



Engineering and Technology Quarterly Reviews

Sharifi, M. A., Nowrozi, A., Rostazada, M. D., & Ali, J. (2024), Effect of Different Doses of Animal Manure on Growth and Yield of Common Bean. In: *Engineering and Technology Quarterly Reviews*, Vol.7, No.1, 33-36.

ISSN 2622-9374

The online version of this article can be found at:
<https://www.asianinstituteofresearch.org/>

Published by:
The Asian Institute of Research

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Effect of Different Doses of Animal Manure on Growth and Yield of Common Bean

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Abstract

This research (the effect of different doses of animal manure on growth and yield of common bean) carried out based on (RCBD) in Yakawlang district. This experiment conducted in three replications and eighteen treatments (each replication contains six treatments). Land preparation was first done, all extra materials removed from field and the field was furrowed by traditional tools. All other operation for preparing land to cultivate was done in a traditional manner. Descriptions of treatments are as follow: T1 (control) T2 (2 ton ha¹) T3 (4 ton ha¹) T4 (6 ton ha¹) T5 (8 ton ha¹) T6 (10 ton ha¹). This study was conducted in Yakawlang district during 2023. For achieving of this research, agricultural lands was selected and prepared for common bean cultivation through using traditional tools, shovel, and other essential tools.

Keywords: Animal Manure, Bean, Growth, Yakawlang, Yield

1. Introduction

Common bean is one of the food supply resources for human, so I decided to work on organic fertilizer on bean in Yakawlang district. Common bean (*Phaseolus vulgaris* L.) is an annual leguminous, self-pollinated plant having non-endospermic seeds which mostly differ in size and color from wild type small black to mottled large red, black, brown or white seeds 7-16mm long (coble and steele, 1976). Nitrogen is the main component of cellular compounds, including amino acids and nucleic acids. Nitrogen deficiency greatly reduces plant growth (Hauggaard et al., 2009). Animal manure guaranty higher levels of comparatively obtainable nutritional elements, especially N, which is basically, desired for plant growth (Amanullah et al., 2007). Bean (*Phaseolus vulgaris* L.) is an important legume, a rich protein source for humans and animals, in the developing countries. Grains of beans contain 18% to 32% protein, which considerably have more validity than animal protein in the diet of low-income people. Drought and lack of nutrients, particularly nitrogen (N), are the most important environmental stresses threatening bean yields (Majnoon Hosseini, 2008). Organic manure in the soil is as store

house for nitrogen supply to plant. There is very little inorganic nitrogen in soil and much of it obtained by the conversion of organic forms. Organic manure not only increases the yield but also improve physical, chemical and biological properties of soil that improve the productivity of crop (Blane, *et al.*, 1998).

To provide enough N for the bean plant and increase its product or yield organic and inorganic fertilizers have to apply. By this way the yield of agricultural products may increase. N availability influences the distribution of assimilates between vegetative and reproductive organs, while N deficiency leads to a delay in growth and development. (Ali and Lal, 1992).

Generally, application of NPK fertilizer increased yield and yield components of common bean, this result is in agree with other results of the same crop (Arf *et al.*, 2011). Other researchers found that organic fertilizer increased growth, yield pods in cluster bean followed by chemical fertilizer as compared with the control (Balbhim *et al.*, 2015). Organic fertilizer (cow manure) increased pod weight, pod dry weight, and total yield of bean (Olfati *et al.*, 2012). Positive response of common bean to chicken manure application could be due to the reduction of soil pH by the manure that makes the nutrient such as phosphorus more available to the plants. Using of poultry manure combined with NPK increased yield and yield component of maize plant (Izuchukwu *et al.*, 2007). Also another study showed that cow manure combined with chemical fertilizer increased yield and yield component of sweet maize (Anonymous, 2007). Nitrogen is the main component of cellular compounds, including amino acids and nucleic acids. Nitrogen deficiency greatly reduces plant growth (Hauggaard-Nielsen, *et al.*, 2009). Compost and vermicompost are soil conditioners, which provide nutrients and organic matter within the soil and also ameliorate the water holding capacity, firmness and structure of soil (Vogtmann *et al.*, 1993). The application of 5 and 10 ton¹ of cow manure increased yield of green bean (Mudji Santosa *et al.*, 2017).

