ABSTRACT

Aims: To determine fungal and bacterial populations under white lupin (Lupinus albus) - maize (Zea mays L) cropping system amended with Minjingu Phosphate Rock (MPR). Study Design: A randomized complete block design with four replicates was used. Treatments were; (i) control i.e. fallow (F) – maize (M) rotation with triple super phosphate fertilizer (TSP) applied (MTSP - F), (ii) fallow - maize rotation with MPR applied (MMPR - F), (iii) white lupin (L) – maize rotation with MPR applied (MMPR - L) and (iv) maize/white lupin intercrop with MPR applied (M/LMPR - F). Place and duration of study: The experiment was conducted in Njoro sub-County, Kenya during the long (LRS) and short rain seasons (SRS) of 2010 and 2011. Methodology: Population of bacteria and fungi were determined at seedling, flowering and maturity stages of crop development by serial dilution plate method (Johnson and Curl, 1972). Results: Significantly higher bacterial population was recorded in MTSP- F at maize seedling and 50% flowering in LRS of 2010 and 2011. At maturity, treatments M/LMPR – F in LRS of 2010 and M/LMPR – F and MMPR- L in LRS of 2011 had significantly higher population. In the SRS of both years, bacterial population was significantly higher in MTSP- F and M/LMPR – F at all sampling periods. In the LRS of 2010, fungal population was significantly higher in MTSP-F at maize seedling and in MTSP- F and M/LMPR – F at 50% flowering and maturity. In the LRS of 2011, fungal population was significantly higher in M/LMPR – F followed by MMPR- L at all maize growth stages. During the SRS of both years fungal population was significantly higher in MMPR- L across all sampling periods. Positive correlation between fungal and bacterial populations was found at termination of experiment. Conclusion: White lupin-maize cropping system with application of MPR increased soil bacterial and fungal population, an indication of improved soil health and hence cropping system sustainability.