

INVERTEBRATES

Ants & Termites

Defence strategies in driver ants "Any meat they meet they eat"

Abstract

We tested whether the variable trail architecture of driver ant colonies influences the defence (soldier) allocation within a colony. The soldier abundance at different trail sites of eight stationary driver ant colonies was measured. We found an increased proportion of soldiers present 1) in open trails compared to closed trails and 2) in trails close to the nest site compared to trail sites far from the nest.

Christian Braendle, University of Basel, Switzerland

Thomas Brevig, University of Oslo, Norway

1998

Comparative foraging behaviour and prey choice of the African Stink Ant, *Paltothyreus tarsatus*, in three different habitats in Amani, East Usambara Mountains, Tanzania

Abstract

The study sought to determine the various foraging strategies and prey preference of the African Stink Ant *Paltothyreus tarsatus* in three distinct habitat conditions within Amani. A total of six different nests were sampled within the three habitats. The study findings revealed that there were no significant differences in terms of foraging patterns between the three sites. This suggested that habitat conditions do not necessarily influence the foraging behaviour of this species. However, there appeared to be a marked difference in diet composition between the three sites. This could suggest that habitat conditions influence the type of prey available and hence the prey choice of *P. tarsatus*. Our prey-choice experiment revealed that, across all sites, there was a high preference ratio of Isopteran to Lepidopteran. The study concluded that our data showed no marked differences in foraging behaviour and prey preference within the three different habitats.

Jonas Casslén, Uppsala University, Sweden

Dan Peter Omolo, Kenyatta University, Kenya

Melanie Schmit , University of Vienna, Austria

2000

The Distribution Pattern of *Nasutitermes* sp. Nests in Amani Nature Reserve

Abstract

The distribution pattern of *Nasutitermes* sp. nests in diverse forest patches in Amani Nature Reserve was studied to find out whether some tree species preference could be related with nesting by *Nasutitermes* sp. The Diameter at breast height (Dbh) of nest tree, soil pH, density, number of nests were recorded in order to test whether they could have any significant influence on their distribution. Three main sites namely, semi natural, disturbed and very disturbed forests were chosen from each site, and five plots of 10mx10m were randomly selected. A plotless sampling along a transect were made. Data indicate that, in general *Nasutitermes* were indifferent with regard to tree species preference, but the distribution of *Nasutitermes* nest is highly influenced by the degree of forest disturbance.

Nana Poku, Kwame Nkrumah University of Science and Technology, Ghana

Tabitha Ndunguru, University of Dar es Saalam, Tanzania

2002

An investigation into the effect on abundance and diversity of terrestrial invertebrates of a changing environmental gradient: looking at the edge effect of primary, tropical submontane forest to monoculture tea plantation habitats

Abstract

Natural and artificial fragmentation on a variety of scales present to organisms sharp boundaries between contrasting habitat types. Altered microclimates and microhabitats

occurring along such an edge ultimately impact on biota, and in environments where high endemism is continually threatened by increasing fragmentation through other land use, it is crucial to understand the extent of edge effects on organism dispersal and mobility at both the individual and species level. The study, conducted in Amani Nature Reserve, East Usambara Mountains, considered the effect of prominent forest/tea boundaries on abundance, species diversity and species similarity of terrestrial vertebrates along the habitat gradient across the edge. Abundance and diversity were found to differ significantly across the edge (ANOVA, $F_{4,45} = 3.6$; $p = 0.01$ & $F_{4,60} = 6.47$, $p < 0.001$ respectively), with similarly high values when crossing from forest to edge. Clear decreases in mean abundance and diversity by 40% and 50% respectively were observed when moving from the edge to the tea habitat. Changes in similarity in species composition showed a greater rate of decline when moving from the forest habitat to tea than in the opposite direction. It is evident from our preliminary study that even over such short distances edge effects on biotic diversity and abundance do exist. In an already heavily fragmented habitat where patches are continually being created, it is important to consider to what extent increasing fragmentation impacts on endemic flora and fauna.

Fanomezana M. Ratsoavina, University of Antananarivo, Madagascar

Kate Henson, University of St. Andrews, UK

2003

The nesting behaviour of *Eutermes* sp. (Isoptera: Termitidae) in Amani Nature Reserve, Tanzania

Abstract

Nests of the termite genus *Eutermes* were studied in Amani Nature Reserve, Tanzania. The termites tend to build nests approximately halfway up tree trunks, and do not discriminate between trees of different heights or different species. Density of trees only limits nest density where conditions are apparently favourable; elsewhere environmental or biotic factors are more important. Predation by ants is not a significant influence on nest density, but it may influence the ratio of soldiers to workers present in the tunnels. Temperature does not affect activity of termites, and the effect of humidity on activity is

only small. Nest size is linked to the ratio of soldiers to workers. Choice of food substrate was not determined satisfactorily.

