

Important Plant Biodiversity of the Southern Part of India

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Abstract: *In India, Western Ghats is a mountain range that covers an area of 140,000 km² in a stretch of 1,600 km parallel to the western coast of the Indian peninsula, traverse the States of Kerala, Tamil Nadu, Karnataka, Goa, Maharashtra and Gujarat. It is a UNESCO World Heritage Site and is one of the eight "hottest hot-spots" of biological diversity in the world. Total 256 plants were identified with different aspects of botanical view. Western Ghats have common, endemic and endangered species of flora and already listed those who were worked in that aspect. This research only cluster samples from various separate 05 places only selected in Tamil Nadu state and finally concluded as; ornamental plants – 80%, invasive plants were 14% and cultivated 6% by the tribal community. In the origin of evaluation; lower plants – 3%, gymnosperms were 4%, Ferns were 5% and Angiosperms were identified 88%. In taxonomical aspect; most high no. of trees were 59, herbs were 52, Shrubs were 43 and few of cactus were 7 in numbers out of 256 plants.*

Keywords: Western Ghats, Plants, Biodiversity, Tamil Nadu.

1. Introduction

Biodiversity is the total variability within and among species of all living organisms and their habitats. It is estimated that there are between 300,000 and 500,000 species of higher plants (i.e flowering and cone bearing plants), of which approximately 250,000 have been identified or described. (Botanic Gardens Conservation International, 2017)

Plants define the habitat of a site, providing structure, shelter and food as well as contributing to the overall biodiversity. They include flowering plants (trees, shrubs, grasses and herbaceous plants), as well as the gymnosperms (which include conifers), ferns and related species, and also the bryophytes (mosses and liverworts). While plant diversity is well represented in rural areas, development pressures have reduced the amount of greenspace in urban and peri-urban areas, resulting in a poorer diversity of plant communities. However, there are still many small pockets of greenspace within the built environment with a rich diversity of plant species, and other areas where improvements to greenspace could encourage the establishment of plants. Management of urban greenspace directly influences the micro-environment and can create conditions favourable to a range of plants, which in turn can increase habitats for, and therefore the diversity of, other species groups. (Forest Research, 2018)

In 2016, an alternative hypothesis ("the fractal biodiversity") was proposed to explain the biodiversity latitudinal gradient. In this study, the species pool size and the fractal nature of ecosystems were combined to clarify some general patterns of this gradient. This hypothesis considers temperature, moisture, and net primary production (NPP) as the main variables of an ecosystem niche and as the axis of the ecological hypervolume. In this way, it is possible to build fractal hypervolumes, whose fractal dimension rises up to three moving towards the equator. Hotspots; A biodiversity hotspot is a region with a high level of endemic species that have experienced great habitat loss.

In India, **Western Ghats** also known as **Sahyadri** (Benevolent Mountains) is a mountain range that covers an area of 140,000 km² in a stretch of 1,600 km parallel to the western coast of the Indian peninsula, traverse the States of Kerala, Tamil Nadu, Karnataka, Goa, Maharashtra and Gujarat.^[1] It is a UNESCO World Heritage Site and is one of the eight "hottest hot-spots" of biological diversity in the world.^{[2][3]} A total of thirty-nine areas including national parks, wildlife sanctuaries and reserve forests were designated as world heritage sites - twenty in Kerala, ten in Karnataka, five in Tamil Nadu and four in Maharashtra.^{[6][7]}

The range starts near the Songadh town of Gujarat, south of the Tapti river, and runs approximately 1,600 km (990 mi) through the states of Maharashtra, Goa, Karnataka, Kerala and Tamil Nadu ending at Marunthuvazh Malai, at Swamithope, near the southern tip of India. These hills cover 160,000 km² (62,000 sq mi) and form the catchment area for complex riverine drainage systems that drain almost 40% of India. The Western Ghats block southwest monsoon winds from reaching the Deccan Plateau.^[8] The average elevation is around 1,200 m (3,900 ft).^[9] The area is one of the world's ten "Hottest biodiversity hotspots" and has over 7,402 species of flowering plants, 1,814 species of non-flowering plants, 139 mammal species, 508 bird species, 179 amphibian species, 6,000 insects species and 290 freshwater fish species; it is likely that many undiscovered species live in the Western Ghats. At least 325 globally threatened species occur in the Western Ghats.^{[10][11][12]}

