

ABSTRACT

Comparative studies were undertaken in five forest fragments (Chawia, Fururu, Mbololo, Ngangao and Vuria) of varying sizes in Taita Hills, Kenya to determine the effects of forest edge on the forest structure, species diversity and richness and above-ground carbon stock along a forest edge-interior gradient, and the relationship between pioneer and late successional tree species. For each forest fragment, belt transects proportional to the forest area were established. Within each belt transect, plots of 10×10m were systematically established and replicated three times in a stratum at an interval between 10 and 50m along a forest edge-interior gradient depending on the size of the forest fragment for assessment of the forest structure, species diversity and richness and aboveground carbon stock, and the relationships between pioneer and late successional tree species. Results showed that there was no significant edge effect on tree species diversity in Chawia ($p=0.564$), Fururu ($p=0.689$), Mbololo ($p=0.369$), Ngangao ($p=0.576$) and Vuria ($p=0.338$), although the species diversity was higher in the forest interior than in the intermediate forest and on the forest edge. Similarly, there was no significant edge effect on species richness in Chawia ($p=0.490$), Fururu ($p=0.507$), Mbololo ($p=0.303$), Ngangao ($p=0.886$) and Vuria ($p=0.090$). Above-ground carbon stocks were not significantly affected by edge effect in Chawia ($p=0.704$), Fururu ($p=0.908$), Mbololo ($p=0.544$), Ngangao ($p=0.991$) and Vuria ($p=0.590$). *Tabernaemontana stapfiana* and *M. lanceolata* co-existed with 45.5% and 18.2% of the late successional tree species respectively while 9.1% of the late successional tree species co-existed with each of the following pioneer tree species: *A. gummifera*, *M. conglomerata*, *S. guineense* and *X. monospora*. These results could be used to develop conservation strategies that may minimize forest degradation and biodiversity erosion and loss in the fragmented forest ecosystems.