

A Review of Faunal Diversity in the Western Ghats of India

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ABSTRACT

The phrase "Biodiversity Hotspot" refers to a geographical area with high biodiversity and a significant number of endemic species that have been overexploited over time. India has four biodiversity hotspots: Himalayan, Indo-Burma, Sundaland, and Western Ghats. Human activities have had a substantial influence on the biodiversity in these hotspot locations. As a result, conservation of these places is critical to ensuring the survival of many species and the future well-being of both creatures and people. The Western Ghats are India's most varied hotspot, known for its distinct and abundant biodiversity. Land snails are among the most important invertebrates in the Western Ghats, although they have received little attention or research. The Western Ghats include 270 species of snails, 204 of which are indigenous to the area. Additionally, 37 of the 330 butterfly species in the region are indigenous. The Western Ghats also sustain a high amount of endemism among reptiles and amphibians. However, mammals have a lower amount of endemism than other categories of species. Several endemic species in the Western Ghats, such as the lion-tailed macaque (*Macaca silenus*), Malabar civet (*Viverra civettina*), Nilgiri tahr (*Hemitragus hylocrius*), and Red slender loris (*Loris tardigradus*), are facing significant threats and are classified as "vulnerable" or "endangered." Today, the Western Ghats' life-sustaining and species-rich ecosystems are threatened by habitat pressures, prompting the designation of one of the world's hottest biodiversity hotspots.

Keywords: Endogenous, Warmspot, Man-made, Biodiversity, and Susceptible

Introduction:

Diverse creatures may be found in aquatic, terrestrial, and even space habitats. They exhibit genetic, species, and ecological variety, among other degrees of diversity. Diversity exists everywhere, yet it varies in intensity depending on where you are. "Biodiversity Hotspots" are geographical areas that have experienced overexploitation of endemic species due to their greater degree of diversity. Every living thing on earth depends on the abundance of the planet. One of the main reasons for the planet's health to be declining is increased human activity. The growing human population and urbanisation cause hazardous materials to be produced, which have an adverse effect on other living things on the planet. Researchers have noted a great deal of extinct species in the IUCN Red Data Book and have issued warnings on a considerable quantity of extinctions of wild creatures. With four biodiversity hotspot regions—the Himalayan biodiversity hotspot, the Indo-Burma biodiversity hotspot, the Sundaland biodiversity hotspot, and the Western Ghats biodiversity hotspot—India is

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regarded as one of the mega-diverse nations. Hotspot zones feature the largest concentration of endemic species and the highest level of biological diversity of any region. Hotspot areas' biodiversity is greatly impacted by human activities. Therefore, the biodiversity of the area and the continued survival of humans and other species depend on the careful maintenance of the hotspot zone. Here, Myers' focus was on protecting endemic plant species that are exclusive to tropical forests rather than biodiversity. Nevertheless, he makes the case that since endemic species densities are particularly high in tropical forests, conservation efforts should prioritise these sites. In this first effort, Myers found 10 distinct tropical forest zones that he classified as hotspots because they were threatened by substantial habitat loss and had extraordinarily high concentrations of unique flora. In this instance, Myers views biodiversity as an intrinsically valuable feature of these places that should be preserved for its own purpose. Furthermore, the hotspot concept that he adds to it is a conflation of three distinct and largely independent concepts: vulnerability (the possibility of impending loss without prompt conservation action), biological diversity (the number of species per unit area), and endemism-dependent rarity (a concept focusing on individual endemics). The vertebrates and invertebrates of the Western Ghat biodiversity hotspot are covered in this article.

Criteria for determining hotspots:

A biodiversity hotspot must host almost 60% of the world's plant, reptile, amphibian, bird, and mammal species while also exhibiting a high degree of endemism. (i.e. the species that is unique to that place and cannot be found anywhere else). Habitat loss indicates the degree of hazard to a hotspot. The property should have varied ecosystems. A sufficient number of specialist species should be present. These places should have valuable gene pools for animals and plants.

