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Effect of Dolomite Dosage and Chicken Manure on the Growth and Yield of Red Onions (Allium ascanolicum L.)

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Abstract

Shallots (Allium ascalonicum L.) are a vital horticultural commodity in Indonesia, with demand increasing alongside population growth. The aim of this research was to determine the effect of giving dolomite on the growth and yield of shallots (Allium ascalonicum L.), to determine the effect of giving chicken manure on the growth and yield of shallots (Allium ascalonicum L.), to determine the effect of the interaction between doses of dolomite and chicken manure which had the best effect on the growth and yield of shallots (Allium ascalonicum L.). This study, conducted from August 17 to October 20, 2023, in Bangsalan Village, Teras District, Boyolali Regency, Central Java, at an altitude of 227 meters above sea level, employed a factorial Complete Randomized Block Design (RAKL) with three replications. Two factors were examined: the first was dolomite application (D) at three levels—D0 (no dolomite), D1 (5 tons/ha), and D2 (10 tons/ha); the second was chicken manure application (F) at four levels—F0 (no chicken manure), F1 (5 tons/ha), F2 (10 tons/ha), and F3 (15 tons/ha). The results indicated that dolomite significantly influenced shallot growth and yield, particularly affecting bulb diameter, bulb count per plant, fresh bulb weight per plant, and dry bulb weight per plant and plot. It also significantly impacted bulb count per plot. Chicken manure notably influenced dry bulb weight per plot and significantly affected plant height, dry stalk weight per plant, bulb diameter, fresh bulb weight per plant, and dry bulb weight per plant. The interaction between dolomite and chicken manure significantly impacted fresh stalk weight per plant, dry bulb weight per plant and plot, bulb diameter, and bulb count. The highest yield was observed in the D2F3 combination, with a dry bulb weight per plot of 1441.10 grams (25.60 tons/ha), while the lowest yield was in the D0F0 combination, at 1151.10 grams (20.46 tons/ha). The use of dolomite and chicken manure singly or in combination has a positive impact on the growth and yield of tubers, so it can be concluded that administering these two types of ameliorant simultaneously is more effective in increasing plant productivity than single treatment. It is recommended that the combination of dolomite and chicken manure be applied optimally in shallot cultivation to increase yields and quality of bulbs. Its use needs to be adjusted to soil conditions and plant needs to support better growth and productivity.

Keywords: chicken manure, dolomite dosage, shallot growth, shallot yield, shallots

Introduction

Shallots (*Allium ascalonicum* L.) are a horticultural commodity that plays a very important role in meeting the needs of the community. Shallots (*Allium ascalonicum* L.) are a horticultural commodity that plays a very important role in meeting the needs of the

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community. The plants whose bulbs are used are used as kitchen spices and medicine. The need for shallots continues to increase along with the increasing population of Indonesia. Developing shallot production and increasing productivity in production centers is important considering the increasing consumer demand along with population growth and increasing purchasing power. Based on data from the National Food Agency (Bapanas), the need for shallots for household consumption in Indonesia in 2023 is 797.3 thousand tons. This number has decreased by 4.4% compared to 2022. However, when compared to the previous five years, this figure is still slightly higher. For national shallot production in 2023, it is estimated to reach 2.14 million tons. This amount has increased by 8.15% or equivalent to 161.62 thousand tons compared to 2022. With a production of 2.14 million tons, after deducting the amount that is left over, use for seeds, food and beverage needs, industrial raw materials, and direct consumption, and taking into account imports and exports, there will be a surplus of around 844.46 thousand tons (Pertanian, 2023).

Increasing the efficiency of shallots must also be supported by the quality of the seeds used, because the growth and yield of shallots are not stopped by the bulbs used as seeds. Differences in seed size may make a difference in the initial growth of the plant, large seeds certainly have more food reserves, so that sufficient energy is available for better growth, but on the other hand, this will affect how much production costs will be incurred to secure the seeds (Armaini *et al.*, 2021).

