae	
280. *Jynx torquilla* (Linnaeus, 1758)	Northern Wryneck (Eurasian Wryneck)
281. *Picumnus innominatus* (Burton, 1836)	Speckled Piculet
282. *Hemicircus canente* (Lesson, 1832)	Heart-spotted Woodpecker
283. *Dinopium javanense* (Ljungh, 1797)	Common Golden-backed Woodpecker (Common Flameback)
284. *Dinopium benghalense* (Linnaeus, 1758)	Lesser Golden-backed Woodpecker (Black-rumped Flameback)
285. *Micropternus brachyurus* (Vieillot, 1818)	Rufous Woodpecker
286. *Picus chlorolophus* (Vieillot, 1818)	Lesser Yellow-naped Woodpecker (Lesser Yellownape)
287. *Picus xanthopygaeus* (Gray, JE & Gray, GR, 1847)	Streak-throated Woodpecker
288. *Dryocopus Javensis* (Horsfield, 1821)	White-bellied Woodpecker
289. *Chrysocolaptes lucidus* (Tickell, 1833)	Greater Golden-backed Woodpecker (Greater Flameback)
290. *Chrysocolaptes festivus* (Boddaert, 1783)	White-naped Woodpecker
291. *Dendrocopos moluccensis* (Vigors, 1832)	Brown-capped Pygmy Woodpecker
292. *Dendrocopos mahrattensis* (Latham, 1801)	Yellow-crowned Woodpecker

Family Ramphastidae

293. *Psilopogon zeulanicus* (Gmelin, JF, 1788)	Brown-headed Barbet
294. *Psilopogon viridis* (Boddaert, 1783)	White-cheeked Barbet
295. *Psilopogon malabaricus* (Blyth, 1847)	Coppersmith Barbet
296. *Psolopogon haemacephalus* (Statius muller, 1776)	Coppersmith Barbet

Order: Coraciiformes

Family Meropidae

297. *Nyctyornis athertoni* (Jardine & selby, 1828)	Blue-bearded Bee-eater
298. *Merops orientalis* (Latham, 1801)	Green Bee-eater
299. *Merops leschenaulti* (Vieillot, 1817)	Chestnut-headed Bee-eater
300. *Merops phillippinus* (Linnaeus, 1767)	Blue-tailed Bee-eater
301. *Merops persicus* (Pallas, 1773)	Blue-cheeked Bee-eater

Family Coraciidae

302. *Coracias benghalensis* (Linnaeus, 1758)	Indian Roller
303. *Coracias garullus* (Linnaeus, 1758)	European Roller
304. *Eurystomus orientalis* (Linnaeus, 1766)	Dollarbird (Oriental Dollarbird)

Family Alcedinidae

305. *Ceyx erithaca* (Linnaeus, 1758)	Oriental Dwarf Kingfisher (Black-backed Dwarf Kingfisher)
306. *Alcedo meninting* (Horsfield, 1821)	Blue-eared Kingfisher
307. *Alcedo atthis* (Linnaeus, 1758)	Common Kingfisher
308. *Ceryle rudis* (Linnaeus, 1758)	Pied Kingfisher
309. *Pelargopis capensis* (Linnaeus, 1766)	Stork-billed Kingfisher
310. *Halcyon smyrnensis* (Linnaeus, 1758)	White-throated Kingfisher (White-breasted Kingfisher)
311. *Halcyon pileata* (Boddaert, 1783)	Black-capped Kingfisher

Order: Falconiformes

Family Falconidae

312. *Falco naumanni* (Fleischer, JG, 1818)	Lesser Kestrel
313. *Falco tinnunculus* (Linnaeus, 1758)	Common Kestrel (Eurasian Kestrel)
314. *Falco chicquera* (Daudin, 1800)	Red-necked Falcon (Red-headed Falcon)
315. *Falco amurensis* (Radde, 1863)	Amur Falcon
316. *Falco severus* (Horsfield, 1821)	Oriental Hobby
317. *Falco peregrinus* (Tunstall, 1771)	Peregrine Falcon

Order: Psittaciformes

Family Psittaculidae

318. *Psittacula cyanocephala* (Linnaeus, 1766)	Plum-headed Parakeet
319. *Psittacula columboides* (Vigors, 1830)	Malabar Parakeet (Blue-winged Parakeet)
320. *Psittacula eupatria* (Linnaeus, 1766)	Alexandrine Parakeet
321. *Psittacula krameri* (Scopoli, 1769)	Rose-ringed Parakeet
322. *Loriculus vernalis* (Sparrman, 1787)	Vernal Hanging Parrot

Order: Passeriformes

Family Pittidae

323. *Pitta brachyuran* (Linnaeus, 1766)	Indian Pitta

Family Campephagidae

324. *Pericrocotus cinnamomeus* (Linnaeus, 1766)	Small Minivet
325. *Pericrocotus falmmeus* (Forster, JR, 1781)	Scarlet Minivet (Orange Minivet)
326. *Pericorcotus divaricatus* (Raffles, 1822)	Ashy Minivet
327. *Coracina javensis* (Lesson, 1831)	Large Cuckooshrike
328. *Lalage melanoptera* (Ruppell, 1839)	Black-headed Cuckooshrike

Family Oriolidae

329. *Oriolus xanthornus* (Linnaeus, 1758)	Black-headed Oriole
330. *Oriolus kundoo* (Sykes, 1832)	Indian Golden Oriole
331. *Oriolus chinensis* (Linnaeus, 1766)	Black-naped Oriole

Family Artamidae

332. *Artamus fuscus* (Vieillot, 1817)	Ashy Woodswallow

Family Vangidae

333. *Hemipus picatus* (Sykes, 1832)	Bar-winged Flycatcher-shrike
334. *Tephrodornis virgatus* (Raffles, 1822)	Large Woodshrike (Malabar Woodshrike)
335. *Tephrodornis pondicerianus* (Gmelin, JF, 1789)	Common Woodshrike

Family Aehithinidae

336. *Aegithina tiphia* (Linnaeus, 1758)	Common Lora

Family Dicruridae

337. *Dicrurus macrocercus* (Vieillot, 1817)	Black Drongo
338. *Dicrurus leucophaeus* (Vieillot, 1817)	Ashy Drongo
339. *Dicrurus caerulescens* (Linnaeus, 1758)	White-bellied Drongo
340. *Dicrurus aeneus* (Vieillot, 1817)	Bronzed Dongo
341. *Dicrurus hottentottus* (Linnaeus, 1766)	Hair-crested Drongo
342. *Dicrurus paradiseus* (Linnaeus, 1766)	Greater Racket-tailed Drongo

Family Rhipiduridae

343. *Rhipidura aureola* (Lesson, 1831)	White-browed Fantail

Family Laniidae

344. *Lanius cristatus* (Linnaeus, 1758)	Brown Shrike
345. *Lanius vittatus* (Valenciennes, 1826)	Bay-backed Shrike
346. *Lanius schach* (Linnaeus, 1758)	Long-tailed Shrike

Family Corvidae

347. *Dendrocitta vagabunda* (Latham, 1790)	Rufous Treepie
348. *Dendrocitta leucogastra* (Gould, 1833)	White-bellied Treepie
349. *Corvus Splendens* (Vieillot, 1817)	House Crow
350. *Corvus macrorhynchos* (Wagler, 1827)	Large-billed Crow (Indian Jungle Crow)

Family Monarchidae

351. *Hypothymis azurea* (Boddaert, 1783)	Black-naped Monarch
352. *Terpsiphone paradise* (Linnaeus, 1758)	Indian Paradise-flycatcher (Asian Paradise-flycatcher)

Family Dicaeidae

353. *Dicaeum agile* (Tickell, 1833) Thick-billed Flowerpecker
354. *Dicaeum erythrorynchos* (Latham, 1790) Pale-billed Flowerpecker
355. *Dicaeum concolor* (Jerdon, 1840) Plain Flowerpecker (Nilgiri Flowerpecker)

Family Nectariniidae

356. *Arachnothera longirostra* (Latham, 1790) Little Spiderhunter
357. *Leptocoma zeylonica* (Linnaeus, 1766) Pruple-rumped Sunbird
358. *Leptocoma minima* (Sykes, 1832) Crimson-backed Sunbird
359. *Cinnyris asiaticus* (Latham, 1790) Purple Sunbird
360. *Cinnyris lotenius* (Linnaeus, 1766) Loten's Sunbird (Long-billed Sunbird)

Family Irenidae

361. *Irena puella* (Latham, 1790) Asian Fairy-bluebird
362. *Chloropsis aurifrons* (Temminck, 1829) Golden-fronted Leafbird
363. *Chloropsis jerdoni* (Blyth, 1844) Jerdon's Leafbird

Family Ploceidae

364. *Ploceus manyar* (Horsfield, 1821) Streaked Weaver
365. *Ploceus phillippinus* (Linnaeus, 1766) Baya Weaver

Family Estrildidae

366. *Amandava amandava* (Linnaeus, 1758) Red Munia (Red Avadavat)
367. *Euodice malabarica* (Linnaeus, 1758) Indian Silverbill (White-throated Munia)
368. *Lonchura striata* (Linnaeus, 1766) White-rumped Munia
369. *Lonchura punctulata* (Linnaeus, 1758) Scaly-breasted Munia
370. *Lonchura kelaarti* (Jerdon, 1863) Black-throated Munia
371. *Lonchura Malacca* (Linnaeus, 1766) Black-headed Munia (Tricoloured Munia)

Family Passeridae

372. *Passer domesticus* (Linnaeus, 1758) House Sparrow
373. *Gymnoris xanthocollis* (Burton, 1838) Yellow-throated Sparrow (Chestnut-shouldered Petronia)

Family Motacillidae

374. *Dendronanthus indicu* (Gmelin, JF, 1789) Forest Wagtail
375. *Anthus trivialis* (Linnaeus, 1758) Tree Pipit
376. *Anthus hodgsoni* (Richmond, 1907) Olive-backed Pipit
377. *Anthus cervinus* (Pallas, 1811) Red-throated Pipit
378. *Anthus nilghiriensis* (Sharpe, 1885) Nilgiri Pipit
379. *Anthus richardi* (Vieillot, 1818) Richard's Pipit
380. *Anthus rufulus* (Vieillot, 1818) Paddyfield Pipit
381. *Anthus godlewskii* (Taczanowski, 1876) Blyth's Pipit
382. *Anthus campestris* (Linnaeus, 1758) Tawny Pipit
383. *Anthus similis* (Jerdon, 1840) Long-billed Pipit
384. *Motacilla flava* (Linnaeus, 1758) Western Yellow Wagtail
385. *Motacilla cinerea* (Tunstall, 1771) Grey Wagtail

386. *Motacilla citreola* (Pallas, 1776)	Citrine Wagtail
387. *Motacilla maderaspatensis* (Gmelin, JF, 1789)	White-browed Wagtail
388. *Motalica alba* (Linnaeus, 1758)	White Wagtail
Family Fringillidae	
389. *Erythrina erythrina* (Pallas, 1770)	Common Rosefinch
Family Emberizidae	
390. *Granativora bruniceps* (von Brandt, JF, 1841)	Red-headed Bunting
391. *Granativora melanocephala* (Scopoli, 1769)	Black-headed Bunting
392. *Emberiza buchanani* (Blyth, 1845)	Grey-necked Bunting (Grey-hooded Bunting)
Family Stenostiridae	
393. *Culicicapa ceylonensis* (Swainson, 1820)	Grey-headed Canary-flycatcher
Family Paridae	
394. *Parus cinereus* (Vieillot, 1818)	Cinereous Tit (Indian Great Tit)
395. *Machlolophus xanthogenys* (Vigors, 1831)	Black-lored Tit (Indian Black-lored Tit, Indian Tit)
Family Alaudidae	
396. *Ammomanes phoenicura* (Franklin, 1831)	Rufos-tailed Lark
397. *Eremopterix griseus* (Scopoli, 1786)	Ashy-crowned Sparrow Lark
398. *Mirafra affinis* (Blyth, 1845)	Jerdon's Bushlark
399. *Calandrella brachydactyla* (Leisler, 1814)	Greater Short-toed Lark
400. *Alauda gulgula* (Franklin, 1831)	Oriental Skylark
401. *Glaeridamalabarica* (Scopoli, 1786)	Malabar Lark
Family Cisticolidae	
402. *Cisticola juncidis* (Rafinesque, 1810)	Zitting Cisticola
403. *Cisticola exilis* (Vigors & Horsfield, 1827)	Golden-headed Cisticola
404. *Prinia hodgsonii* (Blyth, 1844)	Grey-breasted Prinia
405. *Prinia sylvatica* (Jerdon, 1840)	Jungle Prinia
406. *Prinia socialis* (Sykes, 1832)	Ashy Prinia
407. *Prinia inornata* (Sykes, 1832)	Plain Prinia
408. *Orthotomus sutorius* (Pennant, 1769)	Common Tailorbird
Family Locustellidae	
409. *Locustella certhiola* (Pallas, 1811)	Rusty-rumped Warbler (Palla's Grasshopper Warbler)
410. *Locustella naevia* (Boddaert, 1783)	Grasshopper Warbler
411. *Schoenicola platyurus* (Jerdon, 1841)	Broad-tailed Grass Warbler (Broad-tailed Grassbird)
412. *Chaetornis striata* (Jerdon, 1841)	Bristled Grass Warbler (Bristled Grassbird)
Family Acrocephalidae	
413. *Arundinax aedon* (Pallas, 1776)	Thick-billed Warbler
414. *Iduna caligata* (Lichtenstein, MHK, 1823)	Booted Warbler
415. *Iduna rama* (Sykes, 1832)	Sykes's Warbler
416. *Acrocephalus* (Blyth, 1849)	Blyth's Reed Warbler
417. *Acrocephalus Agricola* (Jerdon, 1845)	Paddyfield Warbler

418. *Acrocephalus stentoreus* (Hemprich & Ehrenberg, 1833)	Clamorous Reed Warbler
Family Hirundinidae	
419. *Delichon urbicum* (Linnaeus, 1758)	Northern House Martin (Common House Martin)
420. *Petrochelidon fluvicola* (Blyth, 1855)	Streak-throated Swallow
421. *Cecropis daurica* (Laxmann, 1769)	Red-rumped Swallow
422. *Hirundo tahitica* (Gmelin, 1789)	Pacific Swallow (Hill Swallow)
423. *Hirundo smithii* (Leach, 1818)	Wire-tailed Swallow
424. *Hirunda rustica* (Linnaeus, 1758)	Barn Swallow
425. *Ptyonoprogne rupestris* (Scopoli, 1769)	Eurasian Crag Martin
426. *Ptyonoprogne concolor* (Sykes, 1832)	Dusky Crag Martin
427. *Riparia paludicola* (Gray, JF, 1830)	Plain Martin (Grey-throated Martin)
Family Pycnonotidae	
428. *Hypsipetes leucocephalus* (Gmelin, 1789)	Black Bulbul (Square-tailed Bulbul)
429. *Pycnonotus melanicterus* (Gmelin, 1789)	Black-crested Bulbul (Flame-throated Bulbul)
430. *Pycnonotus jocosus* (Linnaeus, 1758)	Red-Whiskered Bulbul
431. *Pycnonotus cafer* (Linnaeus, 1766)	Red-vented Bulbul
432. *Pycnonotus xantholaemus* (jerdon, 1845)	Yellow-throated Bulbul
433. *Pycnonotus luteolus* (Lesson, 1841)	White-browed Bulbul
434. *Brachypodius priocephalus* (Jerdon, 1839)	Grey-headed Bulbul
435. *Acritillas indica* (Jerdon, 1839)	Yellow-browed Bulbul
Family Phylloscopidae	
436. *Abrornis heumei* (Brooks, WE, 1878)	Hume's Leaf Warbler (Hume's Warbler)
437. *Phylloscopus collybita* (Vieillot, 1817)	Common Chiffchaff
438. *Phylloscopus tytlerei* (Brooks, WE, 1871)	Tytler's Leaf Warbler
439. *Phylloscopus affinis* (Tickell, 1833)	Tickell's Leaf Warbler
440. *Seicercus nitidus* (Blyth, 1843)	Green Leaf Warbler (Green Warbler)
441. *Seicercus trochiloides* (Sundevall, 1837)	Greenish Leaf Warbler (Greenish Warbler)
442. *Seicercus magnirostris* (Blyth, 1843)	Large-billed Leaf Warbler
443. *Seicercus occupitalis* (Blyth, 1845)	Western Crowned Leaf Warbler (Western Crowned Warbler)
Family Sylviidae	
444. *Curruca crassirostris* (Cretzschmar, 1830)	Eastern Orphean Warbler
445. *Curruca curruca* (Linnaeus, 1758)	Lesser whitethroat
446. *Chrysomma sinense* (Gmelin, JF, 1789)	Yellow-eyed Babbler
Family Zosteropidae	
447. *Zosterops palpebrosus* (Temminck, 1824)	Oriental White-eye
Family Timallidae	
448. *Pomatorhinus horsfieldii* (Sykes, 1832)	Indian Scimitar Babbler

