International Journal of Forest Sciences (2023). 3(2):67-71

Mini Review **Open Access**

Study of altitudinal distribution of moths (Lepidoptera) - Mini review

Maryam Faiz[1*]

1. Department of Zoology, Women University of Azad Jammu and Kashmir, Bagh, Pakistan

***Corresponding author e-mail:** maryamfaiz1996@gmail.com

SUMMARY

The world's animal and plant variety is not spread evenly. Sharp environmental variations may be seen from barren deserts to opulent tropical rainforests to lowland forests and alpine pastures. Generations of explorers and naturalists have been assembling the early foundations of biogeography for more than two centuries, recording countless examples of environmental changes along latitude and elevation. Moths as butterflies and additional insects are an excellent group for ecology and conservation research. One of the most general ecological interactions is the negative association of species richness with decreasing latitude and rising elevation. They were formerly thought to be caused by a decline in favorable climatic conditions as latitude and elevation decreased. Understanding the patterns and causes of wildlife distribution is a critical component of ecological study.

Keywords: Distribution, Diversity, Moth, Richness

Citation: Faiz, M. 2023. Study of altitudinal distribution of moths (Lepidoptera) - Mini review. International Journal of Forest Sciences. 3(2): 67-71.

Received: January, 2022**; Accepted**: April, 2023

INTRODUCTION

The world's biodiversity is not spread equally. Sharp environmental variations may be seen from barren deserts to opulent tropical rainforests to lowland forests and alpine pastures. Generations of explorers and naturalists have been assembling the early foundations of distribution and abundance for more than two centuries, recording numerous examples of environmental changes along latitude and altitude (Lomolino, 2001). One of the most general ecological interactions is the negative association of species richness with decreasing latitude and rising elevation. They were formerly thought to be caused by a decline in favorable climatic conditions as latitude and elevation decreased. Understanding the patterns and causes of wildlife distribution is a critical component of ecological study (Hillebrand, 2004).

Furthermore, diversification investigations along latitude are among the most difficult and expensive ecological methodologies. Elevation gradients, on the other hand, aggregate severe variations in climatic conditions across a small geographical range (Körner, 2007) and seem to be easier to assess logistically. Because altitudinal variations are rather common over the world, they soon establish themselves as an acceptable choice for biogeographical investigation (Rahbek, 2005), allowing for the investigation of the reasons of regional variation in species diversity. The

consequences of rising elevation on insects have been thoroughly studied. It has an impact on their morphology, ecology, activity, reproduction, spatial distribution, biodiversity, and frequency. In this context, studying diversity changes along altitudinal variations has provided several possibilities to efficiently comprehend the mechanisms involved across short spatial scales, while avoiding misunderstanding between biogeographical and historical impacts connecting places (Rasmann *et al.*, 2014).

Moths, as other insects, are an excellent community for management and ecosystem research. Because many species of moth species are easily fascinated to traps of light, good evaluations of spatial patterns and relative abundance of biodiversity may be made (Choi, 2008). Moths are indicator species of habitat quality because they react to disturbances of human and activities of succession (Hilt and Fiedler, 2006). Certain environmental changes do not affect all moth groups, hence sensitivity varies by taxon. As a result, assessing moth species' responses to variations in ecosystem functioning is an essential tool for ecological management (New, 2004). Variations in flora can affect the predominance of “endemic moth taxa”, causing alters in the quantity of common species, which may indicate prospective transfers in the large quantity of uncommon species. For examples, intense cultivation and “grazing speed changes” in the species richness and richness of vegetation types, and the loss of endemic host plants hastens the extinction of specialized moth species (White, 1991).

Zoology research is important to know diversity (Heyer *et al.*, 2014; Batool *et al.*, 2022; Muhammad and Abideen, 2022) economic study (McNeely, 1988), tourism study (Altaf *et al.*, 2021c), Zoonotic diseases study (Altaf, 2020; Adil, 2021; Altaf *et al.*, 2021c; Bilal *et al.*, 2021), social study (Cilliers, 2010), folklore study (Maffi, 2005; Altaf *et al.*, 2017; Bashir *et al.*, 2018; Abbasi, 2021; Altaf *et al.*, 2021b), literary study (Lindemann-Matthies *et al.*, 2010), folk medicine study (Umair *et al.*, 2017; Altaf *et al.*, 2018b; Farooq *et al.*, 2019; Saeed *et al.*, 2022), education study (Caro *et al.*, 2003), biological control study (Saba *et al.*, 2020) and bio-indicator study (Sidra *et al.*, 2019). Diversity ecology (Altaf *et al.*, 2013; Altaf, 2016) study is essential to know niche (Daly *et al.*, 1978; Wiens and Graham, 2005) and anthropogenic impacts (Altaf *et al.*, 2018a; Altaf *et al.*, 2021a; Ijaz and Adil, 2021).

