Vol. 7 No. 2 March 2024
ISSN : 2597 - 8713 (ONLINE)
ISSN : 2598 - 5167 (PRINT)
AGRICULTURAL SCIENCE
Journal Of Agricultural Science And Agriculture Engineering
Faculty of Agriculture, Merdeka University Surabaya,Indonesia
Available on :
https://agriculturalscience.unmerbaya.ac.id/index.php/agriscience/index

The effect of solid manure dosage and cow biourine concentration on the growth and yield of shallot (Allium ascalonicum L.) Sembrani variety

Jhon Hardy Purba[1]*, Made Suarsana[1], Putu Sri Wahyuni[1], Ketut Mariasa[1]

[1]Faculty of Agriculture, Universitas Panji Sakti, Singaraja - Bali, Indonesia

*Corresponding author E-mail: jhonhardyp@gmail.com

Article History: Received: November 11, 2023; Accepted: January 20, 2024

ABSTRACT

The aim of this research was to determine the effect of cow manure and cow biourine on the growth and yield of shallots. This experiment used a factorial experiment with a Randomized Group Design (RAK). The treatment tried consisted of two factors, namely the first factor was the dose of solid manure (O) with 4 levels, namely O0: without manure (control), O1: dose of 5 tons.ha-1 (0.5 kg of solid manure.petak- 1), O2: dose 10 ton.ha-1 (1.0 kg solid manure.plot-1), O3: dose 15 ton.ha-1 (1.5 kg solid manure.plot-1). The second factor is the concentration of cow biourine (U) with 4 levels, namely U0: without cow biourine (control), U1: 10% concentration or 100 ml.l-1 cow biourine, U2: 20% concentration or 200 ml.l-1 cow biourine , and U3: 30% concentration or 300 ml.l-1 bovine biourine. Each combination treatment was repeated 3 times. The treatment dose of solid cow manure had a very significant effect on the wet weight of the crown per hill and the wet weight of the tubers per hill. A dose of solid manure of 10 tons.ha-1 gave the highest wet weight of tubers per hill, namely 146.30 g. The cow biourine concentration treatment had a very significant effect on the oven dry weight of the canopy per hill, the wet weight of the canopy per hill and the number of leaves per hill at the age of 56 days after planting, 42 days after planting. A cow biourine concentration of 20% or 200 ml.l-1 gave the highest wet weight of tubers per hill, namely 127.50. The interaction between solid manure dose and cow biourine concentration had no significant effect on all observed variables.

Keywords: solid manure; cow biourine; growth and yield; shallot

1. INTRODUCTION

Shallots (Allium ascalonicum L.) is an annual vegetable plant which is widely grown in areas with a height of 10 – 250 m above sea level (lowlands), slightly hot temperatures, dry climates and sunny weather, shallots can still be planted in the plains. high, although the results are not good, because the tubers are small and the harvest time is long, namely 80 – 90 days. Therefore, shallot cultivation is recommended to be planted in the lowlands (Purba et al., 2020).

The productivity that has been achieved to date is still low, namely around 5 tons.ha-1, while the potential yield of shallots can reach 20 tons.ha-1. The level of gross income of farmers from shallot farming varies greatly, because production costs, especially for purchasing seeds, are quite high and the use of labor is intensive. To overcome this, efforts are needed to improve the way plants are cultivated in the field (Tarigan et al., 2011).

DOI : https://doi.org/10.55173/agriscience.v7i2.125

Vol. 7 No. 2 March 2024
ISSN : 2597 - 8713 (ONLINE)
ISSN : 2598 - 5167 (PRINT)
AGRICULTURAL SCIENCE
Journal Of Agricultural Science And Agriculture Engineering
Faculty of Agriculture, Merdeka University Surabaya,Indonesia
Available on :
https://agriculturalscience.unmerbaya.ac.id/index.php/agriscience/index

Efforts that can be taken to increase the growth and yield of shallot plants include fertilization. The fertilizer generally given to shallot plants is organic fertilizer. Organic fertilizer derived from cattle plays a role, among other things, in adding nutrients to the soil, adding humus or soil organic matter, improving the life of soil microorganisms and increasing the soil's ability to hold water (Purba et al., 2019).

Providing manure to shallot plants can be done after the fertilizer has undergone proper decomposition or fermentation or has been stored for 2 – 3 months, at a dose of 10 – 15 tons.ha-1. Providing cow manure at a dose of 10 tons.ha-1, has the best effect on the growth and yield of shallot plants. This can be seen from the high weight of fresh tubers per hill, namely 52.35 g or an increase of 14.43% when compared to treatment without organic fertilizer, namely 45.75 g. (Firmansyah I, Liferdi, Khaririyatun N, 2015).

Apart from using solid organic fertilizer, to increase the growth and yield of shallot plants, you can also use liquid organic fertilizer, namely cow biourine. Cow biourine is a liquid organic fertilizer derived from cow urine which has previously gone through a fermentation process involving the role of microorganisms. Fermentation is the activity of microorganisms, both aerobic and anaerobic, which are capable of changing or transforming chemical compounds into organic substrates. Fermentation can occur due to the activity of microorganisms (Purba, Parmila, et al., 2018).

Currently, cow biourine is an alternative to increase the availability, adequacy and efficiency of nutrient uptake for plants that contain microorganisms, thereby reducing the use of inorganic fertilizers. The organic material content in biourine can improve the physical, chemical and biological properties of soil. Organic matter plays a role in soil fertility, namely in the process of rock weathering and the decomposition process of soil minerals, is a source of plant nutrients, forms stable nutrients, and has a direct effect on plant growth and roots. (Hardjowigeno, 2003; Siyum et al., 2022).

