

# Evaluating Arbuscular Mycorrhizal Fungi (AMF) and Phosphate Solubilizing Bacteria (PSB) inoculants on performance of potato (*Solanum tuberosum*)



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## Introduction

Production of potato in Kenya constitutes 0.3% of the world's total and 6.5% of Africa's production. The major production constraint is rapid decline in soil fertility occasioned by continuous cultivation without adequate replenishment of mined nutrients. An alternate plant strategy for coping with deficiency is the establishment of a mycorrhizal symbiosis with an appropriate bacterium as biofertilizers to enhance productivity of the crop nutrition and reduce fertilizers and pesticides. This study, therefore evaluated the effect of Arbuscular Mycorrhizal Fungi and Phosphate Solubilizing Bacteria inoculants on performance of three Kenyan potato genotypes.

## Methodology

Potato plantlets of Tigoni, Kenya mpya and Asante were planted in completely randomized block design with nine treatments of seven different combinations of AMF and PSB, and two controls including fertilizer treatment with no inoculant and one lacking both inoculants and fertilizers. The parameters evaluated were total minituber weight, shoot weight and root mycorrhizal colonization.

## Results

### Percentage root colonization in potatoes

There was no significant ( $P > 0.05$ ) difference among the varieties and treatments in the percentage mycorrhizal root colonization.

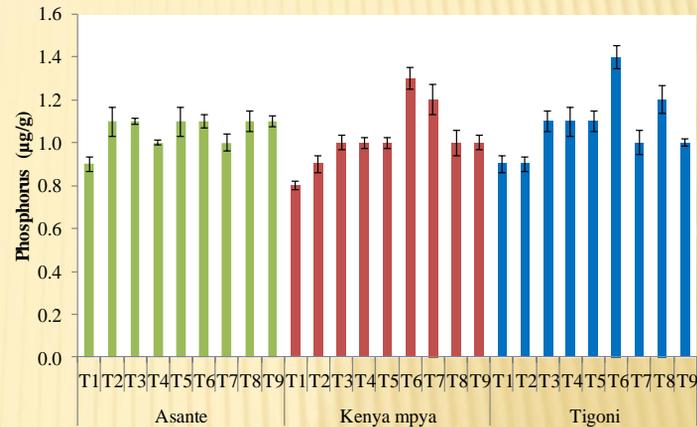
### Shoot phosphorus content

P varied among the varieties. Microbial inoculants enhance P shoot content in Kenya mpya and Tigoni but not in Asante when compared to control with fertilizer (Fig. 1)

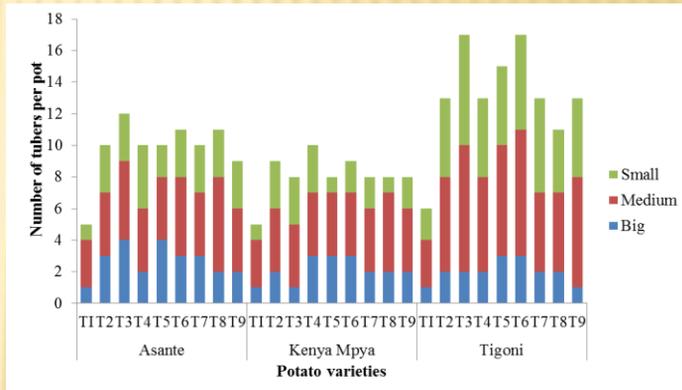
### Potato tuber grades

Tuber size is an important index of commercial value in potato seed production. Fig. 2 shows the different potato minituber size under different microbial inoculants.

*African Potato Association conference, Naivasha, Kenya. Financial support from AGRA and International Center for potato (CIP) is acknowledged*



**Fig. 1: Shoot phosphorus content with different inoculation regimes.** T1= Control-fertilizer, T2=Control+fertilizer, T3=AMF 1, T4=AMF2, T5= AMF3, T6=AMF1+PSB, T7=AMF2+PSB, T8=AMF3+PSB, T9=PSB,(AMF1-*G. intradices*, AMF2-*G. mosseae*, AMF3-*G. etunicatum*)



**Fig. 2: Potato grade as influenced by microbial inoculants**

## Discussion

Mycorrhizal root colonization was enhanced in the presence of *Pseudomonas*. This synergistic effect from the duo inoculation facilitated the uptake of P especially in *G. intradices*. Native AMF were not effective due to low spore number and deactivation during soil solarization. Mineral concentration vary with potato genotype with P being highest in Tigoni while Asante did not respond to microbial inoculants. Tigoni was the best cultivar with the highest number of minitubers.

## Conclusion

Further research shall evaluate the effects of these microbials under field conditions.