

A novel Biological Control of Fall Armyworm (*Spodoptera frugiperda* Smith) in Tanzania

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Abstract

Fall army worm (*Spodoptera frugiperda*) is a serious invasive pest from tropical America causing extensive food loss on maize that is a major food crop sustaining livelihood of people in Tanzania. Production of maize is seriously threatened by the invasion of this devastating pest that causes up to 100% maize loss in fields in Tanzania. This study evaluated the efficacy of recently innovated biopesticide (VURUGA BIOCIDE), *Moringa oleifera* seed extract and synthetic pesticide (Duduba) for control of fall armyworm (FAW) in field conditions. Experiment was conducted at Usariver Arusha to from August to December 2018 and trials were replicated thrice in plots measuring 14m x 7m. Two maize seeds (DEKALB 8031) were sown in pits (15 cm dip) that irrigated by furrowing water into pits to ensure wetness in pits. Three weeks after sowing plots were sprayed by biopesticide (1.0×10^8 conidial/ml), *M. oleifera* extract (0.5mg/L), Duduba as per manufacture instruction and control (water with 0.01% triton x-100) sprayed for three weeks consecutively at interval of seven days. Five weeks from sowing, number of maize leaves damaged by FAW were counted after a week for five weeks consecutively. After maturity, marketable yield and total yield per plot was recorded as well. Results showed that maize plants treated with VURUGA BIOCIDE exhibited lower damage by FAW larvae that reached 2.3 ± 0.9 damaged laves/plant compared to those treated with *M. oleifera* extract (3.4 ± 0.8 leaves/plant), Duduba and control where the later exhibited the highest leaf damage averaging 9.3 ± 2.9 damaged laves/plant. Maize plot treated with biopesticide exhibited high yield averaging 3.7 ± 0.2 t/ha compared to control with low yield of 1.6 ± 0.1 t/ha. The percentage of marketable maize yield was high in biopesticide treated plot that averaged $94.6 \pm 4.5\%$ whereas control plot yielded $45.5 \pm 3.7\%$. Application of biopesticide exhibited high activity against *S. frugiperda* and increased yield and amount of marketable yield than chemical pesticide (Duduba) hence could be potential biocontrol of the pest in Tanzania and across Africa region where the pest has recently invaded.

Keywords: Biological control, *Spodoptera frugiperda*, Tanzania, A novel