The application of cow biourine is different from solid organic fertilizer. Cow biourine is applied to plants after the plants grow, because during the growth and reproduction period plants need a lot of nutrition. The superiority of cow biourine as a source of nutrients for plants has been proven in field experiments. Several research results show that the use of cow biourine has a positive impact on plant growth and yield. The use of biourine with a dilution of 200 ml.l-1 or a concentration of 20% water on average gives better shallot yields, when compared with a dilution of 100 ml.l-1 or a concentration of 10% water and 300 ml.l-1 or a concentration of 30 % water.

DOI : https://doi.org/10.55173/agriscience.v7i2.125

Vol. 7 No. 2 March 2024
ISSN : 2597 - 8713 (ONLINE)
ISSN : 2598 - 5167 (PRINT)
AGRICULTURAL SCIENCE
Journal Of Agricultural Science And Agriculture Engineering
Faculty of Agriculture, Merdeka University Surabaya,Indonesia
Available on :
https://agriculturalscience.unmerbaya.ac.id/index.php/agriscience/index

Biourine treatment with a concentration of 200 ml.l-1 water had a very significant effect on the weight of shallot oven-dried tubers (Sanuwaliya & Murniati, 2020). The aim of the research was to determine the effect of solid manure dosage, cow biourine concentration, and the interaction of the two on the growth and yield of shallots.

2. RESEARCH METHOD

This experiment was carried out in Sangsit Village, Buleleng-Bali (85 m above sea level) from February to April 2020 during the rainy season. The materials used in this experiment were Sembrani variety shallot seeds, cow manure, cow biourine, straw. The tools used in this experiment were a hoe, measuring tape, measuring cup, handsprayer, digital scale, wood, bamboo, wire mesh, wire, knife, plastic bucket, labels, office stationery, camera.

This experiment used a factorial experiment with a Randomized Block Design. The treatment tried consisted of two factors, namely the first factor, dose of solid manure (O) with 4 levels, namely O0: without manure (control), O1: dose of 5 tons.ha-1 (0.5 kg of solid manure.petak- 1), O2: dose 10 ton.ha-1 (1.0 kg solid manure.plot-1), O3: dose 15 ton.ha-1 (1.5 kg solid manure.plot-1). The second factor is the concentration of cow biourine (U) with 4 levels, namely U0: without cow biourine (control), U1: 10% concentration or 100 ml.l-1 cow biourine, U2: 20% concentration or 200 ml.l-1 cow biourine , and U3: 30% concentration or 300 ml.l-1 bovine biourine. Each combination treatment was repeated 3 times, each treatment consisted of 10 plants, so there were 480 plants.

Data analysis

The data from this research were analyzed statistically according to the design used, namely the Randomized Block Design. If the treatments show significant differences, continue with the BNT test at the 5% level. If the interaction effect is very significant or significant, then proceed with the Duncan test at 5% level (Gomez & Gomez, 1984).

3. RESULTS AND DISCUSSION

Plat Height (cm)

Solid manure treatment had no significant effect ($p>0.05$) on plant height per hill at 28 days after, 42 days after, 56 days after (Figure 1). The growth of plant height per hill when applying solid manure at a dose of 10 ton.ha-1 (O2) at the age of 56 DAP obtained the highest

DOI : https://doi.org/10.55173/agriscience.v7i2.125

Vol. 7 No. 2 March 2024
ISSN : 2597 - 8713 (ONLINE)
ISSN : 2598 - 5167 (PRINT)
AGRICULTURAL SCIENCE
Journal Of Agricultural Science And Agriculture Engineering
Faculty of Agriculture, Merdeka University Surabaya,Indonesia
Available on :
https://agriculturalscience.unmerbaya.ac.id/index.php/agriscience/index

plant height per hill, namely 29.31 cm or significantly higher by 4.13%, compared to the plant height without solid manure (O0) obtained the lowest plant height, namely 28.10 cm (Figure 1).

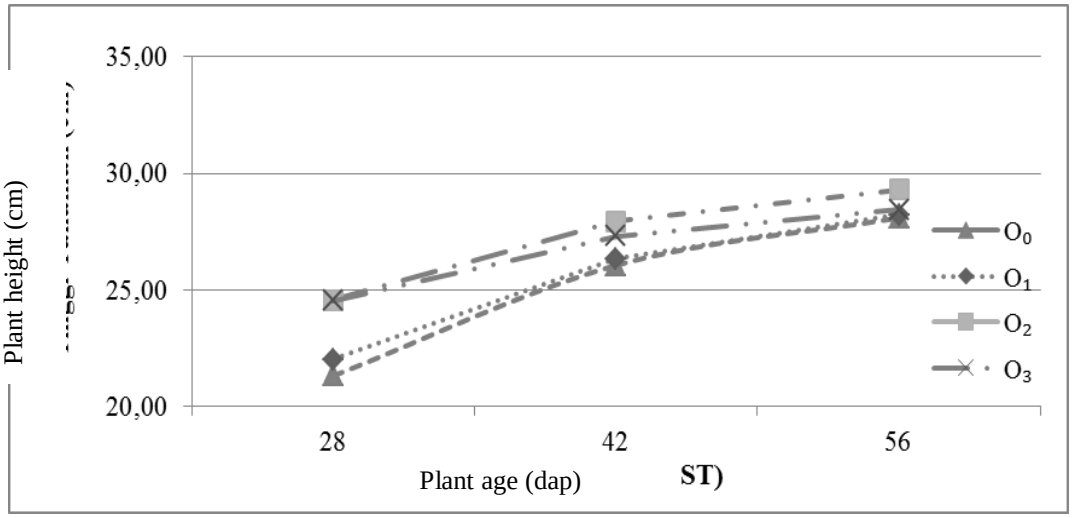

Figure 1. Graph of the effect of solid manure dosage on plant height growth.