DISTRIBUTION AND ECOLOGY OF WESTERN GHAT



Fig 1. Map showing the Western Ghats hotspot

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This criteria has found 34 hotspots worldwide, the majority of which are situated in tropical locations (Mittermeier et al., 2011). According to Williams et al. (2011), the Forests of East Australia rank 35th among the world's biodiversity hotspots. Bawa et al. (2011) calculated that the Western Ghats encompass around 180,000 square kilometres, which is 6% smaller than the entire area of the Indian subcontinent. India is designated as a mega diversity nation because it has many species, with the Western Ghats hosting 30% of all species found in India. The Western Ghats are often regarded as India's most varied hotspot, with a distinct and abundant biodiversity. The Malabar lowlands on India's western coast are home to the Western Ghat biodiversity hotspot. The Western Ghats' tallest peak is 2969 metres, with elevations ranging from 900 to 1500 metres (Nameer, Molur, & Walker, 2001). While this hotspot region has a high level of species variety, increased human activity is lowering species diversity and forest cover. Concern at all levels, both legal and interpersonal, is essential for the protection of the Western Ghats biodiversity hotspot. The Western Ghats' terrain is distinct in terms of biology, geology, ecology, and geomorphology, and the high amount of precipitation makes the Western Ghats a stunning mountain range and one of the most biologically diverse landscapes.

Faunal Endemism in Western Ghana.

Invertebrates and vertebrates are critical components of every ecosystem, accounting for the majority of biodiversity. Precipitation, temperature, sunshine, soil content, and other natural variables all contribute to species diversity (MAppSci., 2012). The whole Western Ghat area is designated as an environmentally sensitive zone (ESZ) by the Western Ghat Ecology Expert Panel (WGEEP), and the degree of sensitivity is divided into three zones. These zones are ESL1, ESL2, and ESL3, and they are characterised based on the environmental conditions for wild creatures (Gadgil et al., 2011).

Table 1. Overview of Western Ghats

Category	Value
Hotspot original extent (km ²)	1,89,612
Hotspot vegetation remaining (km ²)	43,612
Human population density (people/km ²)	262
Area protected (km ²)	26,131
Number of National Parks	21
Number of Sanctuaries	69
Number of Biosphere Reserves	2

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Table 2. Faunal Endemism in Western Ghats

Taxonomic Group	Species	Endemic Species	Endemism (%)
Mammals	141	19	13.9
Birds	459	36	8.6
Reptiles	268	175	66.2
Amphibians	179	131	74.0
Freshwater fishes	192	140	73.8
Land snails	270	205	76.8
Freshwater snails	78	29	37.3
Butterflies	333	38	12.1
Odonata	175	70	40.6
Ants	351	71	21.0

[Source: Conservation International]

Invertebrates

Bawa et al. mention in their research both terrestrial and aquatic invertebrates in the Western Ghats area. They also argued that the IUCN was unable to include any freshwater invertebrates on the Red List, despite the fact that human activities had an equivalent impact on invertebrates in hotspot regions. In recent years, the majority of invertebrate study has focused on ants and butterflies.

Snails

Land snails are among the most important invertebrates in the Western Ghats, however they are infrequently exploited and researched. Several molluscan species were investigated by a few scientists at various times. According to Ramakrishna et al. (2010), India has 1129 snail species, divided into 140 genera and 26 families. While 270 species of snails are conserved in the Western Ghats, 204 of them species are indigenous to the area. *Cyathopomais*, a snail genus found solely in the Western Ghats, is endemic, accounting for 41% of the total genus of land snails present here. Molluscs

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are among the most sensitive species, and they prefer to concentrate in one spot. This feature is one of the primary reasons of their demise, along with human pressure.

Insects

Insect diversity ranks high among the world's most diverse creatures. Insects inhabit in terrestrial and aquatic habitats. Balachandran et al. (2014) argue in their research on aquatic insects that aquatic insects are the most significant species in aquatic environments because they aid in the breakdown of organic materials. Insects are regarded as useful indicators of the ecology. Butterflies are another significant insect, with 330 species in the Western Ghats. Of the 330 species, 37 butterfly species were identified as indigenous. Butterflies play an important role in the natural habitat because they pollinate the forest ecosystem. According to the authors, the Western Ghats are home to 200 different spider species. Ants are insects that account for roughly 20% of the biomass in the tropical area. A list of 210 ant species newly discovered in the Western Ghats and Sri Lanka. Odonata has a remarkable degree of variety in the Western Ghats. There are 223 Odonata species that live in the Western Ghats and Sri Lanka. Among the Odonata, 43 percent is unique to this biodiversity hotspot. Insects are susceptible to adverse weather conditions. Increased human activity poses a hazard to insect families. Thus, adequate care for this issue is critical, and additional research is needed to learn more about the species richness of the Western Ghat hotspot.

