

PLANT AND FOREST ECOLOGY

Fruit Density

A study of the relationship between size of tree and density of fruits, and the influence of light on fruits density of *Allanblackia stuhlmannii* in Amani Nature Reserve, Tanzania.

Abstract

The main objective of this study was to look at the relationship between fruit density and the size of tree of *Allanblackia stuhlmannii*, in relation to soil composition and canopy cover. The study was carried out from the 14th to the 25th of September 2003 in three different forest areas: farmland (disturbed forest) in Shebomeza village, semi-disturbed forest in the Monga Forest of the Amani Nature Reserve and an undisturbed forest at the foot of the Mbomole Hill. Thirty-five plants in each site were sampled randomly, with their corresponding soil samples collected and analysed. There was a significant increase in the number of fruits of a tree as tree size increases in all three sites. Canopy cover (shade) had a negative influence on the number of fruits produced by a tree. This was evident from the fact that more fruits were observed in the farmland with very low canopy cover, followed by semi-disturbed forest, finally the undisturbed forest where trees had a very small number of fruits yet had very high canopy cover. A comparison of soil ionic concentration, soil pH, and soil moisture content among all three sites revealed that there were no significant differences.

Motutu Elinge, Limbe Botanic Garden, Cameroon

Joël Ndayishimiye, University of Burundi, Burundi

2003

Abundance

Distribution and performance of *Cyathea Manniana* in Amani Nature Reserve

Abstract

This study was carried out during the TBA course at the Amani Nature Reserve in the East Usambara Mountains located in north eastern Tanzania. The course ran from the 28/7/00 to 26/8/00, our study was carried out as a part of the course curriculum. The data was collected and analysed in approximately 10 days. We chose to address the distribution of *Cyathea manniana* throughout Amani Nature Reserve following two major questions: Which environmental factors influence the distribution of *Cyathea manniana* in Amani Nature Reserve? How do the different factors influence the performance of *Cyathea manniana* in ANR? Our results show that *Cyathea manniana* grows preferably either close to water or in higher altitude. The other parameters measured, e.g. pH, slope, soil temperature and associated vegetation showed no significant influence on the distribution or performance of *C. manniana*.

Monika Bertzky University of Bonn, Germany

Darach Lupton Trinity College, Dublin, Ireland

2000

Distribution and density of *Newtonia buchananii* in Amani Nature Reserve, Tanzania

Abstract

The study was conducted in Amani West and Monga forest to determine the size class distribution and density of *Newtonia buchananii* and further examine the micro habitat factors affecting seedlings, sapling and tree abundance. 20m x 20m plots were marked along existing road/trails for tree and sapling identification and enumeration, measuring diameter, slope, altitude, canopy cover as well as soil pH and moisture content. Seedling enumeration and assessment of defoliation was carried out in a 2m x 2m quadrat marked in each of the plots. The size class distribution of the tree species were highly skewed towards the smaller tree sizes when both study sites were considered together. The forest could not have recovered fully to large size trees from the effect of logging that stopped

in 1986. High regeneration of the seedlings was observed but with a higher mortality rate of 95%. Among the factors considered to affect the abundance of the seedlings, saplings and trees, only altitude was found to account for the variability in tree numbers ($df=0$ 18, $R^2 = 0.394$, $p = .004$).

Charles K. Meshack, Tanzania Forest Conservation Group, Tanzania
Warui M. Harun, Kenya Agricultural Research Institute, Kenya
2000

Population density of *Allanblackia stuhlmannii* in the disturbed, semi-disturbed and undisturbed areas of Amani Nature Reserve, East Usambaras, Tanzania.

Abstract

The study was carried out to assess the population density of *Allanblackia stuhlmannii* in three different sites as disturbed, semi-disturbed and undisturbed forest. The highest density for trees was in Monga Forest (130.56/ha), followed by Mbomole Forest (122.22/ha) and the forest near Amani village (72.22/ha). The density for seedlings and saplings showed similar pattern with (1250/ha) Monga, followed by Mbomole Forest (569.44/ha) and Amani village (97.22/ha).

Mohammed El Tahir Sir El Khatim, University of Juba, Sudan.
Devis Mlowe, Sokoine University of Agriculture, Tanzania.
2002

Does plant species composition vary beneath *Cinnamomum camphora* plantation trees, compared to natural forest in Amani Nature Reserve?

Abstract

Plantations of introduced species can alter the species richness and composition of understorey plant communities relative to natural forest, by changing the biological and physical environment. In this study, the plant species beneath a *Cinnamomum camphora* plantation were compared with an adjacent natural forest. Species richness was lower in the *C. camphora* plantation than in natural forest. Samples from the two communities

were 2.5 times more dissimilar than samples from within the same area. Climbers and ferns were significantly more abundant in natural forest than in the plantation. Potential reasons for species composition differences are discussed.