Treatment with cow biourine concentration had no significant effect (p>0.05) on plant height at 28 days after planting, 42 days after planting, 56 days after planting (Table 2). The growth of plant height when given cow biourine with a concentration of 20% or 200 ml.l-1 (U2) at the age of 56 DAP obtained the highest plant height, namely 29.96 cm or significantly 7.61% higher, compared to plant height without giving biourine. cattle (U0) obtained the lowest plant height, namely 27.68 cm (Figure 2).

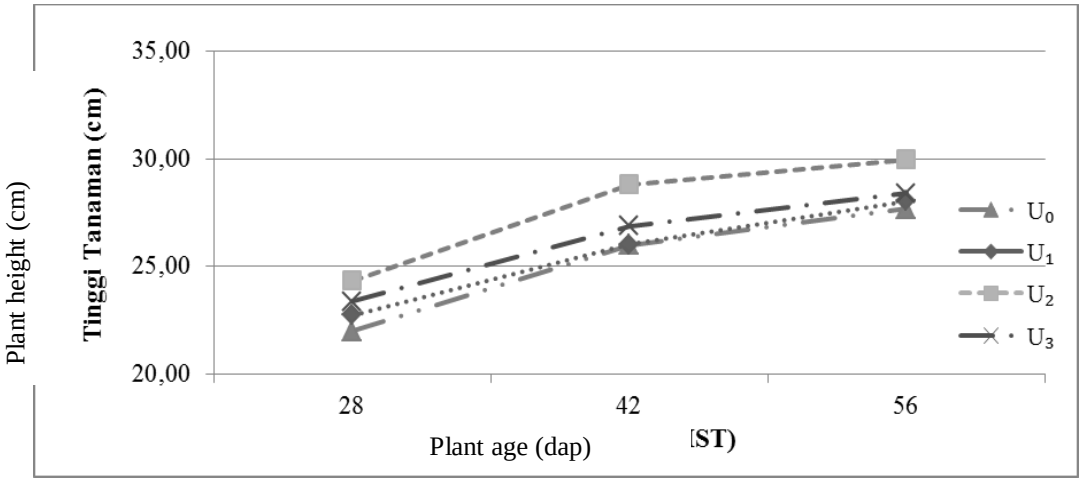

Figure 2. Graph of the effect of cow biourine on plant height growth.

DOI : https://doi.org/10.55173/agriscience.v7i2.125

Vol. 7 No. 2 March 2024
ISSN : 2597 - 8713 (ONLINE)
ISSN : 2598 - 5167 (PRINT)
AGRICULTURAL SCIENCE
Journal Of Agricultural Science And Agriculture Engineering
Faculty of Agriculture, Merdeka University Surabaya,Indonesia
Available on :
https://agriculturalscience.unmerbaya.ac.id/index.php/agriscience/index

Number of Leaves (pieces)

Table 1. Effect of Solid Manure Dosage Treatment and Cow Biourine Concentration on Leaf Number Growth

Treatment	Number of leaves (pieces)		
	28 dap	42 dap	56 dap
Solid manure dosage (O)			
Control (O0)	16.98	18.44a	21.80
5 ton.ha^{-1} (O1)	18.25	19.92ab	22.12
10 ton.ha^{-1} (O2)	20.55	22.67d	24.05
15 ton.ha^{-1} (O3)	18.66	20.87b	22.68
LSD 5%	Ns	2.53	ns
Cow biourine concentration (U)			
Control (U0)	16.59a	18.24a	20.60a
100 ml.l^{-1} (U1)	18.60ab	20.49ab	23,57b
200 ml.l^{-1} (U2)	20.95b	22.84b	24,47c
300 ml.l^{-1} (U3)	18.30ab	20.33ab	22.03ab
LSD 5%	2.84	2.53	1.88

Remarks: The same letter behind values of mean of treatment indicates no significant differences among the mean treatment based on The Least Significant Difference (LSD) at 5% level of probability and vice versa for different letter.

The solid manure treatment had a significant effect ($p<0.05$) on the number of leaves at the age of 42 dap and had no significant effect ($p>0.05$) at the ages of 28 dap and 56 dap (Table 1). The growth in the number of leaves when applying solid manure at a dose of 10 tons.ha-1 (O2) at the age of 56 days after planting resulted in the highest number of leaves, namely 24.05 pieces or significantly higher by 9.36%, compared to the number of leaves without giving solid manure (O0) obtained the lowest number of leaves, namely 21.80 pieces (Figure 3) and (Table 1).

DOI : https://doi.org/10.55173/agriscience.v7i2.125

Vol. 7 No. 2 March 2024
ISSN : 2597 - 8713 (ONLINE)
ISSN : 2598 - 5167 (PRINT)
AGRICULTURAL SCIENCE
Journal Of Agricultural Science And Agriculture Engineering
Faculty of Agriculture, Merdeka University Surabaya,Indonesia
Available on :
https://agriculturalscience.unmerbaya.ac.id/index.php/agriscience/index

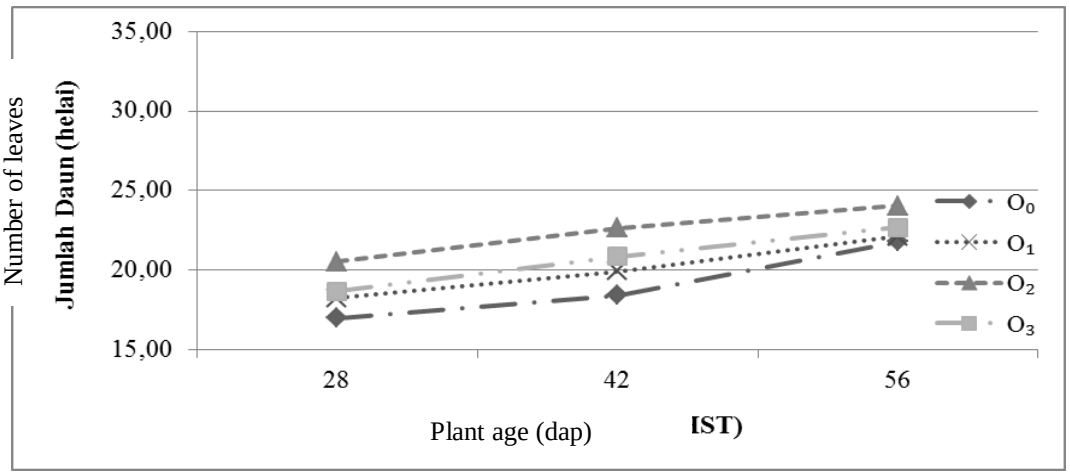

Figure 3. Graph of the effect of solid manure on the growth of the number of leaves.