449. *Dumentia hyperythra* (Franklin, 1831)	Tawny-bellied Babbler
450. *Rhopocichla atriceps* (Jerdon, 1839)	Dark-fronted Babbler
Family Pellorneidae	
451. *Pellorneum ruficeps* (Swainson, 1832)	Puff-throated Babbler
Family Leiothrichidae	
452. *Alcippe poioicephala* (Jerdon, 1841)	Quaker Tit Babbler (Brown-cheeked Fulvetta)
453. *Argya malcolmi* (Sykes, 1832)	Large Gray Babbler
454. *Argya subrufa* (Jerdon, 1839)	Rufous Babbler
455. *Turdoides striata* (Dumont, 1823)	Jungle Babbler
456. *Turdoides affinis* (Jerdon, 1845)	Yellow-billed Babbler
457. *Garrulax delesserti* (Jerdon, 1839)	Wynaad Laughing-thrush
458. *Trochalopteron fairbanki* (Blanford, 1869)	Kerala Laughing-thrush
459. *Trochalopteron cachinnans* (Jerdon, 1839)	Black-chinned Laughing-thrush
Family Sittidae	
460. *Sitta castanea* (Lesson, 1830)	Chestnut-bellied Nuthatch (Indian Nuthatch)
461. *Sitta frontalis* (Swainson, 1820)	Velvet-fronted Nuthatch
Family Sturnidae	
462. *Sturnus vulgaris* (Linnaeus, 1758)	Common Starling (European Starling)
463. *Pastor roseus* (Linnaeus, 1758)	Rosy Starling
464. *Sturnia pagodarum* (Gmelin, JF, 1789)	Brahminy starling
465. *Sturnia malabarica* (Gmelin, JF, 1789)	Chestnut- tailed Starling
466. *Acridotheres tristis* (Linnaeus, 1766)	Common Myna
467. *Acridotheres fuscus* (Wagler, 1827)	Jungle Myna
468. *Gracula religiosa* (Linnaeus, 1758)	Hill Myna (Southern Hill Myna)
Family Muscicapidae	
469. *Saxicoloides fulicatus* (Linnaeus, 1766)	Indian Robin
470. *Copsychus saularis* (Linnaeus, 1758)	Oriental Magpie Robin
471. *Kittacincla malabarica* (Scopoli, 1786)	White-rumped Shama
472. *Muscicapa dauurica* (Raffles, 1822)	Asian Brown Flycatcher
473. *Muscicapa muttui* (Layrad, EL, 1854)	Brown-breasted Flycatcher
474. *Muscicapa ruficauda* (Swainson, 1838)	Rusty-tailed Flycatcher
475. *Cyornis pallidipes* (Jerdon, 1840)	White-bellied Blue Flycatcher
476. *Cyornis tickelliae* (Blyth, 1843)	Tickell's Blue Flycatcher
477. *Cyornis rubeculoides* (Vigors, 1831)	Blue-throated Blue Flycatcher (Blue-throated Flycatcher)
478. *Eumyias thalassinus* (Swainson, 1838)	Verditer Flycatcher
479. *Eumyias albicaudatus* (Jerdon, 1840)	Nilgiri Flycatcher
480. *Brachypteryx major* (Jerdon, 1844)	White-bellied Shortwing
481. *Larvivora brunnea* (Hodgson, 1837)	Indian Blue Robin
482. *Luscinia svecica* (Linnaeus, 1758)	Bluethroat
483. *Myophonus horsfieldii* (Vigors, 1831)	Malabar's Whistling Thrush
484. *Ficedula subrubra* (Hartert & Steinbatcher, 1934)	Kashmir Flycatcher

485. *Ficedula parva* (Bechstein, 1792)	Red-breasted Flycatcher
486. *Ficedula albicilla* (Pallas, 1811)	Taiga Flycatcher
487. *Ficedula zanthopygia* (Hay, 1845)	Yellow-rumped Flycatcher
488. *Ficedula nigrorufa* (Jerdon, 1839)	Black-and-orange Flycatcher (Black-and-rufous Flycatcher)
489. *Phoenicurus ochruros* (Gmelin, SG, 1774)	Black Redstart
490. *Monticola cinclorhyncha* (Vigors, 1831)	Blue-capped Rock Thrush
491. *Monticola solitarius* (Linnaeus, 1758)	Blue Rock Thrush
492. *Saxicola maurus* (Pallas, 1773)	Siberian Stonechat
493. *Saxicola caprata* (Linnaeus, 1766)	Pied Bushchat
494. *Oenanthe oenanthe* (Linnaeus, 1758)	Northern Wheatear
495. *Oenanthe isabellina* (Temminck, 1829)	Isabelline Wheatear
496. *Oenanthe deserti* (Temminck, 1825)	Desert Wheatear
Family Turdidae	
497. *Zoothera dauma* (Latham, 1790)	Scaly Thrush (Nilgiri Thrush)
498. *Geokichla wardii* (Blyth, 1843)	Pied Thrush
499. *Geokichla citrina* (Latham, 1790)	Orange-headed Thrush
500. *Turdus simillimus* (Jerdon, 1839)	Indian Blackbird

Checklist of reptiles of Kerala (Marine species included)

Order/Family Species	Common Name
Order: Crocodylia	
Family Crocodylidae	
1. *Crocodylus porosus* (Schneider, 1801)	Estuarine Crocodile (Salt-water Crocodile)
2. *Crocodylus palustris* (Lesson, 1831)	Mugger (Marsh crocodile)
Order: Testudines	
Family Geoemydidae	
3. *Vijayachelys sylvatica* (Henderson, 1912)	Cochin Forest Cane Turtle (Kerala Forest Terrapin, Kavalai Forest Turtle)
4. *Melanochelys trijuga* (Schweigger, 1812)	Indian Black Turtle (Indian Pond Terrapin)
Family Cheloniidae	
5. *Chelonia mydas* (Linnaeus, 1758)	Green Sea Turtle
6. *Eretmochelus imbricate* (Linnaeus, 1766)	Hawksbill Sea Turtle (Hawksbill Turtle)
7. *Lepidochelys olivacea* (Eschscholtz, 1829)	Olive Ridley Sea Turtle (Pacific Ridley Turtle)
Family Dermochelyidae	
8. *Dermochelys coriacea* (Vandelli, 1761)	Leatherback Sea Turtle (Luth, Leathery turtle)
Family Testudinidae	
9. *Geochelone elegans* (Schoepff, 1795)	Indian Star Tortoise (Indian Starred Tortoise)
10. *Indotestudo travancorica* (Boulenger, 1907)	Travancore Tortoise (Forsten's Tortoise)
Family Trionychidae	
11. *Nilssonia leithii* (Gray, 1872)	Leith's Softshell Turtle
12. *Lissemys punctata* (Bonnaterre, 1789)	Indian Flapshell Turtle (Indian flap-shelled Turtle)
13. *Pelochelys cantorii* (Gray, 1864)	Asian Giant Softshell Turtle (Cantor's Giant Softshell Turtle)
14. *Chitra indica* (Gray, 1831)	Indian Narrow-headed Softshell Turtle (Narrow-headed Softshell Turtle)
Order: Squamata	
Family Agamidae	
15. *Calotes calotes* (Linnaeus, 1758)	Common Green Forest Lizard (Southern Green Calotes)
16. *Calotes grandisquamis* (Gunther, 1875)	Large-scaled Forest Lizard (Large-scaled Calotes)
17. *Calotes nemoricola* (Jerdon, 1853)	Nilgiri Forest Lizard

18. *Monilisaurus ellioti* (Gunther, 1864)	Elliot's Forest Lizard
19. *Monilisaurus rouxii* (Dumeril & Binron, 1837)	Roux's Forest Lizard (Roux's Forest Calotes)
20. *Calotes versicolor* (Daudin, 1802)	Indian Garden Lizard (Oriental Garden Lizard)
21. *Monilisaurus montanus* Pal, Vijayakumar, Shanker, Jayarajan & Deepak, 2018	Montane Forest Lizard
22. *Monilisaurus acanthocephalus* Pal, Vijayakumar, Shanker, Jayarajan & Deepak, 2018	Spiny-headed Forest Lizard
23. *Microauris aurantolabium* Krishnan,2008	Orange-lipped Forest Lizard
24. *Draco dussumieri* (Dumeril & Bibron, 1837)	South Indian Flying Lizard (Draco)[5]
25. *Otocryptis beddomei* (Boulenger, 1885)	Indian Kangaroo Lizard
26. *Psammophilus blanfordanus* (Stoliczka, 1871)	Blanford's Rock Agama
27. *Psammophilus dorsalis* (Gray, 1831)	South Indian Rock Agama
28. *Salea anamallayana* (Beddome, 1878)	Anamalai Spiny Lizard (Anamalai Salea)
29. *Salea horsfieldii* (Gray, 1845)	Horsfield's Spiny Lizard (Nilgiri Salea)
30. *Sitana marudhamneydhal* Deepak, Khandekar, Varma & Chaitanya	Fan-throated Lizard
Family Chamaeleonidae	
31. *Chamaeleo zeylanicus* (Laurenti, 1768)	Indian Chameleon
Family Gekkonidae	
32. *Cnemaspis aaronbaueri* Sayyed, Grismer, Campbell & Dileep Kumar, 2019	Aaronbauers Day Gecko
33. *Cnemaspis anamudiensis* Cyriac, Johny, Umesh & Palot, 2018	Anamudi Day Gecko
34. *Cnemaspis beddomei* (Theobald, 1876)	Beddome's Day Gecko
35. *Cnemaspis chengodumalensis* Cyriac, Palot, Deuty & Umesh, 2020	Chengodumala Day Gecko
36. *Cnemaspis gracilis* (Beddome, 1870)	Slender Day Gecko
37. *Cnemaspis indica* (Gray, 1846)	Indian Day Gecko
38. *Cnemaspis kottiyoorensis* (Cyril & Umesh, 2014)	Kottiyur Day Gecko
39. *Cnemaspis littoralis* (Jerdon, 1854)	Coastal Day Gecko
40. *Cnemaspis maculicollis* Cyriac, Johny, Umesh & Palot, 2018	Agasthyamala Day Gecko
41. *Cnemaspis mysorensis* (Jerdon,1854)	Mysore Day Gecko
42. *Cnemaspis monticola* (Manamendra-Arachchi, Batuwita & Pethiyagoda, 2007)	Mountain Day Gecko
43. *Cenemaspis nairi* (Inger, Marx & Koshy, 1984)	Ponmudi Day Gecko
44. *Cnemaspis nilagirica* (Manamendra-Arachchi, Batuwita & Pethiyagoda, 2007)	Nilgiri Day Gecko
45. *Cnemaspis Ornata* (Beddome, 1870)	Ornate Day Gecko (Ornate Dwarf Gecko)
46. *Cnemaspis palakkadensis* Sayyed,Cyriac & Dileepkumar ,2020	Palakkad Day Gecko
47. *Cnemsapis sisparensis* (Theobald, 1876)	Sispara Day Gecko

48. *Cnemaspis wynadensis* (Beddome, 1870)	Wayanad Day Gecko
49. *Cnemaspis zacharyi* Cyriac, Palot, Deuty & Umesh, 2020	Zacharia"s Day Gecko
50. *Geckoella collegalensis* (Beddome, 1870)	Kollegal Ground Gecko (Forest Spotted Gecho)
51. *Gehyra mutilate* (Wiegmann, 1834)	Four-clawed Gecko (Stump-toed Gecko)
52. *Dravidogecko janakiae* Chaithanya, Giri, Deepak, Roy, Murthy & Karanth, 2019	Janaki's Dravidogecko
53. *Dravidogecko smithi* Chaithanya, Giri, Deepak, Roy, Murthy & Karanth, 2019	Smithi's Dravidogecko
54. *Dravidogecko septentrionalis* Chaithanya, Giri, Deepak, Roy, Murthy & Karanth, 2019	Wayanad Dravidogecko
55. *Hemidactylus brookii* (Gray, 1845)	Brook's House Gecko
56. *Hemidactylus frenatus* (Schlegel, 1836)	Asian House Gecko (Common House Gecko)
57. *Hemidactylus leschenaultii* (Dumeril & Bibron, 1836)	Bark Gecko
58. *Hemidactylus maculatus* (Dumeril & Bibron, 1836)	Spotted House Gecko
59. *Hemidactylus murrayi* Gleadow,1887	Muray's Day Gecko
60. *Hemidactylus parvimaculatus* Deraniyagala,1953	Common spotted Gecko
61. *Hemidactylus paaragowli* Srikanthan, Swamy, Mohan & Pal, 2018	Travancore Rock Gecko
62. *Hemidactylus prashadi* (Smith, 1935)	Prashad's Gecko
63. *Hemidactylus reticulatus* (Beddome, 1870)	Reticulated Gecko
64. *Hemidactylus triedrus* (Daudin, 1802)	Termite Hill Gecko
Family Lacertidae (Lacertas)	
65. *Ophisops beddomei* (Jerdon, 1870)	Beddome's Lacerta
66. *Ophisops leschenaultii* (Milne-Edward, 1829)	Leschenault's Lacerta
Family Scincidae (Skinks)	
67. *Dasia subcaeruleum* (Boulenger, 1891)	Blue-bellied Tree Skink
68. *Eutropis allapallensis* (Schmidt, 1926)	Allapalli Grass Skink
69. *Eutropis beddomii* (Jerdon, 1870)	Beddome's Grass Skink
70. *Eutropis bibronii* (Gray, 1838)	Bibron's Seashore Skink
71. *Eutropis brevis* (Gunther, 1875)	Gunther's grass skink
72. *Eutropis carinata* (Schneider, 1801)	Common Keeled Skink
73. *Eutropis clivicola* (Inger, Shaffer Koshy & Bakde, 1984)	Mountain Skink
74. *Eutropis macularia* (Blyth, 1853)	Bronze Grass Skink (Bronze Skink)
75. *Eutropis dawsoni* (Annandale, 1909)	Dawson's grass skink
76. *Lygosoma albopunctata* (Gray, 1846)	White-spotted Supple Skink
77. *Lygosoma punctata* (Gmelin, 1799)	Spotted supple Skink (Common Snake Skink)
78. *Lygosoma guentheri* (Peters, 1879)	Gunther's Supple skink
79. *Ristella beddomii* (Boulenger, 1887)	Beddome's Cat Skink
80. *Ristella guentheri* (Boulenger, 1887)	Gunther's Cat Skink
81. *Ristella rurkii* (Gray, 1839)	Rurk's Cat Skink (Rurk's Ristella)

82. *Ristella travancorica* (Beddome, 1870)	Travancore Cat Skink (Travancore Ristella)
83. *Kaestlea beddomii* (Boulenger, 1887)	Beddome's Ground Skink
84. *Kaestlea bilineata* (Gray, 1846)	Two-lined Ground Skink
85. *Kaestlea laterimaculata* (Boulenger, 1887)	Side-spotted Ground Skink
86. *Kaestlea travancorica* (Beddome, 1870)	Tranvancore Ground Skink
87. *Kaestlea palnica* (Boettger, 1892)	Palni Hills Ground Skink
88. *Sphenomorphus dussumieri* (Dumeril & Bibron, 1839)	Dussumier Litter Skink (Dussumier's Forest Skink)
89. *Chalcides pentadactylus* (Beddome, 1870)	Earless Skink (Five-fingered Skink)
Family Varanidae (Monitor lizards)	
90. *Varanus bengalensis* (Daudin, 1802)	Bengal Monitor (Indian Monitor)
91. *Indotyphlops braminus* (Daudin, 1803)	Brahminy Worm Snake
92. *Grypotyphlops acutus* (Dumeril & Bibron, 1844)	Beaked Worm Snake (Beaked Blind Snake)
93. *Gerrhopilus thurstoni* (Boettger, 1890)	Thurston's Worm Snake
94. *Gerrhopilus tindalli* (Smith, 1943)	Tindall's Worm Snake
95. *Gerrhopilus beddomii* (Boulenger, 1890)	Beddome's Worm Snake
Family Uropeltidae	
96. *Melanophidium punctatum* (Beddome, 1871)	Pied-belly Shieldtail (Beddome's Black Earth Snake)
97. *Melanophidium bilineatum* (Beddome, 1870)	Yellow-striped Shieldtail (Two-lined Black Earth Snake)
98. *Melanophidium wynaudense* (Beddome, 1863)	Wynad Shieldtail (Indian Black Earth Snake)
99. *Platyplectrurus trilineatus* (Beddome, 1867)	Three-lined Shieldtail (Lined Thorntail Snake)
100. *Platyplectrurus madurensis* (Beddome, 1877)	Three-lined Shieldtail
101. *Teretrurus sanguineus* (Beddome, 1867)	Western Shieldtail (Purple-Red Earth Snake)
102. *Teretrurus rhodogaster* Wall,1921	Wall's shieldtail
103. *Plectrurus aureus* (Beddome, 1880)	Golden Shieldtail (Kerala Burrowing Snake)
104. *Plectrurus guentheri* (Beddome, 1863)	Purple Shieldtail (Gunther's Burrowing Snake)
105. *Plectrurus perroteti* (Dumeril & Blbron, 1854)	Perrotet's Shieldtail (Nilgiri Burrowing Snake)
106. *Uropeltis ellioti* (Gray, 1858)	Elliot's Shieldtail
107. *Uropeltis nitida* (Beddome, 1878)	Cochin Shieldtail
108. *Uropeltis ocellata* (Beddome, 1863)	Nilgiri Shieldtail (Ocellated Shieldtail)
109. *Uropeltis beddomii* (Gunther, 1862)	Beddome's Shieldtail (Beddome's Earth Snake)
110.*Uropeltis macrorhyncha* (Beddome, 1877)	Anamalai Shieldtail (Anamalai Earth Snake)
111. *Uropeltis woodmalsoni* (Theoblad, 1876)	Black-bellied Shieldtail (Woodmason's Earth Snake)

112. *Uropeltis ceylanicus* (Cuvier, 1829)	Kerala Shieldtail (Ceylon Earth Snake)
113. *Uropeltis arcticeps* (Gunther, 1875)	Periyar Shieldtail (Thirunelveli Earth Snake)
114. *Uropeltis rubromaculatus* (Beddome, 1867)	Red-spotted Shieldtail (Red-spotted Earth Snake)
115. *Uropeltis rubrolineata* (Gunther, 1875)	Red-lined Shieldtail (Red-lined Earth Snake)
116. *Uropeltis myhendrae* (Beddome, 1886)	Barred Shieldtail (Boulenger's Earth Snake)
117. *Uropeltis maculata* (Beddome, 1878)	Red-sided Shieldtail (Spotted Earth Snake)
118. *Uropeltis petersi* (Beddome, 1878)	Peter's Shieldtail (Peter's Earth Snake)
119. *Uropeltis liura* (Gunther, 1875)	Ashambu Shieldtail (Gunther's Earth Snake)
120. *Uropeltis pulneyensis* (Beddome, 1863)	Palni Shieldtail (Indian Earth Snake)
121. *Uropeltis grandis* (Beddome, 1867)	Violet Shieldtail (Smith's Earth Snake)
122. *Rhinophis sanguineus* (Beddome, 1863)	Red-billed Shieldtail (Beddome's Shieldtail)
123. *Rhinophis fergusonianus* (Boulenger, 1896)	Cardamom Shieldtail (Cardamom Hills Earth Snake)
124. *Rhinophis travancoricus* (Boulenger, 1892)	Tranvancore Shieldtail (Tamil Nadu Earth Snake)
125. *Rhinophis melanoleucus* Cyriac, Narayanan, Sampaio, Umesh & Gower,2020	Lakkidi Shieldtail
126. *Rhinophis karinthandani* Cyriac, Narayanan, Sampaio, Umesh & Gower,2020	Karinthandan Shieldtail
Family Pythonidae (Pythons)	
127. *Python molurus* (Linnaeus, 1758)	Indian Rock Python
Family Boidae (Boas)	
128. *Eryx conicus* (Schneider, 1801)	Common Sand Boa
129. *Eryx jhonii* (Russel, 1801)	Red Sand Boa (Indian Sand Boa)
130. *Eryx whitakeri* (Das, 1991)	Whitaker's Boa (Whitaker's Sand Boa)
Family Acrochordidae	
131. *Acrochordus granulatus* (Schneider, 1799)	Marine File Snake (Little Wart Snake)
Family Colubridae	
132. *Coelognathus helena* (Daudin, 1803)	Common Trinket Snake
133. *Ptyas mucosa* (Linnaeus, 1758)	Indian Rat Snake (Dhaman)
134. *Argyrogena fasciolata* (Shaw, 1802)	Banded Racer
135. *Liopeltis calamaria* (Gunther, 1858)	Lesser Stripe-necked Snake (Calamaria Reed Snake)
136. *Oligodon venustus* (Jerdon, 1853)	Black-spotted Kukri Snake
137. *Oligodon travancoricus* (Beddome, 1877)	Tranvancore Kukri Snake
138. *Oligodon taeniolatus* (Jerdon, 1853)	Russell's Kukri Snake
139. *Oligodon arnensis* (Shaw, 1802)	Common Kukri Snake (Banded Kukri Snake)
140. *Oligodon affinis* (Gunther, 1862)	Western Kukri Snake

