

Abstract

A study was conducted in Buyangu and Ivakale villages, Kakamega over three seasons from March 2010 to August 2011 to evaluate the potential of six locally available organic biomass sources namely; cow manure, maize stover, *Tithonia diversifolia*, sugarcane straw, bagasse and filtermud for compost production and effect on soil quality, soil fauna diversity and on maize yields. There was a total of eight treatments namely six composts made from the organic biomass, a fertilizer treatment and a no-input control; replicated four times in randomized complete block design. Soil samples were analyzed for chemical and biological parameters. Earthworms were collected using monoliths while nematodes were sampled and extracted using steel core samplers and Baerman pan techniques, respectively. Data obtained was subjected to analysis of variance while treatment differences were compared using least significant difference. There was no significant difference in chemical characteristics of composts prepared. However, compost amendments had significant ($P < 0.001$) effect on soil chemical properties. Soils' total N, organic C and extractable P were significantly higher in composts amended soils than in control. On average, C and N increased by 90% and 21% respectively but P decreased by 2% in compost treatments while control had 37% increase in C but a 15% and 40% decrease in N and P, respectively. Fertilizer treated soils recorded increase in all the three elements; 92, 26 and 81% in C, N and P, respectively. Earthworm abundance and biomasses were significantly higher in compost treatments (38 individuals m^{-1} and 1.2 g m^{-1}) than in fertilizer and control treatments (10 individuals m^{-1} and 0.3 g m^{-1}). Generally, plant-parasitic nematodes decreased with addition of composts, whereas bacteria-feeding nematodes increased with application of composts. Maize yields averaged over the three seasons were significantly highest in fertilizer treatments (4.4 t ha^{-1}), followed by composts (2.8 t ha^{-1}) and lowest in controls (1.4 t ha^{-1}). Results demonstrate the potential of composts to improve fertility and maize productivity.