

The Abundance of Guinea fowl Butterflies (*Hamanumida daedalus*; Nymphalidae) in Kingupira Sector, Selous Game Reserve

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ABSTRACT

The study aimed at determining the abundance of *Hamanumida daedalus*; Nymphalidae in North East Sector-Kingupira, in Selous Game Reserve. Transect-quadrat count was used in sampling the Butterflies. The abundance varied significant among transect ($P < 0.05$). The relation between the trees and butterflies abundance was positive correlated ($P < 0.05$). More is still to be discovered on this species in Tanzania and Selous Game Reserve in particular.

Key word; Abundance, Guinea fowl butterfly, Selous Game Reserve, Kingupira

INTRODUCTION

Hamanumida daedalus is among the butterflies species found in the Selous game Reserve at Northeast Sector-Kingupira camp (Plate 1). *H. daedalus* are species which are commonly distributed in savanna, arid savanna and lowland forest [1]. The importance of butterflies including *H. daedalus* in the ecosystem is vital for ecosystem health and functioning. Many studies have shown that butterflies have a significant role in the ecosystem functioning and socioeconomic benefit to man that include pollination, source of food to other organisms like dragonfly, used as indicator species to monitor ecosystem health and farmed for economic gain to farmers [1,2,3,4]. These importance make conservation of butterflies including *H. daedalus* to be important in the challenging world where environmental degradation and extinction are accelerating at high speed. Regardless of vast benefits offered by butterflies nothing was known to *H. daedalus* of Kingupira and Selous Game Reserve as the whole.

The Selous Game Reserve (SGR) is the largest reserve in Africa with 55,000km², and the UNESCO World Heritage Site since 1982. The reserve is found in the South-eastern of Tanzania. It has different habitats type as described by [5] which offer huge number of wildlife species including the endangered once like Wild dogs (dogs (*Lycaon pictus*)) [6]. In spite wealth information on biodiversity of the reserve, few studies have been done on insect

including *H. daedalus* [7]. It is our hope that the finding in this paper will help to alleviate the existing knowledge gap.

In this study we aimed at determining the abundance of the species at different habitat conditions with the following specific objectives; to count *H. daedalus* in Kingupira, specifically areas surrounding the wildlife research center, to determine the influence of tree density on *H. daedalus* abundance and to determine how mobility of *H. daedalus* is affected by habitat type and fire burning.

We hypothesized that, the abundance of the *H. daedalus* will vary among transect (study sites), there would be negative relationship between the number of trees and the abundance of the *H. daedalus*.

MATERIALS AND METHODS

Study area

The research took place in Kingupira sector at the area surrounding Kingupira Wildlife Research Center in month of July 2014. Kingupira is among the 8 sectors of the Selous Game Reserve located at 7°20'-10°30'S to 36°00'-38°40'E. The vegetation is mostly *Brachystegia* woodland ('Miombo') (50 %), followed by open savannah (40 %), wetlands (5 %), mountains and inselbergs (3 %) and riverine and montane forests (2%). There are 21 vegetation types and the preliminary surveys indicated 191 species of trees and shrubs [5,8].

Methods

There were five transects of 150m long for each, set, set at interval of 100m apart. In each transect there were five quadrats of 10mX10m located at interval of 20m apart. In each quadrat the number of butterflies encountered were counted and recorded in the notebook. Also in the sampling quadrat, habitat type, number of trees, burning status (Burnt or Un-burnt) of the area was recorded. Ten people, one pair per transect collected data (Plate 2 and 3). Furthermore, mobility distance was recorded for the *H. daedalus*. The recording of mobility distance was done to the first butterfly encountered after random searching in the study transect. The mobility distance in meter (m) per transect was recorded for two hours in each butterfly. The time was partitioned for interval of 5 minutes. In each partition the distance moved by butterfly was recorded.

The variation in mobility distances of *H. daedalus*, abundance of trees among transects, in the study and their correlation were tested using f-test at $\alpha=0.05$.



Plate 1: The *H. daedalus* as observed in Kingupira sector, Selous Game Reserve. Field photo July, 2014.



Plate 2: The team of two researchers in fourth Transect recording mobility distance of the *H. daedalus* (Field Photo).



Plate 2: The team of two researchers in third Transect recording the number of trees in the quadrat (Field Photo).

RESULTS

Abundance of tree

The study yielded the total amount of 66 (Mean=2.64±0.637390, Max=11, Min=0) with Kurtosis of 1.2948 and Skewness of 1.46554. The abundance of trees among transect was not similar. The first transect (T1) and the fifth transect (T5) had higher abundance while the fourth transect had least abundance of trees than others (Figure 1). The difference in abundance was attributed by variation in abundances found in different quadrates varied in abundance, for instance the quadrate with highest abundance had 11 trees (16.67%), followed by 10 trees (15.15%) while the least had 0 trees. The ANOVA single factor showed that, the difference was statistical significant ($F_{4,24} = 3.15548$, $P < 0.05$).

