

ABSTRACT

Background and aims

Degradation of physical, chemical and biological properties of soils in sub-Saharan Africa mainly results from little or no organic resource application coupled with sub-optimal fertilizer application. A study was conducted over three seasons, from March 2010 to August 2011, to evaluate potential of six organic materials (bagasse, cow manure, filtermud, maize stover, sugarcane straw and *Tithonia diversifolia*) for compost production and their influence on maize yield and soil fauna diversity.

Methods

Treatments comprised of the six composts, commercial fertilizer and no-input control, laid out in randomized complete block design in four replicates. Soil macrofauna were collected using soil monolith method. Data obtained were subjected to analysis of variance (ANOVA) using GENSTAT whereas differences were evaluated using Fisher's least significant difference (LSD). Correlation between macrofauna and soil chemical properties was done using CANOCO 3.1.

Results

The ANOVA showed significantly higher N and P on filtermud (10.0 g N kg⁻¹ and 979 mg P kg⁻¹) and *T. diversifolia* (9.6 g N kg⁻¹ and 614 mg P kg⁻¹) composts. Generally, amending soils with composts increased C, N and P of the soil by 90 %, 29 % and 20 %, respectively, while fertilizer treated plots recorded 42 %, 4 % and 110 % increase in C, N and P, respectively. Control plots recorded 25 % increase in C, but 15 % and 50 % decline in N and P, respectively. Maize yields were highest in fertilizer (4.4 Mg ha⁻¹), followed by composts (2.8 Mg ha⁻¹) and lowest in control plots (1.4 Mg ha⁻¹). Soil macrofauna responded positively to addition of composts. Isopteran, Oligochaeta and Hymenopteran dominated the sites constituting 44 %, 26 % and 17 %, respectively of all the macrofauna. Relationships between macrofauna and soil chemical properties were positively significant.

Conclusions

Results of this study demonstrate the potential of composts in improving soil biodiversity and crop productivity.