141. *Oligodon brevicauda* (Gunther, 1862)	Stripped Kukri Snake (Short-tailed Kukri Snake)
142. *Dendrelaphis ashoki* (Vogel & Van Rooijen, 2011)	Ashok's Bronzeback Tree Snake
143. *Dendrelaphis girii* (Vogel & Van Rooijen, 2011)	Giri's Bronzeback Tree Snake
144. *Dendrelaphis grandoculis* (Boulenger, 1890)	Large-eyed Bronzeback Tree Snake
145. *Dendrelaphis chairecaeos* (Boie, 1827)	Southern Bronzeback Tree Snake
146. *Dendrelaphis tristis* (Daudin, 1803)	Common Bronzeback Tree Snake
147. *Chrysopelea ornata* (Shaw, 1802)	Ornate Flying Snake (Golden Tree Snake)
148. *Lycodon travancoricus* (Beddome, 1870)	Travancore Wolf Snake
149. *Lycodon striatus* (Shaw, 1802)	Barred Wolf Snake (Northern Wolf Snake)
150. *Lycodon aulicus* (Linnaeus, 1754)	Common Wolf Snake
151. *Lycodon fasciolatus* (Gunther, 1864)	Russel's wolf snake
152. *Lycodon nympha* (Daudin, 1803)	Bridal Snake
153. *Sibynophis subpunctatus* (Bibron & Dumeril, 1854)	Dumeril's Black Headed Snake
154. *Rhabdops olivaceus* (Beddome, 1863)	Olive Forest Snake
155. *Boiga trigonata* (Schneider, 1802)	Common Cat Snake (Indian Gamma Snake)
156. Boiga thackerayi Giri, Deepak, Captain, Pawar & Tillack, 2019	Thackeray's cat snake
157. *Boiga nuchalis* (Gunther, 1875)	Collared Cat Snake
158. *Boiga forsteni* (Bbron & Dumeril, 1854)	Forsten's Cat Snake
159. *Boiga dightoni* (Boulenger, 1894)	Travancore Cat Snake (Dighton's Cat Snake)
160. *Boiga flaviviridis* (Boulenger, 1894)	Yellow green cat snake
161. *Ahaetulla perroteti* (Dumeril, Bibron & Dumeril, 1854)	Bronze-headed Vine Snake (Perrotet's Vine Snake)
162. *Ahaetulla dispar* (Gunther, 1864)	Gunther's Vine Snake
163. *Ahaetulla oxyrhyncha* (Bell, 1825)	Long nosed vine snake\
164. *Ahaetulla sahyadrensis* Mallik, Srikanthan, Pal, Princia D'souza, Shanker and Ganesh, 2020	Brown vine snake
165. *Ahaetulla isabellina* Wall,1910	Isabelline/Wall's vine snake
166. *Ahaetulla malabarica* Mallik, Srikanthan, Pal, Princia D'souza, Shanker and Ganesh, 2020	Malabar vine snake
167. *Ahaetulla travancorica* Mallik, Srikanthan, Pal, Princia D'souza, Shanker and Ganesh, 2021	Travancore vine snake
168. *Proahaetulla antiqua* Mallik, Achyuthan, Ganesh, Pal, Vijayakumar and Shanker 2019	Antiq vine snake
169. *Amphiesma stolatum* (Linnaeus, 1758)	Striped Keelback (Buff-striped Keelback)
170. *Hebius beddomei* (Günther, 1864)	Beddome's Keelback (Nilgiri Keelback)
171. *Hebius monticola* (Jerdon, 1853)	Hill Keelback (Wayanad Keelback)

172. *Fowlea piscator* Schneider, 1799	Checkered Keelback (Asiatic Water Snake)
173. *Rhabdophis plumbicolor* (Cantor,1839)	Green Keelback
174. *Atretium schistosum* (Daudin, 1803)	Olive Keelback Water Snake
Family Xenodermatidae	
175. *Xylophis captaini* (Gower & Winkler, 2007)	Captain's Wood Snake
176. *Xylophis perroteti* (Dumeril, Bibron & Dumeril ,1854)	Stripped Narrow-headed Snake
177. *Xylophis stenorhynchus* (Gunther, 1875)	Gunther's Narrow-headed Snake
178. *Xylophis mosaicus* Deepak, Narayanan, Das, Rajkumar, Easa, Sreejith, & Gower, 2020	Anamalai Wood Snake
Family Homalopsidae	
179. *Dieurostus dussumieri* (Dumeril, Bibron & Dumeril, 1854)	Dussumier's Smooth Scale Water Snake (Kerala Mud Snake)
180. *Cerberus rynchops* (Schneider, 1799)	Dog-faced Water Snake (Asian Bockadam)
181. *Gerarda prevostiana* (Eydoux & Gervais, 1837)	Glossy Marsh Snake
Family Elapidae	
182. *Bungarus caeruleus* (Schneider, 1801)	Common Indian Krait
183. *Calliophis melanurus* (Shaw, 1802)	Slender Coral Snake
184. *Calliophis nigrescens* (Gunther, 1862)	Striped Coral Snake
185. *Calliophis beddomei* (Smith, 1943)	Beddome's Coral Snake
186. *Calliophis bibroni* (Jan, 1858)	Bibron's Coral Snake
187. *Naja naja* (Linnaeus, 1758)	Spectacled Cobra
188. *Ophiophagus hannah* (Cantor, 1836)	King Cobra
189. *Hydrophis schistosus* (Daudin, 1803)	Hook-nosed Sea Snake
190. *Hydrophis cyanocinctus* (Daudin, 1803)	Annulated Sea Snake
191. *Hydrophis ornatus* (Gray, 1842)	Cochin-banded Sea Snake
192. *Hydrophis curtus* (Shaw, 1802)	Short Sea Snake
193. *Hydrophis platurus* (Linnaeus, 1766)	Black and Yellow Sea Snake
194. *Hydrophis spiralis* (Shaw, 1802)	Yellow Sea Snake
Family Viperidae	
195. *Daboia russelii* (Shaw & Nodder, 1797)	Russel's Viper
196. *Echis carinatus* (Schneider, 1801)	Saw-Scaled Viper
197. *Hypnale hypnale* (Merrem, 1820)	Common Hump-nosed Pit Viper
198. *Trimeresurus macrolepis* (Beddome, 1862)	Large-scaled Green Pit Viper
199. *Trimeresurus malabaricus* (Jerdon, 1854)	Malabar Pit Viper
200. *Trimeresurus strigatus* (Gray, 1842)	Horseshoe Pit Viper
201. *Trimeresurus gramineus* (Shaw, 1802)	Bamboo Pit Viper

Checklist of Amphibians of Kerala (As on July 2021)

Sl No	Scientific name	Authority	Common name	Malayalam Name
	CLASS: AMPHIBIA	Gray		
	I. ORDER ANURA	Fischer von Waldheim		
	1. Family BUFONIDAE	Gray		
1	*Duttaphrynus beddomii*	(Gunther, 1875)	Beddome's Toad	തെക്കൻൻ ചൊറിത്തവള
2	*Duttaphrynus melanostictus*	(Schneider, 1799)	Common Indian Toad	ചൊറിത്തവള
3	*Duttaphrynus*	(Boulenger 1882)	Small-eared Toad	ചെറുചെവിയൻ
4	*Duttaphrynus parietalis*	(Boulenger, 1882)	Ridged Toad	കാട്ടുചൊറിത്തവള
5	*Duttaphrynus scaber*	(Schneider, 1799)	Ferguson's Toad	കുഞ്ഞൻ ചൊറി
6	*Duttaphrynus*	(Linnaeus, 1758)	Silent Valley Toad	സൈലന്റ് വാലി ചെ
7	*Blaira ornata*	(Gunther, 1876)	Malabar Torrent	തീവയറൻ അരുവി
8	*Blaira rubigina*	(Pillai & Pattabiraman,	Red Stream Toad	ചെമ്പൻ അരുവിയ
9	*Pedostibes tuberculosus*	Gunther 1875	Malabar Tree Toad	മരച്ചൊറിയൻ
	2. Family	Anderson		
10	*Euphlyctis aloysii*	Joshy, Alam, Kurabayashi, Sumida, and Kuramoto, 2009	Aloysius skittering frog	അലോഷി ചാട്ടക്കാരൻ തവള
11	*Euphlyctis cyanophlyctis*	(Schneider, 1799)	Indian Skipper Frog	ചാട്ടക്കാരൻ

12	*Euphlyctis karaavali*	Priti, Naik, Seshadri, Singal, Vidisha, Ravikanth, and	Karaavali Skittering Frog	പൊന്മാൻ തവള
13	*Euphlyctis kerala*	Dnesh, Channakeshavamurthy, Deepak, Ghosh and Deuti,	Kerala skittering frog	പച്ച ചാട്ടക്കാരൻ
14	*Hoplobatrachus crassus*	(Jerdon, 1853)	Jerdon's Bullfrog	ആട്ടുമാക്കാച്ചി
15	*Hoplobatrachus tigerinus*	(Daudin, 1803)	Indian Bullfrog	നാട്ടുമാക്കാച്ചി
16	*Minervarya agricola*	(Jerdon, 1853)	Common Indian cricket frog	ഇന്ത്യൻ ചിലപ്പൻ
17	*Minervarya brevipalmata*	(Peters, 1871)	Short-webbed Frog	ചതുപ്പൻ ചിലപ്പൻ
18	*Minervarya kadar*	(Garg and Biju, 2017)	Kadar Burrowing Frog	കാടർ ചിലപ്പൻ
19	*Minervarya keralensis*	(Dubois, 1980)	Kerala Warty Frog	കേരള ചിലപ്പൻ
20	*Minervarya manoharani*	(Garg and Biju, 2017)	Manoharan's Burrowing Frog	മനോഹരന് ചിലപ്പൻ
21	*Minervarya mudduraja*	(Kuramoto, Joshy, Kurabayashi, and Sumida, 2008)	Mudduraja cricket frog	മുദ്ദുരാജ ചിലപ്പൻ
22	*Minervarya murthii*	(Pillai, 1979)	Murthy's frog	മൂർത്തി ചിലപ്പൻ
23	*Minervarya neilcoxi*	(Garg and Biju, 2017)	Neil Cox's Burrowing Frog	നീൽ കോക്സ് ചിലപ്പൻ

24	*Minervarya nilagirica*	(Jerdon, 1853)	Nilgiris wart frog	നിലഗിരി ചിലപ്പൻ
25	*Minervarya parambikulamana*	(Rao, 1937)	Parambikulam Wart Frog	പറമ്പിക്കുളം ചിലപ്പൻ
26	*Minervarya rufescens*	(Jerdon, 1853)	Rufescent Burrowing Frog	ചെങ്കൽ ചിലപ്പൻ
27	*Minervarya syhadrensis*	(Annandale, 1919)	Minervarya Frog	ബോംബേ ചിലപ്പൻ
28	*Minervarya sahyadris*	Dubois, Ohler & Biju, 2001	Bombay Wart Frog	ചിലു ചിലപ്പൻ
29	*Sphaerotheca pluvialis*	(Jerdon, 1853)	Jerdon's Burrowing Frog	ജെർഡൻ കുഴിത്തവള
	3. Family MICRIXALIDAE	Dubois, Ohler and Biju		
30	*Micrixalus adonis*	Biju, Garg, Gururaja, Shouche, & Walujkar, 2014	Munnar Torrent Frog	മൂന്നാർ പിലിഗിരിയൻ
31	*Micrixalus elegans*	(Rao,1937)	Elegant Torrent Frog	കുടക് പിലിഗിരിയൻ
32	*Micrixalus frigidus*	Biju, Garg, Gururaja, Shouche, & Walujkar, 2014	Cold Stream Torrent Frog	ആനമല പിലിഗിരിയൻ
33	*Micrixalus fuscus*	(Boulenger, 1882)	Dusky Torrent Frog	അഗസ്ത്യമല പിലിഗിരിയൻ
34	*Micrixalus gadgili*	Pillai & Pattabiraman, 1990	Gadgil's Torrent Frog	ഗാഡ്ഗിൽ പിലിഗിരിയൻ
35	*Micrixalus herrei*	Myers, 1942	Kallar Torrent Frog	കല്ലാർ പിലിഗിരിയൻ

36	*Micrixalus kurichiyari*	Biju, Garg, Gururaja, Shouche, & Walujkar, 2014	Kurichiyar Torrent Frog	കുറിച്യർ പിലിഗിരിയൻ
37	*Micrixalus mallani*	Biju, Garg, Gururaja, Shouche, & Walujkar, 2014	Mallan's Torrent Frog	ശെന്തുരുണി പിലിഗിരിയൻ
38	*Micrixalus nelliyampathi*	Biju, Garg, Gururaja, Shouche, & Walujkar, 2014	Nelliyampathi Torrent Frog	നെല്ലിയാമ്പതി പിലിഗിരിയൻ
39	*Micrixalus nigraventris*	Biju, Garg, Gururaja, Shouche, & Walujkar, 2014	Black-bellied Torrent Frog	കരിവയറൻ പിലിഗിരിയൻ
40	*Micrixalus nudis*	Pillai, 1978	Naked Torrent Frog	വയനാട് പിലിഗിരിയൻ
41	*Micrixalus phyllophilus*	(Jerdon, 1854)	Pink-thighed Torrent Frog	ചെങ്കാലൻ പിലിഗിരിയൻ
42	*Micrixalus sairandhri*	Biju, Garg, Gururaja, Shouche, & Walujkar, 2014	Sairandhri Torrent Frog	സൈരന്ധ്രി പിലിഗിരിയൻ
43	*Micrixalus sali*	Biju, Garg, Gururaja, Shouche, & Walujkar, 2014	Sali’s Torrent Frog	പൊന്മുടി പിലിഗിരിയൻ
44	*Micrixalus saxicola*	(Jerdon, 1854)	Wayanad Torrent Frog	വടക്കൻ പിലിഗിരിയൻ
45	*Micrixalus silvaticus*	(Boulenger, 1882)	Forest Torrent Frog	കാട്ടു പിലിഗിരിയൻ
46	*Micrixalus thampii*	Pillai, 1981	Thampi’s Torrent Frog	സൈലന്റ് വാലി പിലിഗിരിയൻ

	4. Family MICROHYLIDAE	Günther		
47	*Melanobatrachus indicus*	Beddome, 1878	Black Microhylid Frog	ചൊലകറുമ്പി
48	*Microhyla darreli*	Garg, Suyesh, Das, Jiang, Wijayathilaka, Amarasinghe, Alhadi, Vineeth, Aravind,	Darrel's Chorus Frog	ഡറെലി കുറിമുക്കൻ
49	*Microhyla nilphamariensis*	Howlader, Nair, Gopalan, and Merilä, 2015	Nilphamarai Narrow-mouthed Frog	നിൽഫമറയ് കുറിമുക്കൻ
50	*Microhyla ornata*	(Dumeril & Bibron, 1841)	Ornate Narrow-mouthed Frog	സ്വർണ്ണ കുറിമുക്കൻ
51	*Microhyla rubra*	Jerdon, 1854)	Reddish Narrow-mouthed Frog	ചെമ്പൻ കുറിമുക്കൻ
52	*Microhyla sholigari*	Dutta & Ray, 2000	Sholigari Microhylid	ഷോളിഗാരി കുറിമുക്കൻ
53	*Mysticellus franki*	Garg and Biju, 2019	Franky's Narrow-mouthed Frog	നാൽക്കണ്ണൻ കുറിമുക്കൻ
54	*Uperodon anamalaiensis*	Rao, 1937	Anamalai Dot Frog	ആനമല കുറിവായൻ
55	*Uperodon globulosus*	(Gunther, 1864)	Indian Balloon Frog	ബലൂൺ തവള
56	*Uperodon montanus*	(Jerdon, 1854)	Jerdon's Ramanella	ചോല കുറിവായൻ
57	*Uperodon mormoratus*	(Rao, 1937)	Indian Dot Frog	ചെങ്കൽ കുറിവായൻ

58	*Uperodon systoma*	(Schneider, 1799)	Marbled Balloon Frog	വെണ്ണക്കൽ വട്ടിത്തവള
59	*Uperodon taprobanicus*	Parker, 1934	Painted Frog	ചിത്ര തവള
60	*Uperodon triangularis*	(Gunther, 1875)	Malabar Ramanella	മലബാർ കുറിവായൻ
61	*Uperodon variegatus*	(Stoliczka, 1872)	Variegated Ramanella	വർണ കുറിവായൻ
	5. Family NASIKABATRACHIDA	Biju and Bossuyt		
62	*Nasikabatrachus sahvadrensis*	Biju & Bossuyt, 2003	Purple Frog	പാതാള തവള
	6. Family NYCTIBATRACHIDAE	Blommers-Schlösser		
63	*Astrobatrachus kurichiyana*	Vijayakumar, Pyron, Dinesh, Torsekar, Srikanthan, Swamy, Stanley, Blackburn, and Shanker, 2019	Starry Dwarf Frog	നക്ഷത്ര കുഞ്ഞൻ
64	*Nyctibatrachus acanthodermis*	"Biju, Bocxlaer, Mahony, Dinesh, Radhakrishnan,	Spinular Night Frog	മുള്ളൻ രാത്തവള
65	*Nyctibatrachus aliciae*	Inger, Shaffer, Koshy & Bakde, 1984	Aliciae's Night Frog	അലിസി രാത്തവള
66	*Nyctibatrachus anamallaiensis*	(Myers, 1942)	Anamallai Night Frog	ആനമല രാത്തവള
67	*Nyctibatrachus athirappillyensis*	Garg, Suyesh, Sukesan, and Biju, 2017	Athirappilly Night Frog	അതിരപ്പിള്ളി രാത്തവള

