Invertebrate Diversity in Anthropogenically Disturbed Forest of Maruthamalai Hills, Western Ghats, Tamil Nadu, South India

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Abstract: Anthropogenic Biomes describe globally significant ecological patterns within the terrestrial biosphere caused by sustained direct human interaction with ecosystem, including agriculture, urbanization, forestry and other land uses. The present study focused on the invertebrate diversity in Marudhamalai Hills which is highly disturbed by human activities. Different techniques to identify the distribution of the study area were employed. The abundance and richness of invertebrate diversity, was recorded and calculated using Shannon Wiener Index. Further, this study has laid a foundation for future research in invertebrate population in Western Ghats region of Tamil Nadu.

Key words: Invertebrate Diversity • Anthropogenic Activity • Marudhamalai Hills • Shannon Wiener Index

INTRODUCTION

The natural environment is the source of all our resources for life. Anthropogenic biomes describe globally significant ecological patterns within the terrestrial biosphere caused by sustained direct human interaction with ecosystem, including agriculture, urbanization, forestry and other land uses. Maruthamalai is located in the northern part of the Coimbatore, which our focus is on Maruthamalai area in Western Ghats. According to Champion and Seth [1] the vegetation of the Maruthamalai hills comes under the dry deciduous forests. Ramachandran and Nair [2] documented nearly 66 medicinal plants species in this area. However, since last few decades this floristic wealth of Maruthamalai hills are depleted at a alarming rate due to the influence of heavy biotic pressure. Invertebrates help in many ways such as, recycling waste, pollination, is being at the base of many food chains and much more. The greatest parts of the animal kingdom are invertebrates. About 98% of the identified and described Species of living Species of animals are invertebrate [3]. All invertebrates are cold-blooded animals they keep body temperature constant all the time. Invertebrate represent the greatest diversity in the forest [4,5]. Ecologically, invertebrates have a strong functional significance and are a major component within most ecosystems [6,7]. The key roles they play in the food webs make invertebrate assemblages important indicators of ecosystem function [8]. Human beings are an integral part of the ecosystem and have sizeable impact on their function as well [9]. Disturbance is one of the dominant forces affecting community structure in many ecological systems [11, 12]. As human-made habitats, dry, nutrient-poor grasslands harbour numerous species whose primordial habitats (floodplains, peat lands and rocky outcrops) have been vastly destroyed [13]. Human land use must be integrated with conservation and it is therefore essential to understand how biological communities respond to anthropogenic disturbances [14]. Deforestation results from complex socio-economic processes and in many situation it is impossible to isolate a single cause [15].

In the present study, which aimed to contribute to our understanding of the species diversity in Maruthamalai hills which respond to anthropogenically disturbed habitats and explore how this knowledge can guide conservation efforts To acheive this we documented the richness and composition of invertebrates in the study area. The disturbed habitat has evolved differently in different region due to abiotic factors, but also due to human pressure and land use, invasive species and biotic contrasts between natural and anthropogenic habitat. Hence we documented the diversity of Invertebrates in Maruthamalai hills and adjoining areas.
MATERIALS AND METHODS

Study Area: The study was conducted along the dry deciduous forest in Maruthamalai (11°046’N, 76°852’E). The mean maximum and minimum temperature during summer and winter varies between 35°C to 18°C. Highest temperatures ever recorded are 41°C and lower are 12°C. The average annual rainfall is around 700mm with the north east and the south west monsoons contributing to 47% and 28% respectively to the total rainfall.

Methodology: Invertebrates from 11 randomly selected locations on the study area were sampled. At each of the 11 locations, we installed one pitfall trap (75mm diameter) filled with soapy water and left it for 15 hours (overnight) before collecting the Invertebrates.

Litter sample was collected by playing a 1/4m² wooden quadrate frames on to the litter and scraping up all litter and loose humus from within the frame area into a large polythene bags. Samples were collected as quickly as possible to prevent escape of animals. Light traps, Malaise traps, Sticky traps, Hand picking methods were employed randomly. Diversity is calculated by using Shannon Weiner index.

RESULTS AND DISCUSSION

Based on the survey the present study showed a distribution of invertebrate diversity in the 11 locations. During the study period we encountered spiders, Scorpions, Butterflies, Dragon flies, Beetles, Moth, Centipedes, Millipedes, Grasshoppers, Stick insects,

![Fig. 1: Pie diagram showing the diversity of Invertebrates in Maruthamalai Hills during the study period.](image1)

![Fig. 2: Bar diagram showing Shannon-wiener index for the invertebrate abundance observed in the study area (11 Locations).](image2)
Bugs, Molluscs, Ant, Housefly, Termites, Honey bees etc. The overall species diversity in the study area (11 Locations) is about 2.87 respectively. We found 721 individuals belonging to 50 different species. Maruthamalai vegetation generally becomes structurally simpler and botanically impoverished with increasing human impact. Local endemic decline and are replaced by invasive. Arthropods are hyper diverse, with many local micro endemics and sensitive to habitat disturbance [16, 17] many partition the world on a much finer scale than vertebrates. Maruthamalai show restricted ranges and small population sizes; thus small habitat patches likely hold unique species; deforestation has likely already driven many extinct. In a study including Invertebrates such as ants, flies and butterflies, spiders.

Moderate disturbance can increase insect diversity, especially when it causes greater habitat heterogeneity; with smaller fragments or heavier disturbance, species loss becomes increasingly likely and ant communities become vulnerable to invasion [18]. In general, disturbed habitat is only valuable for some species; species richness declines with disturbance, though density of some species increases. Species that persist often exhibit altered physiology, ecology and behaviour, jeopardizing their long-term prospects.

However, most species need natural forest, although many are tolerant of a certain level of anthropogenic degradation. Natural disasters, such as cyclones of fires, are a natural aspect of the environment; perhaps the adaptations of certain taxa are partially associated with such events. Finally, there is strong evidence of community nested ness in fragment; thus, protecting fragments large enough to preserve complete communities. Most species cannot survive in anthropogenic habitat, but tree plantation can provide buffer zones around forests, providing food in some seasons, typically for smaller, more omnivorous lemurs [19]. Finally, with removal of anthropogenic pressures and elimination of aliens, some secondary vegetation has the potential to regenerate or to be restored to more botanically important vegetation. Habitat destruction and fragmentation are the most important factors influencing extinction [20].Many populations in disturbed habitat may represent non-viable population; disturbed habitat population may be remnants, or (when adjacent to undisturbed habitats) sustained only by immigration.

In general, conservation actions must address the overwhelming threats to habitat loss and high level disturbance, by assuring the stability of protected areas and by defining new protected areas. When new urban development strategies are introduced their effects on urban biodiversity an often unknown and may have serious consequences for conservation. Long live species require more habitats. The results of the study encompass the conservation of Forest and design during urban development planning.

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REFERENCES