

FACULTY OF AGRICULTURE AND ANIMAL SCIENCES
DEPARTMENT OF CROP PRODUCTION AND MANAGEMENT
EFFICACY OF LOCALLY MADE BIO-FERTILIZER ON GROWTH AND YIELD OF
NAROSORG 2

BY

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DECLARATION

DECLARATION

I Cherotich Stella do declare that the work in this document is entirely out of research results and nothing whatsoever is manipulated or will be found anywhere as belonging to someone.

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Date.....28/08/2023.....

Approval

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LIST OF ABBREVIATIONS

SSA:	Sub Saharan Africa
FAO:	Food and Agriculture Organization
WFP:	World Food Programme
IPC:	Integrated Food Security Phase Classification
UNDP:	United Nations Development Programme
GNP:	Gross National Product
Ha:	Hectare
IFDC:	International Fertilizer Development Company
FYM:	Farm Yard Manure
NaSSARI:	National Semi-arid Resources Research Institute
WAP:	Weeks After Planting
m:	meters
Cm:	centimeters
g:	grams
Kg:	kilograms

Abstract

Soil and soil nutrient degradation is a substantial problem in Uganda. It is estimated that 4% - 12% of GNP is lost from environmental degradation, 85% of this from soil erosion, nutrient loss and changes in crops. The use of bio fertilizers is picking as a sustainable approach to soil nutrient management for different crop production. This study therefore assessed the effect of bio-fertilizer in increasing productivity and reducing production costs of Narosorg 2 sorghum variety in Uganda. Bio fertilizers from green gram and pigeon extracts were applied at different levels of 100 mls, 75 mls, 50 mls, and Urea applied in farmers practice and a control and split plot experimental design was used. The bio fertilizers were applied at an interval of two weeks until flowering and the urea fertilizer was applied once two weeks after germination as practiced by the farmers. The results of the study showed that different rates of biofertilizers significantly ($p < 0.05$) affected different growth and yield parameters of Narosorg 2 sorghum variety. 100 mls of bio-fertilizers produced significantly the highest plant height, leaf area and leaves numbers and followed by Urea application at 5g, and 50mls of biofertilizer respectively. Meanwhile the application of 100 mls of bio fertilizers produced the highest yield which is about 3075 kg/ ha and followed by Urea application which produced about 2988 kg/ha. All the different levels of the bio fertilizers performed significantly higher than control in terms of yields in kg/ha. This study concludes that the best level of application to yield the best result in terms of growth and yields in kg/ha is 100 mls of bio fertilizers/20liters of water applied, followed by Urea application and 70 mls respectively at application of rate of two weeks interval. However more study needs to be done on the qualitative analysis of the bio fertilizers to establish the standard nutrients available so as it can be recommended appropriately for use in different crops as well. More study should as well be conducted on the use of these bio fertilizers as a blend with inorganic fertilizers for improved crop production and productivity. Further studies be done on more varied levels of the bio fertilizers preferably increased levels than those used in this research and as well studies be done on the bio fertilizer effect on various crops especially vegetables

CHAPTER ONE

INTRODUCTION

1.1 Background

Sorghum [*Sorghum bicolor* (L.) Moench] is the fifth most important cereal in the world after wheat, rice, maize and barley. In Africa it comes second after maize in terms of production. (FAO & 2012, n.d.) it is the most important cereal crop in Uganda, after maize and rice (Scandinavica *et al.*, 2021) it is mainly produced by smallholder farmers in the semi-arid regions of Eastern,

South Western Uganda as it is uniquely adapted to Africa's climate, being both drought resistant and able to withstand periods of water-logging.

Sorghum is an important staple crop in the African semi-arid tropics including Uganda serving as a daily food requirement (Hara & Sonoda, 1981). It is the only viable food grain for many of the world's most food insecure people.

World sorghum production during 2009 was about 59 million tonnes of grain from 40 million ha with an average productivity of 1.4 tonne/ha (FAO, 2011), with the United States, India, Mexico, Nigeria, Sudan, Ethiopia, Australia, and Brazil as major producing countries, in that order (FAO, 2011).

In Uganda most communities in Africa are often faced with malnutrition which is common among women and pre-school age children. In SSA, approximately 500 million people rely on sorghum as their dietary staple to derive the bulk of their energy, protein, minerals and vitamins requirements and, therefore, sorghum has a substantial prospect to be used as a human food and beverage source (gluten-free) in SSA (Taylor *et al.* 2006). It plays important roles in the food security of the country and incomes of many rural households (Andiku *et al.*, 2021).

Uganda faces a food insecurity problem and a proportion of 29% of the children are stunted (2021) (WFP). The country lies in 3 IPC phases (Integrated food insecurity Phase Classification). For the period (June - August 2020), 23% of the analyzed population (2.6 million people) is facing high levels of acute food insecurity (IPC Phase 3 or above). 38% of the population is in Stressed (IPC Phase 2) and 40% is in Minimal Acute Food Insecurity (IPC Phase 1) (IPC 2021).

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