The cow biourine concentration treatment had a very significant effect ($p<0.01$) on the number of leaves at the age of 42 dap, 56 dap and had a significant effect ($p<0.05$) on the number of leaves at the age of 28 dap (Table 1). Growth in the number of leaves when given cow biourine with a concentration of 20% or 200 ml.l-1 (U2) at the age of 56 days after the birth resulted in the highest number of leaves, namely 24.47 pieces or significantly higher by 15.82%, compared to the number of leaves without giving biourine. cows (U0) obtained the lowest number of leaves, namely 20.60 pieces (Figure 4) and (Table 1).

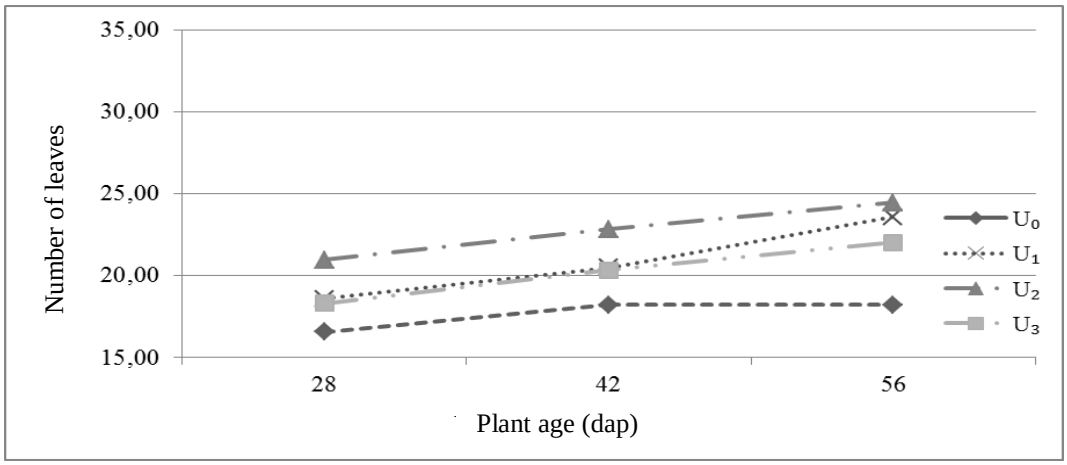

Figure 4. Graph of the influence of cow biourine on the growth of the number of leaves.

Leaf wet weight (g)

Solid manure treatment had no significant effect ($p>0.05$) on leaf wet weight (Table 2). The wet weight of leaves when applying solid manure at a dose of 10 tons.ha-1 (O2) obtained the highest wet leaf weight, namely 51.91 g or significantly 32.83% higher, compared to the wet

DOI : https://doi.org/10.55173/agriscience.v7i2.125

Vol. 7 No. 2 March 2024
ISSN : 2597 - 8713 (ONLINE)
ISSN : 2598 - 5167 (PRINT)
AGRICULTURAL SCIENCE
Journal Of Agricultural Science And Agriculture Engineering
Faculty of Agriculture, Merdeka University Surabaya,Indonesia
Available on :
https://agriculturalscience.unmerbaya.ac.id/index.php/agriscience/index

weight of leaves without giving solid manure (O0) obtained the lowest fresh leaf weight, namely 34.87 g (Table 2).

Treatment with cow biourine concentration had a significant effect ($p<0.05$) on leaf fresh weight (Table 2). The wet weight of leaves when giving cow biourine at a concentration of 20% or 200 ml.l-1 (U2) obtained the highest wet leaf weight, namely 55.87 g or significantly 49.54% higher compared to the wet weight of leaves without giving cow biourine (U0) which obtained the lowest wet leaf weight, namely 28.18 g (Table 2).

Table 2. Effect of Solid Manure Dosage Treatment and Cow Biourine Concentration on Leaf Wet Weight, Number of Tubers, Wet Weight of Tubers

Treatment	Leaves fresh weight (g)	Number of tuber (pcs)	Tuber fresh weight (g)
Solid manure dosage (O)			
Control (O0)	34.87	8.53a	79.19a
5 ton.ha^{-1} (O1)	37.92	10.36b	98.74b
10 ton.ha^{-1} (O2)	51.91	12.58c	146.30d
15 ton.ha^{-1} (O3)	43.93	10.79b	110.49c
LSD 5%	ns	2.38	29.59
Cow biourine concentration (U)			
Control (U0)	28.18a	9.19a	79.94a
100 ml.l^{-1} (U1)	42.00b	10.02ab	99.58b
200 ml.l^{-1} (U2)	55.87c	13.06b	127.50c
300 ml.l^{-1} (U3)	42.58b	13.06b	127.71c
LSD 5%	19.01	2,38	29.59

Remarks: The same letter behind values of mean of treatment indicates no significant differences among the mean treatment based on The Least Significant Difference (LSD) at 5% level of probability and vice versa for different letter.

Number of tubers (cloves)

Solid manure treatment had a significant effect ($p<0.05$) on the number of tubers (Table 2). The number of tubers when applying solid manure at a dose of 10 ton.ha-1 (O2) obtained the highest number of tubers, namely 12.58 cloves or significantly 32.19% higher, compared to the number of tubers without applying solid manure (O0), which obtained the highest number of tubers. the lowest tuber was 8.53 cloves (Table 2).

