Vol. 4 (2022) No.2
ISSN: 2655-3023

JERAMI
Indonesian Journal of Crop Science

Research Article

OPEN ACCESS

The Effect of Doses Quail Manure on The Growth and Yield of Shallot (*Allium ascalonicum* L.)

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Article Info

Received:
20 March 2022

Accepted:
28 April 2022

Published:
30 April 2022

Competing Interest:
The authors have declared that no competing interest exists.

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Abstract

Shallots are one of the vegetables that are often used in Indonesian cuisine. Cultivation of shallot require porous soil and good aeration and drainage, and contains organic matter. One of the organic materials that can be used is quail manure. so that it can improve the physical, chemical and biological properties of the soil to support the growth and development of shallots. Research on the effect of Quail Manure on the Growth and Yield of Shallots (Allium ascalonicum L.), has been carried out in Jorong Lima Ninik, X Koto Singkarak District, Solok Regency with an altitude of ± 400 m above sea level. This study aims to obtain the best dose of quail manure for the growth and yield of shallots. The method used was a Randomized Block Design (RAK) with 6 treatments, 4 groups. The treatment given was the dose of quail manure namely, as follows: P1=0 g/polybag, P2=30 g/polybag, P3=60 g/polybag, P4=90 g/polybag, P5=120 g/polybag, P6=150 g/polybag. The research data were analyzed for variance if the calculated F was greater than F table 5%, followed by Duncan's New Multiple Range Test (DNMRT) at a 5% significance level. Parameters observed were plant height (cm), number of leaves (strands), number of tubers (fruit), wet weight (g), dry weight (g). The results showed that the application of quail manure had a very significant effect on plant height, the number of leaves, wet weight, and dry weight of shallot bulbs. The best results were obtained from the P5 treatment (120 g/polybag) with a production of 78.25 g/plant.

Keywords: dose, fertilizer, quail manure, shallots

1. Introduction

Shallots (*Allium ascalonicum* L.) is one of the vegetable commodities that is often used by the community, both used as cooking spices and also used as medicinal ingredients. Shallots are a leading commodity in the Province of West Sumatra, whose prices and production are very volatile. According to BPS (2021), shallot production in West Sumatra has increased and decreased for the last 5 years. Efforts to increase the production of shallots have many determining factors, namely: improvement of farming methods, selection of superior seeds, fertilization, irrigation, and eradication of pests or diseases [1].

One of the efforts to achieve an increase in shallot production is the application of organic fertilizer. Organic fertilizer is an alternative application of agricultural technology that is sustainable and environmentally friendly [2]. Utilization of organic fertilizers, especially from animal manure such as poultry, namely quail droppings can be a solution in shallot cultivation techniques to improve soil physical and chemical properties, as well as add nutrients to the soil [3]. Quail manure contains high levels of protein and contains many macro and micronutrients. Microelements for onion plants such as Bo are needed, especially for the development of the size of the onion bulbs [4]. Quail manure contains very high C-organic, namely 17.61%, N 1.32%, P2O5 3.10%, K2O 1.24%, C/N 13 so that it can be used as organic fertilizer in fertilizing the soil [5,6,7].

Quail manure can cause environmental pollution because it smells more pungent than chicken manure or other poultry, The quail manure can be used as an excellent fertilizer for vegetable and ornamental plants [4]. Shallot is one of these vegetable crops is the onion plant. The use of organic quail manure can work as a granulator that can improve soil structure and texture. The organic C content in quail manure serves as a substance that can nourish the soil. Organic fertilizer from quail droppings can also help increase the growth of microorganism activity [6]. Quail manure also contains the element phosphate. According to Kusuma [5], phosphate elements play a role in cell division and also in the development of meristem tissue. Thus the phosphate element can stimulate the growth and roots of young plants. The Provision of quail manure helps the availability of phosphate in the soil. The Provision of quail manure fertilizer can also increase the availability of potassium nutrients according to Musnamar [8], potassium is one of the main elements needed by plants and greatly affects the level of plant production and is important in the synthesis of amino acids.