According to data from the Ministry of Agriculture (2019), Indonesia ranks third as a country importing shallots in the ASEAN region, with an average import of 89 thousand tons per year. In the 2017-2018 period, Thailand was the main supplier with the highest import volume, reaching 28.06%, and an average price of 631 USD per ton. The high demand for shallots, which have great economic value, has driven increased consumption. In 2023, shallot production in Indonesia is estimated to reach 2.14 million tons, an increase of around 8.15% compared to the previous year. This increase in production was supported by an increase in harvested area of 7.88% to 199.57 thousand hectares, as well as an increase in productivity of 0.22% to 10.74 tons per hectare. However, in some areas, there has been a decrease in the area of shallot land. For example, in Brebes Regency, which is one of the largest centers of shallot production in Indonesia, the planting area and harvested area have decreased due to the impact of climate change and long droughts. In 2023, the planted area was recorded at 26,331 hectares with a harvested area of 24,182 hectares, a decrease compared to the previous year which had a planted area of 30,757 hectares and a harvested area of 32,571 hectares (Palupi & Widyasunu, 2022).

Lime and manure are given to plants to help their growth by making them taller and having more branches. The experimental soil used is ultisol which has a low pH and low natural material content. The provision of dolomite will increase the soil pH to neutral so that it will increase the availability of nutrients needed by plants, especially phosphorus. Phosphorus is an important component in the cell metabolism cycle. The availability of phosphorus will affect the consumption of other large and small scale basic supplements. Manure plays a role in increasing the natural material content of the soil, increasing the nitrogen content, and then developing the soil structure so that the soil becomes more fertile (Buhaira & Akmal, 2019).

Manure has advantages compared to inorganic compost. The advantage of organic compost is that it is less harmful to the ecosystem and safe when applied to the soil. Chemical residues that can harm the soil ecosystem, including soil organisms,

groundwater, air, and their impact on humans, are not found in organic fertilizers. Compost is one of the natural fertilizers that can be used by farmers. Compost is manure that comes from various types of animal waste that contains various nutrients for plants, both small-scale and full-scale supplements. Fertilizers that can be used by farmers are cow compost, chicken manure, pig manure, goat compost and various types of manure (Baka *et al.*, 2020).

Compost from chicken manure has superior quality when compared to regular manure and artificial compost. This advantage is seen from its ability to increase the humus content which is rich in natural ingredients important for plants, provide complete nutrients on a large and small scale, and help increase water retention in the soil so that plant roots can absorb water and nutrients more efficiently. In addition, chicken compost contains active microorganisms that are able to decompose natural ingredients in the soil into useful humus, while improving the physical structure of the soil to support long-term fertility. In addition, the availability of chicken compost is very abundant thanks to the large amount of waste from the chicken farming industry which continues to grow, especially for meat and egg production. Chicken manure is also an ideal material to be processed into natural fertilizer that supports sustainable agricultural practices (Ifadah *et al.*, 2021).

Although shallot production in Indonesia continues to increase, there are still challenges in maintaining productivity in various regions, especially due to climate change, limited land, and low soil fertility as in Brebes Regency. Ultisol soil with low pH and minimal organic matter content is one of the main obstacles in shallot cultivation, so efforts are needed to improve soil quality by providing dolomite and chicken manure. Dolomite plays a role in increasing soil pH and phosphorus availability, while chicken manure can increase organic matter content and soil fertility. However, further research is still needed on the effectiveness of the combination of dolomite and chicken manure in increasing the growth and yield of shallots optimally. Therefore, this study aims to evaluate the effect of dolomite and chicken manure on the growth and yield of shallots, as well as to determine the best combination that can increase plant productivity in ultisol soil.

Method

Place and Time of Research

This research was conducted from August 17 to October 20, 2023 in Bangsalan Village, Teras District, Boyolali Regency, Central Java at an altitude of 227 m above sea level, with Regosol (sub-entisol) soil type.