DOI : https://doi.org/10.55173/agriscience.v7i2.125

Vol. 7 No. 2 March 2024
ISSN : 2597 - 8713 (ONLINE)
ISSN : 2598 - 5167 (PRINT)
AGRICULTURAL SCIENCE
Journal Of Agricultural Science And Agriculture Engineering
Faculty of Agriculture, Merdeka University Surabaya,Indonesia
Available on :
https://agriculturalscience.unmerbaya.ac.id/index.php/agriscience/index

Treatment with cow biourine concentration had a significant effect ($p<0.05$) on the number of tubers (Table 2). The number of tubers when giving cow biourine with a concentration of 20% or 200 ml.l-1 (U2) obtained the highest number of tubers, namely 13.06 cloves or significantly higher by 29.63%, compared to the number of tubers without giving cow biourine (U0). the lowest number of tubers was 9.19 cloves (Table 2).

Tuber wet weight (g)

Solid manure treatment had a very significant effect ($p<0.01$) on the wet weight of tubers (Table 2). The wet weight of tubers when applying solid manure at a dose of 10 tons.ha-1 (O2) obtained the highest wet weight of tubers, namely 146.30 g or significantly 45.87% higher, compared to the wet weight of tubers without applying solid manure (O0) obtained the lowest tuber wet weight, namely 79.19 g (Table 2). The wet weight of tubers of 146.30 g when converted to hectares gets a yield of 48.72 tons.ha-1, while the wet weight of tubers of 79.19 g converted to hectares gets a yield of 26.37 tons.ha-1 (attachment 2).

Treatment with cow biourine concentration had a significant effect ($p<0.05$) on the wet weight of tubers (Table 2). The wet weight of tubers when given cow biourine with a concentration of 20% or 200 ml.l-1 (U2) obtained the highest wet weight of tubers, namely 127.50 g or significantly higher by 37.30%, compared to the wet weight of tubers without giving cow biourine (U0) obtained the lowest tuber wet weight, namely 79.94 g (Table 2).

Table 3. Effect of Solid Manure Dosage and Cow Biourine Concentration on Fresh Weight of Shoot, Oven Dry Weight of Leaves, Oven Dry Weight of Tubers, Oven Dry Weight of Shoot

Treatment	Fresh Weight of Shoot (g)	Oven Dry Weight of Leaves (pcs)	Oven Dry Weight of Tubers (g)	Oven Dry Weight of Shoot (g)
Solid manure dosage (O)				
Control (O0)	114.06a	23.03	57.40	80.43a
5 ton.ha^{-1} (O1)	136.67ab	24.57	69.98	94.55ab
10 ton.ha^{-1} (O2)	198.22c	30.86	83.14	114.01b
15 ton.ha^{-1} (O3)	154.42b	26.95	72.87	99.82ab
LSD 5%	29.18	Ns	Ns	20.29
Cow biourine concentration (U)				
Control (U0)	108.13a	22.02	55.02a	77.04a
100 ml.l^{-1}	141.58ab	25.04	67.71ab	92.79ab

DOI : https://doi.org/10.55173/agriscience.v7i2.125

Vol. 7 No. 2 March 2024
ISSN : 2597 - 8713 (ONLINE)
ISSN : 2598 - 5167 (PRINT)
Agricultural Science
AGRICULTURAL SCIENCE
Journal Of Agricultural Science And Agriculture Engineering
Faculty of Agriculture, Merdeka University Surabaya,Indonesia
Available on :
https://agriculturalscience.unmerbaya.ac.id/index.php/agriscience/index

Treatment	Fresh Weight of Shoot (g)	Oven Dry Weight of Leaves (pcs)	Oven Dry Weight of Tubers (g)	Oven Dry Weight of Shoot (g)
200 ml.l^{-1}	183.37b	33.52	82.72b	116.24b
300 ml.l^{-1}	170.28b	24.83	77.94ab	102.78b
LSD 5%	29.18	Ns	18.70	20.29

Remarks: The same letter behind values of mean of treatment indicates no significant differences among the mean treatment based on The Least Significant Difference (LSD) at 5% level of probability and vice versa for different letter.

Header wet weight (g)

The solid manure treatment had a very significant effect ($p<0.01$) on the wet weight of the canopy (Table 2). The wet weight of the canopy when applying solid manure at a dose of 10 ton.ha-1 (O2) obtained the highest wet weight of the canopy, namely 198.22 g or significantly 42.46% higher, compared to the wet weight of the canopy without applying solid manure (O0) obtained the lowest wet crown weight, namely 114.06 g (Table 3).

The cow biourine concentration treatment had a very significant effect ($p<0.01$) on the wet weight of the shoot (Table 2). The wet weight of the crown when giving cow biourine at a concentration of 20% or 200 ml.l-1 (U2) obtained the highest wet weight of the shoot, namely 183.37 g or significantly higher by 41.03%, compared to the wet weight of the shoot without giving cow biourine (U0) obtained the lowest wet canopy weight, namely 108.13 g (Table 3).

Oven dry weight of leaves (g)

Solid manure treatment had no significant effect ($p>0.05$) on leaf oven dry weight (Table 2). The oven dry weight of leaves when applying solid manure at a dose of 10 ton.ha-1 (O2) obtained the highest oven dry weight of leaves, namely 30.86 g or significantly higher by 25.37%, compared to the oven dry weight of leaves without manure application. solid (O0) obtained the lowest leaf oven dry weight, namely 23.03 g (Table 3).

The cow biourine concentration treatment had no significant effect ($p>0.05$) on the oven dry weight of the leaves (Table 2). The oven dry weight of leaves when given cow biourine with a concentration of 20% or 200 ml.l-1 (U2) obtained the highest oven dry weight of leaves, namely 33.52 g or significantly higher by 34.31%, compared to the oven dry weight of leaves without administration. Cow biourine (U0) obtained the lowest leaf oven dry weight, namely 22.02 g (Table 3).