2. Materials and Methods

The research was carried out in Jorong Lima Ninik, X Koto Singkarak district, Solok Regency, which is located at an altitude of ± 400 m above sea level. Materials and tools used in this study included shallot seeds of Bima Brebes variety, quail manure fertilizer, pearl NPK fertilizer, hoe, sickle, bucket, meter, analytical scale, label paper, polybag size 35 x 40 cm. This study used a Randomized Block Design (RAK) with six treatments and four groups. Each experimental unit consists of 4 polybags, with a planting medium consisting of soil and quail manure in a ratio of 1:1. The treatments given were several doses of quail manure as follows: P1=0 g/polybag, P2=30 g/polybag, P3=60 g/polybag, P4 =90 g/polybag, P5=120 g/polybag, P6=150 g/polybag. Observations data were evaluated by analysis of variance followed by a further test of DNMRT at the 5% significant level. Observed parameters were the plant height, number of leaves, number of shallot bulbs, wet weight and dry weight of sahllot bulbs. Giving quail manure is done one week before planting. Pearl NPK fertilization was carried out at the age of 10 days after planting (HST) with a dose of 3 g/plant as a fertilizer to balance the growth of shallots.

Shallots are harvested after the plants are 70 days after planting with signs of yellowing and drying of 60-70% leaves. The stem is bent outward, the tuber is full (solid) and appears slightly above the ground, the skin color is shiny/reddish. Harvesting is done in sunny weather. The soil is dry and not wet. For harvesting tubers, it is done by pulling up to the roots, and after that leaving it on the surface of the polybag until all have been harvested.

3. Results and Discussion

A. Plant Heigh

The results of the analysis of variance showed that the application of several doses of quail manure showed very significant different effects. The average height of the shallot plants is presented in Table 1.

In Table 1, treatment P1 showed the lowest yield of 34.15 cm for plant height and was significantly different from other treatments. The addition of quail manure to the growing media at a dose of 30 - 150 g/polybag was able to increase plant height growth. This is caused by the addition of quail manure fertilizer to plants with different doses, the higher the added quail manure the better the growth of the plant, meaning that the nutrients and nutrients needed by the plant are sufficient, if the plant lacks the nutrients it needs, the plant will grow. dwarf [9].

Quail is poultry that feeds that comes from the factory and usually, the ration contains a lot of protein and minerals. According to Setyamidjaja [10] animals, fed rations that contain lots of protein and minerals will produce feces and urine which are also high in nitrogen and other minerals. Thus, if there is more nitrogen available than other elements, more protein can be produced and plants can grow well [11].

B. Number of Leaves

The results of the analysis of variance showed that the number of leaves of shallot plants with the application of several doses of quail manure showed a very significant

difference. The average number of leaves of the shallot plant is presented in Table 2.

In Table 2, treatment P1 shows the lowest number of leaves, which is 26.78 strands and, is very significantly different from other treatments. Meanwhile, the addition of quail manure can increase the number of scallions. Giving a dose of quail manure fertilizer into the soil will increase the content of essential nutrients, especially macronutrients N, P, and K. Nitrogen (N) is needed by plants in the vegetative phase in terms of the formation of plant tissues. According[11], that the main role of nitrogen for plants is to stimulate overall growth, especially stems, branches, and leaves. Wijaya [12] stated that plants with a sufficient supply of N will form broad and numerous leaves with high chlorophyll content so that plants can produce assimilate in sufficient quantities to support their vegetative growth. The nutrient that is needed by shallot plants is nitrogen which plays a role in increasing the number of leaves and the number of tiller[13].

C. Number of Shallot Bulbs

The results of the analysis of variance showed that the number of shallot bulbs with the application of several doses of quail manure showed no significant difference. The average number of shallot bulbs is presented in Table 3.

