

BOTANY: Invasive species

Management

Effects of *Maesopsis* on the fauna of the Amani Nature Reserve in the East Usambara Mountains, Tanzania with specific reference to forest litter amphibians

Abstract

This field study was carried out from September 17-22, 1998 at Amani Nature Reserve of the East Usambara forest in north eastern Tanzania. Two buckets were fixed in pits dug 10m apart in *Maesopsis*-poor and *Maesopsis*-rich habitats, and were connected by a drift fence. The three rounds of trapping yielded 74 individual amphibians divided over 7 species. There was a statistically significant difference between the amphibian diversities of the two different habitat types. This suggested that *Maesopsis* had a profound effect on the amphibian diversity by having an influence on the under storey habitat complexity.

Sarah Nachuha, Makerere University, Uganda

Paul Waswa Webala, Institute of Primate Research, Kenya

1998

The agro-ecological importance of invasive species on farmlands in the East Usambara Mountains, Tanzania. Case species - *Lantana camara*, *Clidemia hirta* and *Rubus rosifolius*)

Abstract

We investigated the percentage surface coverage of invasive species - *Lantana camara*, *Clidemia hirta* and *Rubus rosifolius* on farmlands in relation to the coverage of agricultural crops. We also studied the agro-ecological relationships that exist between crops and the invasive species. The results revealed that all the eight farms surveyed had a reasonable percentage cover of at least one or a combination of the studied invasive species. It was clear also from results that there's an inverse relationship between

percentage average cover of crops and that of invasive species. A field observation of interfaces between agricultural crops and the invasive species revealed poor health of crops, thus, an ecological impact to crops affecting their productivity.

Wasike Mahmoud Mukoche, Egerton University, Kenya

Bakari Salim Mohammed, Tanga Catchment Forestry Project, Tanzania

2001

Abudance and Distribution

Invasive Woody Species in the Monga Forest, East Usambara Mountains, Tanzania

Abstract

A study to assess the extent of invasive alien species *Maesopsis eminii*, *Clidemia hirta*, *Lantana camara* and *Rubus rosifolius* was conducted in the undisturbed Monga Forest of the Eastern Usambara mountains, Tanzania. Ten transects were aligned along the forest edge with 10 m distance zones to determine the presence or absence of the species in 2 m x 2 m quadrats for any of the plant species while a larger (4 m x 4 m) quadrat was used to record the presence of *Maesopsis* trees. ANOVA showed significant variation in the extent of invasiveness among the five species and across the zones. Greater frequency of occurrence of *Maesopsis eminii* and *Clidemia hirta* were observed at the edge of the forest than in the interior. *Lantana camara* and *Rubus rosifolius* were restricted to the edge of the forest. G^2 -tests revealed some associations between *Maesopsis* and *Clidemia* as well as *Lantana* and *Rubus rosifolius* although it could signify only suggest that required conditions for growth are similar. The results show that invasion is associated with forest disturbance, with the edge of the forest being the most comprehensively invaded.

Anthony A. Kimaro, Sokoine University of Agriculture, Tanzania

Luke Malembo, Forestry Research Institute of Malawi, Malawi

1998

Density variation of *Lantana camara* and *Clidemia hirta* with a forest profile perspective, across the forest edge in Amani Nature Reserve

Abstract

This study was carried out in Amani Nature Reserve, and focused on the variation in densities of *Clidemia hirta* and *Lantana camara*, and their relationships to canopy openness and distance from disturbed and undisturbed forest edges. A forest profile was constructed to summarise forest edge ecology in Amani. *C. hirta* was found to show no clear relationship with either canopy openness or distance from forest edge and *L. camara* correlated more strongly with distance from forest edge. The relationships were attributed to light demand. Further study should focus on other possible causes of the relationships presented.