Biodiversity protection; Historically the Western Ghats were well-covered in dense forests that provided wild foods and natural habitats for native tribal people. Its inaccessibility made it difficult for people from the plains to cultivate the land and build settlements. After the arrival of the British in the area, large swathes of territory were cleared for agricultural plantations and timber. The forest in the Western Ghats has been severely fragmented due to human activities, especially clear felling for tea, coffee, and teak plantations during 1860 to 1950. Species that are rare, endemic and habitat specialists are more adversely affected

and tend to be lost faster than other species. Complex and species rich habitats like the tropical rainforest are much more adversely affected than other habitats.^[24]

The Government of India established many protected areas including 2 biosphere reserves, 13 National parks to restrict human access, several wildlife sanctuaries to protect specific endangered species and many Reserve Forests, which are all managed by the forest departments of their respective state to preserve some of the ecoregions still undeveloped. The Nilgiri Biosphere Reserve comprising 5,500 square kilometres (2,100 sq mi) of the evergreen forests of Nagarhole and deciduous forests of Bandipur in Karnataka, adjoining regions of Wayanad-Mukurthi in Kerala and Mudumalai National Park-Sathyamangalam in Tamil Nadu forms the largest contiguous protected area in the Western Ghats. Silent Valley in Kerala is among the last tracts of virgin tropical evergreen forest in India.^{[16][17]} Flora - 7,402 species of flowering plants occurring in the Western Ghats, 5,588 species are native or indigenous and 376 are exotics naturalised and 1,438 species are cultivated or planted as ornamentals. Among the indigenous species, 2,253 species are endemic to India and of them, 1,273 species are exclusively confined to the Western Ghats. Apart from 593 confirmed subspecies and varieties; 66 species, 5 subspecies

and 14 varieties of doubtful occurrence are also reported and therefore amounting 8,080 taxa of flowering plants.

2. Materials and Methods

Research design: Descriptive Cross sectional study

Research Period: 06 months

Research Data Collection:

Data collected from field visits and interview of informants

Data recorded in MS Excel

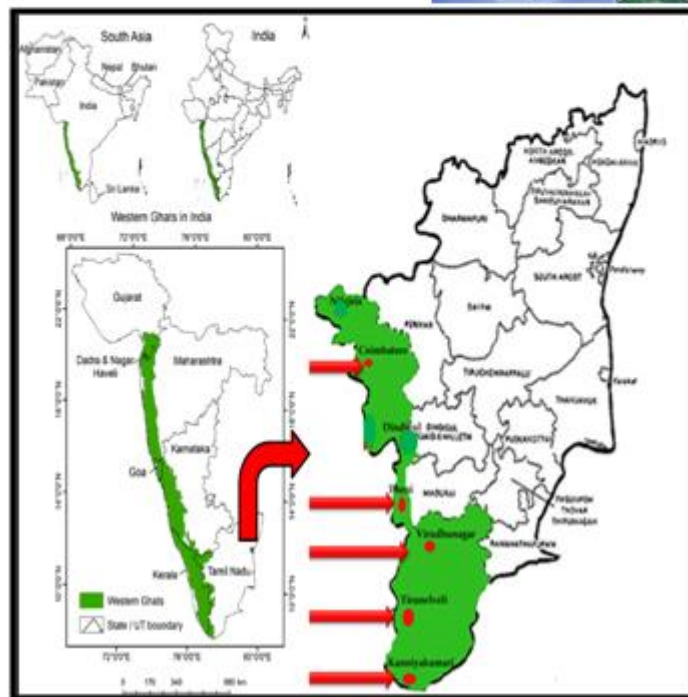
Data Analysis with Simple Descriptive statistics

Research Area:

Area sample defined as cluster samples of random simple sampling method of location of Western Ghats of Tamil Nadu state.

Five clusters defined in different district covered.