DOI : https://doi.org/10.55173/agriscience.v7i2.125

Vol. 7 No. 2 March 2024
ISSN : 2597 - 8713 (ONLINE)
ISSN : 2598 - 5167 (PRINT)
AGRICULTURAL SCIENCE
Journal Of Agricultural Science And Agriculture Engineering
Faculty of Agriculture, Merdeka University Surabaya,Indonesia
Available on :
https://agriculturalscience.unmerbaya.ac.id/index.php/agriscience/index

Oven dry weight of tubers (g)

Solid manure treatment had no significant effect (p>0.05) on the oven dry weight of tubers (Table 2). The oven dry weight of tubers when applying solid manure at a dose of 10 ton.ha-1 (O2) obtained the highest oven dry weight of tubers, namely 83.14 g or significantly higher by 30.96%, compared to the oven dry weight of tubers without manure application. solid (O0) obtained the lowest tuber oven dry weight, namely 57.40 g (Table 3).

Treatment of cow biourine concentration had a significant effect (p<0.05) on the oven dry weight of tubers (Table 2). The oven dry weight of tubers when given cow biourine with a concentration of 20% or 200 ml.l-1 (U2) obtained the highest oven dry weight of tubers, namely 82.72 g or significantly higher by 33.49%, compared to the oven dry weight of tubers without administration. beef biourine (U0) obtained the lowest tuber oven dry weight, namely 55.02 g (Table 3).

Header oven dry weight (g)

Solid manure treatment had a significant effect (p<0.05) on the oven dry weight of the canopy (Table 2). The dry weight of the canopy oven when applying solid manure at a dose of 10 tons.ha-1 (O2) obtained the highest dry weight of the canopy oven, namely 114.01 g or significantly higher by 29.45%, compared to the dry weight of the canopy oven without manure application. solid (O0) obtained the lowest crown oven dry weight, namely 80.43 g (Table 3).

The cow biourine concentration treatment had a very significant effect (p<0.01) on the oven dry weight of the canopy (Table 2). The crown oven dry weight when giving cow biourine with a concentration of 20% or 200 ml.l-1 (U2) obtained the highest crown oven dry weight, namely 116.24 g or significantly higher by 33.72%, compared to the crown oven dry weight without giving it. Cow biourine (U0) obtained the lowest oven dry weight, namely 77.04 g (Table 3).

Treatment of solid manure on the growth and yield of shallots

The treatment dose of solid manure had a very significant effect (p<0.01) on the wet weight of the shoot and the wet weight of the tuber. The treatment dose of solid manure had a significant effect (p<0.05) on canopy dry weight, number of tubers, number of leaves at the age of 42 DAP and had no significant effect (p>0.05) on other variables.

Treatment of solid manure with a dose of 10 ton.ha-1 obtained the highest wet weight of tubers, namely 146.30 g or significantly higher by 45.87%, compared to the wet weight of tubers without solid manure, which obtained the lowest wet weight of tubers, namely 79 .19 g. The wet

DOI : https://doi.org/10.55173/agriscience.v7i2.125

Vol. 7 No. 2 March 2024
ISSN : 2597 - 8713 (ONLINE)
ISSN : 2598 - 5167 (PRINT)
AGRICULTURAL SCIENCE
Journal Of Agricultural Science And Agriculture Engineering
Faculty of Agriculture, Merdeka University Surabaya,Indonesia
Available on :
https://agriculturalscience.unmerbaya.ac.id/index.php/agriscience/index

weight of tubers of 146.30 g when converted to hectares gets a yield of 48.72 tonnes.ha-1, while the wet weight of tubers of 79.19 g converted to hectares gets a yield of 26.37 tonnes.ha-1.

The high yield obtained from solid manure treatment with a dose of 10 tons.ha-1 on the wet weight of tubers, is in line with the high yield obtained on the highest oven dry weight, namely 114.01 g or significantly higher by 29.45%, compared to without applying solid manure, the oven dry weight was 80.43 g. This is because the dose of 10 ton.ha-1 is optimal for the growth of shallot leaves and bulbs so that metabolic processes run optimally, especially photosynthesis. According to Bukit (2008), sufficient and balanced nutrients available to plants cause plant physiological activity to increase, especially photosynthesis. In this case, the higher the photosynthesis, the higher the starch content that is translocated to the food storage tissue, namely tubers.

The high vegetative and generative results obtained in the solid manure treatment are due to the fact that the application of solid manure can improve the physical, chemical and biological properties of the soil, so that the availability of nutrients for plants is within sufficient limits. Basically, the types and amounts of nutrients available in the soil must be sufficient and balanced so that the expected level of plant production is achieved. Plants' need for fertilizer is determined by climatic conditions, plant age and the type of fertilizer used. Basically there are two types of fertilizer that are commonly used, namely inorganic fertilizer and organic fertilizer (Musli, 2022).

The increase in tuber wet dry weight and crown oven dry weight indicates a positive relationship to nutrient availability due to the application of cow manure. If macro nutrients in the soil increase, the amount that can be absorbed by plants also increases, accompanied by the formation of organic compounds in plant tissue. Apart from that, the volume of photosynthate that plants can produce is not only determined by the absorption of sunlight, but also by the level of availability of raw materials in riboson which is obtained through the absorption of nutrients in the soil. Improvements in nutrient absorption are also influenced by improvements in soil pH (Lakitan, 2007; Nurdin et al., 2023).

Besides solid manure, it is an organic material that can improve the physical, chemical and biological properties of soil. Solid manure is also a source of energy for soil microorganisms. Cow manure can increase the water and nutrient holding capacity of the soil and soil biology, including increasing the water and nutrient holding capacity of the soil, increasing the cation exchange capacity of the soil, stabilizing the soil structure, improving soil drainage and adding macro and micro nutrients. (Lingga & Marsono, 2013).