Frances Hepworth, University of Cambridge, UK

David Mushabe, Makerere University, Uganda

2002

Life history of *Maesopsis eminii* – Architecture and behavioural ecology in the forest

Abstract

In this study we focus on the growth patterns of *Maesopsis eminii*, an invasive tree species of the East Usambara Mountains, in Tanzania. Positive correlations of varying significance were found between trunk diameter and crown area, as well as crown area and number of reiterations. These findings suggest that the broad distribution of this tree species lies in its ability to capture light efficiently during its initial stages, by growing rapidly on the vertical axis and then by reiterating and expanding its crown area on the canopy. An interesting finding is that the tree produces growth rings, despite being a tropical species.

Maria Kampouri, King's College London, UK

Sara Sällström, University of Uppsala, Sweden

2002

Regeneration

The relationship between *Maesopsis eminii* and *Anisophyllea obtusifolia* regeneration along a slope

Abstract

Observations were made on the occurrence of seedlings of *Maesopsis eminii* and *Anisophyllea obtusifolia* at three positions along the slope of a hill namely, the top, the middle and the bottom. Data were collected from a closed forest patch near Amani in three quadrat sizes, 16m², 4m² and 1m². The main objective was to determine whether the two species' seedlings occur associated at each of the three sites along the slope. Our results showed that there is positive association between *Maesopsis* and *Anisophyllea* for all quadrat sizes and for all positions on the slope. In other words, despite differences in number, seedlings of these two species are often found growing in the same place. The study shows that canopy closure is not responsible for this association but possible causal factors for this relationship are briefly discussed.

Aisha Abdalmaboud Mohammed, University of Khartoum, Sudan

Joel Mpalanyi Musaasizi, Makerere University, Kampala Uganda

2000

The ecology of *Phyllostachys bambusoides* and its impact on indigenous tree species in Amani Nature Reserve

Abstract

To investigate the ecology of *Phyllostachys bambusoides*, an introduced bamboo species, and its impact on the natural ecosystem in the area of Amani Nature Reserve, thirty two quadrats (2m x 2m) were laid in four randomly selected sites in the study area. Soil samples were collected at each quadrat at a depth 10cm to measure the moisture content and pH of the soil. Other ecological variables such as canopy closure, slope, altitude, ground leaf litter cover and degree of predation were measured. The number of the bamboo stems and different tree seedlings in each quadrat were recorded. Test statistics of the sample data revealed that there is no significant variation in the number of *P.bambusoides* with respect to changes in the recorded ecological variables. However,

there is significant evidence that the bamboo species has a negative impact on the regeneration potential of native tree species.

Tamrat Andargie Belay, Addis Ababa University, Ethiopia
Hanitriniony Rakotojaona, Antananarivo University, Madagascar

2000

Regeneration and population structure of the alien tree species *Maesopsis eminii* in Amani Nature Reserve, Tanzania

Abstract

A study was carried out in Amani Nature Reserve, Tanzania to assess the invasive potential of *Maesopsis eminii*. It involved determining the population structures of the species in a disturbed and intact forest. It was found that, contradictory to other studies, *Maesopsis eminii* is not of an invasive nature in the intact forest site in Amani Nature Reserve. Instead, it is long established in sites that have been subject to disturbances.

Michael Adams, University Of Vienna, Austria

Daniel Waiswa, Makerere University, Uganda

2000

Factors affecting the invasive success of *Clidemia hirta* in Amani, Eastern Usambara Mountains, Tanzania

Abstract

We investigated the growth habit and herbivory of *Clidemia hirta*, family Melastomaceae, in varying light conditions and at different site types. Our results show that *Clidemia* grows most densely where there is most light, as expected. Berry production and herbivory are not linked to light in the same way, however. Both abundance of berries and level of herbivory are related to the type of site; those sites along the edges of pathways having more berries and more herbivory, regardless of light. *Clidemia* is attacked by generalist herbivores, and suffers less from herbivory than other plant species in the same site. We can conclude that both pollination and herbivory are

increased along edges, where there is greater access to plants for generalists who, without the disturbance of paths, may otherwise be prevented from entering the forest.