- 1) Kanyakumari
- 2) Tirunelveli
- 3) Theni
- 4) Coimbatore
- 5) Virudhunagar



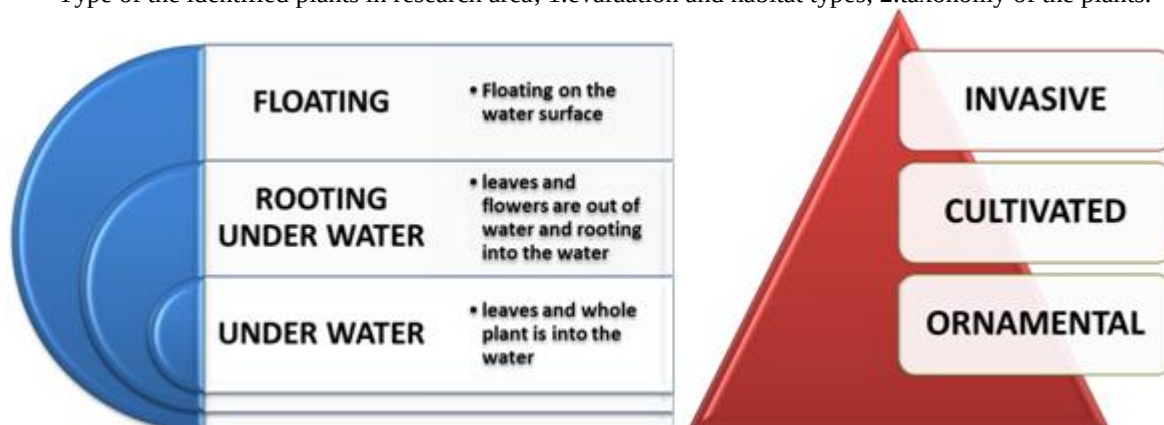
Research locations: Western Ghats



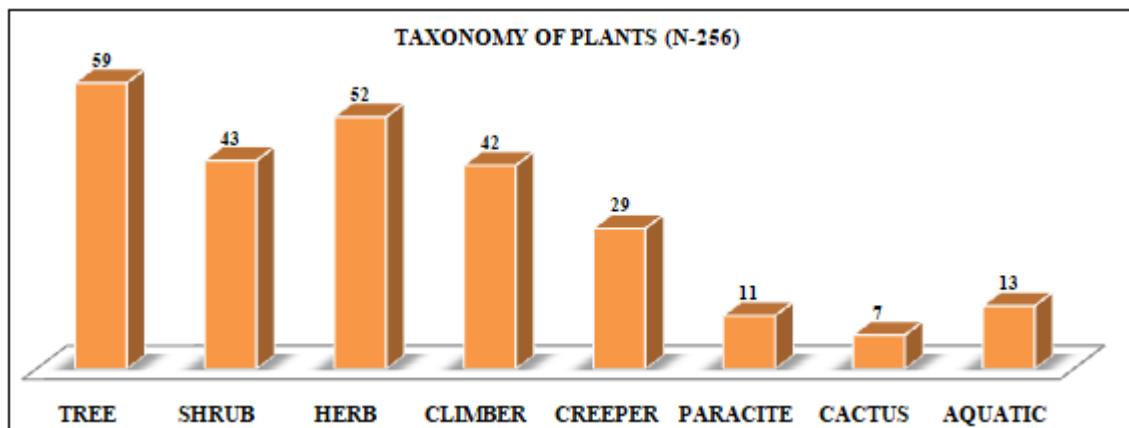
3. Result and Discussion



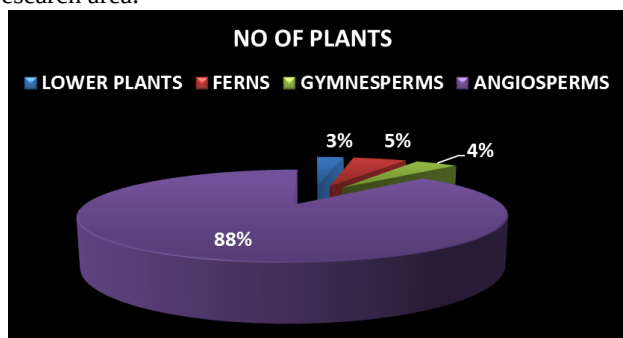
Type of the identified plants in research area; 1.evaluation and habitat types, 2.taxonomy of the plants.



