
FACULTY OF AGRICULTURE AND ANIMAL SCIENCE
DEPARTMENT OF CROP PRODUCTION AND MANAGEMENT

**EFFECT OF KENCOP FUNGICIDE ON THE CONTROL OF ANGULAR
LEAF SPOT ON FRENCH BEANS**

BY

GUMBIRI YUNUS

REGISTRATION NUMBER: BU/UP/2018/2999

STUDENTS NUMBER: 1800402999

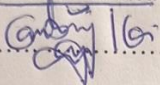
SUPERVISOR: MR. AMAYO ROBERT.

**A RESEARCH PROJECT REPORT SUBMITTED TO THE FACULTY OF
AGRICULTURE AND ANIMAL SCIENCE IN PARTIAL FULFILLMENT
OF THE AWARD OF BACHELOR OF SCIENCE IN AGRICULTURE,
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DECLARATION

I, **Gumbiri Yunus**, declare that this research report is to the best of my knowledge and efforts resulting from the implementation of an experimental study on evaluating KENCOP fungicide. It has never been submitted to any institution of learning for the award of Graduate, Undergraduate, Diploma or Certificate program.

Sign.....

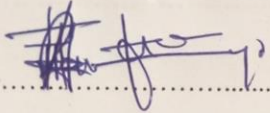
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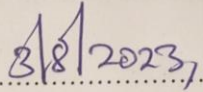
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APPROVAL

The entire work relating to this research; from proposal development, implementation to report writing has been done by **Gumbiri Yunus** under my supervision and has met all the necessary Busitema University guidelines for research, I therefore approve it accurate for submission to the Department of Crop Production and Management of Busitema University for examination.

Sign.....

Date.....

Amayo Robert

Lecturer, Department of Crop Production

Busitema University-Arapai Campus.

(ACADEMIC SUPERVISOR)

DEDICATION

To God almighty, for the power in His word and His able ability to keep me alive to see this accomplishment, He's granted me good health, cared and protected me through this entire period of my course. I truly believe that without Him I am nothing.

To my loving father and mother, Mr Waiwai Shaban and Mrs Maitum Iziku, you are great parents indeed, you taught me moral standards, commitment, positive thinking, hard work and endurance at all times and these were just needed not only in my research but they are elements I will always employ for a successful life. Thank you very much.

To my brothers and sisters; for your unconditional love and sacrifice toward me, you accepted to forego your needs to enable me study, how do I even repay you. I pray the almighty God blesses you and your household with good health and sufficiency in all that you need, Amen.

Lastly, I dedicate this report to my academic supervisor and mentor, Mr Amayo Robert who has overwhelmingly supported me throughout all my studies and the research process. Am profoundly honored and exceedingly grateful for the guidance and gratitude you have given me.

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No accomplishment in life is without the cooperative effort of many gifted people who willingly and passionately dedicate themselves to excellence and quality. This report is not different; it is a sum total of what I have learned from those who shared their thoughts with me; lecturers of Busitema University- Department of Crop Production and Management, re-known scholars in the field of pathology and other disciplines and to my ability to use this knowledge to set up an experiment that gave results documented today.

I acknowledge and thank more specifically Mr Amayo Robert, my academic supervisor and mentor, who helped guide this research project to its finish. Thank you very much for your commitment and constant support in ensuring that I produce this quality result within the reporting schedule.

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ABBREVIATIONS

ALS	: Angular leaf spot
AUDPC	: Area Under Disease Progress Curve
BSA	: Bachelor of Science in Agriculture
BUAC	: Busitema University Arapai Campus
BugizARDI	: Buginyanya Zonal Agricultural Research and Development Institute.
CIAT	: International Center for Tropical Crops
CV	: Coefficient of variation
LSD	: Least Significant Difference
NaCRRI	: National Crops Resources Research Institute
RCBD	: Randomized Complete Block Design
S.E	: Standard Error
UNMA	: Uganda National Meteorological Authority
WP	: Wettable Powder

