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FACULTY OF AGRICULTURE AND ANIMAL SCIENCES

DEPARTMENT OF CROP PRODUCTION AND MANAGEMENT

EFFICACY OF EZOATE 57EC CONTAINING *EMAMACTIN BENZOATE* ON LEVEL OF INFESTATION OF FALL ARMY WORM ON LONGE 10H MAIZE VARIETY IN UGANDA

BY

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A RESEARCH REPORT SUBMITTED TO THE FACULTY OF AGRICULTURE AND ANIMAL SCIENCES IN PARTIAL FULFILLMENT OF REQUIREMENTS FOR AWARD OF THE DEGREE OF BACHELOR OF SCIENCE IN AGRICULTURE OF BUSITEMA UNIVERSITY

MAY, 2023

DECLARATION

I ..GWABI KIMU..... declare that this research report is my original work and that it has never been produced by any person, company, or organisation, It has never been submitted by any person to any institution or university for the award of any qualifications.

SIGNATURE ..... DATE 17/11/2023

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APPROVAL

This research report was prepared and submitted with approval from;

Sign……..…….. Date…17/11/2023……

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DEDICATION

I would like to dedicate this report to God and my family members, Kadondi Masitula (my mother) and Ayoyi Abu (my father), as well as my beloved wife, Weere Babrah.

ACKNOWLEDGEMENT

I am greatly indebted to the Management and staff of Busitema University, Faculty of Agriculture and Animal sciences, and Department of Crop Production and Management for giving me the opportunity to study at the institution. I gladly appreciate the support of Mr. Amayo Robert and Mr. Wandulu Joseph, who took me in as a student and supervised the research work.

I also owe infinite thanks to Kadondi Masitula (my mother) and Ayoyi Abu (my father) for their financial and moral support in this venture.

Special thanks to my beloved wife, Weere Babrah, for her patience and moral support during this research project.

Thanks to Mutalemwa Zipola, Nameyi Kasimu, Ndagi Musa, Gessa Sammuel, Kowa Wamandi, for the advice, encouragement and support.

May the almighty God bless you all!

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ABSTRACT

Fall army worm, FAW, is an insect pest native to tropical and subtropical regions of Americas. It is new to Africa and was first detected in central and West Africa in early 2016 and was reported in Uganda in June 2016 in the districts of Kayunga, Kasese, and Bukedea. By the end of 2017, the pest had spread to all the districts of Uganda. FAW is a migratory, and highly polyphagous pest capable of feeding on more than 80 plant species with cereals (maize and sorghum) being the most preferred hosts. The purpose of this study was to evaluate the efficacy of *Emamectin benzoate* (Ezoate 57EC) as a control measure against FAW on long10H Maize variety. Two field trials were conducted in two seasons of 2021B and 2022A at NaSARRI. Four concentrations levels of *emamectin benzoate* were used (11.3 ml, 9.4 ml, 4.5 ml and 3.4 ml) including 25ml of rocket used as a positive control and no spray used as a negative control. The chemicals were mixed in 15L of water. A completely randomised block design (RCBD) was used to set up the experiments with three replicates. Spraying was done once and data for FAW incidence, cob damage, yield and unshelled maize weight were collected before and after spray. Yield data collected was also used in computation of yield loss. The results obtained showed a significantly (<.001) high variation in the efficacy of different concentration of *emamectin benzoate* against the FAW in both seasons. The 11.3 ml concentration was superior to the rest of concentrations as it caused 90% percentage reduction in mean FAW incidence, lower mean percentage cob damage 3.69% and 6.04%, higher mean yield 6533.33Kg/H, 5866.67kg/H in both seasons, respectively. This is followed by 9.4ml of *emamectin benzoate* and 25ml of rocket that had no statistical difference in performance across all parameters studied in the two seasons. The 4.5ml and 3.4ml of *emamectin benzoate* were lower and had no statistical difference in performance across all parameters assessed in the two seasons. The plots were not sprayed had the worst performance in all parameters studied, low yield 1800.00kg/h and 1755.56kg/h were obtained in the respective seasons. It was observed that all concentration of *emamectin benzoate* had an effect on the FAW incidence, yield and cob damage, however spraying maize with concentration of *emamectin benzoate* varying between 9.4 ml and 11.5 ml per 15L of water is recommended. However, further research should be done to evaluate the effect of *Emamectin benzoate* against beneficial insects like bees, butterflies.

CHAPTER ONE

1.0 INTRODUCTION

1.1 Background

Maize (*Zea mays*), also called corn, is believed to have originated in central Mexico 7000 years ago from a wild grass, and transformed into a better source of food (Epule et al., 2021) . Maize contains approximately 72% starch, 10% protein, and 4% fat, supplying an energy density of 365 Kcal/100 g and is grown throughout the world, with the United States, China, and Brazil being the top three maize producing countries in the world, producing approximately 563 of the 717 million metric tons/year (Ranum & Pe, 2014) in Africa. Maize was introduced in Uganda in 1861(Singh & Kumar, 2016). The World Bank estimates that there are about 1.3 million ha of land suitable for maize production in Uganda, Maize grown in every district of Uganda but largely at subsistence level except for a few commercial farmers (Singh & Kumar, 2016). Maize is produced with very few productivity enhancing inputs and yield is generally below 1.5 ton/ha. This is due to nitrogen and phosphorous deficiencies in the soil and currently by the prevalence of fall army worm and maize streak virus disease that reduces yields by up to 80% (Frugiperda et al., 2020). Maize is the number one staple for the urban poor, in institutions such as schools, hospitals and the military and also a number one source of income for most farmers in eastern, northern and north western Uganda (Musinguzi, 2019).

Nutritionally, maize has a high value with whole grain of l00g containing l0g of protein (poor in tryptophan and rich in leucine) 4g fat, and provides 360 calories; the germ (12% by weight of the whole grain) contains 22% of the total protein and 80% of the oil(Singh & Kumar, 2016) . Maize has also become an important ingredient in the animal (maize bran) diets Statistics from the Uganda National Household Survey (UNHS) of 2005/06 show that maize was cultivated on an estimated area of 1.54 million hectares (ha) by about 86 percent of the 4.2 million Agricultural households (*UBOS Corporate Plan,2007*). But still the yield of maize to feed the growing population generally below 1.5 ton/ha (NARO Uganda), African countries are facing a maize shortage and losses running into billions of dollars due to the devastation caused by the fall army worm (MAAIF, 2018). A new report released by the Centre for Agriculture and Bio-sciences International (CABI) shows that

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