Table 3 shows a non-significant effect on the number of bulbs of shallot plants. The addition of quail droppings has not been able to increase the number of shallot bulbs produced. This is because the dose of fertilizer given has not been fully absorbed by the plant. In general, shallot plants will grow well in soils with high organic matter content [14]. Availability of nutrients in plants takes time and different amounts. One of the limiting factors for plant growth and development is the absorption of important nutrients [15].

D. Wet Weight and Dry Weight of Shallot Bulbs

The results of the analysis of variance showed that the wet weight and dry weight of shallots with the application of several doses of quail manure showed very significant different effects. The average wet weight and dry weight of shallots can be presented in Table 4.

In Table 4, the wet weight of shallots in treatment P1 shows the lowest yield of 59.87 g and is very significantly different from other treatments. While the highest wet weight in the P4 treatment was 114.12 g. The dry weight of shallot bulbs, treatments P1 and P2 showed the lowest yields, namely 39.31 g and 56.31 g, very significantly different from treatments P4, P5, and P6. Treatment P5 showed the highest yields of the dry weight of shallot bulbs, which was 78.25 g. high nutrient absorption causes the photosynthesis process to be high and this will increase growth and yield of plants [16].

The dry weight of the plant reflects the accumulation of organic compounds that have been successfully synthesized by plants from inorganic materials, especially water and carbon dioxide. The dry weight of the plant is the result of the efficiency of absorption and utilization of solar radiation available throughout the planting period by the plant canopy [17]. The dry weight of the plant is also influenced by the wet weight where the wet weight results show a very significant effect so that in the drying process there is also a decrease in the water content according to the wet weight of the plant.

4. Conclusions

From the results of the study it could be concluded that the application of quail manure had a very significant effect on plant height, the number of leaves, tuber wet weight, tuber dry weight. The best results were obtained in the P5 treatment, namely the provision of quail manure fertilizer at 120 g/polybag with a production of 78.25 g/polybag.

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Table 1. The average height of shallot plants with the provision of several doses of quail manure until the age of 8 weeks after planting.

Dose of quail manure (g/polybag)	The average height of plants (cm)
P1 = 0	34.15 a
P2 = 30	46.31 b
P3 = 60	45.21 b
P4 = 90	48.18 b
P5 = 120	44.58 b
P6 = 150	48.90 b
KK = 6,18 %	

The numbers in the columns and rows followed by the same lowercase letters were not significantly different according to the DNMRT follow-up test at the 5% level.

Table 2. The average number of leeks with the provision of several doses of quail manure until the age of 8 weeks after planting.

Dose of quail manure (g/polybag)	The average number of leeks (sheet)
P1 = 0	26.78 a
P2 = 30	31.96 b
P3 = 60	31.31 b
P4 = 90	34.65 b
P5 = 120	32.87 b
P6 = 150	34.40 b
KK = 7,92 %	

The numbers in the columns and rows followed by the same lowercase letters were not significantly different according to the DNMRT follow-up test at the 5% level.

Table 3. The average number of shallot bulbs with the provision of several doses of quail manure until the age of 8 weeks after planting.

Dose of quail manure (g/polybag)	Number of shallot bulbs
P1 = 0	9.43 tn
P2 = 30	9.00
P3 = 60	10.25
P4 = 90	10.31
P5 = 120	10.12
P6 = 150	9.12
KK = 15,70 %	

The numbers in the same column and row are not significantly different according to the F test at the 5% level

Table 4. The average wet weight and dry weight of shallots with the application of several doses of quail manure until the age of 8 weeks after planting.

Dose of quail manure (g/polybag	wet weight (g)	dry weight (g)
P1 = 0	59,87 a	39,31 a
P2 = 30	93,31 b	56,31 a
P3 = 60	101,93 b	67,18 a b
P4 = 90	114,12 b	70,93 b
P5 = 120	109,81 b	78,25 b
P6 = 150	111,06 b	64,43 b
KK = 12,87 %		*KK = 15,94 %*

The numbers in the columns and rows followed by the same lowercase letters were not significantly different according to the DNMRT follow-up test at the 5% level