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Evaluation of botanical biopesticides against the control of the fall armyworm (*Spodoptera frugiperda*) in Zimbabwe

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Abstract

Fall Armyworm (FAW), (*Spodoptera frugiperda*), is a prevalent and destructive insect pest in Zimbabwe, causing yield losses of up to 60 % resulting in household food insecurity. Maize is the most important staple food crop in Zimbabwe and is predominantly grown by smallholder farmers for human consumption and livestock feed. The Fall Armyworm invasion in Sub-Saharan Africa has caused a huge concern on food security worsened by a lack of resistant or tolerant cultivars, poor capacity to control and manage the insect pest and the suitability of climatic conditions for the rapid multiplication of the pest. The occurrence of Fall Armyworm in African countries has resulted in the wide use of synthetic insecticides as an emergency response to reduce the spread of the pest and damage to maize. Using synthetic insecticides has caused unintentional harmful consequences to the environment, including food and water pollution and human health risk. The present study assessed the efficacy of botanical biopesticides against the control of Fall Armyworm in Maize. The treatments consisted of Dipel (Bt) and Neem Seed Extract, Neem Leaf Extract, Metarhizium Anisopliae and Baeuveria Basiana, and a control. The application of bio-pesticides was significantly effective in reducing the population of FAW larvae and leaf damage. Dipel (Bt) ,Neem Seed Extract and Neem Leaf Extract performed better than other biopesticides (Metarhizium Anisopliae and Baeuveria Basiana) in reducing the FAW larvae population. The lowest number of FAW larvae was recorded under the treatment of Dipel (2.3), followed by Neem Seed Extract (4.7) and Neem Leaf Extract (6.7). The control plot was heavily infested with FAW larvae and recorded the lowest maize grain yield. The bio-pesticides showed comparatively high efficacy against FAW larvae and therefore can be recommended as a component for Climate Smart Integrated Pest Management (CSIPM), especially under the smallholder farmer farming system.

Keywords: Botanical biopesticides, Climate Smart Integrated Pest Management (CSIPM), fall Armyworm