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Graduation Research Project

Effect of Mono Amoum Phosphate(MAP) and Nutrifol on the Vegetive  
Growth Common bean

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# الآية

## قال تعالى

وَهُوَ الَّذِي أَنْزَلَ مِنَ السَّمَاءِ مَاءً فَأَخْرَجْنَا بِهِ نَبَاتَ كُلِّ شَيْءٍ فَأَخْرَجْنَا مِنْهُ خَضِرًا نُخْرِجُ مِنْهُ حَبًّا مُتَرَاكِبًا وَمِنَ النَّخْلِ مِنَ طَلْعِهَا قِنْوَانٌ دَانِيَةٌ وَجَنَّاتٍ مِّنْ أَعْنَابٍ وَالزَّيْتُونَ وَالرُّمَّانَ مُشْتَبِهًا وَغَيْرَ مُتَشَابِهٍ انظُرُوا إِلَى ثَمَرِهِ إِذَا أَثْمَرَ وَيَنْعِهِ إِنَّ فِي ذَلِكُمْ لَآيَاتٍ لِّقَوْمٍ يُؤْمِنُونَ).

صدق الله العظيم

سورة الأنعام الايه (99)

## DEDICATION

*To the teacher of mankind and the source of science , our prophet muhammed peace be upon him ,, To the cause of my being in life , to those who do not see hope to their eyes My parents ,, To my dear grandfather ,, To those who have gained strength and love with no limits and with them greater and I have to rely on them My uncles and aunts ,, To those who planted optimism in my way to whom I derive my gratitude and determination My brothers and sisters ,, To the spirit of my dear grandmother ,, To those who forgot in my studies and shared my worries My friends.*

## **ACKNOWLEDGEMEN**

*All praise to GOD .. To Dr. Sami , I appreciate everything you offered , your invaluable directions services and guidance.. also I would like to deliver the most beautiful words of thanks to my family , friend and to everyone who contributed to my sussess and achievement .*

## **ABSTRACT:**

Plastic bags were tested in the winter of 2016/ 2017 by the experimental farm of the Faculty of Agricultural Studies, Sudan University of Science and Technology in Shambat, to study the effect of adding Mono Ammonium Phosphate (MAP) and Nutrifol on the vegetative growth in common bean.

The factorial experiment was done at randomized complete block design with four replicates.

The study showed that there are no significant differences between the treatments.

## الخلاصة

أجريت تجربة أكياس بلاستيكية في شتاء 2016 / 2017م بالمزرعة التجريبية لكلية الدراسات الزراعية، جامعة السودان للعلوم والتكنولوجيا بشمبات وذلك لمعرفة تأثير سماد فوسفات أحادي الأمونيم والنيوتروفول على نمو محصول الفاصوليا. صممت التجربة العلمية بتصميم كامل العشوائية بأربع مكررات وأربعة معاملات. تم أخذ وزن جاف أول وثاني حتى نمو النبات لمعرفة الفرق في معدل النمو. أثبتت الدراسة أنه لا توجد فروقات معنوية بين المعاملات.

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# CHAPTER ONE

## Introduction

Common bean (*Phaseolus vulgaris*) is a member of the family fabacea and it will be known as field beans, kidney beans and dry beans. South America is the home to lima beans and multiflora beans. The American used them in their diet and then moved from South America to Europe and the rest of the world following the discovery of the Americas. The zeren (1997) is believed to have moved to Europe around 1500. The total area planted with dry beans in 1998 was about 2517 million hectares and was the most cultivated area in the world was in America, Brazil and India. In the Sudan, considered to Shendi and Berber from the early areas that has planted his own, where yield of more than 95% of the crop then spread planting in Madani, Shambat and Sennar and increased the cultivated area were became 3.98% thousand/ ha and productivity 1557.7 kg/ha . Dry beans are a crop that rich in carbohydrate, protein, calcium, iron, thiamine and niacin. Beans are good sources of calcium; calcium concentration is significantly higher in green pods than in dry. Seeds based on dry weight. The varieties of beans vary in the content of their horns.

Multi- MAP is a fully water soluble mono ammonium phosphate fertilizer, a highly efficient source of phosphorus and nitrogen for plants. It Plays a role in the composition of phosphate organic compounds necessary for the storage and transfer of energy and genetic qualities within the plant. It is Important in the formation of seed and full of pods.

The objective of this study is to work is to study the effect pf mono ammonium phosphate fertilizer and nitrophol fertilizer on the growth of dry bean.

## **CHAPTER TWO**

### **Literature Review**

#### **2.1 Botany:**

Common bean is a herbal plant, the root is deep in the soil within one month of planting for 60cm under the soil, the stem leg is slightly clogged with the growth of the plant, and the varieties are dried into short medium length, existing, climber and creopy (Kazalik, 2001). The first two leaves on the plant are simple ovoid, the following leaves are a single feather vehicle consisting of three plates, the varieties vary in size and shape of the leaves, some of them were with long and narrow and others were with large and oval shaped leaves, the neck of the leaves is long and concave (Hassan, 1997). A small percentage of grass pollination occurs by insects, the most important of which are bees. The rate of hybrid pollination in dry beans is 0.19- 1.42% (Kalel, 2004). Flowers are carried in limited cluster shoots, each of which consists of 3- 8 blowing flowers (Kazalik, 2001). The number of seeds can vary from 1 to 12; they show considerable variation in their colour, shape and size (Kay, 1979).

