

ABSTRACT

The potato industry in Kenya is threatened by bacterial wilt because most production areas are infested with the wilt-causing *Ralstonia solanacearum* and over 50% yield losses have been reported. Continuous cultivation causes soil physical and biological constraints that greatly affect the crop performance and increase proliferation of the bacterium. Rotation with non-host or suppressant plant species could contribute to considerable reduction of bacterial wilt in the subsequent potato crops. This study tested the effect of different crop sequences on *R. solanacearum* population in the soil, wilting incidence and yield of potato. Two season field experiments were conducted at two sites (Egerton University, Njoro and National Agricultural Research Laboratories (NARL), Kabete) with 17 different crop sequences. Rotations involving brassica and legumes with potato gave a higher emergence percentage compared to the other sequences. The bacterial population was significantly influenced by the different environments from the first season to the third season; $F(1, 102) = 53.2, P < 0.001$, $F(1, 102) = 12.5, P < 0.001$ and $F(1, 102) = 236.8, P < 0.001$ respectively. There was a significant effect $F(16, 119) = 7.063, P < 0.001$ of the crop rotation sequences on the wilting incidence of potato. Pre cropping potato with spring onion and barley resulted to a significantly lower wilting incidence compared to all the other crop rotation sequences with a mean of 8.3% across sites. The results showed that Potato-Lablab-Potato and Cabbage-Lablab had the highest yield with 19.9 and of 19.7 tons/ha in the one crop rotations and pre crops to potato respectively. A Genotype x Environmental means versus IPCA scores showed that the yield due to barley-spring onion, spring onion-barley and wheat-spring onion as pre crops were more stable in both locations compared to the other cropping sequences. The study indicates that rotations involving spring onion with the locally grown cereals such as barley and wheat can be utilized in curbing bacterial wilt. Rotations involving lablab and cabbage may also be used to increase the yield of potato in bacterial wilt infested fields. These crops should be used in rotations involving more seasons so as to achieve better effects.