DOI : https://doi.org/10.55173/agriscience.v7i2.125

Vol. 7 No. 2 March 2024
ISSN : 2597 - 8713 (ONLINE)
ISSN : 2598 - 5167 (PRINT)
AGRICULTURAL SCIENCE
Journal Of Agricultural Science And Agriculture Engineering
Faculty of Agriculture, Merdeka University Surabaya,Indonesia
Available on :
https://agriculturalscience.unmerbaya.ac.id/index.php/agriscience/index

Cow biourine treatment on the growth and yield of shallots

The cow biourine concentration treatment had a very significant effect ($p<0.01$) on the oven dry weight of the shoot, the fresh weight of the shoot and the number of leaves at the age of 56 DAP, 42 DAP. Treatment with cow biourine concentration had a significant effect ($p<0.05$) on dry weight of tubers, wet weight of tubers, number of tubers, wet weight of leaves, number of leaves aged 28 days after planting, and had no significant effect ($p>0.05$) on other variables. .

Treatment with cow biourine with a concentration of 20% or 200 ml.l-1 obtained the heaviest tuber oven dry weight, namely 82.72 g or significantly 33.49% higher, compared to the tuber oven dry weight without cow biourine treatment, which obtained an oven dry weight. the lowest tuber was 55.02 g. Likewise, the wet weight of tubers when given cow biourine with a concentration of 20% or 200 ml.l-1 resulted in a wet weight of tubers of 127.50 g or significantly higher by 37.30%, compared to the wet weight of tubers without giving cow biourine which gained weight the lowest tuber wetness was 79.94 g.

The high yield of oven dry weight of tubers and wet weight of tubers obtained in the treatment of cow biourine with a concentration of 20% or 200 ml.l-1, was supported by the high yield of the highest oven dry weight of tubers, namely 116.24 g or significantly higher by 33.72%. , compared with the crown oven dry weight without giving cow biourine, which obtained the lowest crown oven dry weight, namely 77.04 g.

The high results obtained from cow biourine treatment with a concentration of 20% or 200 ml.l-1 on the variables of tuber oven dry weight, tuber wet weight and shoot oven dry weight, this is because cow biorine contains nutrients and enzymes needed by plants. to grow, because cow urine and feces which are the main ingredients in making biourine contain nutrients. The nutrients contained in making biourine must undergo a fermentation process first so that they can be optimally absorbed by plants. Biourine contains the elements N, P, K which can affect plant yields. The high N content will stimulate the growth of seedlings so that you will get a harvest with a larger number of tubers, because the tillers affect the number of tubers. Growth is also assisted by the element phosphorus which can be absorbed in the form of H2PO4. In sufficient amounts, phosphorus can help root growth. Phosphorus is also known to increase the size of bulbs and the yield of shallot plants (Rahayu et al., 2022; Setyaningsih, 2022; Sudaryono, 2017).

Giving cow biourine provides quite high K-availability, this is possible because biourine contains microorganisms that break down organic matter which is a biological activator that can break down compost fertilizer. Potassium is a nutrient that influences most biochemical and

DOI : https://doi.org/10.55173/agriscience.v7i2.125

Vol. 7 No. 2 March 2024
ISSN : 2597 - 8713 (ONLINE)
ISSN : 2598 - 5167 (PRINT)
AGRICULTURAL SCIENCE
Journal Of Agricultural Science And Agriculture Engineering
Faculty of Agriculture, Merdeka University Surabaya,Indonesia
Available on :
https://agriculturalscience.unmerbaya.ac.id/index.php/agriscience/index

physiological processes and influences plant growth and metabolism. So if there is a lack of potassium in shallot plants, it will inhibit leaf growth so that the photosynthesis process will also be hampered and result in the resulting bulbs being small. (Purba, Wahyuni, et al., 2018; Srilaba et al., 2018;Purba, 2014).

The interaction between solid manure dose and cow biourine concentration had no significant effect ($p>0.05$) on all observed variables. The interaction effect is not significant, it could possibly be caused by the influence of external and internal factors at the time the research was carried out as follows 1) External factors such as the weather at the time of the research were uncertain, then sunlight had a big influence on photosynthesis which hampered the growth of the shallot plant leaves; 2) The internal factor is solid manure and cow biourine, both of which are organic materials. The working process of manure is slow, the nitrogen content in it is released slowly, so it is very difficult for it to interact.

4. CONCLUSIONS

The treatment dose of solid cow manure had a very significant effect on the wet weight of the crown per hill and the wet weight of the tubers per hill. A dose of solid manure of 10 tons.ha-1 gave the highest wet weight of tubers per hill, namely 146.30 g. The cow biourine concentration treatment had a very significant effect on the oven dry weight of the canopy per hill, the wet weight of the canopy per hill and the number of leaves per hill at the age of 56 days after planting, 42 days after planting. A cow biourine concentration of 20% or 200 ml.l-1 gave the highest wet weight of tubers per hill, namely 127.50. The interaction between solid manure dose and cow biourine concentration had no significant effect on all observed variables.

REFERENCES

Firmansyah I, Liferdi, Kharitiyatun N, et al. (2015). Pupuk Organik & Pupuk Hayati. *Pertumbuhan Dan Hasil Bawang Merah Dengan Aplikasi Pupuk Organik Dan Pupuk Hayati Pada Tanah Alluvial*, *25*(2), 133–141.

Gomez, K. A., & Gomez, A. A. (1984). *Statistical procedures for agricultural research. 2nd edn.* International Rice Research Institute, College, Laguna.

Hardjowigeno, S. (2003). *Klasifikasi Tanah dan Pedogenesis*. Akademika Pressindo.

Lakitan, B. (2007). *Fisiologi Pertumbuhan dan Perkembangan Tanaman*. Raja Grafindo Persada.