#### **2.2 Economic Importance:**

Dry beans are the main source of protein in human nutrition in developing countries in tropical and subtropical regions. Dry beans seeds are characterized by high nutritional value. Common beans protein is close to animal protein and can be substituted for nutrition, and seed flour can be about 5- 10% and in pasta industry up to 30%, good feed for animals especially sheep and goats. It is characterized by the ability to increase soil fertility by stabilizing air nitrogen and improving the soil structure (Hassan, 2002).

## **2.3 Ecology:**

The crop of dry beans is a crop of warm areas and the optimum temperature for germination is 20°C and for growing from 20- 28°C. In the period from germination to flowering the bean plant needs a temperature of about 16°C. The soil moisture is low compared with the soy bean crop. In the rainfall rate of 300- 600 ml. The growth season of early varieties is 70- 80 days and the late varieties of 150- 140 days (Hassan, 2002).

## **2.4 Agricultural Operations:**

### **2.4.1 Patching:**

After about a week or ten days of planting (full germination), graze with a dry seed and till the field (Arhem, 2002).

### **2.4.2 weed control:**

The hoeing takes place after about three weeks of cultivation (Arhem, 2002). Also the beans field 3-4 times first after germination, then every three weeks thereafter (Hassan, 1984).

### **2.4.3 Irrigation:**

The soil moisture of the beans should be as suitable as possible at all stages of their growth (Hassan, 1997).

## **2.5 Fertilizer:**

Mono Ammonium Phosphate (MAP)  $\text{NH}_4\text{H}_2\text{PO}_4$  high phosphorus fertilizer and complete solubility in water containing (12%N) + (6% phosphorus  $\text{P}_2\text{O}_5$ ). The advantages and benefits of MAP is an important compound for all biological processes within the plant. The main source of the phosphorus element modern irrigation methods is important for the growth and development of the root total,

which reduces the rate of utilization of other fertilizers, especially in the early stages of plant life, plays a role in the composition of phosphate organic compounds necessary for storage and transport of energy and genetic qualities within the plant. The presence of ammonium increases the absorption of the phosphorous components. This compound can be mixed with osmotic and potassium fertilizers.

Method and rate of use it is preferable to use a pump with irrigation water in modern irrigation methods such as drip irrigation, axial or sprinkler. Prefer not to mix with fertilizers containing the calcium element, depending on the rate of use according to soil type- quality of irrigation water- plant growth stage- plant type (Said, 2011).

## **CHAPTER THREE**

### **Materials and Methods**

#### **3.1 Experimental site:**

Plastic bags were tested in the winter of 2016/ 2017 by the experimental farm of the Faculty of Agricultural Studies, Sudan University of Science and Technology in Shambat. Shambat is located at the intersection 531 North and 35.32 East and 350 meters above the sea level within the semi- desert region, according to Adam (2003) Appendix 1. The soil is alkaline clay by Abdelgadir (2010) appendix 2.

#### **3.2 Materials:**

##### **3.2.1 The plant:**

Use the dry bean to conduct this experiment, which is a member of the family fabaceae.

##### **3.2.2 Fertilizers:**

###### **3.2.2.1 Mono Ammonium Phosphate:**

MAP: 12- 16- 0

###### **3.2.2.2 Nutrifol:**

Iron	2.60%
Zinc	2.60%
Manganese	1.95%
Boron	0.97%
Copper	0.23%
Molybdenum	0.03%
Magnesium	2.50%

### **3.3 Methods:**

#### **3.3.1 Experimental design:**

The experiment was designed in a randomized complete block design with four replicates.

#### **3.3.2 Agriculture:**

Bags were filled with soil at a rate of 5 kg for the bag, was done on 14. 12. 2016 after the operations of palm and the leaves left 6 plants in each bag.

#### **3.3.3 Fertilization:**

MAP fertilizer was applied with agriculture at a rate of 310 mg per bag. The nitrifol fertilizer was sprayed using a manual machine with 3 cc/ liter water twice the first on 12. 1 2017 and the second on 12, 2. 2017.

#### **3.3.4 Irrigation:**

The first irrigation was done one day followed by the second irrigation (lightly) immediately after planting. 3 days after planting the third irrigation was given (lightly). Then irrigation was done weekly.

#### **3.3.5 Treatments:**

1- Control

2- MAP

3- MAP + nitrifol

4- MAP + nitrifol + nitrifol

### **3.4 Sampling and analysis:**

#### **3.4.1 Take samples**

##### **3.4.1.1 Bacterial nodes:**

The roots count of two plants from each bay was taken to calculate the plant number in 27 days after germination.