LITERATURE REVIEW

The variety and community structure of moths were studied using light moth traps at 32 sites. The findings revealed a greatly important universal connection between flora concerto and moth community structure, and multi - variable (CCA) evaluations demonstrated that light access and soil fertility specifications were the best cross - correlation habitat features with moth community structure. Positive associations between “moth abundance” and “local vascular plant diversity” were also shown to be less robust but still significant. The diversity of woody plant taxa in the area was strongly tied with moth species richness, but not with local vascular plant diversity in general. In terms of more general site characteristics, sites with more productive soils had higher moth abundance and richness, whereas tree canopy cover, control, soil disruption regimes, and nectar creation appeared completely irrelevant to “moth

community" specifications. It is determined that site conditions and plant composition have a major impact on local moth assemblages (Tyler, 2020).

High-elevation communities, on the other hand, are linked with fewer, more equally dispersed species, and also uncommon moth species. The structure and variety of Macromoth communities were connected to the year or sampling period, as well as structural descriptions of vegetative groups, yet not to recognized "host-plant diversity". High-elevation populations are endangered by the shrinking of climate change and montane meadows, which, given the variety in high-elevation populations, might have a significant influence on the landscape's biological richness (Highland *et al.*, 2013).

Moths make up the majority of the order Lepidoptera. The samples were from four diverse habitats: desert, plants, landscape, field crops, and grass lawns. Specimens were collected using both direct hand picking and hand nets. They were later maintained via dry preservation. The taxonomic status was determined using public identifying keys and online web sites. It was determined that these findings appeared to be useful in ecosystem ecological management. Moths, diversity, identity, and abundance are key phrases (Sial *et al.*, 2017).

REFERENCES

Abbasi, Z. 2021. Diversity and folklore medicinal uses of mammalian species of Harighal, Azad Jammu and Kashmir, Pakistan. Journal of Wildlife and Ecology. 5: 60-65.

Adil, S. 2021. Animals use to enhance immunity during a COVID-19 Pandemic-a mini review. Journal of Wildlife and Ecology. 5: 100-103.

Altaf, M. 2016. Assessment of Avian and Mammalian Diversity at Selected Sites along river Chenab University of Veterinary and Animal Sciences, Lahore-Pakistan.

Altaf, M. 2020. Wild animals as source of Zoonotic diseases-a review. Journal of Wildlife and Ecology. 4: 71-84.

Altaf, M., A.G.M. Abbasi, S. Adil. 2021a. Anthropogenic impacts on the diversity and distribution of amphibian and reptiles in the vicinity of Dhirkot, Azad Jammu and Kashmir, Pakistan. Journal of Wildlife and Ecology. 5: 38-46.

Altaf, M., A.M. Abbasi, M. Umair, M.S. Amjad, N. Muhammad, K.J. Iqbal, A.M. Khan. 2021b. The usage of freshwater fishes in cultural and folklore therapies among the people along river Jhelum, Punjab, Pakistan. Journal of Wildlife and Ecology. 5: 79-99.

Altaf, M., T. Hussain, M.S.H. Khan, M. Umair, U. Atique, K.J. Iqbal, J. Naseer, A. Saeed, G. Yasin, M.A. Latif, R.M. Shafiq, A. Saleem, S. Adil, M.H. Hamed. 2021c. An overview of Pakistan Tourism Sector, potential hindrances, and Impact of COVID-19-a review. Journal of Wildlife and Ecology. 5: 186-201.

Altaf, M., A. Javid, Irfan, M.A. Munir, S. Ashraf, K.J. Iqbal, M. Umair. 2013. Diversity, distribution and ecology of birds in summer season at head Khanki, Punjab, Pakistan. BIOLOGIA (PAKISTAN). 59: 131-137.

Altaf, M., A. Javid, A.M. Khan, M. Khan, M. Umair, Z. Ali. 2018a. Anthropogenic impact on the distribution of the birds in the tropical thorn forest, Punjab, Pakistan. Journal of Asia-Pacific Biodiversity. 11: 229-236.

Altaf, M., A. Javid, M. Umair, K.J. Iqbal, Z. Rasheed, A.M. Abbasi. 2017. Ethnomedicinal and cultural practices of mammals and birds in the vicinity of river Chenab, Punjab-Pakistan. Journal of ethnobiology and ethnomedicine. 13: 41.

Altaf, M., M. Umair, A.R. Abbasi, N. Muhammad, A.M. Abbasi. 2018b. Ethnomedicinal applications of animal species by the local communities of Punjab, Pakistan. Journal of ethnobiology and ethnomedicine. 14: 55.

Bashir, S.M., Z. Rashid, B. Mumtaz, M. Altaf, K. Rauf, R. Haider, B. Safeer, S.I. Farooq, L. Safdar, I. Manzoor, S. Yasrub, A. Iftikhar. 2018. Assessment of behavioral ecology, folklore and medicinal uses of Barn Swallow (*Hirundo rustica*) in district Bagh-Pakistan. Journal of Wildlife and Ecology. 2: 13-21.

Batool, S., T. Mustafa, U. Ali, M. Khan, T. Laraib, H. Ayoub. 2022. Bird abundance and diversity in vicinity of urban-rural gradient in Khanewal, Punjab, Pakistan. Journal of Wildlife and Ecology. 6: 163-171.