68	*Nyctibatrachus beddomii*	(Boulenger, 1882)	Beddome's Night Frog	ബെടോം രാത്തവള
69	*Nyctibatrachus deccanensis*	Dubois, 1984	Anamallai Night Frog	ചോല രാത്തവള
70	*Nyctibatrachus deveni*	"Biju, Bocxlaer, Mahony, Dinesh, Radhakrishnan, Zachariah, Giri &	Deven's Night Frog	ദേവനി രാത്തവള
71	*Nyctibatrachus gavi*	"Biju, Bocxlaer, Mahony, Dinesh, Radhakrishnan,	Gavi Night Frog	ഗവി രാത്തവള
72	*Nyctibatrachus grandis*	"Biju, Bocxlaer, Mahony, Dinesh, Radhakrishnan,	Wayanad Night Frog	വയനാട് രാത്തവള
73	*Nyctibatrachus indraneili*	"Biju, Bocxlaer, Mahony, Dinesh, Radhakrishnan,	Indraneil's Night Frog	ഇന്ദ്രീലി രാത്തവള
74	*Nyctibatrachus kempholeyensis*	(Rao, 1937)	Kempholey Night Frog	കെംഫോളേ രാത്തവള
75	*Nyctibatrachus major*	Boulenger, 1882	Malabar Night Frog	പെരും രാത്തവള
76	*Nyctibatrachus manalari*	Garg, Suyesh, Sukesan, and Biju, 2017	Manalar Night Frog	മണലാർ രാത്തവള
77	*Nyctibatrachus mewasinghi*	Krutha, Dahanukar, and Molur, 2017	Mewa Singh's Night Frog	പെരുവണ്ണാമുഴി രാത്തവള
78	*Nyctibatrachus minimus*	Biju, Bocxlaer, Giri, Roelants, Nagaraju & Bossuyt, 2007	Miniature Night Frog	കുഞ്ഞൻ രാത്തവള
79	*Nyctibatrachus minor*	Inger, Shaffer, Koshy & Bakde, 1984	Kerala Night Frog	കേരളാ രാത്തവള

80	*Nyctibatrachus periyar*	"Biju, Bocxlaer, Mahony, Dinesh, Radhakrishnan, Zachariah, Giri & Bossuyt 2011"	Periyar Night Frog	പെരിയാർ രാത്തവള
81	*Nyctibatrachus pillai*	"Biju, Bocxlaer, Mahony, Dinesh, Radhakrishnan,	Pillai's Night Frog	പിള്ള രാത്തവള
82	*Nyctibatrachus poocha*	Biju, Bocxlaer, Mahony, Dinesh, Radhakrishnan,	Meowing Night Frog	പൂച്ചത്തവള
83	*Nyctibatrachus pulivijayani*	Garg, Suyesh, Sukesan, and Biju, 2017	Vijayan's Night Frog	പുലി രാത്തവള
84	*Nyctibatrachus sabarimalai*	Garg, Suyesh, Sukesan, and Biju, 2017	Sabarimala Night Frog	ശബരിമല രാത്തവള
85	*Nyctibatrachus vasanthi*	Ravichandran, 1997	Kalakad Night Frog	കളക്കാട് രാത്തവള
86	*Nyctibatrachus vrijeuni*	Biju, Bocxlaer, Mahony, Dinesh, Radhakrishnan,	VUB Night Frog	വി യു ബി രാത്തവള
87	*Nyctibatrachus webilla*	Garg, Suyesh, Sukesan, and Biju, 2017	Kadalar Night Frog	വെബ്ബില്ലാത്തവള
	7. Family RANIDAE	Batsch		
88	*Clinotarsus curtipes*	(Jerdon, 1853)	Bicoloured Frog	കാട്ടുമണവാട്ടി
89	*Hydrophylax malabarica*	(Tschudi, 1838)	Malabar Hills Frog	മണവാട്ടിത്തവള
90	*Indosylvirana aurantiaca*	(Boulenger, 1904)	Boulenger's Golden-backed frog	ബൊലെഞ്ചർ സ്വർണത്തവള

91	*Indosylvirana doni*	(Biju, Garg, Mahony, Wijayathilaka, Senevirathne &	Don's Golden-backed frog	ഡോണി സ്വർണത്തവള
92	*Indosylvirana flavescens*	(Jerdon, 1853)	Yellowish Golden-backed frog	മഞ്ഞ സ്വർണത്തവള
93	*Indosylvirana indica*	(Biju, Garg, Mahony, Wijayathilaka,	Indian Golden-backed frog	ഇന്ത്യൻ സ്വർണത്തവള
94	*Indosylvirana intermedia*	(Rao, 1937)	Rao's intermediate Golden-backed frog	റാവു സ്വർണത്തവള
95	*Indosylvirana magna*	(Biju, Garg, Mahony, Wijayathilaka,	Large Golden-backed Frog	വലിയ സ്വർണത്തവള
96	*Indosylvirana sreeni*	(Biju, Garg, Mahony, Wijayathilaka,	Sreeni's Golden-backed frog	ശ്രീനി സ്വർണത്തവള
97	*Indosylvirana urbis*	(Biju, Garg, Mahony, Wijayathilaka, Senevirathne & Meegaskumbura, 2014)	Urban Golden-backed frog	നാട്ടു സ്വർണത്തവള
	8. Family RANIXALIDAE	Dubois		
98	*Indirana beddomii*	(Gunther, 1875)	Beddome's leaping frog	ബെഡോം പാറത്തവള
99	*Indirana brachytarsus*	(Gunther, 1875)	Anamallais Leaping frog	ആനമല പാറത്തവള
100	*Indirana gundia*	(Dubois, 1986)	Gundia Leaping Frog	ഗുണ്ടണ്ടിയ പാറത്തവള
101	*Indirana paramakri*	Garg and Biju, 2016	Rocky-terrain Leaping Frog	പാറമാക്രി പാറത്തവള

102	*Indirana sarojjamma*	Dahanukar, Modak, Krutha, Nameer, Padhye, and Molur, 2016	Sarojamma's Leaping Frog	പൊന്മുടി പാറത്തവള
103	*Indirana semipalmata*	(Boulenger, 1882)	South Indian Frog	ചെറുകാലൻ പാറത്തവള
104	*Indirana tysoni*	Dahanukar, Modak, Krutha, Nameer, Padhye, and Molur, 2016	Tyson's Leaping Frog	റാണിപുരം പാറത്തവള
105	*Indirana yadera*	Dahanukar, Modak, Krutha, Nameer, Padhye, and Molur, 2016	Yadera's Leaping Frog	ഇടുക്കി പാറത്തവള
106	*Walkerana diplosticta*	(Gunther, 1875)	Spotted Leaping Frog	പുള്ളി പാറത്തവള
107	*Walkerana leptodactyla*	(Boulenger, 1882)	Boulenger's Leaping Frog	ബൊലെഞ്ചർ പാറത്തവള
108	*Walkerana muduga*	Dinesh, Vijayakumar, Ramesh,	Muduga's Leaping Frog	മുദുഗ പാറത്തവള
109	*Walkerana phrynoderma*	(Boulenger, 1882)	Toad skinned Leaping Frog	ചൊറിയൻ പാറത്തവള
	9. Family RHACOPHORIDAE	Hoffman		
110	*Beddomixalus bijui*	(Zachariah, Dinesh, Radhakrishnan,	Anamalai Swamp Frog	ആനമല ചതുപ്പൻ
111	*Ghatixalus asterops*	Biju, Roelants & Bossuyt, 2008	Ghat Tree Frog	ചോല മരത്തവള

112	*Ghatixalus magnus*	Abraham, Mathew, Cyriac, Zachariah, Raju & Zachariah, 2015	Large Ghats Tree Frog	വലിയ ചോല മരത്തവള
113	*Ghatixalus variabilis*	(Jerdon, 1853)	Green Tree Frog	പച്ചച്ചോല മരത്തവള
114	*Mercurana myristicapalustris*	Abraham, Pyron, Ansil, Zachariah & Zachariah, 2013	Myristica Swamp frog	തെക്കൻ ചതുപ്പൻ
115	*Polypedates maculatus*	(Gray, 1834)	Common Indian Tree Frog	ചുവർത്തവള
116	*Polypedates occidentalis*	Das & Dutta, 2006	Charpa Tree frog	ചാർപ്പ ചുവർത്തവള
117	*Polypedates pseudocruciger*	Das & Ravichandran, 1998	False Hour-glass Tree Frog	ഘടികാര തവിട്ടുമരത്തവള
118	*Pseudophilautus kani*	(Biju & Bossuyt, 2009)	Kani Bush Frog	കാണി ഇലത്തവള
Sl No	**Scientific name**	**Authority**	**Common name**	**ങമഹമ്മമഹമാ ചമാല**
119	*Pseudophilautus wynaadensis*	(Jerdon,1853)	Jerdon's Bush Frog	വയനാടൻ ഇലത്തവള
120	*Raorchestes agasthyaensis*	Zachariah, Dinesh,Kunhikrishnan,	Agasthyamala Bush Frog	അഗസ്ത്യൻ ഇലത്തവള
121	*Raorchestes akroparallagi*	(Biju & Bossuyt, 2009)	Variable Bush Frog	പച്ച ഇലത്തവള
122	*Raorchestes anili*	(Biju & Bossuyt, 2006)	Anil's Bush Frog	അനിലി ഇലത്തവള
123	*Raorchestes archeos*	Vijaykumar, Dinesh, Prabhu & Shanker, 2014	Archaic Bush Frog	പുള്ളി ഇലത്തവള

124	*Raorchestes aureus*	Vijaykumar, Dinesh, Prabhu & Shanker, 2014	Golden-eyed Frog	സ്വർണ്ണക്കണ്ണി ഇലത്തവള
125	*Raorchestes beddomii*	(Gunther, 1876)	Beddome's Bush Frog	ബെടോം ഇലത്തവള
126	*Raorchestes blandus*	Vijaykumar, Dinesh, Prabhu & Shanker, 2014	Pleasant Bush Frog	ബ്ലാണ്ടസ് ഇലത്തവള
127	*Raorchestes bobingeri*	(Biju & Bossuyt, 2005)	Bob Inger's Bush Frog	ബോബിന്ഗർ ഇലത്തവള
128	*Raorchestes chalazodes*	(Gunther, 1876)	Chalazodes Bubble Nest Frog	പച്ച ഈറ്റത്തവള
129	*Raorchestes charius*	(Rao, 1937)	Seshachar's Bush Frog	ശേഷാചർ ഇലത്തവള
130	*Raorchestes chlorosomma*	(Biju & Bossuyt, 2009)	Green-eyed Bush Frog	പച്ചക്കണ്ണി ഇലത്തവള
131	*Raorchestes chotta*	(Biju & Bossuyt, 2009)	Small Bush Frog	കുഞ്ഞൻ ഇലത്തവള
132	*Raorchestes chromasynchysi*	(Biju & Bossuyt, 2009)	Confusing Green Bush Frog	സമ്മിശ്ര ഇലത്തവള
133	*Raorchestes crustai*	Zachariah, Dinesh,Kunhikrishnan,	Bark Bush Frog	പട്ട ഇലത്തവള
134	*Raorchestes drutaahu*	Garg, Suyesh, Das, Bee and Biju, 2021	Fast-calling Shrub Frog	ദ്രുതാഹു ഇലത്തവള
135	*Raorchestes dubois*	(Biju & Bossuyt, 2006)	Kodaikanal Bush Frog	കൊടൈ ഇലത്തവള

136	*Raorchestes flaviocularis*	Vijayakumar, Dinesh, Prabhu, and Shanker, 2014	Yellow-eyed Reed Frog	മഞ്ഞക്കണ്ണി ഈറ്റത്തവള
137	*Raorchestes flaviventris*	(Boulenger, 1882)	Yellow-bellied Bush Frog	മഞ്ഞവയറൻ ഇലത്തവള
138	*Raorchestes glandulosus*	(Jerdon, 1853)	Glandular Bush frog	മാനന്തവാടി ഇലത്തവള
139	*Raorchestes graminirupes*	(Biju & Bossuyt, 2005)	Ponmudi Bush frog	പൊന്മുടി ഇലത്തവള
140	*Raorchestes griet*	(Bossuyt, 2002)	Griet Bush Frog	ഗ്രിയറ്റ് ഇലത്തവള
141	*Raorchestes jayarami*	(Biju & Bossuyt, 2009)	Jayaram's Bush Frog	ജയറാം ഇലത്തവള
142	*Raorchestes johnceei*	Zachariah, Dinesh,Kunhikrishnan,	Johnceei's Bush Frog	ജോൺസി ഇലത്തവള
143	*Raorchestes kadalarensis*	Zachariah, Dinesh,Kunhikrishnan,	Kadalar Bush Frog	കടലാർ ഇലത്തവള
144	*Raorchestes kaikatti*	(Biju & Bossuyt, 2009)	Kaikatti Bush Frog	കൈകാട്ടി ഇലത്തവള
145	*Raorchestes kakachi*	Seshadri, Gururaja & Aravind, 2012	Kakachi Bush Frog	കാക്കാച്ചി ഇലത്തവള
146	*Raorchestes kakkayamensis*	Garg, Suyesh, Das, Bee and Biju, 2021	Kakkayam Shrub Frog	കക്കയം ഇലത്തവള
147	*Raorchestes keirasabina*	Garg, Suyesh, Das, Bee and Biju, 2021	Keira’s Shrub Frog	കെയ്റ ഇലത്തവള

148	*Raorchestes lechiya*	Zachariah, Cyriac, Chandramohan, Ansil,	Lechiyappan's bush frog	ലെച്ചിയ്യപ്പൻ ഇലത്തവള
149	*Raorchestes leucolatus*	Vijaykumar, Dinesh, Prabhu & Shanker, 2014	White Patch Bush Frog	പാണ്ടൻ ഇലത്തവള
150	*Raorchestes manohari*	Zachariah, Dinesh,Kunhikrishnan,	Beautiful Reed Bush Frog	മനോഹരി ഈറ്റത്തവള
151	*Raorchestes marki*	(Biju & Bossuyt, 2009)	Mark's Bush Frog	മാർക്കി ഇലത്തവള
152	*Raorchestes munnarensis*	(Biju & Bossuyt, 2009)	Munnar Bush Frog	മൂന്നാർ ഇലത്തവള
153	*Raorchestes nerostagona*	(Biju & Bossuyt, 2005)	Water Drop Frog	മഴത്തുള്ളി തവള
154	*Raorchestes ochlandrae*	(Gururaja, Dinesh, Palot, Radhakrishnan & Ramachandra, 2007)	Ochlandrae Reed Bush Frog	ഈറ്റത്തവള
155	*Raorchestes ponmudi*	(Biju & Bossuyt, 2005)	Large Ponmudi Bush Frog	വലിയ ഇലത്തവള
156	*Raorchestes ravii*	Zachariah, Dinesh,Kunhikrishnan,	Ravi's Bush Frog	രവി ഇലത്തവള
157	*Raorchestes resplendens*	Biju, Shouche, Dubois, Dutta & Bossuyt, 2010	Resplendent Shrub Frog	ആനമുടി ഇലത്തവള
158	*Raorchestes sanjappai*	Garg, Suyesh, Das, Bee and Biju, 2021	Sanjappa’s Shrub Frog	സഞ്ജപ്പ ഇലത്തവള
159	*Raorchestes signatus*	(Boulenger, 1882)	Star-eyed Bush Frog	നക്ഷത്രക്കണ്ണി ഇലത്തവള
160	*Raorchestes silentvalley*	Zachariah, Cyriac, Chandramohan, Ansil,	Silent Valley bushfrog	സൈലന്റ് വാലി ഇലത്തവള

161	*Raorchestes sushili*	(Biju & Bossuyt, 2009)	Sushil's Bush Frog	സുഷിലി ഇലത്തവള
162	*Raorchestes theuerkaufi*	Zachariah, Dinesh, Kunhikrishnan,Das, Raju,	Theuerkauf's Bush Frog	തെർകൊഫ് ഇലത്തവള
163	*Raorchestes tinniens*	(Jerdon, 1853)	Nilgiri Bush Frog	നീലഗിരി ഇലത്തവള
164	*Raorchestes travancoricus*	(Boulenger, 1891)	Travancore Bush Frog	നീലക്കണ്ണി ഇലത്തവള
165	*Raorchestes tuberohumerus*	(Kuramoto & Joshy, 2003)	Kudremukh Bush Frog	കുദ്രേമുഖ് ഇലത്തവള
166	*Raorchestes uthamani*	Zachariah, Dinesh,Kunhikrishnan, Das, Raju,	Uthaman's Reed Bush Frog	ഉത്തമനി ഈറ്റത്തവള
167	*Raorchestes vellikkannan*	Garg, Suyesh, Das, Bee and Biju, 2021	Silver-eyed Shrub Frog	വെള്ളിക്കണ്ണൻ ഇലത്തവള
168	*Rhacophorus calcadensis*	Ahl, 1927	Kalakad Tree Frog	കളക്കാട് പച്ചിലപ്പാറാൻ
169	*Rhacophorus lateralis*	Boulenger, 1883	Small Tree Frog	വരയൻ പച്ചിലപ്പാറാൻ
170	*Rhacophorus malabaricus*	Jerdon, 1870	Malabar Gliding Frog	പച്ചിലപ്പാറാൻ
171	*Rhacophorus pseudomalabaricus*	Vasudevan & Dutta, 2000	Malabar False Tree frog	പുള്ളി പച്ചിലപ്പാറാൻ
	II. ORDER GYMNOPHIONA	Müller		

	10. Family ICHTHYOPHIIDAE	Taylor		
172	*Epicrium beddomei*	Peters 1879	Beddome's Caecilian	വരയൻ കുരുടി
173	*Epicrium bombayensis*	Taylor, 1960	Bombay Caecilian	തടിയൻ കുരുടി
174	*Epicrium kodaguensis*	Ichthyophis kodaguensis	Kodagu Striped Caecilian	കൊടഗുകുരുടി
175	*Epicrium longicephalus*	Pillai, 1986	Long-headed Caecilian	മൂക്കൻ കുരുടി
176	*Epicrium tricolor*	Ann&ale, 1909	Three-colored Caecilian	ത്രിവർണ്ണ കുരുടി
177	*Uraeotyphlus interruptus*	Pillai & Ravich&ran, 1999	Chengalam Caecilian	ചെങ്ങളം കുരുടി
178	*Uraeotyphlus malabaricus*	(Beddome, 1870)	Malabar Caecilian	മലബാർ കുരുടി
179	*Uraeotyphlus menoni*	Ann&ale, 1913	Menon's Caecilian	മേനോൻ കുരുടി
180	*Uraeotyphlus narayani*	Seshachar, 1939	Narayan's Caecilian	നാരായൺ കുരുടി
181	*Uraeotyphlus oommeni*	Gower & Wilkinson, 2007	Oommen's Uraeotyphlus	ഉമ്മൻ കുരുടി
182	*Uraeotyphlus oxyurus*	(Dumeril & Bibron, 1841)	Red Caecilian	ചെമ്പൻ കുരുടി
	11. Family INDOTYPHLYIDAE	Lescure, Renous and Gasc		

