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"Solidarity in a competing world — fair use of resources"

Managing Bacterial Wilt (*Ralstonia solanacearum*) of Potato (*Solanum tuberosum*) Using Indigenous Biological Control Agent

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Abstract

The study was aimed at developing effective indigenous biological control agents (BCAs) isolated from Kenyan soils for use in managing bacterial wilt (BW) caused by *Ralstonia solanacearum* on potato. #300 rhizobacteria were locally isolated from potato rhizosphere and their antagonistic activity tested against BW *in vitro*. Promising isolates were then screened in the greenhouse using semi-sterilized soil through soil solarisation and inoculated with BW having 107 CFU. Those treatments that were most effective in control of BW were in consortium (mixtures) and included; *Bacillus* spp. + *Azotobacter* spp., *Pseudomonas spp.*+ *Bacillus* spp. and *Pseudomonas spp.* + *Bacillus* spp.+ *Azotobacter* spp. with area under disease progress curve ranging from 40–28 compared with the control having 2052–2900. A field study to evaluate these best performing BCAs was conducted for two seasons in 2015. During the first season (March to June), three experiments were established at three locations which were, two highly infected farms with soils containing BW of 10^3 CFU and an artificially inoculated field located at a research quarantine station with different BW inoculum concentration of 10^3, 10^5 and 10^7 CFU. Tolerant (Shangi) and susceptible (Tigoni) potato cultivars were used in this study. The second season experiment was established during the short rains (October– December) and was carried out only at the quarantine station where BW inoculation (10^6 CFU) was done and only the susceptible potato cultivar was used.

In the first season all the fields had few wilted plants from 1–3 observed across all the treatments including control hence there was no effect of the BCAs on yield. In the second season, there was no significant difference ($P \leq 0.05$) on tuber number and weight of BCAs compared to control despite them having high number of wilted plants ranging from 12–21 compared to the control with 8. Under controlled conditions the BCAs were effective in controlling BW however in the fields there was no effect. Further studies need to be undertaken on the mode of delivery of the BCAs to determine if this will enhance their performance in managing BW.

Keywords: *Azotobacter*, *Bacillus*, bacterial wilt, *Pseudomonas*, Rhizobacteria

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