Vertebrates

The Western Ghat hosts a large range of aquatic and terrestrial creatures. According to Roy (2021), this biodiversity hotspot area has roughly 315 species, all of which are indigenous to the Western Ghats. According to his findings, the Western Ghats are home to 458 bird species, 35 of which are indigenous. It also supports 140 mammals, 178 amphibians, 267 reptiles, and 191 fish species. The Western Ghats maintain a high degree of endemism among reptiles and amphibians. Thus, this biodiversity hotspot is home to both aquatic and terrestrial animals. The current loss in natural elements has naturally raised the hazard to all levels of organisms in the Western Ghats.

Fishes

The variety of fish in the Western Ghats contributes significantly to its status as a biodiversity hotspot. Gunawardene et al. argued that fish diversity is not evenly distributed over the Western Ghats. According to their findings, the southern western area of the Western Ghats has a greater diversity of fish species than the central and northern parts. It's well-known for its decorative fish production. Denison barb (*Puntius denisonii*) is the most valuable ornamental fish for commerce (Roy, 2021). According to Yadav (2000), a large number of fish species are vulnerable and indigenous to the Western Ghats area. In his investigation, he identified 51 endangered species that dwell in Western Ghat, 40 of which are indigenous. Some of the endemic fish are *Danio fraseri*, *Barilius evezardi*, *Gonoproktopterus curmuca*, *Labeo potail*, *Puntius deccanensis*, and others. He also noted that growing human pressure and extensive industrialization enhance the risk of extinction for

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indigenous species. The quick decrease of extinction rates for endemic fish species is essential.

Amphibians

Amphibians are one of the most significant markers of a region's health because of their interactions with several environmental elements (Krishnamurthy, 1996). The western ghats offer a variety of amphibians with varied traits and environments. It indicates that certain amphibian species are mostly aquatic, such as *Occidozyga cyanophlyctis*, while others are semi-aquatic, such as *Rana keralensis*, and yet others are terrestrial, such as *Bufo melanostictus*. According to Dinesh and Radhakrishnan (2011), the Western Ghats sustain 157 amphibian species, divided into 11 families and 27 genera. The 11 amphibian families are: Bufonidae, Dicoglossidae, Micrixalidae, Microhylidae, Nasikabatrachidae, Nyctibatrachidae, Ranidae, Ranixalidae, Rhacophoridae, Caeciliidae, and Ichthyophiidae. Three of these families are indigenous to the Western Ghats: Micrixalidae, Nasikabatrachidae, and Ranixalidae. They also said that eight species are severely endangered. *Ansonia rubigina*, *Rana curtipes*, *Bufo parietalis*, and *Rhacophorus malabaricus* are endemic amphibian species of the Western Ghats (Abraham et al., 2001). The previous author indicated that aquatic and semiaquatic amphibian species are the major species in the Western Ghats. Extreme changes in climatic circumstances and aquatic factors heighten the hazard to amphibians. According to Krishnamurthy (1996), the southern Western Ghats are more diversified than the rest of the Western Ghats.

Reptiles

Reptiles of the Western Ghats are widely distributed across the area. Ganesh et al. noted in their paper that the central Western Ghats are home to 71 reptile species. Unfortunately, only four Western Ghats species were discovered during the British era. Some significant reptile species from the middle Western Ghats include *Geckoella albofasciata*, *Cnemaspis goensis*, *Hemidactylus prashadi*, *Calliophis casto*, and so on. Radhakrishnan compiled the first list of reptiles of the Western Ghats in 1997, including 169 species. Palot (2015) noted that interest in Western Ghats reptiles has grown over time. The author cites 173 species that are classified as reptiles in the Western Ghats. Jayakumar and Nameer (2018) observed that reptiles in the Western Ghats are more active at night than during the day. According to Kumar et al. (2018), reptiles in the Western Ghats are heavily afflicted with tick vectors. These are some of the most major causes of reptilian illness in the Western Ghats, and they have an influence on reptile diversity. Several reptile species are indigenous to Western Ghat, including *Vijayachelys silvatica*, *Eryx whitakeri*, *Cnemaspis indraneildasi*, *Rhinophis sanguineus*, *Dendrelaphis grandoculis*, and *Draco dussumieri*. According to their findings, 36 indigenous reptile species were found in the Western Ghats.