Bilal, A., M.K. Ullah, M.S. Khan, A. Fatima, K. Iqbal, S.S. Abbasi, A. Hafeez, S. Hussain, I. Nazar. 2021. Impacts of covid-19 pandemic on wildlife-mini review. Journal of Wildlife and Ecology. 5: 135-138.

Caro, T., M.B. Mulder, M. Moore. 2003. Effects of conservation education on reasons to conserve biological diversity. Biological Conservation. 114: 143-152.

Choi, S.-W. 2008. Diversity and composition of larger moths in three different forest types of Southern Korea. Ecological Research. 23: 503-509.

Cilliers, S. 2010. Social aspects of urban biodiversity–an overview. In: N. Müller, P. Werner & J. Kelcey, Urban biodiversity and design—implementing the convention on biological diversity in towns and cities. p 81-100.

Daly, H.V., J.T. Doyen, P.R. Ehrlich. 1978. Introduction to insect biology and diversity. McGraw-Hill Book Company.

Farooq, A., M.S. Amjad, K. Ahmad, M. Altaf, M. Umair, A.M. Abb. 2019. Ethnomedicinal knowledge of the rural communities of Dhirkot, Azad Jammu and Kashmir, Pakistan. Ethnobiology and Ethnomedicine. 15: 1-45.

Heyer, R., M.A. Donnelly, M. Foster, R. Mcdiarmid. 2014. Measuring and monitoring biological diversity: standard methods for amphibians. Smithsonian Institution.

Highland, S.A., J.C. Miller, J.A. Jones. 2013. Determinants of moth diversity and community in a temperate mountain landscape: vegetation, topography, and seasonality. Ecosphere. 4: 1-22.

Hillebrand, H. 2004. On the generality of the latitudinal diversity gradient. The American Naturalist. 163: 192-211.

Hilt, N., K. Fiedler. 2006. Arctiid moth ensembles along a successional gradient in the Ecuadorian montane rain forest zone: how different are subfamilies and tribes? Journal of Biogeography. 33: 108-120.

Ijaz, S., S. Adil. 2021. Anthropogenic impacts on the distribution of mammalian species in the vicinity of Head Trimmu, Punjab, Pakistan. Journal of Wildlife and Ecology. 5: 168-175.

Körner, C. 2007. The use of 'altitude'in ecological research. Trends in Ecology & Evolution. 22: 569-574.

Lindemann-Matthies, P., X. Junge, D. Matthies. 2010. The influence of plant diversity on people's perception and aesthetic appreciation of grassland vegetation. Biological Conservation. 143: 195-202.

Lomolino, M.V. 2001. Elevation gradients of species-density: historical and prospective views. Global Ecology and Biogeography. 10: 3-13.

Maffi, L. 2005. Linguistic, cultural, and biological diversity. Annu. Rev. Anthropol. 34: 599-617.

McNeely, J.A. 1988. Economics and biological diversity: developing and using economic incentives to conserve biological resources. Iucn.

Muhammad, N., S.M.Z.u. Abideen. 2022. Diversity of fishes of head Marala, Punjab, Pakistan. Journal of Wildlife and Ecology. 6: 58-63.

New, T. 2004. Moths (Insecta: Lepidoptera) and conservation: background and perspective. Journal of Insect Conservation. 8: 79-94.

Rahbek, C. 2005. The role of spatial scale and the perception of large-scale species-richness patterns. Ecology letters. 8: 224-239.

Rasmann, S., L. Pellissier, E. Defossez, H. Jactel, G. Kunstler. 2014. Climate-driven change in plant–insect interactions along elevation gradients. Functional Ecology. 28: 46-54.

Saba, M., D.S. Awan, S. Yousaf. 2020. Spider as a biological agent in pest control-A Review. Journal of Wildlife and Ecology. 4: 27-34.

Saeed, A., M. Umair, M. Altaf, T. Hussain, A.M. Abbasi. 2022. Ethno-veterinary medicines of South Punjab, Pakistan Journal of Wildlife and Ecology. 6: 64-81.

Sial, N., S. Shafeeq, H.M. Ali, M.I. Shahzad, S. Abid. 2017. Diversity and Abundance of Moths in Bahawalpur, Punjab, Pakistan. Wulfenia. 24: 1-7.

Sidra, S., R. Saleem, S. Ghafoor, H. Azeem, I. Imtiaz, Z. Parveen. 2019. Fecal matter as a bio-indicator tool for heavy metal pollution. Journal of Wildlife and Ecology. 3: 1-7.

Tyler, T. 2020. Relationship between moth (night active Lepidoptera) diversity and vegetation characteristics in southern Sweden. Journal of Insect Conservation. 24: 1005-1015.

Umair, M., M. Altaf, A.M. Abbasi. 2017. An ethnobotanical survey of indigenous medicinal plants in Hafizabad district, Punjab-Pakistan. PloS one. 12: e0177912.

White, E. 1991. The changing abundance of moths in a tussock grassland, 1962-1989, and 50-to 70-year trends. New Zealand Journal of Ecology. 5-22.

Wiens, J.J., C.H. Graham. 2005. Niche conservatism: integrating evolution, ecology, and conservation biology. Annu. Rev. Ecol. Evol. Syst. 36: 519-539.