The Biodiversity and Ecology of the Butterflies (Rhopalocera) of the Iwokrama Rainforest and the Communities of the North Rupununi District, Guyana, South America.

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INTRODUCTION

Guyana is situated along the North Eastern Coast of South America (Wright 1998) and it is divided into four natural regions: a narrow, fertile, densely populated marshy plain along the Atlantic (Low Coastal Plain) coast, a white mineral rich sand belt more inland (Hilly Sand and Clay Region), the dense rainforests (Forested Highland Region) across the middle of the country, the grassy flat savannah in the south and finally the larger interior highlands (Interior Savannah) consisting mostly of mountains that gradually rise to the Brazilian border. (Guyana—Wikipedia, the free encyclopedia 2007)

Although Guyana is divided into these four distinct regions the characteristic vegetation of this country is tropical rainforest interspersed by patches of savannah. Therefore fauna, such as butterflies that are always caught in the dynamics of a complex herbivore/host-plant relationship, dependent on the vegetation type of their environment will be influenced by this characteristic vegetation. (Neild 1996).

Though butterflies are one of the most intensively studied insect groups much is still unknown and it is believed that if tropical areas, such as Guyana, are investigated large numbers of new species will be discovered. This project, which investigates the **diversity and ecology of the butterflies of the Iwokrama Forest and North Rupununi**, will add a substantial amount of data to the existing information pool. In addition, it is the premiere investigation in these areas regarding a complete annual survey (monthly recordings) in three different vegetation zones.

OBJECTIVES

- To investigate the effect of seasonal (wet and dry) and phenological (flowering and fruiting) patterns in relation to butterfly abundance and species diversity;
- To determine butterfly assemblages (species richness and relative abundance) and diversity with reference to habitat type (forest v/s intermediate site v/s savannah) and elevation (lowland v/s mountain).

Map Showing Traversed Transects for Butterfly Study

METHODOLOGY

Owing to the fact that butterfly diversity is dependent on the vegetation of an area the sites chosen for this study needed to reflect the major vegetation of this country - tropical rainforest interspersed by patches of savannah- so as to provide a true representation of species diversity.
As such the three selected sites are as follows :-

- A forest site (transects include; Turtle Mountain, Canopy Walkway & Fair-View).
- An intermediate (savannah-forest) site (transects include; Surama Access Road & Burro-Burro Trail).
- A savannah site (transects include; Kwatamang School, Kwatamang Landing & Clarence Mountain Aranaputa).

Sampling

Methods employed to ascertain the butterfly diversity on each of the line transects located at the selected sites include:-

1. Hand collecting with nets as illustrated by Neild
2. Fruit baited traps
3. Walk and count as described by McDonough .

Treatment of samples/data

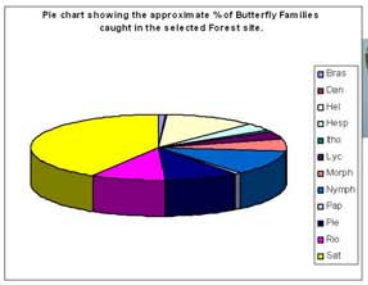
- Once the butterflies have been caught they are immobilized and placed into labelled glassine envelopes.
- All specimens, when returned from the field, are softened, set and then oven dried.
- They are identified using texts, *The Butterflies of Costa Rica - Volumes 1 and 2, by De Vries 1987*, *Butterflies of Venezuela by Neild 1996 etc.*, and cross referencing with the existing collections at the Centre for the Study of Biological Diversity, University of Guyana. If the specimens cannot be identified by the researcher it will be sent to the Natural History Museum and the Smithsonian Institute.
- Photographs of the dorsal and ventral views of the males and females of each species are taken, after which all specimens are deposited at the Centre for the Study of Biological Diversity, University of Guyana.
- Butterflies are then catalogued via an electronic database.

In addition to collecting specimens each habitat type is described, phenological and seasonal patterns are noted and all sites are geo-referenced.

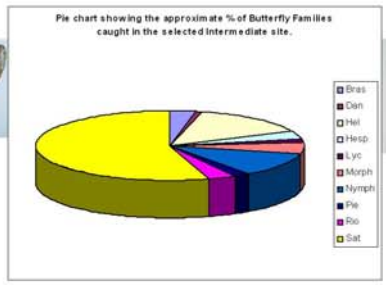
PRELIMINARY RESULTS

From data collected thus far the following are evident:-

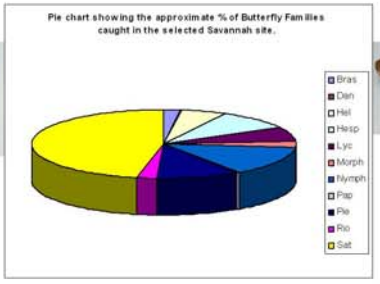
- Butterfly communities present in each habitat type are dominated by common species.
- Butterfly diversity, richness and abundance are dependent on both the biotic and abiotic components of the environment - vegetation and topography.



Eg. dominant Forest sp.: *Cissia confusa*



Eg. dominant Intermediate site sp.: *Aphrissa statira*



Eg. dominant Savannah sp.: *Junonia evarete*

PRELIMINARY CONCLUSIONS

Data analysis is ongoing, however, based upon research and present trends it is surmised that, as more data is collected, these associations, as seen in the preliminary results, will become more evident and other trends such as relationships between diversity and precipitation, will manifest.

FUTURE WORK

1. Establish the relationships that exist between the biodiversity of the butterflies and the seasonal patterns, phenological patterns, habitat types and varying elevations of this region.
2. Identify the species of butterflies found in each habitat type at different seasons and describe new species, if any;
3. Collect and preserve specimens from sites thus creating an international and national reference collection/resource that will be housed at the Centre for the Study of Biological Diversity, University of Guyana ;
4. Identify species of economic significance in the butterfly trade so that they can be sustainability farmed by communities to create an income from a non-timber product thus contributing to forest preservation;
5. Facilitate the making of a handbook of butterfly species of the Iwokrama Forest and the North Rupununi District with particulars of their discrete morphological features for tourism and community awareness;
6. Develop a complete electronic database system for the butterfly collection;
7. Contribute directly to butterfly conservation and that of the ecosystem in which they live by informing on logging strategies, since one of Iwokrama's primary businesses is sustainable timber harvesting.

REFERENCES:-

*[1]**Guyana—Wikipedia, the free encyclopedia, (2007)**.* United States of America http://en.wikipedia.org/wiki/Guyana, Date information retrieved 14/10/07.

*[2]**McDonough A., April (1997).*** An Assessment of Forest Canopy and Butterfly Diversity in the Rainforest of Central Guyana. Submitted as part of the requirements for the Degree, BSc. Environmental Studies the University of Hertfordshire.

*[3]**Neild A.F.E. (1996).*** The Butterflies of Venezuela, Part 1: Nymphalidae 1 (Limenitidinae, Apaturinae, Charaxinae) Meridian Publications, Greenwich, London, pp 14-25.

*[4]**Wright I September, (1998).*** The Diversity and Movement of the Fruit Feeding Butterflies Guyana, South America. Submitted as part of the requirements for the Degree of BSc. In Environmental Studies, University of Hertfordshire.