

Indigenous knowledge and ecology of subterranean termites on grazing lands in semi-arid ecosystems of Central Uganda

Mugerwa, Swidiq

Date: 2011

Abstract:

Development of sustainable termite management interventions in any ecosystem requires adequate knowledge of the ecological interactions between termites and other ecosystem components, diversity and composition of termite assemblages and proper understanding of farmers' ethno-ecological knowledge of the termite problem. To this effect, a study was conducted in the rangeland ecosystem in semi-arid Nakasongola of Uganda with intention to generate information to aid in the formulation of sustainable termite management practices in the area. The objectives of the study were: (1) to investigate farmers' ethno-ecological knowledge of the termite problem; (2) to examine the termite assemblage structure and (3) to analyze the effect of ecological factors on composition and foraging intensity of subterranean termites on the grazing lands. The study involved administration of pre-tested semi-structured questionnaires on 120 randomly selected respondents to capture information on farmers' perceptions of the genesis and prevalence of the termite problem, factors enhancing termite damage on vegetation, temporal and spatial variability of damage, diversity of termite species and potential termite control strategies. The termite assemblage structure was established by collecting termite samples following a standardized direct search sampling protocol. The standardized sampling protocol that involved sampling for termite species and selected soil and vegetation variables in selected sections of the belt transects was used to analyze the effect of ecological factors on composition and foraging intensity of subterranean termites. The factor-effect relationships were analyzed using principal component and canonical correspondence analysis, and modeled by non-linear regression. Kruskal-Wallis test showed that there was a significant difference ($X^2= 451.5$, $P>0.0001$) among farmers' ranking of factors responsible for the destructive behaviour of termites on rangeland vegetation. Overgrazing and deforestation were significantly ($X^2= 156$, $P>0.0001$) ranked higher than other factors. Use of chemical insecticides and removal of the queen from mounds were reported as the most common control methods attempted by 74% and 30% of the farmers respectively. However, use of cattle manure and heaps of organic materials were noted as potential ecologically sustainable termite control strategies that require further evaluation and improvement. The termite assemblage in the study area constituted of 16 termite species from eight genera, three sub-families and one family. Species from the sub-family Macrotermitinae and genus *Macrotermes* constituted 69 and 38% of the total number of species sampled respectively. The assemblages comprised of Group II (wood, litter, dung and grass feeders) and Group IV (true soil feeders) feeding groups, with most of the species belonging to Group II. Most of the species were noted to nest in epigeal and hypogeal nests with a few species nesting in wood. Results from nonlinear regression of percentage of bait consumed with basal cover indicated that highest consumption of baits (95%) occurred within a range of 55-60% basal cover beyond which the amount of bait consumed reduced. Litter and biomass quantity, pH and bulk density were noted as the most influential environmental variables driving the variability in termite composition while basal cover was the major determinant of foraging intensity. The

results from the study implied that rangeland management techniques that enhance accumulation of adequate litter and maintenance of adequate basal cover are critical in mitigating termite damage on rangeland vegetation.