Malgorzata Grzesiuk, University of Warsaw, Poland

Emily Murfitt, University of Liverpool, UK

2003

Fruitflies

Drosophilids as indicators of the level of environmental changes:

A case study at Amani, in East Usambara Mountains

Abstract

Drosophilids are highly diversified and most often habitat specific, but poor attention has been given so far to their relation to habitat modifications. Here we tested the hypothesis whether fruit flies can be used to reliably assess the extent of the habitat changes. A comparison of the species composition and abundance was made on a mosaic of five adjacent habitats at the Amani Nature Reserve in East Usambara Mountains. A total of 6 genera and 44 species were recorded. Using species-specific abundance profiles, the relative frequency of an invading species (*Zaprionus tuberaculatus*) and endemic species (*Drosophila baucipyga*), and an index reflecting the ratio of two sister species of *Drosophila* (*D.teissieri* and *D.yakuba*), we provided multiple consistent evidence that these insects are among the most informative indicators of forest disturbance.

Riana Rakotondrainy, University of Antananarivo, Madagascar

Terence Suinyuy, Apiculture and Nature Conservation Organisation, Cameroon

Kate Lee, University College Dublin, Ireland

2002

Butterflies

Investigation of butterfly diversity and abundance in open agricultural land and in forest edge in Amani Nature Reserve, Tanga, Tanzania

Abstract

An investigation of butterfly diversity and abundance in open agricultural land and in forest edge in Amani Nature Reserve, Tanzania was done from the 16th to the 20th of September 1998. Two distinct habitats were looked at, Agricultural land and Forest edge, with seven replicates sampled in both habitats. The results suggest that there was a significant difference in the numbers of butterfly individuals between the two sites but the statistical analysis showed that the species diversity between the two habitats was not significantly different. The species found at the Forest edge habitat were more typical of those usually found in open land. Further similar studies could be carried out in which the sites penetrated further into the forest to better represent a different habitat to the Agricultural land.

Godwell Elias Ole Meing'ataki, Tarangire National Park, Tanzania

Catherine McCarney, University College Dublin, Ireland

1998

Do ground dwelling insect assemblages in forest fragments differ from those found in linear strips and the surrounding matrix (Tea Plantation)

Abstract

The similarity of invertebrate taxa were examined for forest, a riparian forest strip and tea plantation. The forest sample differed markedly from the assemblage found in the tea plantation, whereas the riparian strip shared species from the forest and tea plantation. Moisture dependant species, such as those belonging to the woodlice, were found to be present in the corridor but not largely represented in the tea plantation which was dominated by coleoptera (beetles), orthoptera (grasshoppers) and hymenoptera (ants).

Roger O'Malley, University of Aberdeen, UK

1998

Butterfly feeding behaviour around *Lantana camara*

Abstract

A study was undertaken into the feeding behavior of butterfly species around *Lantana camara* of Amani, Tanzania. A total of 12 hours of sunny weather on six days were spent observing the feeding behavior of butterflies that visited large and small bushes. In addition 10% of inflorescence buds were monitored to assess the rate of flower opening and subsequent pollination. Sixteen butterfly species were recorded which overall showed preference towards feeding on yellow flowers as opposed to pink ones. The large and small patches were visited without discrimination and the butterflies were observed to be more active around the midday of sunny days. There was no flying during cold, cloudy and rainy times.

Susan Sande, Kenyatta University, Kenya

Ishraga Mohammed A/Rhman, University of Khartoum, Sudan

2000

Behaviour and feeding preferences of three Amani butterfly species

(*Acraea insignis*, *Junonia terea* and *Bicyclus safitza*)

Abstract

The study was conducted in Amani Nature Reserve to determine the variation in the behaviour and feeding preferences of three common butterfly species belonging to family Nymphalidae. The behaviour was studied in terms of feeding, flying and resting, while feeding preference was in terms of flower type commonly visited. Data were collected for seven days during which 37 individuals were located in different plots and their behavioural pattern recorded. The results indicated that the three species differed in their behaviour pattern. It was also clear from the results that the three species had different flower preferences. Temperature of the environment seemed to have no effect on the activities of the butterflies.

