MAKERERE UNIVERSITY

RESISTANCE OF SOYBEAN GERMPLASM TO THE GROUNDNUT LEAF MINER (*Aproaerema modicella*) IN UGANDA

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REG No. 2012/HD02/212U

A THESIS SUBMITTED TO THE DIRECTORATE OF RESEARCH AND GRADUATE TRAINING IN PARTIAL FULFILLMENT OF THE AWARD OF MASTER OF SCIENCE DEGREE IN PLANT BREEDING AND SEED SYSTEMS OF MAKERERE UNIVERSITY

SEPTEMBER, 2015

ABSTRACT

Soybean is an important food and cash crop. Its production trend in Uganda has been increasing for the past 10 years, though yields are still below the potential. Soybean productivity is constrained by a number of both biotic and abiotic factors. Most importantly, ravages by the groundnut leaf miner, *Aproaerema modicella*, an increasingly economic threat to soybean production in eastern Uganda. Most farmers in Uganda have tried to control the pest by use of pesticides with limited success. Use of resistant cultivars may provide cost-effective and environmentally friendly control of the pest for the resource-poor soybean farmers. However, there are no known/documented sources of resistance to this pest among soybeans in Uganda and the amount of damage caused by this pest on soybeans hasn't been quantified. This study was therefore geared towards identifying sources of resistance to the groundnut leaf miner, that will be deployed into the soybean breeding program for incorporation of resistance to the already existing high yielding varieties, and quantifying yield losses caused by this pest on soybeans.

In experiment I, a total of 160 exotic and local genotypes were evaluated in three environments that is Iki Iki A and Iki Iki B in Budaka district and NaSARRI in Serere district, in eastern Uganda, in a 16 by 10 alpha lattice design replicated two times. The experiment was conducted in the field under natural infestation. Staggered planting was done in Iki Iki whereby Iki Iki B was planted a month after the first planting in Iki Iki (Iki Iki A) in the second planting season of 2013.

The study identified a number of moderately resistant exotic genotypes which included BSPS 48C, 4.21, PI 615437, PI 644103, PI 605638, PI 567034, PI 567102B, NIIGC 4.1-2, PI 578457A and PI 605865B. Two commercial varieties, Maksoy 3N and Maksoy 5N, were found to be moderately resistant.

In experiment II, six commercial varieties were used in the yield loss quantification study in a split plot RCBD with two treatments (protected and unprotected) as the main plots and varieties as the sub-plots. This was also implemented in the three environments.

Results indicated that yield losses ranging between 38.9-53.9% were recorded among the tested commercial varieties in the unprotected plots. The highest yield loss was recorded from Maksoy 4N (53.9%) while the lowest was recorded in Namsoy 4M (38.9%). The highest loss was recorded from Iki Iki A (53.1%) while the lowest yield loss was recorded in Iki Iki B (39.8%). These

levels of yield loss are relatively high and confirm the fact that *A. modicella* is a priority pest and strategies for its effective management are pertinent.

In general, the study showed that there is potential of breeding for leaf miner resistance since some stable and moderately resistant genotypes were identified though most of the genotypes succumbed to the pest. Furthermore, the leaf miners pose a threat to soybean productivity as shown by the relatively high levels of yield loss due to the pest and confirm the fact that *A. modicella* be considered a priority pest, and strategies for its effective management are pertinent.