2. Materials and methods

This research (the effect of animal manure on growth and yield of common bean) carried out based on (RCBD) in 2023 in Yakawlang district. One local variety seed namely *Lobia Negrabi* was used in this research. Other equipment including Raja, shovel, Kidman, ruler, paper pockets, were used for research's various purposes. Soil samples were taken randomly before preparing the land and sowing from the experimental field from 0 to 30 cm in depth to check its pH and other properties such as texture and electrical conductivity. The pH of the soil that was taken from the experimental area was checked in laboratory of ministry of agriculture, irrigation and husbandry showed 8.95. after land prepared the heaps created and then seeds in specific rate, distance between two plant was 20cm and the distance between two heaps were 40cm, the depth of cultivation was 4cm. 22 seeds were put on each heaps (11seeds on one side and 11seeds on other sides of heaps were placed). It was a problem or a challenge that I couldn't find an improved seed to cultivate that and get a result. So, one variety of local common bean (*Lobia Negrabi*) was provided from market (Mandawi) and cultivated in the farm and the effect of animal manure was considered in different ways on growth, and yield of local bean variety. Irrigation was conducted according to the necessity of the plant under Yakawlang climatic conditions, weed control was another fact that was done in a traditional manner, no chemicals were applied. Several time weeds were controlled by hand, pulled from the root and put away from the field. All data was statistically analyzed by SAS. Checking differences among the means of all parameters were calculated by using Duncan.

3. Result

For evaluation of different doses of animal manure effects on the growth and yield of common bean, this research conducted in Yakawlang district. Various plant parameters including plant height, No. of branches, No. of leaves per plant, Dry weight per plant, No. of seeds per pod, No. of pods per plant and yield per plant was evaluated to explore the effects of applied fertilizer doses. So, this study described the results of those recorded parameters in details. For better interpretation of results, results will be explained under two portions (growth parameters & yield parameters). According to (Table 1) The effect of different doses of animal manure on growth attribute studied and showed different effects and results. Plant height, number of branches per plant and number of leaves per plant was significantly affected throw application of 10-ton animal manure¹ in compare with control. Application of

10-ton animal manure per hectare recorded the highest effect on height of plant, number of branches per plant and number of leaves per plant respectively (51 cm, 23.5 branches per plant and 58.6 leaves per plant).

Table 1: Plant height, no of branches and no of leaves.

Treatments	height of plant/cm	no of branches/plant	no of leaves / plant
T1 (Control)	30.6 c	10.7 c	35 d
T 2 (2 ton)	32.8 bc	11 c	37.9 c
T3(4 ton)	33.3 bc	13 bc	34.6 c
T4(6 ton)	34.6 b	13.4 bc	48.13 b
T5 (8 ton)	36 b	15 b	53 a
T6 (10 ton)	51 a	21.5 a	54 a
Cv	24.5	12.9	24

The effect of animal manure on yield components of common bean are showed on (Table 2), more number of pods per plant are produced in T6 where 10-ton animal manure has been applied (24.9 pods per plant).it was a significant effect on producing of number of pods per plant. lengths of pods are also significantly affected by applying 10-ton animal manure per hectare (8.6 cm). Number of seed per plant also significantly affected over control throw applying 10-ton animal manure per hectare (66 seed per plant.) 10-ton animal manure put significant effect on dry weight and yield of common bean respectively (95 and 112.8 g/plant).

Table 2: No of pod, length of pod, no of seed, dry weight and yield / plant (g).

Treatments	no of pod/plant	length of pods /plant	no of seeds/plant
(Control)	13.5 c	5 c	40.9 d
(2 ton)	12 c	5.2 bc	52 c
(4 ton)	16.9 b	6.5 b	52.7 cd
(6 ton)	17 b	7 b	54.5 c
(8 ton)	23.4 a	8 ab	62.3 b
(10 ton)	24.9 a	8.6 a	66 a
CV	28.4	26	20.7

3. Conclusion

In this research I focused to evaluate the effect of different doses of organic fertilizer (animal manure) on growth and yield attributes of common bean. As I result from the application of different doses of animal manure, it was found that treatment T1 (10-ton animal manure per hectare) put significant effect on most of the growth and yield attributes of common bean exactly on height of plant, number of branch per plant, number leaves per plant, number and length of pods per plant, number of seed per plant, dry weight and yield of common bean.

Author Contributions: All authors contributed to this research.

Funding: Not applicable.

Conflict of Interest: The authors declare no conflict of interest.

Informed Consent Statement/Ethics Approval: Not applicable.

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