Research Materials and Tools

The materials used in the study were shallot seeds, chicken manure, dolomite, NPK, SP-36 fertilizer, ZA, pesticides, fungicides. The tools used in this study were hoes, watering cans, mulch, buckets, meters, raffia ropes, knives, bamboo/stakes, stationery, plastic, documentation tools, calculators, digital scales, sample plant plates, title boards, treatment boards.

Research Methods

This study used a factorial method with a basic design. Completely Randomized Block Design (RAKL) with 3 replications and consisting of 2 factors as follows: The first factor, the dose of dolomite (D) consisting of 3 levels, namely: D_0 (without dolomite), D_1 (Dolomite 5 tons/ha), D_2 (Dolomite 10 tons/ha). The second factor, the dose of Chicken

Manure (F) consisting of 4 levels, as follows: F0 (Without chicken manure), F_1 (Chicken manure 5 tons/ha), F_2 (Chicken manure 10 tons/ha), F_3 (chicken manure 15 tons/ha).

Research Implementation

The implementation of this research began with land preparation, namely hoeing the Regosol soil, making a 45 cm x 100 cm plot, and clearing weeds. Fertilization was carried out by administering NPK, SP-36, ZA, chicken manure, and dolomite according to the treatment dose. The shallot seeds used were 80 HST old, healthy, and had been cut into pieces to stimulate tuna growth. Before planting, plastic mulch was installed to maintain humidity, then the seeds were planted with a distance of 15 cm x 20 cm. Irrigation was carried out according to soil conditions through a ditch irrigation system. Weed control was carried out manually, while pests were controlled with insecticides containing the active ingredient Emamectin Benzoate 30 g / l and mechanically. Diseases were prevented with fungicides containing the active ingredient Dimethomorph. Harvesting was carried out at the age of 60 HST when the leaves turned yellow, fell, and some of the bulbs appeared on the surface of the soil.

