Abstract

Legume biological nitrogen fixation is an environmentally friendly and economical means that can reduce low resource farmer dependence on expensive chemical nitrogen (N) fertilizers. We investigated the effect of two cowpea (*Vigna unguiculata* (L.) Walp) varieties (IT95K-52-34, an international variety from IITA and Kang'au, a local variety) under an integrated soil fertility management trial on indigenous symbiotic rhizobia in a semi-arid farmer's field in eastern Kenya. The ox-ploughed field trial had the following treatments: an unamended control, manure applied at 2.5 t ha^{-1}, triple superphosphate (TSP as (P_2O_5, 0:46:0) at 15 kg ha^{-1}; and a combination of manure and TSP applied at the single rates. Soil samples were collected from each treatment during planting and harvesting of the cowpea crop and used in most probable number (MPN) plant infection assays with the two cowpea varieties as traphosts in Leonard jar growth systems and grown under glasshouse conditions. Generally, soil amendments enhanced cowpea rhizobial populations which varied from 4.89×10^2 rhizobia g^{-1} soil to 1.074×10^3 rhizobia g^{-1} soil. The highest shoot biomass accumulation occurred on cowpea variety IT95K-52-34 plants inoculated with soils from the manure applied plots. We isolated 150 fast- and slow-growing cowpea rhizobia. Contrary to most previous studies, the bulk (97%) of the isolates was fast growing which grouped into 9 types on the growth characteristics on yeast extract agar (YEMA). The study indicated that ISFM was important for rhizobia population build up over a cowpea-growing season.