183	*Gegeneophis carnosus*	(Beddome, 1870)	Ramaswami's Caecilian	രാമസ്വാമി കുരുടി
184	*Gegeneophis ramaswamii*	Taylor, 1964	Malabar cardomom Gegeneophis	ഏലക്കാടൻ കുരുടി
185	*Gegeneophis primus*	Kotharambath, Gower, Oomen & Wilkinson, 2012	Tejaswini Gegeneophis	തേജസ്വിനി കുരുടി
186	*Gegeneophis tejaswini*	Kotharambath, Wilkinson, Oommen, and Gower, 2015	Beddome's Caecilian	വരയൻ കുരുടി

Checklist of freshwater fishes of Kerala

Order/Family Species	Common Name
Order: Osteoglossiformes	
Family Notopteridae	
1. *Notopterus synurus* (Bloch & Schneider 1801)	Bronze Featherback
Order: Anguilliformes	
Family Anguillidae	
2. *Anguilla bengalensis* (Gray 1831)	Indian Mottled Eel
3. *Anguilla bicolor* McClelland 1844	Indian Shortfin Eel
Family Ophichthidae	
4. *Pisodonophis boro* (Hamilton 1822)	Rice Paddy Eel
Order: Clupeiformes	
Family Clupeidae	
5. *Dayella malabarica* (Day 1873) (MT)	Day's Round Herring
6. *Ehirava fluviatilis* Deraniyagala 1929 (MT)	Malabar Sprat
Order: Cypriniformes	
Family Cyprinidae	
7. *Dawkinsia arulius* (Jerdon 1849)	Aruli Barb
8. *Dawkinsia austellus* Katwate et al. 2020	Southern Filament Barb
9. *Dawkinsia exclamatio* (Pethiyagoda & Kottelat 2005)	Exclamation Barb
10.*Dawkinsia filamentosa* (Valenciennes 1844)	Filament Barb
11. *Dawkinsia lepida* (Katwate et al. 2020)	Lepidus Barb
12. *Dawkinsia rubrotinctus* (Jerdon 1849)	Three Spot Barb
13. *Eechathalakenda ophicephalus* (Raj 1941)	Snakehead Barb
14. *Garra arunachalami* (Johnson & Soranam 2001)	Arunachalam's Stone Sucker
15. *Garra emarginata* Kurup & Radhakrishnan 2011	Emarginate Stone Sucker
16. *Garra hughi* Silas 1955	Hughe's Stone Sucker
17. *Garra mcclellandi* (Jerdon 1849)	McClelland's Stone Sucker
18. *Garra menoni* Rema Devi & Indra 1984	Menon's Stone Sucker
19. *Garra mlapparaensis* Kurup & Radhakrishnan 2011	Mlappara Stone Sucker
20. *Garra mullya* (Sykes 1839)	Striped Stone Sucker
21. *Garra periyarensis* Gopi 2001	Periyar Stone Sucker
22. *Garra surendranathanii* Shaji, Arun & Easa 1996	Surendran's Stone Sucker
23. *Garra stenorhynchus* (Jerdon 1849)	Sahyadri Horned Stone Sucker
24. *Gymnostomus ariza* (Hamilton 1807)	Ariza Carp
25. *Haludaria fasciata* (Jerdon 1849)	Cauvery Melon Barb
26. *Haludaria melanampyx* (Day 1865)	Melon Barb
27. *Haludaria kannikattiensis* (Arunachalam & Johnson 2003)	Kannikkati Barb
28. *Hypselobarbus carnaticus* (Jerdon 1849)	Carnatic Carp
29. *Hypselobarbus dubius* (Day 1867)	Nilgiri Barb
30. *Hypselobarbus jerdoni* (Day 1870)	Jerdon's Carp
31. *Hypselobarbus kurali* Menon & Rema Devi 1995	Kurali Barb

32. *Hypselobarbus lithopidos* (Day 1874) Canara Barb
33. *Hypselobarbus micropogon* (Valenciennes 1842) Korhi Barb
34. *Hypselobarbus periyarensis* (Raj 1941) Periyar Barb
35. *Hypselobarbus thomassi* (Day 1874) Red Canarese Barb
36. *Kantaka brevidorsalis* (Day 1873) Kantaka Barb
37. *Labeo dussumieri* (Valenciennes 1842) Malabar Labeo
38. *Labeo fimbriatus* (Bloch 1795) Fringe Lipped Carp
39. *Labeo kontius* (Jerdon 1849) Pig Mouth Carp
40. *Labeo nigrescens* (Day 1870) Black Labeo
41. *Lepidopygopsis typus* Raj 1941 (MT/EG) Periyar Hill Barb
42. *Neolissochilus wynaadensis* (Day 1873) Wayanad Mahseer
43. *Oreichthys incognito* Knight & Kumar 2015 Kerala High Fin Barb
44. *Oreichthys coorgensis* (Jayaram 1982) Cauvery High Fin Barb
45. *Osteochilichthys longidorsalis* Pethiyagoda & Kottelat 1994 Long Finned Kerala Barb
46. *Osteochilichthys nashii* (Day 1869) Nash's Barb
47. *Osteochilichthys thomassi* (Day 1877) Thomas' Barb
48. *Osteobrama bakeri* (Day 1873) Baker's Barb
49. *Osteobrama neilli* (Day 1873) Nilgiri Patashi
50. *Pethia conchonius* (Hamilton 1822) Rosy Barb
51. *Pethia nigripinnis* Knight et al. 2012 Black Finned Barb
52. *Pethia pookodensis* (Mercy & Jacob 2007) Pookode Barb
53. *Pethia punctata* (Day 1865) Dotted Sawfin Barb
54. *Puntius amphibius* (Valenciennes 1842) Amphibius barb
55. *Puntius bimaculatus* (Bleeker 1863) Redside Barb
56. *Puntius chola* (Hamilton 1822) Chola Barb
57. *Puntius cauveriensis* (Hora 1937) Cauvery Barb
58. *Puntius dorsalis* (Jerdon 1849) Dorsalis Barb
59. *Puntius madhusoodani* Kumar, Pereira & Radhakrishnan 2012 Madhusoodan's Barb
60. *Puntius mahecola* (Valenciennes 1844) Mahe Barb
61. *Puntius melanostigma* (Day 1878) One spot Barb
62. *Puntius parrah* (Day 1865) Parrah Barb
63. *Puntius sophore* (Hamilton 1822) Sophore Barb
64. *Puntius vittatus* (Day 1865) Green Stripe Barb
65. *Sahyadria denisonii* (Day 1865) Denison's Barb
66. *Sahyadria chalakkudiensis* (Menon, Rema Devi & Thobias 1999) Chalakudy Redline Torpedo Barb
67. *Systomus sarana* (Hamilton 1822) Swamp Barb
68. *Tariqilabeo periyarensis* (Menon & Jacob 1996) Periyar Latia
69. *Tor khudree* (Sykes 1839) Deccan Mahseer
70. *Tor malabaricus* (Jerdon 1849) Malabar Mahseer
71. *Tor remadevii* (Kurup & Radhakrishnan 2011) Humpbacked Mahseer

Family Danionidae

72. *Amblypharyngodon melettinus* (Valenciennes 1844) Silver Carplet
73. *Amblypharyngodon microlepis* (Bleeker 1853) Indian Carplet

74. *Danio rerio* (Hamilton 1822) Zebra Fish
75. *Devario malabaricus* (Jerdon 1849) Malabar Danio
76. *Devario neilgherriensis* (Day 1867) Nilgiri Danio
77. *Esomus thermoicos* (Valenciennes 1842) Flying Barb
78. *Horadandia brittani* Rema Devi & Menon 1992 Glass Carplet
79. *Laubuka fasciata* (Silas 1958) Malabar Leaping Barb
80. *Laubuka trevori* Knight 2015 Trevor's Leaping Barb
81. *Neochela dadiburjori* (Menon 1952) (MT/EG) Burjor's Brilliance
82. *Opsarius bakeri* (Day 1865) Baker's Baril
83. *Opsarius bendelisis* (Hamilton 1807) Spotted Baril
84. *Opsarius canarensis* (Jerdon 1849) Canara Baril
85. *Opsarius gatensis* (Valenciennes 1844) Emerald Baril
86. *Opsarius malabaricus* (Jerdon 1849) Malabar Baril
87. *Rasbora dandia* (Valenciennes 1844) Black Line Rasbora
88. *Rasbora neilgherriensis* (Day 1867) Nilgiri Rasbora
89. *Salmostoma acinaces* (Valenciennes 1844) Silver Razorbelly Minnow
90. *Salmostoma boopis* (Day 1874) Boopis Razorbelly Minnow

Family Cobitidae

91. *Lepidocephalichthys thermalis* (Valenciennes 1846) Common Spiny Loach
92. *Pangio goaensis* (Tilak 1972) Indian Coolie Loach
93. *Pangio bhujia* Anoop et al. 2019 Bhujia Loach

Family Balitoridae

94. *Balitora jalpalli* Raghavan et al. 2012 Silent Valley Stone Loach
95. *Balitora mysorensis* Hora 1941 Mysore Stone Loach
96. *Bhavania annandalei* Hora 1920 Annandale's Stone Loach
97. *Bhavania australis* (Jerdon1849) Bhavani Stone Loach
98. *Ghatsa menoni* (Shaji & Easa 1995) Menon's Stone Loach
99. *Ghatsa montana* (Herre 1945) Anamalai Stone Loach
100. *Ghatsa pillaii* (Indra & Rema Devi 1981) Pillai's Stone Loach
101. *Ghatsa santhamparaiensis* Arunachalam et al. 2002 Santhampara Stone Loach
102. *Ghatsa silasi* (Kurup & Radhakrishnan 2011) Silas's Stone Loach
103. *Travancoria elongata* Pethiyagoda & Kottelat 1994 (EG) Elongated Stone Loach
104. *Travancoria jonesi* Hora 1941 (EG) Jone's Stone Loach

Family Nemacheilidae

105. *Indoreonectes keralensis* (Rita & Nalbant 1978) Cardamom Hills River Loach
106. *Mesonoemacheilus guentheri* (Day 1867) Gunther's Loach
107. *Mesonoemacheilus herrei* (Nalbant & Bănărescu 1982) Anamalai Loach
108. *Mesonoemacheilus menoni* (Zacharias & Minimol 1999) Menon's River Loach
109. *Mesonoemacheilus pambarensis* (Rema Devi & Indra 1994) Pambar Loach
110. *Mesonoemacheilus periyarensis* (Kurup & Radhakrishnan 2005) Periyar Loach
111. *Mesonoemacheilus pulchellus* (Day 1873) Pretty Spotted Loach
112. *Mesonoemacheilus remadevii* Shaji 2002 Remadevi's Loach
113. *Mesonoemacheilus tambaraparniensis* (Menon 1987) Tambaraparini Zodiac Loach
114. *Mesonoemacheilus triangularis* (Day 1865) Zodiac Loach
115. *Nemacheilus monilis* Hora 1921 Black Bead Loach

116. *Paracanthocobitis sinuata* (Day 1870)	Wayanad Loach
117. *Schistura denisoni* (Day 1867)	Denison's Loach
118. *Schistura nilgiriensis* (Menon 1987)	Nilgiri Loach
119. *Schistura semiarmata* (Day 1867)	Small-spotted Loach
120. *Schistura striata* (Day 1867)	Long Bodied Striped Loach
Order: Siluriformes	
Family Bagridae	
121. *Batasio travancoria* Hora & Law 1941	Travancore Batasio
122. *Hemibagrus punctatus* (Jerdon 1849)	Cauvery Giant Catfish
123. *Mystus armatus* (Day 1865)	Dwarf Mystus Catfish
124. *Mystus gulio* (Hamilton 1822)	Long Whiskered Catfish
125. *Mystus malabaricus* (Jerdon 1849)	Malabar Mystus
126. *Mystus montanus* (Jerdon 1849)	Wayanad Mystus
127. *Mystus oculatus* (Valenciennes 1840)	Spotted Mystus
128. *Mystus seengtee* (Sykes 1839)	Krishna River catfish
129. *Mystus vittatus* (Bloch 1794)	Striped Mystus
Family Horabagridae	
130. *Horabagrus brachysoma* (Günther 1864)	Yellow Catfish
131. *Horabagrus nigricollaris* Pethiyagoda & Kottelat 1994	Imperial White Collared Catfish
Family Clariidae	
132. *Clarias dayi* Hora 1936	Malabar Clarid
133. *Clarias dussumieri* Valenciennes 1840	Valencienne's Clarid
134. *Horaglanis abdulkalami* Babu 2012 (EG)	Abdulkalam's Blind Catfish
135. *Horaglanis alikunhii* Babu & Nayar 2004 (EG)	Alikunhi's Blind Catfish
136. *Horaglanis krishnai* Menon 1950 (EG)	Kerala Blind Well Catfish
Family Heteropneustidae	
137. *Heteropneustes fossilis* Bloch 1794	Stinging Catfish
Family Kryptoglanidae	
138. *Kryptoglanis shajii* Vincent & Thomas 2011 (MT/EG)	Shaji's Blind Catfish
Family Schilbeidae	
139. *Pseudeutropius mitchelli* Günther 1864 (EG)	Mitchell's River Catfish
Family Siluridae	
140. *Ompok bimaculatus* (Bloch 1794)	Butter Catfish
141. *Ompok karunkodu* Ng 2013	Cauvery Catfish
142. *Ompok malabaricus* (Valenciennes 1840)	Malabar Butter Catfish
143. *Pterocryptis wynaadensis* (Day 1873)	Wayanad Stream Catfish
144. *Wallago attu* (Schneider 1801)	Freshwater Shark
Family Sisoridae	
145. *Glyptothorax anamalaiensis* Silas 1952	Anamalai Mountain Catfish
146. *Glyptothorax annandalei* Hora 1923	Annandale's Mountain Catfish
147. *Glyptothorax davissinghi* Manimekalan & Das 1998	Nilambur Mountain Catfish
148. *Glyptothorax elankadensis* Plamoottil & Abraham 2013	Elankadu Mountain Catfish
149. *Glyptothorax housei* Herre 1942	Valparai Mountain Catfish
150. *Glyptothorax madraspatanus* Day 1873	Madras Mountain Catfish
151. *Glyptothorax malabarensis* Gopi 2010	Malabar Mountain Catfish

152. *Pseudolaguvia austrina* Radhakrishnan, Sureshkumar & Ng 2011	Southern Indian Torrent Catfish
Order: Cyprinodontiformes	
Family Aplocheilidae	
153. *Aplocheilus blockii* Arnold 1911	Green Panchax
154. *Aplocheilus lineatus* (Valenciennes 1846)	Striped Panchax
155. *Aplocheilus parvus* Sundara Raj 1916	Raj's Panchax
Order: Beloniformes	
Family Adrianichthyidae	
156. *Oryzias setnai* (Kulkarni 1940)	Malabar Ricefish
Family Belonidae	
157. *Xenentodon cancila* (Hamilton 1822)	Needlefish
Family Hemiramphidae	
158. *Hyporhamphus limbatus* (Valenciennes 1847)	Congaturi Halfbeak
159. *Hyporhamphus xanthopterus* (Valenciennes 1847)	Red-Tipped Halfbeak
Order: Synbranchiformes	
Family Mastacembelidae	
160. *Macrognathus guentheri* (Day 1865)	Malabar Spiny Eel
161. *Mastacembelus armatus* (Lacepède 1800)	Zig-zag Eel
162. *Mastacembelus malabaricus* (Jerdon 1849)	Malabar Tyre-Track Eel
Family Synbranchidae	
163. *Ophichthys fossorius* (Nayar 1951)	Malabar Swamp Eel
164. *Ophisternon bengalense* (McClelland 1844)	Bengal Swamp Eel
165. *Rakthamichthys digressus* (Gopi 2002)	Swamp Eel
166. *Rakthamichthys indicus* (Eapen 1963)	Eapen's Swamp Eel
167. *Rakthamichthys roseni* (Bailey & Gans 1998)	Rosen's Swamp Eel
Order: Perciformes	
Incertae sedis under Ovalenteria	
Family Ambassidae	
168. *Parambassis dayi* (Bleeker 1874)	Day's Glassy Perchlet
169. *Parambassis thomassi* (Day 1870)	Western Ghats Glassy Perchlet
Order: Anabantiformes	
Family Anabantidae	
170. *Anabas testudineus* (Bloch 1792)	Climbing Perch
Family Aenigmachannidae	
171. *Aenigmachanna gollum* Britz et al. 2019 (EG)	Gollum Dragon Snakehead
172. *Aenigmachanna mahabali* Rahul, Basheer & Charan 2019 (EG)	Mahabali Dragon Snakehead
Family Channidae	
173. *Channa diplogramma* (Day 1865)	Tiger Snakehead
174. *Channa gachua* (Hamilton 1822) ≠	Dwarf Snakehead
175. *Channa pseudomarulius* (Günther 1861)	Peninsular Indian Giant Snakehead
176. *Channa punctata* (Bloch 1793) ≠	Spotted Snakehead
177. *Channa striata* (Bloch 1793)	Striped Snakehead

Family Badidae	
178. *Dario neela* Britz, Anoop & Dahanukar 2018	Western Ghats Blue Dario
179. *Dario urops* Britz, Ali & Philip 2012	Western Ghats Dario
Family Nandidae	
180. *Nandus nandus* (Hamilton 1822)	Gangetic Leaf fish
Family Pristolepididae	
181. *Pristolepis marginata* (Jerdon 1849)	Common Catopra
182. *Pristolepis rubripinnis* Britz, Kumar & Baby 2012	Red Finned Catopra
Family Osphronemidae	
183. *Pseudosphromenus cupanus* (Cuvier 1831)	Spike Tailed Paradise Fish
184. *Pseudosphromenus dayi* (Engmann 1909)	Day's Paradise Fish
Order: Cichliformes	
Family Cichlidae	
185. *Etroplus suratensis* (Bloch 1790)	Pearl Spot
186. *Pseudetroplus maculatus* (Bloch 1795)	Orange Chromide
Order: Gobiiformes	
Family Gobiidae	
187. *Awaous grammepomus* (Bleeker 1849)	Scribbled goby
188. *Glossogobius giuris* (Hamilton 1822)	Tank Goby
189. *Pseudogobiopsis oligactis* (Bleeker 1875)	Stream Goby
190. *Schismatogobius deraniyagalai* Kottelat & Pethiyagoda 1989	Redneck Goby
191. *Sicyopterus griseus* (Day 1877)	Clown Goby
Family Eleotridae	
192. *Bunaka gyrinoides* (Bleeker 1853)	Greenback guavina
193. *Eleotris fusca* (Forster 1801)	Dusky Sleeper
Order: Syngnathiformes	
Family Syngnathidae	
194. *Ichthyocampus carce* (Hamilton 1822)	Freshwater Pipe Fish
195. *Microphis cuncalus* (Hamilton 1822)	Crocodile Tooth Pipe Fish
Order: Tetraodontiformes	
Family Tetraodontidae	
196. *Carinotetraodon travancoricus* (Hora & Nair 1941)	Malabar Puffer Fish

