

Abstract:

Termites belong to the order Isoptera, class Insecta and are ecosystem engineers which modify ecological systems and have the potential to be used as bioindicators of soil health.

Subterranean termites are an important component of below ground biodiversity since they live in the soil and they provide physical niche opportunities for lower level organisms hence they determine the community structure of these organisms. They are sampled by the monolith method. These termites are allocated into two functional groups either as soil feeders or non- soil feeders. Soil feeders, wood and litter foragers. The distribution of species between these categories is used to indicate termite community structure, forest communities are often dominated by soil feeders, but disturbance or drying out generally increase the proportion of the non- soil feeders.

Soil physical and chemical properties are affected by termite activity. Land use systems have an effect on termites' density and diversity through the different operations executed by the farmers and the type of vegetation cover. The objectives of this study was first to determine termite abundance and diversity in different land cover types. Secondly, it was to correlate soil physical and chemical characteristics to termite abundance and diversity. The study was carried out over a period of 6 months, covering the dry period (September –October 2007) and wet period (March – May 2008). Two transects were established based on vegetation cover, transect A(5 m x 40 m) was used in the farmlands and transects B(200m x 600m) was used in the forest cover.

At Taita, the highest mean abundance of termites of 28 termites per sampling point was recorded in the indigenous forest and the least mean abundance of termites of 4 termites per sampling point was recorded in the horticulture land cover type. The land cover type significantly affected the termites abundance ($P=0.005$). At Embu, during the wet season, the effect of land cover type on mean abundance of termites was statistically significant ($P= 0.040$). The effect of land cover type on termite diversity was statistically significant ($P= 0.01$) during dry season at Taita. At Embu diversity of termites was higher in indigenous forest, camphor plantation, tea and in Napier. Land cover type was found to significantly affect termite diversity ($P=0.005$). The community structure of the termites sampled were mainly macrotermitinae which are non- soil feeders.

Termites modified soil had a higher concentration of Carbon, Nitrogen and Calcium than adjacent soils. The Nitrogen and Carbon percentage was higher in the forests- ecosystem and least in the agro- ecosystem and this had a significant effect on termite abundance. The soil in the intercrop and horticulture were most acidic and this could be attributed to use of chemical fertilizers (CAN and TSP).

This study established that conversion of forest into farmland negatively affects termites abundance and consequently the soil quality decreases. Sustainable use of agro- ecosystems should focus on the use of organic manure to conserve termites which are important in improving soil fertility