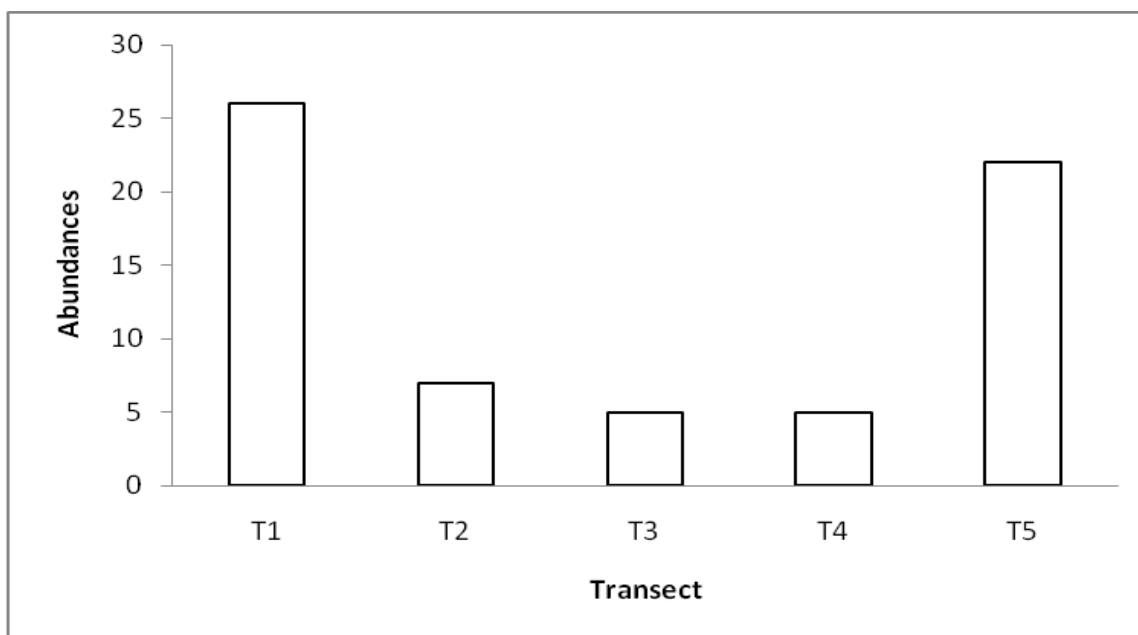


Figure 1: The total Abundance of Trees in the study Transects (T) where the first Transect (T1) had highest abundance while the fourth Transect (T4) had lowest abundance of trees.

The Relationship between the Abundance of tree and *H. daedalus*

During the sampling time a total of 110 sample was collected. The abundance of butterflies varied from one transect to another. For instance the second transect (T2) had highest abundance (Mean=0.7826±0.1881, S.D=0.9023) followed by the fourth transect (T4) (Mean=0.4±0.13377, S.D=0.5982). The fifth transect (T5) had the least abundance (Mean=0.2±0.10690, S.D=0.4140) followed by the first transect (T1) (Mean=0.21739±0.0879, S.D=0.421741, n=23). One way ANOVA showed that, There was significant different in abundances among transects ($F_{4,99} = 2.51032$, $P < 0.05$).

The relationship between the abundance of trees and butterflies was evaluated using linear regression. The results showed that, there was positive correlation between the abundance of the butterflies and trees. The relationship was statistically significant ($r = 0.166$, $r^2 = 0.019$, $t = 5.739$, $P < 0.05$, S.E = 0.084).

DISCUSSION

Abundance of tree

From this study it was eminent that, different transect varied significant in the abundance of the trees in the study area. This can be explained by the different burning frequencies encounter in the two seasons, distance from the flood plain, edge effect and soil characteristics. During the study for instance, the first transect was located near Lungo'nya flood plan which is the edge of the Lung'onya flood plain and the Miombo woodland. In addition, the records and observation showed that, the first transect was not burnt for more than three years.

Several studies have shown that, different plant species are affected by soil characteristics like pH, nutrient, porosity and texture. For instance study in *Leucaena leucocephala* have shown that resources like light, and nutrients have high impact on the survival of the plants for example, the nitrogen content in the soil has implication in the growth rate and performance of the plant while salt stress lead to negative performance of the plant [8].

Abundances of H. daedalus and its relationship with trees

The abundance of Guinea fowl varied significant among transects. The variation was observed to be caused by the sunlight, openness of the canopy, time of the day and variability of the shade. During the study, we observed that, areas that are exposed to sun had few or none butterflies than those with constant shades. In addition, in the morning where the sun was not strong, the butterflies were somehow evenly distributed compared to the noon time. Also we noted that, those areas which experienced constant burning had few butterflies than those areathose areas with little or none frequency of burning in this area. During the study we realized that, those areas which were cleared by weeding near houses of staffs working in the reserve, attracted many butterflies.

The abundance of trees in the sampling sites affected the availability of butterflies positively. The higher the abundance in this area leads to high increase in the abundance of the *H. daedalus*. This can be explained by the fact that, the trees provide shelter, shade, and sometime food in their litters. However we observed that, different plant specie harbors different amount of the *H. daedalus*. [1] reported that, plant species like *Combretam molle* and *Terminalia sericea* are well known to be used as food by larvae. This is anticipated to attract more abundance of this butterflies species than other plant species. The study done by [2,3] in Wazo hill, Tanzania showed that, the diversity and abundance of trees had positive influence on the abundance of the butterflies in the study area. This agrees with our study in this area were the abundance of trees and butterflies are positively collected.

CONCLUSION

From this study, it is concluded that, different locations varied in the abundance of *H. daedalus*. The abundance of trees havehas implication in the abundance of the *H. daedalus*. Additionally, habitat type probably has a role on variation in abundance. Exposure of the habitat through burning is potentially detrimental to the availability of the butterflies.

Conservation strategies in the reserve should consider small species that despite their small body size are of great significant in the ecosystem. Also much study should be done on invertebrates in this reserve, for most of the studies have been concentrating on the large mammals.

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