Birds

India is one of the megadiverse nations, with four biodiversity hotspots. The Western Ghats area in India contains the most endemic avian species (Karmakar, Bhattacharya, & Karmakar, 2010). The

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authors estimated that the variety of bird populations in the Western Ghats is 0.003/km². Some of the most significant and endemic bird species in the Western Ghats are *Myiophonus blighi*, *Centropus chlororhynchus*, *Leptoptilos javanicus*, *Pelecanus philippensis*, *Garrulax cachinnans*, and *Ficedula subrubra*. Jayson and Mathew (2003) said that there is a clear association between foliage and the number of bird species. According to their findings, higher forest foliage correlates to an increase in bird population. They also noted that birds are more drawn to foliage than to the forest's upper canopy. Some regions of the Western Ghats are geographically separated from the mainland, which has an influence on the region's biodiversity. Santharam et al. (2014) studied the bird diversity of the Sirumalai hills and concluded that isolated locations exhibit distinct biodiversity patterns. However, these locations are more endangered in terms of species richness; for example, increasing hunting in these areas may quickly lower species diversity. Avian species are key markers of environmental change. The composition of birds in a forest is strongly influenced by its flora. Increased flora variety and complexity have a favourable influence on avian biodiversity. Harisha and Hosetti (2009) performed a research and identified 132 bird species, 12 of which migrate. They asserted that species richness is influenced by the topography and seasons. Hill Myna was the most common bird in the Lakkavalli range forest, followed by the Malabar parakeet, purple-rumped sunbird, and plum-headed parakeet.

Mammals

Mammals in the Western Ghats have lower levels of endemism when compared to other groups of creatures. Gunawardene et al. (2007) reported in their research on a count of 132 mammal species found in the Western Ghats. According to the author, rising habitat loss and forest fragmentation pose a danger to endemic species. Several endemic species, including the lion-tailed macaque (*Macaca silenus*), Malabar civet (*Viverra civettina*), Nilgiri tahr (*Hemitragus hylocrius*), and Red slender loris (*Loris tardigradus*), are facing a high level of threat and are classified as 'vulnerable' or 'endangered'. Chiroptera is the biggest family of mammal species in the Western Ghats, with about 51 species. Rodents are ranked second on the list, among 31 other mammal species, as well as Carnivora, Artiodactyla, and Primates. *Sunucus dayi*, *Anathana ellioti*, *Macaca silenus*, *Trachypithecus johnii*, *Semnopithecus hypoleucos*, *Martes gwatkinsii*, *Viverra civettina*, *Paradoxurus jerdoni*, *Nilgiritragus hylocrius*, *Funambulus tristriatus*, *Ratufa indica*, and *Mus famulus I* are among the endemic mammal species that live in the Western Ghats. All endemic species face a high risk of extinction. There are various reasons and elements contributing to the danger of wild animals. Anthropogenic activity, such as excessive agricultural practice in forest regions, is one of the most significant reasons. The growing pace of industrialization has degraded the natural state of the forest. The Western Ghats Ecology Expert Panel (WGEEP) was founded by India's Ministry of Environment, Forests, and Climate Change (MoEF&CC) to restore the Western Ghats' ecological system.

CONCLUSION

The Western Ghats have a diverse spectrum of forest types, resulting in tremendous ecological

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diversity. The area is notable for its unusual biodiversity, which includes over 4000 blooming plant species, many of which are endemic, as well as a varied fauna with high endemism. Endemism varies with species, with trees, bryophytes, odonates, land snails, reptiles, and amphibians having greater levels than butterflies, birds, and mammals. The Western Ghats are home to around 50 million people across six states and are an important supply of water for Peninsular India, affecting monsoon patterns. However, the region's biodiversity is threatened by habitat stresses, making it one of the world's most important biodiversity hotspots. The Western Ghats environment Expert Panel was created by the Ministry of Environment, Forests, and Climate Change in recognition of the need to maintain and regenerate the Western Ghats environment while ensuring sustainable development. To better understand the evolutionary history of the region's biota, further comparative research between India and Sri Lanka focused on analogous vegetation types and taxa are required.

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