Checklist of Butterflies of Kerala

Order/Family Species	Common Name
Family Hesperiidae	
Subfamily Coeliadinae	
1. *Badamia exclamationis* (Fabricius, 1775)	Brown Awl
2. *Bibasis sena* (Moore, [1866])	Orange-tailed Awl
3. *Burara gomata* (Moore, [1866])	Pale Green Awlet
4. *Burara jaina* (Moore, [1866])	Common Orange Awlet
5. *Choaspes benjaminii* (Guérin-Méneville, 1843)	Common Awlking
6. *Hasora badra* (Moore, [1858])	Common Awl
7. *Hasora chromus* (Cramer, [1780])	Common Banded Awl
8. *Hasora taminatus* (Hübner, 1818)	White-banded Awl
9. *Hasora vitta* (Butler, 1870)	Plain Banded Awl
Subfamily Hesperiinae	
Tribe Aeromachini	
10. *Aeromachus dubius* (Elwes & Edwards, 1897)	Dingy Scrub Hopper
11. *Aeromachus pygmaeus* (Fabricius, 1775)	Pygmy Scrub Hopper
12. *Ampittia dioscorides* (Fabricius, 1793)	Bush Hopper
13. *Arnetta mercara* (Evans, 1932)	Kodagu Forest Hopper
14. *Arnetta vindhiana* (Moore, [1884])	Vindhyan Bob.
15. *Baracus hampsoni* (Elwes & Edwards, 1897)	Spotted Hedge Hopper:
16. *Baracus subditus* (Moore, [1884])	Striped Hedge Hopper
17. *Cupitha purreea* (Moore, 1877)	Wax Dart
18. *Erionota torus* (Evans, 1941)	Rounded Palm-redeye
19. *Gangara thyrsis* (Fabricius, 1775)	Giant Redeye
20. *Halpe hindu* (Evans, 1937)	Sahyadri Banded Ace
21. *Halpe porus* (Mabille, [1877])	Bispot Banded Ace
22. *Hyarotis adrastus* (Stoll, [1780])	Tree Flitter
23. *Hyarotis coorga* (Evans, 1949)	Kodagu Brush Flitter
24. *Iambrix salsala luteipalpis* (Plötz, 1886)	Southern Chestnut Bob
25. *Matapa aria* (Moore, [1866])	Common Branded Redeye
26. *Notocrypta curvifascia* (C. & R. Felder, 1862)	Restricted Demon
27. *Notocrypta paralysos* (Wood-Mason & de Nicéville, 1881)	Common Banded Demon
28. *Psolos fuligo* (Mabille, 1876)	Dusky Partwing
29. *Quedara basiflava* (de Nicéville, [1889])	Yellow-base Flitter
30. *Salanoemia sala* (Hewitson, [1866])	Maculate Lancer
31. *Halpemorpha hyrtacus* (de Nicéville, 1897) [=] Ace]	White-branded Ace [=Bicolour
32. *Suastus gremius* (Fabricius, 1798)	Oriental Palm Bob

33. *Suastus minuta* (Moore, 1877) Small Palm Bob
34. *Thoressa astigmata* (Swinhoe, 1890) Unbranded Ace
35. *Thoressa evershedi* (Evans, 1910) Travancore Tawny Ace
36. *Thoressa honorei* (de Nicéville, 1887) Sahyadri Orange Ace
37. *Thoressa sitala* (de Nicéville, 1885) Nilgiri Plain Ace
38. *Udaspes folus* (Cramer, [1775]) Grass Demon
39. *Zographetus ogygia* (Hewitson, [1866]) Purple-spotted Flitter

Tribe Baorini

40. *Baoris farri* (Moore, 1878) Complete Paint-brush Swift
41. *Borbo bevani* (Moore, 1878) Lesser Rice Swift
42. *Borbo cinnara* (Wallace, 1866) Rice Swift
43. *Caltoris canaraica* (Moore, [1884]) Karwar Swift
44. *Caltoris kumara* (Moore, 1878) Blank Swift
45. *Caltoris philippina* (Herrich-Schäffer, 1869) Philippine Swift
46. *Parnara bada* (Moore, 1878) Grey Swift
47. *Pelopidas agna* (Moore, [1866]) Obscure Branded Swift
48. *Pelopidas conjuncta* (Herrich-Schäffer, 1869) Conjoined Swift
49. *Pelopidas mathias* (Fabricius, 1798) Small Branded Swift
50. *Pelopidas subochracea* (Moore, 1878) Large Branded Swift
51. *Polytremis lubricans* (Herrich-Schäffer, 1869) Contiguous Swift

Tribe Taractrocerini

52. *Cephrenes acalle* (Höpffer, 1874) Plain Palm-Dart
53. *Oriens concinna* (Elwes & Edwards, 1897) Sahyadri Dartlet
54. *Oriens goloides* (Moore, [1881]) Smaller Dartlet
55. *Potanthus diana* (Evans, 1932) Chinese Dart
56. *Potanthus pallida* (Evans, 1932) Pallid Dart
57. *Potanthus palnia* (Evans, 1914) Palni Dart
58. *Potanthus pava* (Fruhstorfer, 1911) Pava Dart
59. *Potanthus pseudomaesa* (Moore, [1881]) Common Dart
60. *Taractrocera ceramas* (Hewitson, 1868) Tawny-spotted Grass Dart:
61. *Taractrocera maevius* (Fabricius, 1793) Grey-veined Grass Dart:
62. *Telicota bambusae* (Moore, 1878) Dark Palm-Dart
63. *Telicota colon* (Fabricius, 1775) Pale Palm-Dart

Subfamily Pyrginae

Tribe Carcharodini

64. *Gomalia elma* (Trimen, 1862) African Marbled Skipper
65. *Spialia galba* (Fabricius, 1793) Asian Grizzled Skipper

Tribe Celaenorrhinini

66. *Celaenorrhinus ambareesa* (Moore, [1866])	Dakhan Spotted Flat
67. *Celaenorrhinus fusca* (Hampson, [1889])	Dusky Spotted Flat
68. *Celaenorrhinus leucocera* (Kollar, [1844])	Common Spotted Flat
69. *Celaenorrhinus putra* (Moore, [1866])	Restricted Spotted Flat
70. *Pseudocoladenia dan* (Fabricius, 1787)	Fulvous Pied Flat
71. *Sarangesa dasahara* (Moore, [1866])	Common Small Flat
72. *Sarangesa purendra* (Moore, 1882)	Spotted Small Flat

Tribe Tagiadini

73. *Caprona agama* (Moore, [1858])	Spotted Angle
74. *Caprona alida* (de Nicéville, 1891)	Alida Angle
75. *Caprona ransonnettii* (R. Felder, 1868)	Golden Angle
76. *Coladenia indrani* (Moore, [1866])	Tricolour Pied Flat
77. *Gerosis bhagava* (Moore, [1866])	Common Yellow-breasted Flat
78. *Odontoptilum angulata* (C. Felder, 1862)	Chestnut Angle
79. *Tagiades gana silvia* (Evans, 1934)	Dakhan Suffused Snow Flat
80. *Tagiades japetus* (Stoll, [1781])	Common Snow Flat
81. *Tagiades litigiosa* (Möschler, 1878)	Water Snow Flat
82. *Tapena thwaitesi* (Moore, [1881])	Black Angle

Family Lycaenidae

Subfamily Curetinae

83. *Curetis acuta* (Moore, 1877)	Acute Sunbeam
84. *Curetis siva* (Evans, 1954)	Shiva Sunbeam
85. *Curetis thetis* (Drury, [1773])	Indian Sunbeam

Subfamily Miletina

Tribe Spalgini

86. *Spalgis epius* (Westwood, [1851])	Apefly.

Subfamily Polyommatinae

Tribe Lycaenesthini

87. *Anthene emolus* (Godart, [1824])	Common Ciliate Blue
88. *Anthene lycaenina* (R. Felder, 1868)	Pointed Ciliate Blue

Tribe Polyommatini

89.	*Acytolepis lilacea* (Hampson, 1889)	Lilac Hedge Blue
90.	*Acytolepis puspa* (Horsfield, [1828])	Common Hedge Blue
91.	*Azanus jesous* (Guérin-Méneville, 1849)	African Babul Blue
92.	*Azanus ubaldus* (Stoll, [1782])	Bright Babul Blue
93.	*Caleta decidia* (Hewitson, 1876)	Angled Pierrot
94.	*Castalius rosimon* (Fabricius, 1775)	Common Pierrot
95.	*Catochrysops panormus* (C. Felder, 1860)	Silver Forget-me-not
96.	*Catochrysops strabo* (Fabricius, 1793)	Forget-me-not
97.	*Celatoxia albidisca* (Moore, [1884])	White-disc Hedge Blue
98.	*Celastrina lavenduris* (Moore, 1877)	Plain Hedge Blue
99.	*Chilades lajus* (Stoll, [1780])	Lime Blue
100.	*Chilades pandava* (Horsfield, [1829])	Plains Cupid
101.	*Chilades parrhasius* (Fabricius, 1793)	Small Cupid
102.	*Discolampa ethion* (Westwood, [1851])	Banded Blue Pierrot
103.	*Euchrysops cnejus* (Fabricius, 1798)	Gram Blue
104.	*Everes lacturnus* (Godart, [1824])	Orange-crowned Cupid
105.	*Freyeria putli* (Kollar, [1844])	Black-spotted Grass Jewel
106.	*Freyeria trochylus* (Freyer, 1845)	Orange-spotted Grass Jewel
107.	*Ionolyce helicon* (C. Felder, 1860)	Pointed Lineblue
108.	*Jamides alecto* (C. Felder, 1860)	Metallic Cerulean
109.	*Jamides bochus* (Stoll, [1782])	Dark Cerulean
110.	*Jamides celeno* (Cramer, [1775])	Common Cerulean
111.	*Lampides boeticus* (Linnaeus, 1767)	Pea Blue
112.	*Leptotes plinius* (Fabricius, 1793)	Zebra Blue
113.	*Megisba malaya* (Horsfield, [1828])	Malayan
114.	*Nacaduba beroe* (C. & R. Felder, [1865])	Opaque Six-Lineblue
115.	*Nacaduba berenice* (Herrich-Schäffer, 1869)	Rounded Six-Lineblue
116.	*Nacaduba calauria* (C. Felder, 1860)	Dark Six-Lineblue
117.	*Nacaduba hermus* (C. Felder, 1860)	Pale Four-Lineblue
118.	*Nacaduba kurava* (Moore, [1858])	Transparent Six-Lineblue
119.	*Nacaduba pactolus* (C. Felder, 1860)	Large Four-Lineblue
120.	*Nacaduba sinhala* (Ormiston, 1924)	Pale Ceylon Lineblue
121.	*Neopithecops zalmora* (Butler, [1870])	Common Quaker
122.	*Petrelaea dana* (de Nicéville, [1884])	Dingy Lineblue
123.	*Prosotas dubiosa* (Semper, [1879])	Tailless Lineblue
124.	*Prosotas nora* (C. Felder, 1860)	Common Lineblue
125.	*Prosotas noreia* (R. Felder, 1868)	White-tipped Lineblue
126.	*Pseudozizeeria maha* (Kollar, [1844])	Pale Grass Blue
127.	*Talicada nyseus* (Guérin-Méneville, 1843)	Red Pierrot
128.	*Tarucus ananda* (de Nicéville, [1884])	Dark Pierrot
129.	*Tarucus callinara* (Butler, 1886)	Spotted Pierrot
130.	*Tarucus nara* (Butler, 1886)	Spotted Pierro
131.	*Udara akasa* (Horsfield, [1828])	White Hedge Blue
132.	*Zizeeria karsandra* (Moore, 1865)	Dark Grass Blue
133.	*Zizina otis* (Fabricius, 1787)	Lesser Grass Blue

134.	*Zizula hylax* (Fabricius, 1775)	Tiny Grass Blue

Subfamily Theclinae

Tribe Amblypodiini

135.	*Amblypodia anita* (Hewitson, 1862)	Purple Leaf Blue
136.	*Iraota timoleon* (Stoll, [1790])	Silverstreak Blue
137.	*Thaduka multicaudata* (Moore, [1879])	Many-tailed Oakblue

Tribe Aphnaeini:

138.	*Spindasis abnormis* (Moore, [1884])	Abnormal Silverline
139.	*Spindasis elima* (Moore, 1877)	Scare Shot Silverline
140.	*Spindasis ictis* (Hewitson, 1865)	Common Shot Silverline
141.	*Spindasis lohita* (Horsfield, [1829])	Long-banded Silverline
142.	*Spindasis schistacea* (Moore, [1881])	Plumbeous Silverline
143.	*Spindasis vulcanus* (Fabricius, 1775)	Common Silverline

Tribe Arhopalini

144.	*Arhopala abseus* (Hewitson, 1862)	Aberrant Oakblue
145.	*Arhopala alea* (Hewitson, 1862)	Sahyadri Rosy Oakblue
146.	*Arhopala amantes* (Hewitson, 1862)	Large Oakblue
147.	*Arhopala bazaloides* (Hewitson, 1878)	Dusted Oakblue
148.	*Arhopala centaurus* (Fabricius, 1775)	Centaur Oakblue
149.	*Surendra quercetorum* (Moore, [1858])	Common Acacia Blue
150.	*Zinaspa todara* (Moore, [1884])	Silver-streaked Acacia Blue

Tribe Catapaecilmatini

151.	*Catapaecilma major* (Druce, 1895)	Common Tinsel

Tribe Cheritrini

152.	*Cheritra freja* (Fabricius, 1793)	Common Imperial

Tribe Deudorigini

153.	*Bindahara moorei* (Fruhstorfer, 1904)	Blue-bordered Plane
154.	*Deudorix epijarbas* (Moore, [1858])	Cornelian
155.	*Rapala iarbus* (Fabricius, 1787)	Common Red Flash
156.	*Rapala lankana* (Moore, 1879)	Malabar Flash
157.	*Rapala manea* (Hewitson, 1863)	Slate Flash
158.	*Rapala varuna* (Horsfield, [1829])	Indigo Flash
159.	*Virachola isocrates* (Fabricius, 1793)	Common Guava Blue.

160. *Virachola perse* (Hewitson, 1863) — Large Guava Blue

Tribe Horagini

161. *Horaga onyx* (Moore, [1858]) — Common Onyx
162. *Horaga viola* (Moore, 1882) — Brown Onyx
163. *Rathinda amor* (Fabricius, 1775) — Monkey Puzzle

Tribe Hypolycaenini

164. *Hypolycaena othona* (Hewitson, [1865]) — Orchid Tit
165. *Hypolycaena nilgirica* (Moore, [1884]) — Nilgiri Tit
166. *Zeltus amasa* (Hewitson, 1865) — Fluffy Tit

Tribe Iolaini

167. *Creon cleobis* (Godart, [1824]) — Broad-tailed Royal
168. *Pratapa deva* (Moore, [1858]) — White Tufted Royal
169. *Rachana jalindra* (Horsfield, [1829]) — Banded Royal
170. *Tajuria cippus* (Fabricius, 1798) — Peacock Royal
171. *Tajuria jehana* Moore, [1884] — Plains Blue Royal
172. *Tajuria maculatus* Hewitson, [1865] — Spotted Royal
173. *Tajuria melastigma* de Nicéville, 1887 — Branded Royal

Tribe Loxurini

174. *Loxura atymnus* (Stoll, [1780]) — Yamfly

Tribe Remelanini

175. *Ancema sudica* (Evans, 1926) — Sahyadri Silver Royal

Tribe Zesiini

176. *Zesius chrysomallus* (Hübner, [1819]) — Redspot

Family Nymphalidae

Subfamily Apaturinae

Tribe Apaturini

177. *Euripus consimilis* (Westwood, [1851]) — Painted Courtesan
178. *Rohana parisatis* (Westwood, [1851]) — Black Prince

Subfamily Biblidinae

Tribe Biblidini

179.	*Ariadne ariadne* (Linnaeus, 1763)	Angled Castor
180.	*Ariadne merione* (Cramer, [1777])	Common Castor
181.	*Byblia ilithyia* (Drury, [1773])	Joker

Subfamily Charaxinae

Tribe Charaxini

182.	*Charaxes agrarius* Swinhoe, [1887]	Anomalous Nawab
183.	*Charaxes bharata* C.& R. Felder, [1867]	Indian Nawab
184.	*Charaxes psaphon* Westwood, 1847	Plain Tawny Rajah
185.	*Charaxes schreiber* Godart, [1824]	Blue Nawab
186.	*Charaxes solon* (Fabricius, 1793)	Black Rajah

Subfamily Cyrestinae

Tribe Cyrestini

187.	*Cyrestis thyodamas* Doyère, [1840]	Map Butterfly

Subfamily Danainae

Tribe Danaini

188.	*Danaus chrysippus* (Linnaeus, 1758)	Plain Tiger
189.	*Danaus genutia* (Cramer, [1779])	Striped Tiger
190.	*Euploea core* (Cramer, [1780])	Common Crow
191.	*Euploea klugii* Moore, [1858]	King Crow
192.	*Euploea sylvester* (Fabricius, 1793)	Double-branded Crow
193.	*Idea malabarica* (Moore, 1877)	Malabar Tree-Nymph
194.	*Parantica aglea* (Stoll, [1782])	Glassy Tiger
195.	*Parantica nilgiriensis* (Moore, 1877)	Nilgiri Tiger
196.	*Tirumala limniace* (Cramer, [1775])	Blue Tiger
197.	*Tirumala septentrionis* (Butler, 1874)	Dark Blue Tiger

Subfamily Heliconiinae

Tribe Acraeini

198.	*Acraea terpsicore* (Linnaeus, 1758)	Tawny Coster
199.	*Cethosia mahratta* Moore, 1872	Sahyadri Lacewing

Tribe Argynnini

200. *Argynnis castetsi* Oberthür, 1891 — Palni Branded Fritillary
201. *Argynnis* (*castetsi*) *hybrida* Evans, 1912 — Nilgiri Branded Fritillary

Tribe Vagrantini

202. *Cirrochroa thais* (Fabricius, 1787) — Tamil Yeoman
203. *Cupha erymanthis* (Drury, [1773]) — Rustic
204. *Phalanta alcippe* (Stoll, [1782]) — Small Leopard
205. *Phalanta phalantha* (Drury, [1773]) — Common Leopard
206. *Vindula erota* (Fabricius, 1793) — Cruiser

