

Abstract

Two-phased field experiments were conducted at Kabete Field Station, University of Nairobi, Faculty of Agriculture, Kabete Campus and Field 3, Egerton University, Njoro Campus to investigate the effects of legume intercrop management practices and inorganic nitrogen application on growth and yield of finger millet (*Eleusine coracana*). In phase one, an indigenous vegetable legume (*Crotalaria brevidens*), a fodder legume (*Trifolium quartianum*) were intercropped with finger millet and sole finger millet supplied with three rates (0, 20, and 40 Kg N /ha) of nitrogen in the form of urea (46% N) were laid out in a completely randomized block design with three replicates. Data collected included plant heights and biomass for the legumes and finger millet at various harvesting stages. During the last biomass harvest plants from half of an experimental plot were either uprooted or cut at ground level ensuring minimum soil disturbance. This procedure formed the basis for phase two of the study. In this phase finger millet was planted on all the last seasons plots. Considering the two harvesting methods there were eighteen plots which gave eighteen treatments which had been laid out in a split plot design. Data collected included plant heights, biomass, yield and yield components of finger millet. Results from phase one indicated that intercropping promoted vigour in the growth of *Crotalaria brevidens*, whereas the performance of *Trifolium quartianum* was unaffected, especially at Kabete. This was observed from the time of emergence where *Crotalaria brevidens* sprouted earlier than finger millet and *Trifolium quartianum*. At Njoro, germination time was more or less the same for all crops but the vegetative and reproductive growths of *Trifolium quartianum* were improved. At both sites results showed that inorganic nitrogen had a beneficial effect on the two leafy legumes. However, N enhanced both the vegetative and reproductive growth of sole finger millet. Fresh leaf weight of *Crotalaria brevidens* at 56 (DAP) was 12.5% of the cumulative leaf fresh weight at 84 DAP, while that of *Trifolium quartianum* was 10% of the final weight. In the case of total leaf dry weight that for *Crotalaria brevidens*, 56 DAP was 11% of that at 84 DAP while that of *Trifolium quartianum* was 18% of the final weight. Plant heights increased proportionately with that of *Crotalaria brevidens* being higher than that of finger millet. *Trifolium quartianum* was always shorter than finger millet at both sites. Biomass (stems and leaves) of legumes was significantly higher in plots where finger millet was intercropped with *Crotalaria brevidens* than where it was intercropped with *Trifolium quartianum* at Kabete only. Total legume and finger millet biomass production was significantly higher at Kabete than in Njoro. Topdressing with N significantly increased

the biomass of sole finger millet. Land equivalent ratios (LERs) were significantly lower in *Crotalaria brevidens*-finger millet intercrops than they were in *Trifolium quartinianum*-finger millet intercrops. In all plots The C:N ratios were higher in top soils than in subsoils. In phase two, finger millet planted on plots in which plants had been cut germinated earlier than those on plots whose plants had been uprooted at Kabete. Intercropping had no significant effect of the growth of finger millet. It was the opposite at Njoro. Residual N and previous season's harvesting methods had a significant ($P < 0.05$) effect on height but not on biomass, yield and yield components of finger millet plants at both sites. In this phase C:N ratios in all plots were lower in sub than top soils and the ratios were higher than those of phase one.