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ABSTRACT

Uganda is Africa's second largest bean producer after Tanzania. Production of beans in Uganda is predominantly on a small-scale accounting between 60–90% of the production with average productivity of 0.25 tons (250kg) per acre despite potential yield of 700 to 1500kg/acre. The production potential has been undermined by among other factors insect pests and diseases which are the major biotic constraints. Angular leaf spot (ALS) disease caused by *Pseudocercospora griseola* (Sacc.) among other diseases is the most important. It causes severe and premature defoliation resulting in shrivelled pods, shrunken seeds and yield losses of up to 80%. It is also reported that every 10% increase in Angular Leafspot severity results in 7.9 % yield loss of beans. It is against this background that a study was conducted in two different agro ecological zones that is BUAC in Soroti district and BugiZARDI, Bulambuli district for two consecutive seasons (2022A and 2022B) to test the efficacy of a new fungicide, KENCOP that has a different active ingredient and mode of action in controlling ALS on French beans. Experiments were set in a randomized complete block design with three replications and five treatments (60g/20l KENCOP, 40g/20 KENCOP, 20g/20l KENCOP, 20g/20l, Cobox (positive control and commonly used fungicide) and untreated plots (negative control)). The treatments were applied thrice i.e. after every two weeks from the sight of the first ALS symptom. The parameters collected to measure the effectiveness of the rates were ALS disease incidence and severity, fresh pod weights, pod numbers and pod length to constitute the yields. The disease parameters were collected after every one week from the first treatment application while the yield parameters were collected at harvest (physiological maturity). KENCOP was very effective in suppressing ALS in both locations and seasons and its effect was comparable to Cobox fungicide. The higher rates of KENCOP (60g/20l and 40g/20l) showed low disease pressures, though high disease occurrence was observed in Bulambuli than Soroti. Similar observations were also made for the yield parameters across the two sites. In conclusion, the experiment showed KENCOP fungicide was effective in controlling ALS in French beans. At a rate of 40g/20l, KENCOP can be used as an alternative fungicide in the management of the ALS. However, in cases of high rainfall intensity, a higher rate of 60g/20l KENCOP is recommended.

CHAPTER ONE

1.0 INTRODUCTION

1.1 Background

French beans also known as Snap beans or Green beans are dicotyledonous plants belonging to the family, Fabaceae, and forms part of the species *Phaseolus vulgaris* (Starke Ayres, 2019). They have been used as food for centuries, and still one of the most important foodstuffs for mankind. Uganda is Africa's second largest bean producer after Tanzania (1,008,410 tonnes produced on 670,737 ha in 2016), and production has been increasing (CASA Uganda, 2020). The French beans are cultivated for the green pods, which are rich in vitamins such as vitamin C, folic acid, and riboflavin (vitamin B2), and minerals such as calcium, and iron (Negi *et al.*, 2019). The crop offers the second most important source of dietary fibre for humans and the third most important source of calories among all agricultural products in Eastern and Southern Africa (Shimon *et al.*, 2017) It is increasingly becoming important in the socio-economic systems of East and Central Africa (ECA) and has great potential for addressing food insecurity and better incomes, and for alleviating poverty in the region (Katafiire & Ugen, 2021).

However, the production of the crop in Sub-Saharan Africa is very low compared to some developing countries in Asia (Wangu *et al.*, 2019). This is attributed to biotic constraints of which insect and disease pests are the major constraints and contributes to the high yield losses prevalent on farms in the region (Katafiire & Ugen, 2021). Among the diseases, fungal diseases such as angular leaf spot (ALS), anthracnose and rust among others are the most important and persistent (Wani *et al.*, 2021)

Angular leaf spot (ALS) disease caused by *Pseudocercospora griseola* (Sacc.) is generally a major disease of common beans in the tropics and sub-tropics (Stenglein *et al.*, 2003; Pamela *et al.*, 2014) and also a pre-dominant and destructive disease of French beans (Bashir *et al.*, 2017). It causes severe and premature defoliation resulting in shrivelled pods, shrunken seeds and yield losses of up to 80% (Stenglein *et al.*, 2003). The disease has been reported from almost all the bean growing areas of the world, and it often appears as an epidemic resulting in extensive damage to the crop (Gupta and Shyam, 2003).

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