Subfamily Libytheinae

Tribe Libytheini

207. *Libythea laius* Trimen, 1879 — Lobed Beak
208. *Libythea myrrha* Godart, 1819 — Club Beak

Subfamily Limenitidinae

Tribe Adoliadini

209. *Dophla evelina* (Stoll, [1790]) — Redspot Duke
210. *Euthalia aconthea* (Cramer, [1777]) — Common Baron
211. *Euthalia lubentina* (Cramer, [1777]) — Gaudy Baron
212. *Symphaedra nais* (Forster, 1771) — Baronet
213. *Tanaecia lepidea* (Butler, 1868) — Grey Count

Tribe Limenitidini

214. *Athyma inara* Westwood, 1850 — Color Sergeant
215. *Athyma perius* (Linnaeus, 1758) — Common Sergeant
216. *Athyma ranga* Moore, [1858] — Blackvein Sergeant
217. *Athyma selenophora* (Kollar, [1844]) — Staff Sergeant
218. *Moduza procris* (Cramer, [1777]) — Commander

Tribe Neptini

219. *Lasippa viraja* (Moore, 1872) — Yellowjack Sailer
220. *Neptis clinia* Moore, 1872 — Sullied Sailer
221. *Neptis hylas* (Linnaeus, 1758) — Common Sailer
222. *Neptis jumbah* Moore, [1858] — Chestnut-streaked Sailer
223. *Neptis nata* Moore, [1858] — Clear Sailer
224. *Neptis palnica* Eliot, 1969 — Palni Sailer
225. *Pantoporia hordonia* (Stoll, [1790]) — Common Lascar
226. *Pantoporia sandaka* (Butler, 1892) — Extra Lascar

227. *Phaedyma columella* (Cramer, [1780]) — Short-banded Sailer

Tribe Parthenini

228. *Parthenos sylvia* (Cramer, [1775]) — Clipper

Subfamily Nymphalinae

Tribe Junoniini

229. *Hypolimnas bolina* (Linnaeus, 1758) — Great Eggfly
230. *Hypolimnas misippus* (Linnaeus, 1764) — Danaid Eggfly
231. *Junonia almana* (Linnaeus, 1758) — Peacock Pansy
232. *Junonia atlites* (Linnaeus, 1763) — Grey Pansy
233. *Junonia hierta* (Fabricius, 1798) — Yellow Pansy
234. *Junonia iphita* (Cramer, [1779]) — Chocolate Pansy.
235. *Junonia lemonias* (Linnaeus, 1758) — Lemon Pansy
236. *Junonia orithya* (Linnaeus, 1758) — Blue Pansy

Tribe Kallimini

237. *Doleschallia bisaltide* (Cramer, [1777]) — Autumn Leaf
238. *Kallima horsfieldii* (Kollar, [1844]) — Sahyadri Blue Oakleaf

Tribe Nymphalini

239. *Kaniska canace* (Linnaeus, 1763) — Blue Admiral
240. *Vanessa cardui* (Linnaeus, 1758) — Painted Lady
241. *Vanessa indica* (Herbst, 1794) — Indian Red Admiral

Subfamily Satyrinae

Tribe Amathusiini

242. *Amathusia phidippus* (Linnaeus, 1763) — Palmking
243. *Discophora lepida* (Moore, [1858]) — Blue-banded Duffer

Tribe Elymniini

244. *Elymnias caudata* Butler, 1871 — Tailed Palmfly

Tribe Melanitini

245. *Melanitis leda* (Linnaeus, 1758) — Common Evening Brown
246. *Melanitis phedima* (Cramer, [1780]) — Dark Evening Brown
247. *Melanitis zitenius* (Herbst, 1796) — Great Evening Brown

248. *Parantirrhoea marshalli* Wood-Mason, [1881] Travancore Evening Brown

Tribe Satyrini

249. *Lethe drypetis* (Hewitson, 1863) Two-eyed Treebrown
250. *Lethe europa* (Fabricius, 1775) Bamboo Treebrown
251. *Lethe rohria* (Fabricius, 1787) Common Treebrown
252. *Mycalesis anaxias* Hewitson, 1862 White-bar Bushbrown
253. *Mycalesis igilia* Fruhstorfer, 1911 Bicoloured Bushbrown
254. *Mycalesis junonia* Butler, 1868 Malabar Glad-eye Bushbrown
255. *Mycalesis mineus* (Linnaeus, 1758) Dark-branded Bushbrown
256. *Mycalesis orcha* Evans, 1912 Travancore Bushbrown
257. *Mycalesis perseus* (Fabricius, 1775) Common Bushbrown
258. *Mycalesis subdita* (Moore, [1890]) Tamil Bushbrown
259. *Mycalesis visala* Moore, [1858] Long-branded Bushbrown
260. *Orsotriaena medus* (Fabricius, 1775) Medus Brown
261. *Telinga adolphei* (Guérin-Méneville, 1843) Red-eye Bushbrown
262. *Telinga davisoni* (Moore, [1891]) Palni Bushbrown
263. *Telinga oculus* (Marshall, 1881) Red-disc Bushbrown
264. *Ypthima asterope* (Klug, 1832) Common Three-ring
265. *Ypthima baldus* (Fabricius, 1775) Common Five-ring
266. *Ypthima ceylonica* Hewitson, [1865] White Four-ring
267. *Ypthima chenu* (Guérin-Méneville, 1843) Nilgiri Four-ring
268. *Ypthima huebneri* Kirby, 1871 Common Four-ring
269. *Ypthima singala* R. Felder, 1868 Sinhalese Five-ring
270. *Ypthima striata* Hampson, [1889] Striated Five-ring
271. *Ypthima tabella* Marshall, 1883 Sahyadri Baby Five-ring
272. *Ypthima ypthimoides* (Moore, 1881) Palni Four-ring
273. *Zipaetis saitis* Hewitson, 1863 Banded Catseye

Family Papilionidae

Subfamily Papilioninae

Tribe Leptocircini

274. *Graphium agamemnon* (Linnaeus, 1758) Tailed Jay
275. *Graphium antiphates* (Cramer, [1775]) Five-bar Swordtail
276. *Graphium doson* (C. & R. Felder, 1864) Common Jay
277. *Graphium nomius* (Esper, 1799) Spot Swordtail
278. *Graphium teredon* (C. & R. Felder, 1865) Narrow-banded Bluebottle

Tribe Papilionini

279. *Papilio buddha* Westwood, 1872 Malabar Banded Peacock

280.	*Papilio clytia* Linnaeus, 1758	Common Mime
281.	*Papilio crino* Fabricius, 1793	Common Banded Peacock
282.	*Papilio demoleus* Linnaeus, 1758	Lime Swallowtail
283.	*Papilio dravidarum* Wood-Mason, 1880	Malabar Raven
284.	*Papilio helenus* Linnaeus, 1758	Red Helen
285.	*Papilio liomedon* Moore, [1875]	Malabar Banded Swallowtail
286.	*Papilio paris* Linnaeus, 1758	Paris Peacock
287.	*Papilio polymnestor* Cramer, [1775]	Blue Mormon
288.	*Papilio polytes* Linnaeus, 1758	Common Mormon

Tribe Troidini

289.	*Pachliopta aristolochiae* (Fabricius, 1775)	Common Rose
290.	*Pachliopta hector* (Linnaeus, 1758)	Crimson Rose
291.	*Pachliopta pandiyana* (Moore, 1881)	Malabar Rose
292.	*Troides minos* (Cramer, [1779])	Sahyadri Birdwing

Family Pieridae

Subfamily Coliadinae

293.	*Catopsilia pomona* (Fabricius, 1775)	Lemon Emigrant
294.	*Catopsilia pyranthe* (Linnaeus, 1758)	Mottled Emigrant
295.	*Colias nilagiriensis* C. & R. Felder, 1859	Nilgiri Clouded Yellow
296.	*Eurema andersonii* (Moore, 1886)	One-spot Grass Yellow
297.	*Eurema blanda* (Boisduval, 1836)	Three-spot Grass Yellow
298.	*Eurema brigitta* (Stoll, [1780])	Small Grass Yellow
299.	*Eurema hecabe* (Linnaeus, 1758)	Common Grass Yellow
300.	*Eurema laeta* (Boisduval, 1836)	Spotless Grass Yellow
301.	*Eurema nilgiriensis* (Yata, 1990)	Nilgiri Grass Yellow

Subfamily Pierinae

Tribe Anthocharidini

302.	*Hebomoia glaucippe* (Linnaeus, 1758)	Great Orange-tip

Tribe Leptosiaini

303.	*Leptosia nina* (Fabricius, 1793)	Oriental Psyche

Tribe Nepheroniini

304.	*Pareronia ceylanica* (C. & R. Felder, 1865)	Dark Wanderer
305.	*Pareronia hippia* (Fabricius, 1787)	Indian Wanderer

Tribe Pierini

306.	*Appias albina* (Boisduval, 1836)	Common Albatross
307.	*Appias indra* (Moore, [1858])	Plain Puffin
308.	*Appias lalage* (Doubleday, 1842)	Spot Puffin
309.	*Appias libythea* (Fabricius, 1775)	Indian Striped Albatross
310.	*Appias lyncida* (Cramer, [1777])	Chocolate Albatross
311.	*Appias wardii* (Moore, [1884])	Sahyadri Albatross
312.	*Belenois aurota* (Fabricius, 1793)	Pioneer
313.	*Cepora nadina* (Lucas, 1852)	Lesser Gull
314.	*Cepora nerissa* (Fabricius, 1775)	Common Gull
315.	*Delias eucharis* (Drury, 1773)	Indian Jezebel
316.	*Pieris canidia* (Linnaeus, 1768)	Asian Cabbage White
317.	*Prioneris sita* (C. & R. Felder, [1865])	Painted Sawtooth

Tribe Teracolini

318.	*Colotis amata* (Fabricius, 1775)	Small Salmon Arab
319.	*Colotis aurora* (Cramer, [1780])	Plain Orange-tip
320.	*Colotis danae* (Fabricius, 1775)	Crimson-tip
321.	*Colotis etrida* (Boisduval, 1836)	Little Orange-tip
322.	*Colotis fausta* (Olivier, 1804)	Large Salmon Arab
323.	*Ixias marianne* (Cramer, [1779])	White Orange-tip
324.	*Ixias pyrene* (Linnaeus, 1764)	Yellow Orange-tip

Family Riodinidae

Subfamily Nemeobiinae

Tribe Abisarini

325.	*Abisara bifasciata* Moore, 1877	Double-banded Judy
326.	*Abisara echerius* (Stoll, [1790])	Plum Judy

Checklist of Odonata of Kerala

Order/Family Species	Common Name
Suborder: Zygoptera (Damselflies)	
Family Lestidae	
1. *Indolestes gracilis davenporti* (Fraser, 1930)	Davenport's False Spreadwing
2. *Indolestes pulcherrimus* (Fraser, 1924)	Coorg False Spreadwing
3. *Lestes concinnus* (Hagen in Selys, 1862)	Dusky Spreadwing
4. *Lestes dorothea* Fraser, 1924	Forest Spreadwing
5. *Lestes elatus* Hagen in Selys, 1862	Emerald Spreadwing
6. *Lestes malabaricus* Fraser, 1929	Malabar Spreadwing
7. *Lestes nodalis* Selys, 1891	Spotted Spreadwing
8. *Lestes patricia* Fraser, 1924	Black-banded Spreadwing
9. *Lestes praemorsus* Hagen in Selys, 1862	Sapphire-eyed Spreadwing
10. *Lestes viridulus* Rambur, 1842	Emerald-striped Spreadwing
11. *Platylestes kirani* Emiliyamma, Palot & Charesh, 2020	Kiran's Spreadwing
12. *Platylestes platystylus* (Rambur, 1842)	Green-eyed Spreadwing
Family Platystictidae (Shadow damselflies)	
13. *Indosticta deccanensis* (Laidlaw, 1915)	Saffron Reedtail
14. *Protosticta antelopoides* (Fraser, 1931)	Spiny Reedtail
15. *Protosticta cyanofemora* (Joshi, Subramanian & Babu, 2020)	Blue-legged Reedtail
16. *Protosticta davenporti* (Fraser, 1931)	Anamalai Reedtail
17. *Protosticta gravelyi* (Laidlaw, 1915)	Pied Reedtail
18. *Protosticta hearsey*i Fraser, 1922	Little Reedtail
19. *Protosticta monticola* Emiliyamma & Palot, 2016	Mountin Reedtail
20. *Protosticta mortoni* Fraser, 1924	Blue-necked Reedtail
21. *Protosticta ponmudiensis* Kiran, Kalesh & Kunte, 2015	Travancore Reedtail
22. *Protosticta rufostigma* Kimmins, 1958	Agasthyamalai Reedtail
23. *Protosticta sanguinostigma* Fraser, 1922	Red Spotted Reedtail
24. *Protosticta sholai* Subramanian & Babu, 2020	Shola Reedtail
Family Calopterygidae (Broad-winged damselflies)	
25. *Neurobasis chinensis* (Linnaeus, 1758)	Stream Glory
26. *Vestalis apicalis* Selys, 1873	Black-tipped Forest Glory
27. *Vestalis gracilis* (Rambur, 1842)	Clear-winged Forest Glory
28. *Vestalis submontana* Fraser, 1934	Montane Forest Glory
Family Chlorocyphidae (Stream Jewels)	
29. *Calocypha laidlawi* (Fraser, 1924)	Myristica Sapphire
30. *Heliocypha bisignata* (Hagen in Selys, 1853)	Stream Ruby
31. *Libellago indica* (Fraser, 1928)	River Heliodor
Family Euphaeidae (Gossamerwinged damselflies)	
32. *Dysphaea ethela* Fraser, 1924	Black Torrent Dart
33. *Euphaea cardinalis* (Fraser, 1924)	Travancore Torrent Dart

34. *Euphaea dispar* Rambur, 1842	Nilgiri Torrent Dart
35. *Euphaea fraseri* (Laidlaw, 1920)	Malabar Torrent Dart
Family Platycnemididae (White-legged damselflies)	
36. *Caconeura gomphoides* (Rambur, 1842)	Pale-spotted Bambootail
37. *Caconeura ramburi* (Fraser, 1922)	Coorg Bambootail
38. *Caconeura risi* (Fraser, 1931)	Wayanad Bambootail
39. *Copera marginipes* (Rambur, 1842)	Yellow Bush Dart
40. *Copera vittata* (Selys, 1863)	Blue Bush Dart
41. *Disparoneura apicalis* (Fraser, 1924)	Black-tipped Bambootail
42. *Disparoneura quadrimaculata* (Rambur, 1842)	Black-winged Bambootail
43. *Elattoneura souteri* (Fraser, 1924)	Red-striped Bambootail
44. *Elattoneura tetrica* (Laidlaw, 1917)	Black and Yellow Bambootail
45. *Esme cyaneovittata* Fraser, 1922	Palani Bambootail
46. *Esme longistyla* Fraser, 1931	Nilgiri Bambootail
47. *Esme mudiensis* Fraser, 1931	Travancore Bambootail
48. *Melanoneura bilineata* Fraser, 1922	Malabar Bambootail
49. *Onychargia atrocyana* Selys, 1865	Marsh Dancer
50. *Phylloneura westermanni* (Hagen in Selys, 1860)	Myristica Bambootail
51. *Prodasineura verticalis* (Selys, 1860)	Black Bambootail
Family Coenagrionidae (Narrow-winged damselflies)	
52. *Aciagrion approximans krishna* (Fraser, 1921)	Violet-striped Slender Dartlet
53. *Aciagrion occidentale* (Laidlaw, 1919)	Green-striped Slender Dartlet
54. *Agriocnemis keralensis* (Peters, 1981)	Kerala Dartlet
55. *Agriocnemis pieris* (Laidlaw, 1919)	White Dartlet
56. *Agriocnemis pygmaea* (Rambur, 1842)	Pygmy Dartlet
57. *Agriocnemis splendidissima* (Laidlaw, 1919)	Splendid Dartlet
58. *Amphiallagma parvum* (Selys, 1876)	Azure Dartlet
59. *Archibasis oscillans* (Selys, 1877)	Blue-banded Longtail
60. *Ceriagrion cerinorubellum* (Brauer, 1865)	Orange-tailed Marsh Dart
61. *Ceriagrion chromothorax* (Joshi & Sawant 2019)	Sindhudurg Marsh Dart
62. *Ceriagrion coromandelianum* (Fabricius, 1798)	Coromandel Marsh Dart
63. *Ceriagrion olivaceum aurantiacum* (Fraser, 1924)	Rusty Marsh Dart
64. *Ceriagrion rubiae* (Laidlaw, 1916)	Orange Marsh Dart
65. *Ischnura rubilio* (Selys, 1876)	Golden Dartlet
66. *Ischnura senegalensis* (Rambur, 1842)	Senegal Golden Dartlet
67. *Mortonagrion varralli* (Fraser, 1920)	Brown Dartlet
68. *Paracercion calamorum* (Ris, 1916)	Dusky Lilysquatter
69. *Paracercion malayanum* (Selys, 1876)	Malayan Lilysquatter
70. *Pseudagrion australasiae* (Selys, 1876)	Short-tipped Grass Dart
71. *Pseudagrion decorum* (Rambur, 1842)	Green-striped Grass Dart
72. *Pseudagrion indicum* (Fraser, 1924)	Yellow-striped Grass Dart
73. *Pseudagrion malabaricum* (Fraser, 1924)	Jungle Grass Dart
74. *Pseudagrion microcephalum* (Rambur, 1842)	Blue Grass Dart
75. *Pseudagrion rubriceps* (Selys, 1876)	Saffron-faced Grass Dart

Suborder: Anisoptera (Dragonflies)

Family Aeshnidae (Hawkers or Darners)

76.	*Anaciaeschna jaspidea* (Burmeister, 1839)	Rusty Darner
77.	*Anaciaeschna martini* (Selys, 1897)	Martin's Hawker
78.	*Anax ephippiger* (Burmeister, 1839)	Vagrant Emperor
79.	*Anax guttatus* (Burmeister, 1839)	Pale-spotted Emperor
80.	*Anax immaculifrons* (Rambur, 1842)	Blue Darner
81.	*Anax indicus* (Lieftinck, 1942)	Lesser Green Emperor
82.	*Anax parthenope* (Selys, 1839)	Lesser Emperor
83.	*Gynacantha dravida* (Lieftinck, 1960)	Brown Darner
84.	*Gynacantha millardi* (Fraser, 1920)	Parakeet Darner

Family Gomphidae (Clubtails)

