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FACULTY OF AGRICULTURE AND ANIMAL SCIENCES

DEPARTMENT OF CROP PRODUCTION AND MANANAGENT

RESPONSE OF IMPROVED GROUNDNUT LINES TO LATE LEAFSPOT DISEASE

BY

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A RESEARCH REPORT SUBMITTED TO THE DEPARTMENT OF CROP PRODUCTION AND MANAGEMENT IN PARTIAL FULFILLMENT OF THE REQUIREMENTS FOR THE AWARD OF A DEGREE IN BACHELOR OF SCIENCE IN AGRICULTURE OF BUSITEMA UNIVERSITY

MAY, 2023

DECLARATION

I, OSIA PAUL declare that this research report, which I submit to the department of crop production and management for examination in consideration of the award of degree of bachelor of science in agriculture is my original work and personal effort, and that to the best of my knowledge, the findings have never been previously presented to Busitema University of or elsewhere for the award of any academic qualification, I hereby affirm that except for references to other people's works, which have been duly cited, this work is a result of my own insightful observations / research and that has not been presented in part or whole for any other degree in this University or elsewhere.

So I present it without any reservation for examination considerations.

Sign: ..... Date: 01/02/2024

OSIA PAUL

This research proposal was written under my supervision and has been submitted to the Department of Crop production and Management for examination with my approval as supervisor.

Sign: ..... Date: 05/02/2024

DR.LUBADDE GEOFREY

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DEDICATION

I dedicate this report to my academic mentors, academic friends, and family for the positive engagements towards this research study.

May the almighty God bless you all.

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ABBREVIATIONS

LLS	:	Late leaf spot
ANOVA	:	Analysis of variance
BUAC	:	Busitema University Arapai Campus.
FAAS	:	Faculty of Agriculture and Animal Sciences.
BSA	:	Bachelor of Science in Agriculture.
CLS	:	cercospora leaf spot
NaSARRI	:	National semiarid resources research institute
SGV	:	Serere groundnuts variety
ICGV	:	ICRISAT groundnuts variety
NARO	:	National agricultural research organisation
ELS	:	Early leaf spot
RCC	:	Relative chlorophyll content
AUDPC	:	Area under Disease Progress Curve
PDI	:	Percentage disease incidence
Kg/ha	:	kilograms per hectare
SGV	:	Serere groundnuts variety
ICGV	:	ICRISAT groundnuts variety
ICRISAT	:	International crops research institute for semi-arid tropics

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ABSTRACT

Foliar fungal diseases account for over 80% reduction in groundnut productivity in most parts of Uganda. Late leaf spot (LLS) caused by *Cercosporidium personatum* Deighton. Spots of late leaf spot are black and usually without yellow halo. Spread and severity is influenced by the field cropping history, temperature, and relative humidity .the leaf spot disease epidemics, Genetic variation exists in cultivated groundnut for LLS resistance, but the resistant genotypes are generally late maturing. Direct selection for leaf spot resistance in groundnut is also difficult and has been reported to be associated with low yield, poor pod, and kernel characteristics and late maturity. As a result, there is the need to consider other physiological traits that can confer tolerance to the two foliar diseases and enhance pod and haulm yields.
This research study assessed 50 selected groundnuts lines for late leaf spot resistance and high yield in Uganda.

The main objective of the study was to determine the response of improved groundnuts varieties to leaf spot severity

Specific objectives were:

To determine the effect of late leaf spot on groundnut yield (pod / seed, haulm) .

To determine the level of resistance to late leaf spot across the groundnuts genotypes (three selected botanicals of groundnuts)

The research study was conducted for two (2) consecutive seasons in the first rains of 2022, season (2022A) and the second rains of 2022; season (2022B)

This study was to determine the influence of leaf spot disease severity on selected groundnuts lines in terms of yield (pod, seed, and haulm).

Fifty (50) groundnut genotypes with varying degrees of tolerance to leaf spot were evaluated under marginal environments in the field,

Each of the genotype was planted in 5 X 10 alpha lattice design a 3 row plot measuring 1.5x 1.5 meters using a spacing of 45cm x 10 cm in both season A and B year 2022 at NaSARRI Uganda.

Data collection accounted to all the plants per plot at the start of the experiment

Disease severity was assessed at weekly intervals for 12 consecutive weeks. Data on yield and yield component such as, number of pods per plant, and 100 seed weight (grams/kilograms), plant stand, 50% flowering, was collected at 7 days interval. The severity

of LLS infection was scored on a scale of 1 to 9 with 1 being completely resistant and 9 a dead plant.

CHAPTER ONE
INTRODUCTION

1.1 Background of study

Groundnut, also known as peanut, (*Arachis hypogaea* L.), is cultivated in the semi-arid tropical and subtropical regions of nearly 100 countries on six continents between 40˚ N and S of the equator. It is an important legume grown and consumed globally and in particular in sub-Saharan African countries (Okello et al., 2010). For people in many developing countries, groundnuts are the principal source of digestible protein (25-34%), cooking oil (44-56%), and vitamins. These qualities make groundnut an important nutritional supplement to mainly cereal diets of maize, millet and sorghum of many Ugandans. In many countries, groundnut cake and haulms (foliage, straw/stems) are used as livestock feed. Groundnut is also a significant source of cash income in developing countries that contributes significantly to livelihoods and food security (Okello et al., 2010).

Groundnut being a legume improves soil fertility by fixing nitrogen and thereby increases productivity of other crops in the semi-arid cereal cropping systems. Groundnuts are grown in most of SSA by smallholder farmers as a subsistence crop under rain-fed conditions. Yields per hectare are generally low compared to those from developed countries like the USA, because of a combination of factors such as unreliable rainfall, mostly non-irrigated cultures, traditional small-scale farming with little mechanization, outbreaks of insect pest infestations and diseases, the use of low-yielding varieties, poor quality seed, increased and/or continued cultivation on marginal land, poor adoption of agronomic practices and limited extension services (Okello et al., 2010). Insecurity, instability and the frequently unsupportive oilseed policies have also played their role in low groundnut productivity. Therefore, there is excellent potential for yield improvement.

Despite its importance in providing income and food for smallholder farmers, fodder for livestock, and improving soil fertility through biological nitrogen fixation, groundnut yields are lowest on farmers' fields in Sub-Saharan Africa due to biotic and abiotic constraints acerbated by weather patterns such as hot and wet conditions. Temperatures in the range of 25 to 30°C and high relative humidity favour disease infection and development. Efforts have been directed at chemical control of leaf spot diseases in eastern Uganda. However, it has only been partially effective in controlling the disease on farmers' fields and substantially increases cost of production. The development and adoption of leaf spot resistant cultivars

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