

Variations in soil chemical properties and growth traits of tissue culture banana under bio-slurry soil amendments in Uganda

Abstract:

Organic bio-slurry soil amendments' effect on soil chemical properties and the growth traits of tissue culture banana (TCB) were studied from 2017 to 2020 at Uganda Martyrs University Farm. Mpologoma and Kibuzi banana cultivars of the AAB East Africa Highland cultivar were treated with NPK fertilizer and two bio-slurries at different rates. Treatments included the control (CNTL), 3810 L/ha banana bio-slurry (BBS1), 7620 L/ha banana bio-slurry (BBS2), 11,430 L/ha banana bio-slurry (BBS3), 3810 L/ha cow dung bio-slurry (CDBS1), 7620 L/ha cow dung bio-slurry (CDBS2), 11,430 L/ha cow dung bio-slurry (CDBS3) and 300 kg/ha NPK. The soil was analyzed for variations in pH, nitrogen (N), phosphorous (P), potassium (K) and organic matter (OM) at different depths. The growth parameters of TCB were recorded months after planting (MAP). Soil amended with 11,430 L/ha bio-slurry had high potassium, nitrogen, and organic matter contents for the three soil sampling depths (0–8, 8–16, 16–32 cm), and soils amended with CDBS had higher K, N and OM contents than those amended with BBS. The Soils amended with CDBS3 recorded the maximum pseudostem girth and the number of suckers for both cultivars. Soils amended with BBS3 recorded the highest total number of leaves for the Mpologoma cultivar. The interaction effect of the bio-slurry on the variation of stem girth and height, the number of suckers, and the total number of leaves at 12 MAP for Mpologoma and Kibuzi cultivars was significant ($p < 0.05$). The banana cultivar and the bio-slurry interaction significantly ($p < 0.05$) affected the number of clusters per bunch, the number of fingers per cluster, the weight of the bunch (kg) and weight per cluster (kg). Amending soils with 11,430 L/ha of banana and 11,430 L/ha of cow dung bio-slurries provides the soil with sustainable nutrients for TCB growth up to 12 MAP and sustainable environmental health in the long run.

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