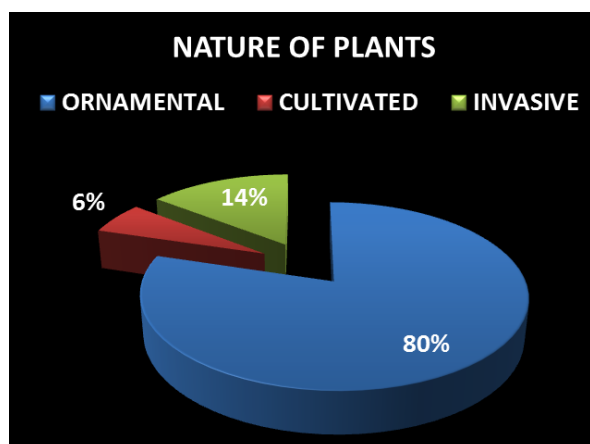
Aquatic plants divided feather three groups by the habit. And total plant survey on invasive, cultivated and ornamental



Taxonomical classification of total identified plants in research area.



In this research identified types of plants according to evaluation origin from lower plants then ferns then gymnosperms and Angiosperms



Nature of plant such as; ornamental plants, cultivated plants by people and invasive plants from other country

4. Conclusion

Total 256 plants were identified with different aspects of botanical view. Western Ghats have common, endemic and endangered species of flora and already listed those who were worked in that aspect. This research only cluster samples from various separate 05 places only selected in Tamil Nadu state and founded as; taxonomical view, evaluation origin of plants, habitat of the plants in respective way. But this is a pilot study of the major research work. This research is helpful to reveal the some flora sources of Western Ghats especially in Tamil Nadu.

Reference

- [1] Census population 2005, Note on Project Elephant. Ministry of Environment and Forests. 2007. Archived from the original on 12 March 2012. Retrieved 30 January 2016.
- [2] Disaster for Western Ghats, Wikipedia, 26-04-2019 @2:45pm
- [3] Elephant Reserves. ENVIS Centre on Wildlife & Protected Areas. Retrieved 30 January 2016.
- [4] Greene, H. W. & R. W. Mcdiarmid (2005). Wallace and Savage: heroes, theories and venomous snake mimicry, Ecology and Evolution in the Tropics, a Herpetological Perspective. Chicago University of Chicago Press. pp. 190–208.
- [5] Harry V., Andrews, Status and Distribution of the Mugger Crocodile in Tamil Nadu, WII, archived from the original on 20 December 2004
- [6] <https://en.climate-data.org> at 5:00 on 24-04-2019.
- [7] Jennings, A.; Veron, G. & Helgen, K. (2008). "Viverracivettina". IUCN Red List of Threatened Species. Version 2012.2. International Union for Conservation of Nature.
- [8] Jhala, Y. V.; Gopal, R.; Qureshi, Q (2008). "Status of the Tigers, Co-predators, and Prey in India" (PDF). TR 08/001. National Tiger Conservation Authority, Govt. of India, New Delhi; Wildlife Institute of India, Dehradun. Archived from the original on 2 June 2013.
- [9] Kumar, Ajith. "Impact of rainforest fragmentation on small mammals and herpetofauna in the Western Ghats, South India". Salim Centre for Ornithology and Natural History, Coimbatore. Archived from the original on 19 December 2008.
- [10] Lévêque, Christian; Mounolou, Jean-Claude (16 January 2004). Biodiversity. Wiley. ISBN 978-0-470-84957-6.
- [11] Levin, Simon A. (2013). Encyclopedia of Biodiversity. ACADEMIC Press INC. ISBN 978-0-12-384719-5.
- [12] Madhav Gadgil (31 August 2012). "Report of the Western Ghats Ecology Expert Panel", Westernghatindia.org. Ministry of Environment and Forests, Government of India. Part 1: summary XIX. Retrieved 4 May 2012.
- [13] Malviya, M.; Srivastav, A.; Nigam, P.; Tyagi, P.C. (2011). "Indian National Studbook of Nilgiri Langur (Trachypitecus johnii)". Wildlife Institute of India, Dehradun and Central Zoo Authority, New Delhi.