Dianah Nalwanga, Makerere University, Uganda

Sopher. N. Ondiaka, University of Nairobi, Kenya

2001

Wasps

Patterns of species abundance within a community of fig-wasps

Abstract

A community of Chalcid wasps (Chalcidoidea:Agaonidae) inhabiting the reproductive structures of one species of East African fig, *Ficus natalensis* (Moraceae) were scored. The wasps maintain a range of obligate mutualist and parasitic relationships with the host plant, detracting, to various extents, from its reproductive functions. Figs were collected such that all contents of a single fig could be scored, producing abundance scores for seed number and a range of wasp genera. Syconium diameter was also recorded. Multiple linear regression identified a strong effect originating from syconium diameter, which correlated with seed number, which made all regressions positive and significant in summary. The majority of component regressions were non-significant, especially with respect to the larger and less numerous wasp species, for example, *Lachaisea*, *Sycophila*, *Otitesella* and *Philotrypesis*. Significant negative correlations were identified between the pollinator species *Alfonsiella* and its competitor *Philocaenus*; also between *Elisabethiella* and its natural enemies *Sycoscapter* and *Philocaenus*. The results demonstrate the importance to the community of variety in oviposition strategies and the difficulty in isolating individual effects from the complex of community interactions.

Hazel Burton, University of Sussex, UK

Andrew Jackson, University of Oxford, UK

2000

Benthic

An investigation of community structure of benthic invertebrate fauna in a montane tropical river ecosystem and the impact of human disturbance

Abstract

This study investigated benthic invertebrate community diversity and structure in four rivers in the Upper Sigi catchment area within the East Usambara Mountains, Tanzania. A standardised kick sampling technique was used to collect invertebrates from the riffle

areas of these rivers. A total of 49 different taxa were identified. The main orders were Ephemeroptera, Trichoptera, Plecoptera and Diptera which accounted for 36 of the families collected. Differences in community composition and structure between the relatively undisturbed forested rivers and those experiencing more human disturbance were recorded. Of the abiotic factors monitored stream depth, flow rate and stream width were found to correlate with taxa diversity.

Mary Anderson, University College Dublin, Ireland

Andrea Strasser, University of Basel, Switzerland

2000

Crickets

Cricket (*Gryllus spp.*) calling activity and factors determining call characteristics in Amani, East Usambara Mountains, Tanzania

Abstract

Male cricket calling activity was studied in relation to burrow size, cricket morphology and environmental factors. Four days of measurements at five time intervals were obtained from five different habitats. Cricket calling activity was greatest between 17.30 and 19.00. Habitat type was also influential, with greatest calling activity heard in banks by grassland and pond. Average sound pressure level and number of species heard were significantly correlated with calling activity. *Gryllus sp.* has a distinct call represented by three or four frequency modulated chirps. Highly significant relationships were found between call frequency, burrow height and relative humidity, but not burrow length, width or air temperature.

Cecilia R. Eldridge, Anglia Polytechnic University, UK

Hanitriniala Vola Razakarivony, University of Antananarivo, Madagascar

2001

Slugs

Investigating the activity patterns of a land slug species of Amani Nature Reserve, East Usambara Mountains, Tanzania

Abstract

There is little background information on ecology of land slugs in Amani Nature Reserve. The study focused on the activity patterns of a common species of slug at two sites 3 days each. We sought to find out if relationships existed between parameters such as weight, location, time of day, weather, and activity patterns. It was observed that there appeared to be a pattern of activity. Individuals A and B suggested a six-hour periodicity. And there tends to be a relationship between weight and activity as smaller slugs were more active.

Maria Ogrzewalska, University of Warsaw, Poland

Stephen Awoyemi, University of Ibadan, Nigeria

2002

Beetles

A comparative study of Coleoptera diversity and abundance in disturbed and undisturbed forest in Amani Nature Reserve

Abstract

This study was conducted in disturbed and undisturbed forest of Eastern Usambara mountains in Amani Nature Reserve. We compared the relative abundance and diversity of Coleopteran families in both habitats. Three methods were used: pit fall traps, leaf litter extractions and beating tray. Analyses were done using the G-statistic (test of independence) to determine significance of counts. Diversity was measured using Simpson's index of diversity. The results showed that the undisturbed forest had higher abundance and diversity of Coleopteran families as compared to disturbed forest. However, it was also found that relative humidity and % shade did not affect the abundance and diversity of Coleoptera in both habitats.

Patricia Namwanda, Makerere University, Uganda

Theogene Ngaboyamahina, Karisoke Research Center, Rwanda

2005
