Abundance and Diversity of Butterfly Species accross Land uses within University of Ibadan, Nigeria

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INTRODUCTION & AIM

The class Insecta is the most prevalent and diverse group of animals, making up more than half of all terrestrial species (Stork, 2018). With about 5.5 million known species, insects exhibit a remarkable ubiquity across diverse ecosystems, spanning from the profound depths of the ocean to the summit of mountains, and from tropical regions to polar environments. Around 1,828 butterfly species have been identified in Nigeria (African Butterfly Database 2009). Survival of butterfly might be seriously threatened by anthropogenic activities including, construction, land clearing, pollution and climate change among others (Chidi and Odo, 2020). Although studies have been done at the Botanical Garden, University of Ibadan (UI), no thorough study of butterflies within the university as a whole. Therefore, this study assesses the butterfly species diversity and abundance accross land uses and seasons within University of Ibadan as a whole)
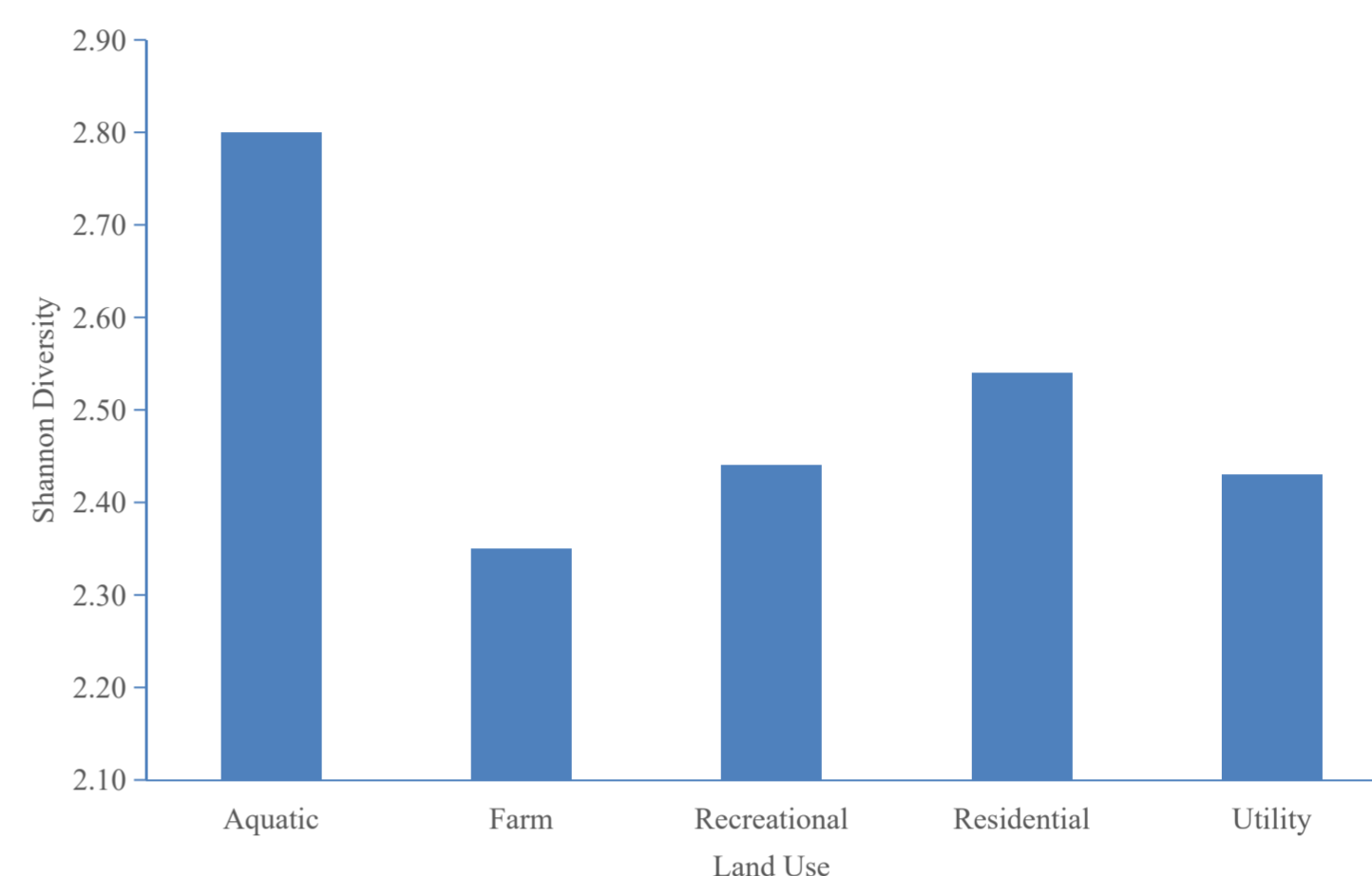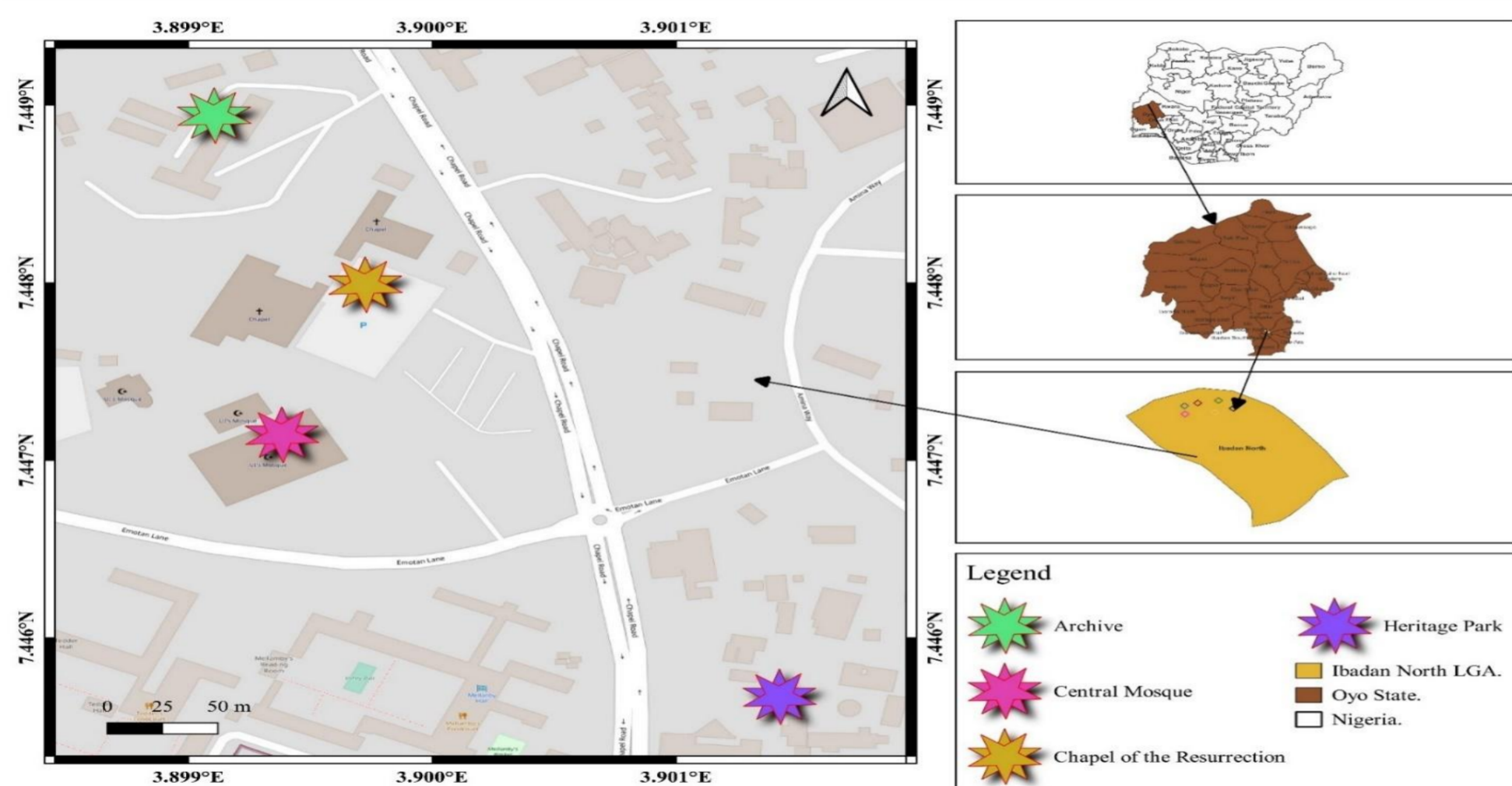
MATERIALS AND METHODS