85.	*Acrogomphus fraseri* (Laidlaw, 1925)	Fraser's Clubtail
86.	*Burmagomphus laidlawi* (Fraser, 1924)	Plain Sinuate Clubtail
87.	*Burmagomphus pyramidalis* (Laidlaw, 1922)	Spotted Sinuate Clubtail
88.	*Cyclogomphus flavoannulatus* (Rangnekar et al., 2019)	Yellow Paddled Clubtail
89.	*Cyclogomphus heterostylus* (Selys, 1854)	Paddled Clubtail
90.	*Davidioides martini* (Fraser, 1924)	Syrandiri Clubtail
91.	*Gomphidia kodaguensis* (Fraser, 1923)	Kodagu Clubtail
92.	*Heliogomphus promelas* (Selys, 1873)	Indian Lyretail
93.	*Ictinogomphus rapax* (Rambur, 1842)	Common Clubtail
94.	*Lamelligomphus nilgiriensis* (Fraser, 1922)	Nilgiri Clawtail
95.	*Macrogomphus wynaadicus* (Fraser, 1924)	Wayanad Bowtail
96.	*Megalogomphus hannyngtoni* (Fraser, 1923)	Giant Clubtail
97.	*Megalogomphus superbus* (Fraser, 1931)	Beautiful Clubtail
98.	*Melligomphus acinaces* (Laidlaw, 1922)	Laidlaw's Clawtail
99.	*Merogomphus longistigma* (Fraser, 1922)	Long Legged Clubtail
100.	*Merogomphus tamaracherriensis* (Fraser, 1931)	Malabar Long Legged Clubtail
101.	*Microgomphus souteri* (Fraser, 1924)	Pigmy Clubtail
102.	*Nychogomphus striatus* (Fraser, 1924)	Striated Clawtail
103.	*Onychogomphus malabarensis* (Fraser, 1924)	Malabar Clawtail
104.	*Paragomphus lineatus* (Selys, 1850)	Common Hooktail

Family Chlorogomphidae

105.	*Chlorogomphus campioni* (Fraser, 1924)	Nilgiri Mountain Hawk
106.	*Chlorogomphus xanthoptera* (Fraser, 1919)	Anamalai Mountain Hawk

Family Macromiidae (Cruisers)

107.	*Epophthalmia frontalis* (Selys, 1871)	Spotted Torrent Hawk
108.	*Epophthalmia vittata* (Burmeister, 1839)	Common Torrent Hawk
109.	*Macromia annaimallaiensis* (Fraser, 1931)	Annaimalai Torrent Hawk
110.	*Macromia bellicosa* (Fraser, 1924)	Militant Torrent Hawk
111.	*Macromia cingulata* (Rambur, 1842)	Rambur's Torrent Hawk
112.	*Macromia ellisoni* (Fraser, 1924)	Coorg Torrent Hawk
113.	*Macromia flavocolorata* (Fraser, 1922)	Yellow Torrent Hawk
114.	*Macromia ida* (Fraser, 1924)	Mountain Torrent Hawk
115.	*Macromia indica* (Fraser, 1924)	Indian Torrent Hawk

116.	*Macromia irata* (Fraser, 1924)	Fraser's Torrent Hawk
Family Corduliidae (Emeralds or Baskettails)		
117.	*Hemicordulia asiatica* (Selys, 1878)	Asian emerald
Family: Libellulidae (Skimmers)		
118.	*Acisoma panorpoides* (Rambur, 1842)	Trumpet Tail
119.	*Aethriamanta brevipennis* (Rambur, 1842)	Scarlet Marsh Hawk
120.	*Brachydiplax chalybea* (Brauer, 1868)	Rufous-backed Marsh Hawk
121.	*Brachydiplax sobrina* (Rambur, 1842)	Little Blue Marsh Hawk
122.	*Brachythemis contaminata* (Fabricius, 1793)	Ditch Jewel
123.	*Bradinopyga geminata* (Rambur, 1842)	Granite Ghost
124.	*Bradinopyga konkanensis* (Joshi & Sawant, 2020)	Konkan Rockdweller
125.	*Cratilla lineata* (Brauer, 1878)	Emerald-banded Skimmer
126.	*Crocothemis servilia* (Drury, 1773)	Ruddy Marsh Skimmer
127.	*Diplacodes lefebvrii* (Rambur, 1842)	Black Ground Skimmer
128.	*Diplacodes nebulosa* (Fabricius, 1793)	Black-tipped Ground Skimmer
129.	*Diplacodes trivialis* (Rambur, 1842)	Ground Skimmer
130.	*Epithemis mariae* (Laidlaw, 1915)	Ruby-tailed Hawklet
131.	*Hydrobasileus croceus* (Brauer, 1867)	Amber Winged Marsh Glider
132.	*Hylaeothemis apicalis* (Fraser, 1924)	Blue Hawklet
133.	*Indothemis carnatica* (Fabricius, 1798)	Light-tipped Demon
134.	*Indothemis limbata* (Selys, 1891)	Restless demon
135.	*Lathrecista asiatica* (Fabricius, 1798)	Asiatic Blood-tail
136.	*Lyriothemis acigastra* (Selys, 1878)	Dwarf Blood Tail
137.	*Lyriothemis flava* (Oguma, 1915)	Tricolour Bloodtail
138.	*Macrodiplax cora* (Kaup in Brauer, 1867)	Coastal Glider
139.	*Neurothemis fulvia* (Drury, 1773)	Fulvous Forest Skimmer
140.	*Neurothemis intermedia* (Rambur, 1842)	Ruddy Meadow Skimmer
141.	*Neurothemis tullia* (Drury, 1773)	Pied Paddy Skimmer
142.	*Onychothemis testacea* (Laidlaw, 1902)	Stellate River Hawk
143.	*Orthetrum chrysis* (Selys, 1891)	Brown-backed Red Marsh Hawk
144.	*Orthetrum glaucum* (Brauer, 1865)	Blue Marsh Hawk
145.	*Orthetrum luzonicum* (Brauer, 1868)	Tri-coloured Marsh Hawk
146.	*Orthetrum pruinosum* (Burmeister, 1839)	Crimson-tailed Marsh Hawk
147.	*Orthetrum sabina* (Drury, 1770)	Green Marsh Hawk
148.	*Orthetrum taeniolatum* (Schneider, 1845)	Ashy Marsh Hawk
149.	*Orthetrum triangulare* (Selys, 1878)	Blue-tailed Forest Hawk
150.	*Palpopleura sexmaculata* (Fabricius, 1787)	Blue-tailed Yellow Skimmer
151.	*Pantala flavescens* (Fabricius, 1798)	Wandering Glider
152.	*Potamarcha congener* (Rambur, 1842)	Yellow-tailed Ashy Skimmer
153.	*Rhodothemis rufa* (Rambur, 1842)	Rufous Marsh Glider
154.	*Rhyothemis triangularis* (Kirby, 1889)	Lesser Blue Wing
155.	*Rhyothemis variegata* (Linnaeus, 1763)	Common Picturewing
156.	*Sympetrum fonscolombii* (Selys, 1840)	Red-veined Darter
157.	*Tetrathemis platyptera* (Selys, 1878)	Pigmy Skimmer
158.	*Tholymis tillarga* (Fabricius, 1798)	Coral-tailed Cloudwing

159.	*Tramea basilaris* (Palisot de Beauvois, 1817)	Red Marsh Trotter
160.	*Tramea limbata* (Desjardins, 1832)	Black Marsh Trotter
161.	*Trithemis aurora* (Burmeister, 1839)	Crimson Marsh Glider
162.	*Trithemis festiva* (Rambur, 1842)	Black Stream Glider
163.	*Trithemis kirbyi* (Selys, 1891)	Scarlet Rock Glider
164.	*Trithemis pallidinervis* (Kirby, 1889)	Long-legged Marsh Glider
165.	*Urothemis signata* (Rambur, 1842)	Greater Crimson Glider
166.	*Zygonyx iris* (Selys, 1869)	Iridescent Stream Glider
167.	*Zyxomma petiolatum* (Rambur, 1842)	Brown Dusk Hawk

Genera *Incertae sedis*

168.	*Idionyx corona* (Fraser, 1921)	Mountain Daggerhead
169.	*Idionyx galeata* (Fraser, 1924)	Minaret Daggerhead
170.	*Idionyx gomantakensis* (Subramanian, Rangnekar & Naik, 2013)	Goan Daggerhead
171.	*Idionyx minima* (Fraser, 1931)	Little Daggerhead
172.	*Idionyx rhinoceroides* (Fraser, 1934)	Rhinoceros Daggerhead
173.	*Idionyx saffronata* (Fraser, 1924)	Saffron Daggerhead
174.	*Idionyx travancorensis* (Fraser, 1931)	Travancore Daggerhead
175.	*Macromidia donaldi* (Fraser, 1924)	Dark Daggerhead

Checklist of Mygalomorph Spiders of Kerala

Order/Family Species	Common Name

Family Barychelidae Simon, 1889

1. *Sason robustum* (O. Pickard-Cambridge, 1883)
2. *Sasonichus sullivani* Pocock, 1900

Family Idiopidae Simon, 1889

3. *Heligmomerus maximus* Sanap & Mirza, 2015

Family Theraphosidae Thorell, 1869

4. *Annandaliella ernakulamensis* Jose & Sebastian, 2008
5. *Annandaliella travancorica* Hirst, 1909
6. *Haploclastus devamatha* Prasanth & Jose, 2014
7. *Haploclastus kayi* Gravely, 1915
8. *Haploclastus nilgirinus* Pocock, 1899
9. *Neoheterophrictus bhori* (Gravely, 1915)
10. *Neoheterophrictus chimminiensis* Jose, 2020
11. *Neoheterophrictus crurofulvus* Siliwal *et al.,* 2012
12. *Poecilotheria regalis* Pocock, 1899
13. *Poecilotheria rufilata* Pocock, 1899
14. *Poecilotheria striata* Pocock, 1895
15. *Sahydroaraneus hirsti* Mirza & Sanap, 2014
16. *Sahydroaraneus raja* (Gravely, 1915)
17. *Sahydroaraneus sebastiani* Jose, 2017
18. *Thrigmopoeus trunculentus* Pocock, 1899

Checklist of Freshwater Crabs of Kerala

Order/Family Species	Common Name

1. *Arcithelphusa cochleariformis* Pati & Sudha Devi, 2015
2. *Arcithelphusa tumpikkai* Pati, Sujila & Sudha Devi, 2019
3. *Baratha peena* Bahir & Yeo, 2007
4. *Baratha pushta* Bahir & Yeo, 2007
5. *Barytelphusa cunicularis* (Westwood in Sykes, 1836)
6. *Cylindrotelphusa breviphallus* Pati, Rajesh, Raj, Sheeja, Kumar & Sureshan, 2017
7. *Cylindrotelphusa granulata* (Pillai, 1951)
8. *Cylindrotelphusa longiphallus* Pati, Rajesh, Raj, Sheeja, Kumar & Sureshan, 2017
9. *Cylindrotelphusa steniops* (Alcock, 1909)

10. *Kani maranjandu* Kumar, Raj & Ng, 2017
11. *Karkata ghanarakta* Pati, Rajesh, Raj, Sheeja, Kumar & Sureshan, 2017
12. *Karkata kusumbha* Pati, Rajesh, Raj, Sheeja, Kumar & Sureshan, 2017
13. *Lamella lamellifrons* (Alcock, 1909)
14. *Oziotelphusa biloba* Bahir & Yeo, 2005
15. *Oziotelphusa kerala* Bahir & Yeo, 2005
16. *Oziotelphusa wagrakarowensis* (Rathbun, 1904)
17. *Pilarta anuka* Bahir & Yeo, 2007
18. *Pilarta aroma* Pati, Rajesh, Raj, Sheeja, Kumar & Sureshan, 2017
19. *Pilarta punctatissima* Pati, Rajesh, Raj, Sheeja, Kumar & Sureshan, 2017
20. *Snaha aruna* Bahir & Yeo, 2007
21. *Spiralothelphusa gibberosa* Pati & Sudha Devi, 2015
22. *Travancoriana charu* Bahir & Yeo, 2007
23. *Travancoriana convexa* (Roux, 1931)
24. *Travancoriana granulata* Pati & Sharma, 2013
25. *Travancoriana kuleera* Bahir & Yeo, 2007
26. *Travancoriana pollicaris* (Alcock, 1909)
27. *Travancoriana schirnerae* Bott, 1969
28. *Vanni ashini* Bahir & Yeo, 2007
29. *Vanni deepta* Bahir & Yeo, 2007
30. *Vanni giri* Bahir & Yeo, 2007
31. *Vanni malabarica* (Henderson, 1912)

Checklist of Non-Marine Molluscs of Kerala

Order/Family Species	Common Name
Family Streptaxidae	
1. *Streptaxis footei* (W. & H. Blanford 1860)	
2. *Streptaxis watsoni* (W. & H. Blanford 1860)	
3. *Streptaxis beddomii* (Blanford 1899)	
4. *Streptaxis personatus* (Blanford 1880)	
5. *Huttonella bicolor* (Hutton 1834)	
Family Ariophantidae	
6. *Ariophanta thyreus* (Benson 1852)	
7. *Ariophanta belangeri* (Desh. 1834)	
8. *Ariophanta basilessa* (Blanford, 1880)	
9. *Ariophanta basileus* (Benson, 1861)	
10. *Ariophanta beddomii* (Blanford 1874)	

11. *Ariophanta grassii* (Blanford 1901)
12. *Indrella ampulla* (Godwin-Austen, 1901)
13. *Euplecta semidecussata* (Pfeiffer, 1851)
14. *Euplecta subcastor* (Beddome, 1891)
15. *Euplecta travancorica* (Benson, 1865)
16. *Euplecta indica* (Pfeiffer, 1846)
17. *Euplecta acuducta* (Benson 1850)
18. *Euplecta orbiates* (Blanford 1901)
19. *Macrochlamys indica* Godwin-Austen, 1883
20. *Macrochlamys woodiana* (Pfeiffer 1851)
21. *Macrochlamys vallicola* (Pfeiffer, 1854)
22. *Macrochlamys prava* (Blanford, 1904)

Family Helicarionidae

23. *Mariaella dussumieri* (Gray 1855)
24. *Mariaella beddomei* (Godwin-Austen, 1888)
25. *Pseudaustenia atra* (Godwin-Austen, 1888)
26. *Satiella dekhanensis* (Godwin-Austen, 1898)
27. *Satiella levidensis* (Godwin-Austen, 1898)
28. *Satiella compressa* (Blanford and Godwin Austen, 1908)
29. *Satiella pertenuis* (Blanford and Godwin Austen, 1908)
30. *Sitala injussa* (W. and H. Blanford, 1861)

Family Chronidae

31. *Kaliella barrakporensis* (Pfeiffer, 1852)

Family Charopidae

32. *Philalanka pirrieana* (Pfeiffer 1854)

Family Corillidae

33. *Corilla anax* (Benson 1865)

Family Camaenidae

34. *Trachia crassicostata* (Benson 1848)
35. *Trachia vittata* (Müller 1774)
36. *Beddomea calcadensis* (Blanford 1870)
37. *Apatetes bourdilloni* (Theobald 1876)

Family Cerastidae

38. *Cerastus densus* (Pfeiffer 1856)
39. *Rachisellus pulcher* (Gray 1825)

Family Subulinidae

40. *Glessula tornensis* (Blanford 1870)
41. *Glessula textilis* (Blanford 1866)
42. *Glessula subserena* (Beddome 1906)
43. *Glessula senator* (Hanley 1875)
44. *Glessula subperrotteti* (Beddome 1906)
45. *Glessula anamullica* (Blanford 1866)
46. *Glessula subinornata* (Beddome 1906)
47. *Glessula travancorica* (Gude 1914)
48. *Glessula malabarica* (Gude 1914)

49. *Glessula filosa* (Blanford 1870)

Family Cyclophoridae

50. *Craspedotropis bilirata* (Beddome 1875)
51. *Micralaux scabra* (Theobald 1876)
52. *Ditropis beddomei* (Blanford 1869)
53. *Ditropis convexa* (Blanford 1869)
54. *Ditropis planorbis* (Blanford 1869)
55. *Cyclophorus nilagiricus* (Besnson 1852)
56. *Pterocyclus pseudocumingi* (Möllendorff 1897)
57. *Pearsonia travancorica* (Blanford 1880)
58. *Cyathopoma latilabre* (Beddome 1875)
59. *Cyathopoma travancoricum* (Beddome 1875)
60. *Cyathopoma wynaadense* (Blanford 1868)
61. *Cyathopoma procerum* (Blanford 1868)
62. *Mychopoma hirsutum* (Blanford 1869)
63. *Dicharax footei* (Blanford 1861)
64. *Nicida nitidula* (Blanford 1868)
65. *Opisthostoma macrostoma* (Blanford 1869)
66. *Cyclotopis subdiscoidea* (Sowerby 1850)

Family Achatinidae

67. Lissachatina fulica

Family Verocinidae

68. Laevicaulis alte

Freshwater Molluscs

Family Neritidae

69. *Neripteron violaceum* (Gmelin, 1791)

Family Viviparidae

70. *Filopaludina bengalensis* (Lamarck, 1882)
71. *Filopaludina bengalensis* (Lamarck, 1882)

Family Ampullariidae

72. *Pila virens* (Lamarck, 1822)

Family Bithinidae

73. *Gabbia stenothyroides* (Dohrn, 1857)
74. *Gabbia stenothyroides* (Dohrn, 1857)

Family Thiaridae

75. *Mieniplotia scabra* (Mueller, 1774)
76. *Thiara riqueti* (Grateloup, 1840)
77. *Melanoides tuberculata* (Mueller, 1774)
78. *Paracrostoma huegeli* (Philippi, 1841)

Family Paludomindae

79. *Paludomus inflatus* (Brot, 1880)
80. *Paludomus rotunda* (Blanford, 1870)
81. *Paludomus transchauricus* (Gmelin, 1771)
82. *Paludomus sulcatus* (Reeve, 1847)
83. *Paludomus stomatodon* (Benson, 1862)

Family Lynimidae

84. *Radix rufescens* (Lamarck, 1822)
85. *Racesina luteola* (Lamarck, 1822)

Family Ancyclidae

86. *Ferrissia tenuis* (Bourguignat, 1862)
87. *Ferrissia verruca* (Benson, 1855)

Family Planorbidae

88. *Indoplanorbis exustus* (Desbayes, 1834)
89. *Gyraulus convexiusculus* (Hutton, 1849)

Family Unionidae

90. *Lamellidens consobrinus* (Lea, 1859)
91. *Lamellidens corrianus* (Lea, 1834)
92. *Lamellidens marginalis* (Lamarck, 1819)

Family Corbiculidae

93. *Corbicula annandalei* (Prashad, 1928)
94. *Corbicula striatella* (Deshayes, 1854)
95. *Villorita cyprinoides* (Gray, 1825)

Calocypha laidlawi © Reji Chandran

सत्यमेव जयते

Ministry of Environment Forest and Climate Change

भारतीय प्राणि सर्वेक्षण १९१६
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