Lingga, P., & Marsono. (2013). *Petunjuk Penggunaan Pupuk. Penebar Swadaya. Jakarta*, *160*. Penebar Swadaya.

DOI : https://doi.org/10.55173/agriscience.v7i2.125

ISSN : 2597 - 8713 (ONLINE)
ISSN : 2598 - 5167 (PRINT)
AGRICULTURAL SCIENCE
Journal Of Agricultural Science And Agriculture Engineering
Faculty of Agriculture, Merdeka University Surabaya,Indonesia
Available on :
https://agriculturalscience.unmerbaya.ac.id/index.php/agriscience/index

Musli, A. (2022). *Pengaruh Konsentrasi Pupuk Organik Cair Orrin Dan Dosis Pupuk Kandang Ayam Terhadap Pertumbuhan Tanaman Wortel (Daucus carota L.)*. Universitas Mataram.

Nurdin, M. Y., Usnawiyah, U., Erliza, S., Fridayanti, N., & Lukman, L. (2023). Karakter Fisiologi, Hasil dan Kualitas Beberapa Varietas Tanaman Jagung Manis (Zea mays saccharata Sturt L.) Akibat Perlakuan Salinitas. *Jurnal Ilmiah Mahasiswa Agroekoteknologi*, *2*(2), 41–44.

Purba, J. H., Parmila, I. P., & Sari, K. K. (2018). Pengaruh Pupuk Kandang Sapi dan Jarak Tanam Terhadap Pertumbuhan dan Hasil Kedelai (Glycine max L. Merrill) Varietas Edamame. *Agro Bali: Agricultural Journal*, *1*(2), 69–81. https://doi.org/10.37637/ab.v1i2.308

Purba, J. H., Wahyuni, P. S., & Febryan, I. (2019). Kajian Pemberian Pupuk Kandang Ayam Pedaging dan Pupuk Hayati terhadap Pertumbuhan dan Hasil Petsai (Brassica chinensis L.). *Agro Bali: Agricultural Journal*, *2*(2), 77–88. https://doi.org/10.37637/ab.v2i2.397

Purba, J. H., Wahyuni, P. S., & Suarnaya, I. G. (2018). Pengaruh Posisi Buku Sumber Mata Tempel dan Konsentrasi Atonik terhadap Pertumbuhan Bibit Okulasi Jeruk (Citrus Sp.) Varietas Keprok Tejakula. *Agro Bali: Agricultural Journal*, *1*(1), 1–10.

Purba, J. H., Wahyuni, P. S., Zulkarnaen, Z., Sasmita, N., Yuniti, I. G. A. D., & Pandawani, M. P. (2020). Growth and yield response of shallot (Allium ascalonicum L. var. Tuktuk) from different source materials applied with liquid biofertilizers. *Nusantara Bioscience*, *12*(2), 127–133. https://doi.org/10.13057/nusbiosci/n120207

Rahayu, S., Irianti, A. T. P., & Oktarianti, S. (2022). Efektivitas Pemupukan NPK dan Supernasa pada Budidaya Tanaman Bawang Merah (Allium ascalonicum L.). *Teknotan: Jurnal Industri Teknologi Pertanian*, *16*(2), 75–78.

Sanuwaliya, S., & Murniati, M. (2020). Pengaruh Pemberian Biourin Sapi Dan Pupuk Npk Terhadap Pertumbuhan Dan Produksi Bawang Merah (Allium ascalonicum L.). *Jurnal Agroteknologi Tropika*, *9*(1), 11–19.

Setyaningsih, A. (2022). *Respon Pertumbuhan Dan Produksi Tanaman Bawang Merah (Allium ascalonicum L.) yang Diberi Beberapa Jenis Pupuk Organik Cair*. UIN SULTAN SYARIF KASIM RIAU.

Siyum, N., Getu, D., Purba, J. H., & Bahta, M. (2022). Enhancing Faba Bean Production through Promoting Integrated Faba Bean Gall Management Practices in Eastern Amhara Region of Ethiopia. *Agro Bali : Agricultural Journal*, *5*(2), 369–375. https://doi.org/10.37637/ab.v5i2.898

Srilaba, N., Purba, J. H., Dewi, I., Ayu, I., Utami, S., Fakultas, A., Universitas, P., Sakti, P., & Dewi, I. (2018). Pengaruh Pengupasan Kulit Biji dan Pemberian Atonik terhadap Perkecambahan Benih Tanaman Badung (Garcinia dulcis (Roxb.) Kurz.). *Agro Bali: Agricultural Journal*, *1*(1), 59–68. https://scholar.google.com/citations?view_op=view_citation&hl=en&user=a56xZ28AAAAJ&pagesize=100&citation_for_view=a56xZ28AAAAJ:_FxGoFyzp5QC

DOI : https://doi.org/10.55173/agriscience.v7i2.125

ISSN : 2597 - 8713 (ONLINE)
ISSN : 2598 - 5167 (PRINT)
AGRICULTURAL SCIENCE
Journal Of Agricultural Science And Agriculture Engineering
Faculty of Agriculture, Merdeka University Surabaya,Indonesia
Available on :
https://agriculturalscience.unmerbaya.ac.id/index.php/agriscience/index

Sudaryono, T. (2017). Respon Tanaman Bawang Merah terhadap Pemupukan Boron. *AGRIKA: Jurnal Ilmu-Ilmu Pertanian*. http://publishing-widyagama.ac.id/ejournal-v2/index.php/agrika/article/view/485

Tarigan, W., Lubis, Z., & Zein. (2011). Analisis Permintaan dan Penawaran Beras di Provinsi Sumatera Utara. *Jurnal Agrica*, *14*(1), 18–30. https://doi.org/10.31289/agrica.v14i1.4759

DOI : https://doi.org/10.55173/agriscience.v7i2.125