Figure 1: Map of the study areas within University of Ibadan, Nigeria. Field survey (2023)

Matreials for this study includes: measuring Tape (50m), Sweep net, Camera, Global Positioning System (GPS). This study was carried out for 5months: Jan-Mar (dry); Apr - May (wet) 2023.

The university was stratified into Five strata based on land use viz: Awba dam, Farm, Residential, Recreation and Utility (Chapel, Mosque and Archive) areas. Three 500m line transects at least 100m apart were established in each stratum Each transect per habitat was trasversed at a uniform pace of an hour from 10:00 hours to 13:00hours. Visual Encounter Survey (VES) was employed for this study i.e, all encountered s butterfly spescies were enumerated. Surveys were made 5times a week (Monday - Friday), one stratum per day.

BUTTERFLY SAMPLING AND IDENTIFICATION

Ten collection points (50m) were established on each transect of 500m length covering all the habitats considered in this study. Species were collected with the aid of a sweep net and identified by consulting " Butterflies of West Africa" and "Common butterflies of IITA". Photographic documentation was used to supplement identification with field guides, museum collections, and Lepidopteris. Using PCQ approach, trees and shrubs were surveyed along a 500m transect marked at 50m intervals. The population of each specie was subsequently estimated using this formula: Alarape, (2002)

$$P = AZ/2YX$$

Where P +Population estimate; A = Total area under study
z = Number of butterflies sighted; X = Length of strip
Y = Mean sighting distance.

ANALYSIS

Tabular and graphical presentations were made, Analysis of variance (ANOVA) was employed to examine significant variations in butterfly diversity and abundance across the five distinct habitats. Simpson diversity and Shannon's Weiner were calculated using PAST and SPSS Softwares.

RESULTS & DISCUSSION

Fig. 2: Butterfly Species diversity across Land Use types in University of Ibadan Field survey (2023)
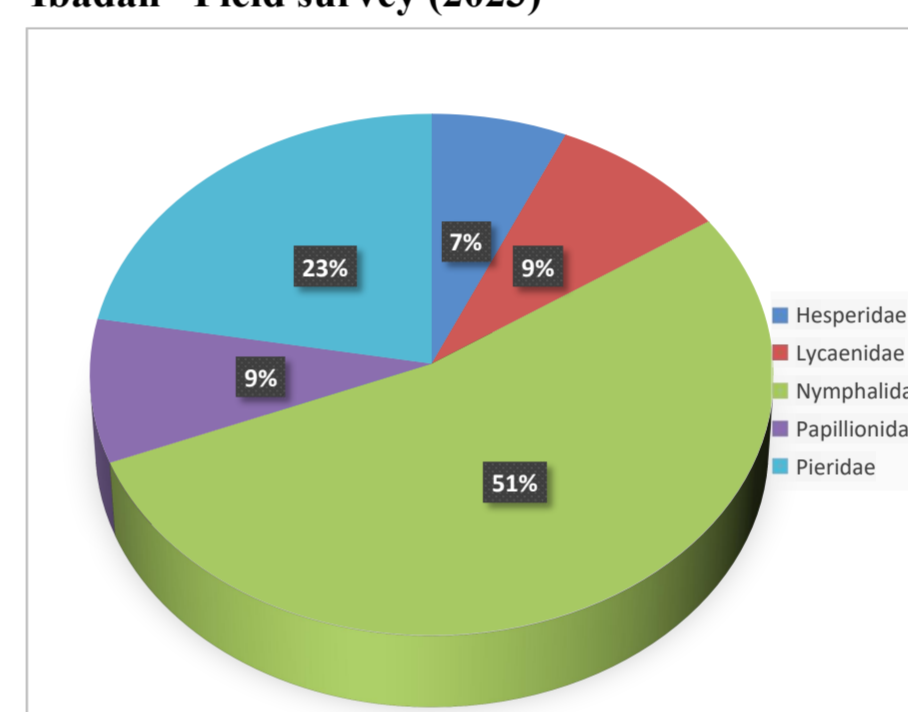

