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Biological Interactions and Influence of Shade on the Performance of *Ficus Natalensis*-Banana Agro Forests in Nakaseke District, Central Uganda

The purpose of the study was to assess the management practices for Banana- *ficus* agroforests and to develop land use strategies in order to maximise production for smallholder farmers in Uganda. The study was guided by three objectives; to assess the influence of *ficus natalensis* shade intensities on growth parameters of different banana varieties, to investigate the effects of different spacing regimes on the performance of different banana varieties under *ficus natalensis* shade and to determine the effect of *ficus natalensis* on soil organic matter and moisture content under banana agro forests. The study was carried out as an on-farm experiment where two banana varieties of Mpologoma and Kisansa were raised as micro corms and planted under three *ficus natalensis* trees and in a control plot. The study investigated influence of shade on banana growth parameters (height, number of leaves and girth), how performance varied in relation to spacing away from the tree and influence of shade on organic matter under *ficus* trees. A completely randomised block design (CRBD) with five replicates was used. The shade of each tree was categorised using Densimeter and the plantlets were planted according to categorised shade intensities (50%-59%, 60%-69%, 70%-79%, 80%-89% and 90%-99%). Planting was done in radial directions from the tree at a spacing of 1 meter from each banana plant. The banana plantlets were spaced at distances 1m (D1), 2m (D2), 3m (D3), 4m (D4), 5m (D5), 6m (D6) and 10m (D9) towards the outer canopy of the tree in circular directions. Instruments such as; Time Dominancy Reflector (TDR 300) for moisture recording, Spherical densitometer for light measurement, Soil kit for organic matter, diameter tapes for girth and rulers for height measurements were used. Shade intensity had varying effects on growth parameters of the two banana varieties with more pronounced effects on Mpologoma than Kisansa, the shade intensities of 70%-79% and 80%-89% were the best performers in influencing the growth of number of leaves and girth of both banana varieties. The growth performance of the two banana varieties under *ficus natalensis* differed significantly ($p < 0.05$) in relation to distance from the tree. The best performance was recorded at a distance of 3m (D3) from the tree trunk with mean number of leaves at 5.06, plant height of 23.51 and girth of 7.64 in Kisansa variety. In Mpologoma, the best performance was obtained at a distance of 6m (D6) closely followed by performance at 3m (D3). Both banana varieties depicted a significant reduction in growth performance ($p < 0.05$) while in close proximity to the tree trunk at 1m distance. The soil organic matter content varied significantly ($F=29.14$; $p= 0.000$) with distance from the *ficus* tree trunk. The organic matter content near the tree trunk and in the control conditions at a distance of 10m from the tree trunk were slightly high and not significantly different. Organic matter increased with distance from the tree trunk, with a steady rise from a distance of 2m (7.119) to the highest value at 6m (16.356). Banana *ficus* agro forests are important in Uganda; it increases food security and reduces poverty as well as increasing soil fertility. Growing bananas in *ficus* agro forests improves banana performance in growth parameters as compared to open conditions away from the tree canopy. Distance is significant in the practice. Planting at a distance of 3meters from tree trunk towards outside the canopy is vital for banana productivity.

Key words: *Ficus*, *Natalensis*, Bana, Agro-forest, Shade