##### **3.4.1.2 relative growth rate :**

The vegetative total of two plants was taken from each bag twice in 27 days after germination and 54 days after germination. It was placed in the oven for 48 hours at 70°C. Dry weight was recorded in the readings to calculate the growth rate according to Radford as follows:

$$\text{Dry weight 2} = \frac{\text{Dry weight 1}}{\text{Area} \times \text{Time}} \text{ (gm/m}^2\text{/day)}$$

##### **3.4.1.3 Harvest:**

The following two plants were taken in each bag:

- Number of pod per plant.
- Number of seeds per pod.
- Weight of 100 grain per gram.

#### **3.4.2 Analysis of Samples:**

The variance of all measurements (ANOVA) was calculated by dividing the mean by using the DMRT test by (1978) Little and Hill.



## CHAPTER FOUR

### Results

Analysis of variance showed no significant difference between treatment of growth rate.

The high mean recorded was by treatment MAP, then MAP + F then MAP + 2F and then control.

**Table 4.1: Growth rate**

<b>Rep</b> <b>Treat</b>	<b>Means</b>
1- Control	1.1 <sup>a</sup>
2- MAP	1.6 <sup>a</sup>
3- MAP + F	1.4 <sup>a</sup>
4- MAP + 2 F	1.2 <sup>a</sup>

The figures shown with same letter are not significantly differ from each other according to DMRT.

Analysis of variance showed no significant difference between for pods number.

The high mean obtained by treatment MAP after the MAP + 2F then control and then MAP + F.

**Table 4.2: Pod number**

<b>Rep</b> <b>Treat</b>	<b>Means</b>
1- Control	1.8 <sup>a</sup>
2- MAP	2.2 <sup>a</sup>
3- MAP + F	1.8 <sup>a</sup>
4- MAP + 2 F	2.0 <sup>a</sup>

The figures shown with same letters are not significantly differ from each other according to DMRT.

Analysis of variance showed no significant difference between treatment for seed number.

The high mean record was by treatment MAP then MAP + F then control and then MAP + 2F.

**Table 4.3: Seed number**

<b>Rep</b> <b>Treat</b>	<b>Means</b>
1- Control	4.8 <sup>a</sup>
2- MAP	6.5 <sup>a</sup>
3- MAP + F	5.1 <sup>a</sup>
4- MAP + 2 F	4.8 <sup>a</sup>

The figures shown with same letters are not significantly differ from each other according to DMRT.

Analysis of variance showed no significant difference between treatment for seed weight.

The high mean obtained by treatment MAP the MAP + F after then MAP + 2F and then control.

**Table 4.4: Seed weight**

<b>Rep</b> <b>Treat</b>	<b>Means</b>
1- Control	1.0 <sup>a</sup>
2- MAP	2.2 <sup>a</sup>
3- MAP + F	1.6 <sup>a</sup>
4- MAP + 2 F	1.5 <sup>a</sup>

The figures shown with same letters are not significantly differ from each other according to DMRT.

Analysis of variance showed no significant difference between treatment for nodules.

The mean in the nodules took the same value.

**Table 4.5: Nodules**

<b>Rep</b> <b>Treat</b>	<b>Means</b>
1- Control	1.0
2- MAP	1.0
3- MAP + F	1.0
4- MAP + 2 F	1.0

The figures shown same letters are not significantly differ from each other according to DMRT.

## CHAPTER FIVE

### Discussion

The phosphorous component is one of the major nutrients and the plants absorb this element to meet their needs and to complete the various vital processes (Alshbeni, 2006).

The importance of phosphorous enters the synthesis of nucleic acids and plays a significant role in many enzymatic reactions. Phosphorous is found at high concentrations in the metastatic regions where growth is active; phosphorous is involved in the representation of the nuclear protein.

Dawelbeit *et al.*, (2007) reported that the soil of the central clay plain of the Sudan are very poor in phosphorous, that available  $p < 10$  ppm. They added that the relatively high CEC and base salutation % make these soils to respond well to adding phosphorous fertilizers.

## CHAPTER SIX

### Summary and Conclusion

#### 6.1 Summary:

Plastic bags were tested in the winter of 2016/ 2017 by the experimental farm of the Faculty of Agricultural Studies, Sudan University of Science and Technology in Shambat, to study the effect of adding Mono Ammonium Phosphate (MAP) and Nutrifol on the vegetative growth in dry bean.

The factorial experiment was done at randomized complete block design with four replicates.

The study showed that there are no significant differences between treatments.

#### 6.2 Conclusion:

Treatment did not show a clear effect on increasing growth rates and holds common bean by intensive research on the field level of the use of fertilizer Mono Ammonium Phosphate and Nutrifol unilateral or common bean crop. You may come with positive results.

However, addition of phosphorous as triple super phosphorus proved not to improve the growth and yield of several crops. This was attributed to the poor availability of phosphorus in such alkaline calcareous clay soil (Cumaa, 1999; Rathad *et al.*, 2002).

In this experiment the Mono Ammonium Phosphate, which is a newly induced P-fertilizer, was used instead of the triple super phosphate. However, the results were not that encouraging. This might be due to the soil nature mentioned above.

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