Fig 3: Butterfly Family composition
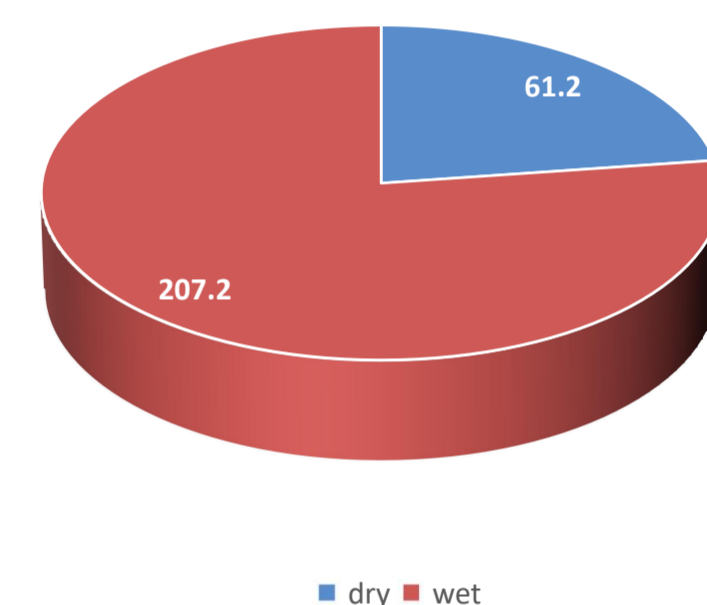Source: Field survey (2023)

Fig 4: Butterfly abundance in different seasons Source: Field Survey (2023)

A total of 43 butterfly species, belonging to 5 families {Nymphalidae (52%), Papillionidae (23%), Lycaenidae (9%), Hesperiidae (9%) and Pieridae (7%)} order Lepidoptera were recorded. Nymphalidae has the highest with 52% and least Hesperiidae 7%. The most abundant butterfly species in University of Ibadan is *Junonia oenone.* Awba dam stands out with highest mean (83.56±16.36) and considerable variability, while residential area lowest (41.20±5.83) and stability. Awba dam hosted highest species richness and diversity, in contrast, the least diverse areas were characterized by low species richness. This is in agreement with Michael *et al.*,(2005), that increase in heterogeneity leads to an increase in species diversity. Changes in land use is a strong force in biodiversity loss and biotic homogenization at local and broad scales (González-Varo *et al.*,2013). However, changes in land use do not only mean shifting from one type of land use to another but also changes in the structure of the vegetation found at a given location. Presence of large numbers and diverse tree species such as *Magnifera indica, Eleais guinensis, Terminalia Africana, T. superba, Milicia excelsa, Caesalpinia pulcherima, Chrysophyllum albidum, Eucalyptus amaldulensis, Ficus rotunda* etc., is in tandem with Goddard *et al.*,2010. Moreover, the vegetation structure directly impact the availability of feeding and nesting resources for invertebrates across their different life stages (Berg, Ahmé, Öckinger, Svensson, & Söderström, 2011). Furthermore, well-designed residential areas with gardens, parks, and native trees provide valuable habitat and support diverse butterfly community. Vegetation structure is highly influential for animal diversity, taxonomic groups respond to different components of habitat structure (Davies & Asner, 2014). Seasonal variations with more butterflies during rainy season compared to the dry season, is due to a complex interplay of ecological factors. Rainfall was significantly positively associated with abundance (María *et al.*, 2019).

CONCLUSION

The butterfly of the family Nymphalidae were the most abundant species and had the highest individual species observed in the study. Overall, different land uses has significant impact on butterfly abundance, diversity, and species richness at the University of Ibadan. Aquatic area supported a higher number of butterfly species compared to other landuse types. Additionally, rainy season appears to favor higher butterfly abundance, while variation in butterfly populations exists across different land use types. Urban forestry as diverse and luxuriant typical of the university campus encourages greater abundance and diversity of butterfly species across land uses within the site.

Land use decisions and management practices have a significant influence on butterfly populations and their diversity

FUTURE WORK / REFERENCES

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