Caroline Buckee, University of Edinburgh, UK

Sofie Tind Nielsen, University of Copenhagen, Denmark

2000

Predation

Relationship between seed predation of *Maesopsis eminii* and gaps

Abstract

The hypothesis, that seed predation is more intense in a gap than at the edge of it or in the surrounding forest, could not be supported. Even the opposite trend was visible, although not significant: most artificial seeds that were left intact were found in the gap. This finding could be due to the high fragmentation and disturbance of the forest producing less distinct gaps. Comparing the predation rate on *Maesopsis* fruits and seeds, a significant difference was detected: only a small percentage of seeds were removed (1.7%) whereas every third fruit suffered post-dispersal predation. An edge effect on the amount of predation could be detected: the closer to the edge, the more fruits were removed.

Ketakandriana Vonintsoa, University of Antananarivo, Madagascar

Muriel Bendel, University of Berne, Switzerland

2000

Botany

Fruit productivity and other life history traits of *Maesopsis eminii* at a forest edge and in a closed habitat of Amani, East Usambara Mountains, Tanzania

Abstract

The amount of fruits produced by tree species in tropical forest ecosystems depends on water availability, soil types, amount of isolation and structural features among other factors. Fruit productivity of the introduced invasive tree *Maesopsis eminii* at the edge

and in closed habitats was investigated at three different study sites within Amani Nature Reserve (ANR), East Usambara Mountains -Tanzania. Fruits Productivity was assessed by visually estimating the amount of fruits in the tree canopies as well as by counting the fruits dropped on the forest floor. Additional variables namely leaf size, fruits weight, canopy diameter (m), canopy height (m), DBH and canopy cover of each tree were collected. Results show that there is no difference in the amount of fruits produced by *Maesopsis* trees between the edges and the closed habitats whereas edge trees had heavier fruits which may be related to the greater leaf biomass per unit space. It was detected that the canopy diameter of trees in closed habitats was larger than of those at the edges. The trees of the latter were found to have larger leaves. As the canopy volume in the two habitats is similar the crowns of edge trees are more packed and thus contain a greater leaf area index. This might be responsible for a greater leaf biomass per unit space (or relative assimilation rate) in the edge trees.

Simon Nganda Musila, National Museums of Kenya, Kenya

Philipp Leonhartsberger, University of Vienna, Austria

2003

Seedling dynamics under *Maesopsis* tree canopy in Different Forest Conditions at Amani Nature Reserve (ANR)

Abstract

There is much discussion on the threat of *Maesopsis* in Amani on native floral diversity. A study was conducted to examine the seedling kinds and seedling diversity and distribution under *Maesopsis* trees in three forest conditions. Adhoc and systematic sampling, including transecting were adopted in collecting data. A total of 59 Forest tree species were existing under the *Maesopsis* trees. Populations of seedlings under *Maesopsis* and native trees were not significantly different. About 63% of the seedlings under *Maesopsis* were climax species. Diversity was highest under *Maesopsis* trees in the secondary forest. Significantly higher numbers of seedlings existed within the inner 2m-radius of the crown than the outer part.

Bertrand Festus Nero, Kwame Nkrumah University of Science and Technology, Ghana

Mayada Mamoun Beshir Mohamed, University of Khartoum, Sudan

Effect of shade on leaf length, leaf area, stem diameter and coverage of *Lantana camara* under *Maesopsis eminii* and *Cinnamomum camphora* dominated sites in Amani Nature Reserve, East Usambara Mountain, Tanzania

Abstract

Two adjacent sites, one dominated by *Maesopsis eminii* and the other by *Cinnamomum camphora* were selected for the study. During site selection we found the two sites looks a bit different in *L. camara* distribution and density and this study therefore investigated the effect of shade on leaf area, length, stem diameter and coverage of *Lantana camara*. Our results show that, shade is not the only limiting factor for *L. camara* distribution. The effect of shade on leaf area, length and stem diameter was very minimal at the ranges encountered.

**Rose Mdendemi, Sokoine University of Agriculture, Tanzania
Tariku Hunduma Tolera, Ethiopian Agriculture Research Organization, Ethiopia**