Performance of *Metarhizium anisopliae* (Metsch.) Sorok and *Beauveria bassiana* (Bals.) Vuill. isolates against cowpea aphid (*Aphis craccivora* Koch) in cowpea under field conditions

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HORTINLEA Framework

INTRODUCTION

- Cowpea *Vigna unguiculata* L. Walp is a drought tolerant grain and vegetable legume grown in the tropics mainly as an intercrop with cereals and improves soil fertility.
- In Africa yields remains low (1500 kg ha^{-1}) compared to other parts of the world (3000kg ha^{-1}) despite the huge potential of the crop to provide dietary and income security to millions of people and this is partly due to attack by insect pests.
- Cowpea aphid (*Aphis craccivora* Koch) is a major pest of cowpea causing direct and indirect damage (through virus transmission) resulting in yield loses of up to100% if not controlled.
- Synthetic pesticides popularly used in management are associated with toxic residues on food, environment as well as indiscriminate killing of beneficial arthropods.
- Entomopathogenic fungi (EPF) based biopesticides offer sustainable alternative to chemical pesticides in management of cowpea aphid as they are environment and user friendly and are compatible with other IPM strategies like biological control
- In this study two isolates of *M. anisopliae* (ICIPE 62 and ICIPE 41) and one *B. bassiana* (ICIPE644) isolate which were selected from an earlier laboratory study were evaluated for their performance against cowpea aphid under field conditions for two seasons.

OBJECTIVE

- To evaluate efficacy of EPF isolates in management of *Aphis craccivora* under field conditions

DAMAGE

A. Craccivora
Source: influentialpoints.com

Plate 1

Plate 2

Mycosed aphids

METHODS

Cowpea was sown in a 10m × 10m plots at a spacing of 40cm × 60cm inter-plant and inter-row respectively and left for natural infestation by *A. craccivora* . There were 4 treatments (ICIPE 62, ICIPE 41, ICIPE 644 and control) each replicated 4 times and experimental design was RCBD, data was collected for 2 seasons.

Data on aphid infestation density was collected weekly by randomly selecting 20 plants/plot and examining them for aphids. Aphids were then dislodged using soft camel brush into vials containing 70% alcohol and counted in the laboratory. Cowpea leaf yield was collected by randomly selecting 10 plants per row and picking edible soft leaves.

Data collection commenced 7 days after planting and continued until cowpea leaves began to dry.

EPF conidia were produced in laboratory (Maniania *et al*., 1993) and viability determined prior to application. Oil formulation of the EPF was used and glycerin (0.1%), nutrient agar (0.1%) , molasses (0.5%) were added as protectants and attractants respectively. A sticker (Integra) was added at 0.05%. Conidial application rate used was 1 × 10^{12} 1^{-ha} and each isolate was applied using a different back mounted knapsack sprayer in the evenings. Treatment application commenced 21 days after planting and thereafter done weekly until full pod filling.

Infection of EPF on *A. craccivora* was evaluated by collecting 30 aphids/treatment and observing dead aphids for mycosis under microscope

DATA ANALYSIS AND RESULTS

Data Analysis: Aphid infestation density and leaf yield (count data) were first log transformed before carrying out ANOVA and means separated using Tukey HSD

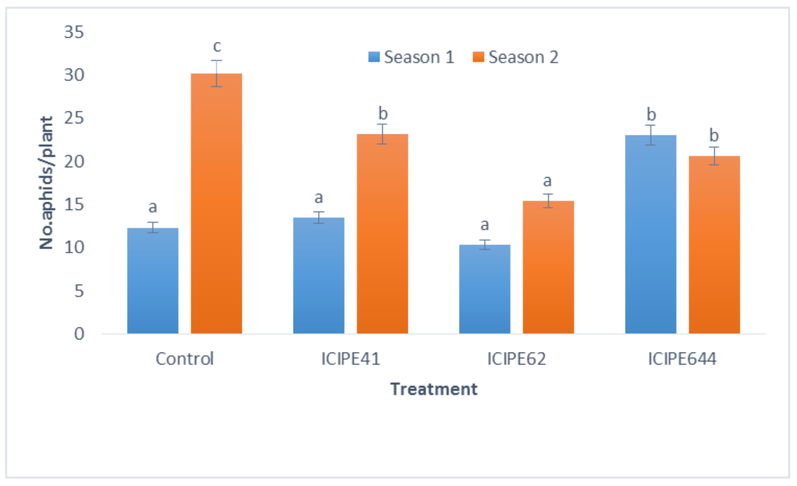

Fig. 1. Mean aphid infestation after treatment with different EPF isolates

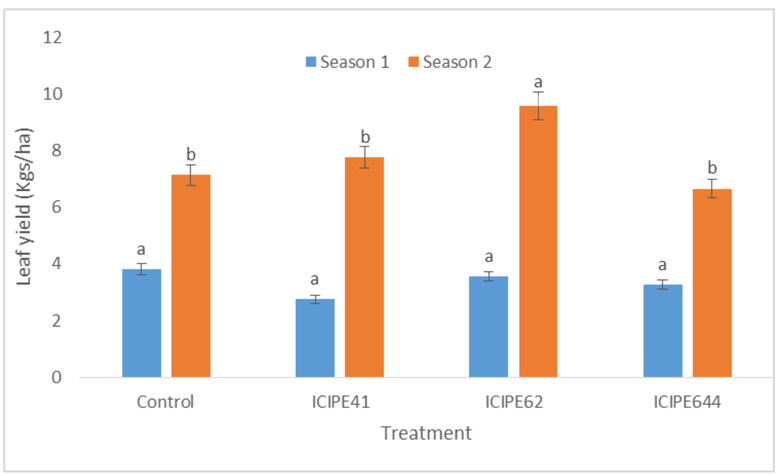

Fig. 2. Leaf yield in Kgs/ha

DISCUSSION

- During the first season characterized by heavy and frequent rains coupled with a delayed natural infestation of cowpea by *A. craccivora*, the three isolates were not effective against *A. craccivora*.
- In the second season, characterized by a low amounts of rainfall and early natural infestation by the aphid, all three isolates were found highly efficient against *A. craccivora*. ICIPE 62 was found to be more effective in management of the aphid compared to the other isolates.
- There was no significant difference in performance between ICIPE 41 and ICIPE 644 (Figure 1).
- There was significance difference in leaf yield between the isolates and the control because the aphid infestation and treatment application began when yield data collection was almost complete and again the isolates were infective against the aphid.
- ICIPE 62 recorded higher leaf yield compared to the other two isolates, however there was no significance difference between ICIPE 41 and ICIPE 644 and the control (Figure 2).

CONCLUSION

- The present result demonstrates the potential of the three isolates against *A. craccivora* and the superior performance of ICIPE 62 , however, the study also highlights the need of enhancing their performance under different environmental conditions

REFERENCE

- Jackai L .E. N and Daoust R. A. 1986. Insect pests of cowpeas. Annual Review of Entomology, **31**, 95-119.
- Maniania NK (1993) Evaluation of three formulations of *Beauveria bassiana* (Bals.) Vuill. for control of the stem borer *Chilo partellus* (Swinhoe) (Lep., Pyralidae). Journal of Applied Entomology:115:266–272.

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