- [14] Margulis, Lynn; Schwartz, Karlene V.; Dolan, Michael (1999). *Diversity of Life: The Illustrated Guide to the Five Kingdoms*. Sudbury: Jones & Bartlett Publishers. ISBN 978-0-7637-0862-7.
- [15] Markov, A. V.; Korotayev, A. V. (2007). "Phanerozoic marine biodiversity follows a hyperbolic trend". *Palaeoworld*. 16 (4): 311–318. doi:10.1016/j.palwor.2007.01.002.
- [16] Mewa, Singh; Werner, Kaumanns (2005). "Behavioural studies: A necessity for wildlife management". *Current Science*. 89 (7): 1233. Archived from the original on 13 January 2007.
- [17] Molur S; D Brandon-Jones; W Dittus; A. Eudey; A. Kumar; M. Singh; M.M. Feeroz; M. Chalise; P. Priya& S. Walker (2003). "Status of South Asian Primates: Conservation Assessment and Management Plan (C.A.M.P.) Workshop Report, 2003". Zoo Outreach Organization/CBSG-South Asia, Coimbatore.
- [18] Moustakas, A.; Karakassis, I. (2008). "A geographic analysis of the published aquatic biodiversity research in relation to the ecological footprint of the country where the work was done". *Stochastic Environmental Research and Risk Assessment*. 23 (6): 737–748. doi:10.1007/s00477-008-0254-2.
- [19] Nameer, P.O.; Molur, Sanjay; Walker, Sally (November 2001). "Mammals of the Western Ghats: A Simplistic Overview". *Zoos' Print Journal*. 16 (11): 629–639. doi:10.11609/jott.zpj.16.11.629-39. Archived from the original (PDF) on 5 March 2012. Retrieved 7 March 2012.
- [20] Nilgiritahr population over 3,000: WWF-India. *The Hindu*. 3 October 2015. Retrieved 1 May 2016.
- [21] Novacek, Michael J. (2001). *The Biodiversity Crisis: Losing what Counts*. New Press. ISBN 978-1-56584-570-1.
- [22] Paradise lost. *Hindustan Times*. Retrieved 14 May 2016.
- [23] Participants of CBSG CAMP workshop: Status of South Asian Primates (March 2002) (2004). "Macacasilenus". IUCN Red List of Threatened Species. Version 2006. International Union for Conservation of Nature. Retrieved 9 May 2006. Database entry includes justification for why this species is endangered.
- [24] Plant biodiversity of India, Wikipedia on 30-042019 @5:30pm
- [25] Ramesh (21 November 2009). "No clearance for mining, hydel projects that destroy Western Ghat". *The Hindu*. Palakkad: Kasturi& Sons Ltd. Retrieved 29 December 2009.
- [26] Ranjit Daniels, R.J. "Biodiversity of the Western Ghats – An Overview". Wildlife Institute of India. Archived from the original on 28 February 2007. Retrieved 19 March 2007.
- [27] Report is anti environmental. *The Hindu*. Retrieved 14 May 2016.
- [28] Samani, R.L.; Ayhad, A.P. (2002). "Siltation of Reservoirs-Koyna Hydroelectric Project-A Case Study". In S. P. Kaushish; B. S. K. Naidu (eds.). *Silting Problems in Hydropower Plants*. Bangkok: Central Board of Irrigation and Power. ISBN 978-90-5809-238-0.
- [29] Staff (4 August 2009). "Gundia project has not got Centre's nod". *The Hindu*. Chennai, India: Kasturi& Sons Ltd. Retrieved 29 December 2009.
- [30] The Nilgiri Bio-sphere Reserve. Archived from the original on 28 September 2006.
- [31] UN designates Western Ghats as world heritage site. *Times of India*. 2 July 2012. Retrieved 28 July 2013.
- [32] UNESCO heritage sites. UNESCO. Retrieved 30 March 2007.
- [33] VasudevanKarthikeyan, A Report on the Survey of Rainforest Fragments in the Western Ghats for Amphibian Diversity, archived from the original on 15 December 2005.
- [34] Vested interests in Western Ghats. *Deccan Herald*. Retrieved 5 May 2016.
- [35] World Heritage sites, Tentative lists, Western Ghats sub cluster. UNESCO. 2007. Retrieved 30 March 2007.