Lucienne de Witte, University of Basel, Switzerland

Wayne Dawson, University of Aberdeen, United Kingdom

2005

Regeneration

A survey of regeneration patterns and spatial distribution of *Cephalosphaera usambarensis*, in Amani Nature Reserve, East Usambara Mountains, Tanzania

Abstract

This study sought to determine the effect of altitude and seed predation on the regeneration pattern and spatial distribution of *Cephalosphaera usambarensis*. The study was conducted in Mbomole and Zigi, two sites of different altitudes within Amani Nature Reserve. The survey was carried out on 10 mother trees with 5 nearest neighbours on each tree in both sites. The parameters measured were tree, seed and seedling density, canopy cover and seed predation. It was observed that Mbomole site agreed with the Janzen and Connell hypothesis of seed predation by host specific predator which produced a low density and uniform dispersion of adults, whereas in Zigi there was no seed predation with high density and random dispersion of adults.

Chekuimo Tagne Georges Herbert, University of Dschang, Cameroon

Francis Omondi Oleche, Kenya Wildlife Service, Kenya

Harison H Randrianasolo, University of Antananarivo, Madagascar

2000

Predation and dispersion of *Allanblackia stuhlmanii* seeds in the East Usambara Mountains, Tanzania

Abstract

In this study seed dispersal and seed predation on *Allanblackia stuhlmannii* seeds was studied. The aim of this study was to test the escape hypothesis by Janzen (1970), which says that seed predation is higher close to the parent tree and when the density of seeds are higher. This would explain the even distribution and coexistence of many different tree species in the tropical forests. Our findings show that Janzen's hypothesis does not apply to *A. stuhlmanii*. In this study distance and abundance does not affect predation rates and the trees are clumped. The effect on seed size and seed burial was also tested but these parameters do not affect rates of predation by rodents.

Steven Glynn, National University of Ireland, Galway

Christina Ritzl, Uppsala University, Sweden

2000

The effect of canopy cover on the regeneration pattern and distribution of *Newtonia buchananii*

Abstract

Newtonia buchananii is a dominant native montane forest tree specie of Amani Nature Reserve, with a particular ecological significance to the site. Repeated observations on the regeneration patterns of the species in the forests of Amani initiated this preliminary study. Five forest sites were considered for the study with five transect plots of size 50m x 4m (non-trees) and 50m x 10m (trees) each. Parameters such as height, diameter, associated canopy trees and percentage canopy cover were collected for each individual of *N. buchananii*. Regression analysis showed that there is no relation between canopy cover and individual size. This shows that the species is not shade demander, but tolerant. A G-test for goodness of fit showed that there is high variation in the distribution/regeneration pattern of the species among sites. *Maesopsis eminii* is found to be the major tree species that grew in association with *N. buchananii*. High mortality of the tree species was also observed.

Elsharif Yasir M., University of Khartoum, Sudan

Katumba B.M., Makerere University, Kampala, Uganda

Yohannes Adane, Ethiopian Agricultural Research Organisation, Ethiopia

2001

Leaf Litter

A study of the leaf decomposition rate and amount of leaf litter of two gap and two emergent tree species in the Amani Nature Reserve, East Usambara Mountains, Tanzania

Abstract

Decomposition of leaf litter is an important source of nutrients in tropical rain forest ecosystems. It is thought that leaves of light demanding tree species will decompose faster than leaves of emergent tree species due to the higher quality of these leaves. It was found, over 10 days, that the leaves of the gap species, *Maesopsis eminii*, decomposed faster than the leaves of the other three species studied. Shallower organic layers were found beneath the gap species, *Maesopsis eminii* and *Macaranga capensis*, compared to the emergent species. The wet/dry ratio for the litter biomass found beneath each species was found to be lower for *Macaranga capensis* than for the other three species.

Anna Liggat, University of Aberdeen, UK

Ciara Mellett, University College Dublin, Ireland

2001

Epiphytes

Investigation of factors influencing the species richness of macro-epiphytes in Amani Nature Reserve, Tanzania

Abstract

The Amani Nature Reserve contains areas of lowland and submontane forest which differ in altitude and, as a consequence, in annual precipitation. This study investigated the effect of this difference in humidity and of other parameters on the species richness and distribution of epiphytes. The results show clearly that the species richness of epiphytes

increases with the altitude. Furthermore, it gives evidence that canopy closure, branch width and roughness of the bark are responsible for the occurrence or absence of epiphytes on certain tree species.

Markus Hartl, University of Vienna, Austria

2000

Distribution patterns of epiphytes in Amani or Epiphytes - spirits of the rainforest

Abstract

We investigated the factors influencing the abundance and diversity of epiphytes in Amani Nature Reserve. We found that most of the variation of abundance and diversity was explained by the tree species, the girth of the tree and the light penetrating the canopy. For the diversity, we saw that the roughness of the bark is an important factor, but it does not explain the unspecific cover of epiphytes. We also noticed that different epiphytic fern species have different requirements for the host tree.

Christophe Bonetti, University of Basel, Switzerland

Miguel Porto, University of Lisbon, Portugal

2001