Research Parameters

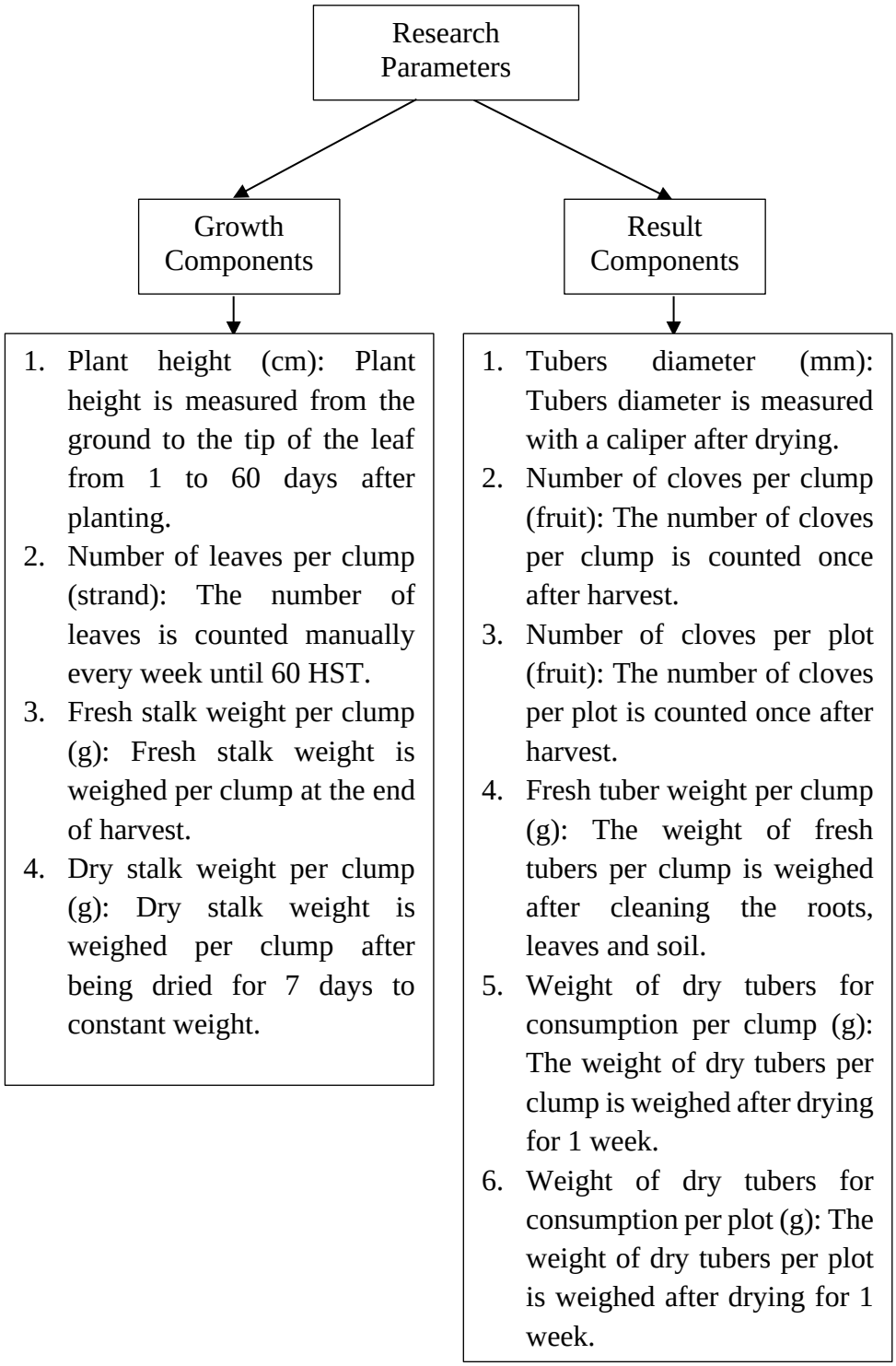

Figure 1. Research Parameters

Data Analysis

The research data were obtained from the results of observations using diversity analysis with levels of 5% and 1%. If it is significantly different or very significantly

different, it is continued with the Duncan's Multiple Range Test (DMRT) to distinguish the treatment levels.

RESULT AND DISCUSSION

Summary of Variance of Red Onion (*Allium ascalonicum* L.)

To determine the effect of real, very real, and not real in the treatment of Dolomite dose and chicken manure on the growth and yield of shallot plants (*Allium ascalonicum* L.). This was done by analysing the observation data using ANOVA (Analysis of Variance) or variance prints whose results are shown in the summary of variance prints Table 1.

Table 1. Summary of Variance

No	Observation Parameters	Dolomite	Chicken Manure	Combination DF	Value	
					Highest	Lowest
1	Plant Height (cm)	ns	*	ns	31,37 (D_2F_2)	27,77 (D_2F_0)
2	Number of leaves (blade)	ns	ns	ns	30,60 (D_2F_1)	26,53 (D_2F_0)
3	Fresh Stalk Weight Per Clump (g)	ns	ns	**	16,13 (D_2F_3)	10,20 (D_0F_0)
4	Dry Stalk Weight Per Clump (g)	ns	*	ns	4,60 (D_2F_3)	2,13 (D_0F_0)
5	Tubers Diameter (mm)	**	*	*	32,36 (D_2F_3)	28,06 (D_0F_0)
6	Number of Cloves Per Clump (fruit)	**	ns	*	5,80 (D_2F_3)	4,07 (D_0F_0)
7	Number of Cloves Per Plot (fruit)	*	ns	*	68,67 (D_2F3)	61,33 (D_0F_0)
8	Fresh Tuber Weight Per Clump (g)	**	*	ns	115,87 (D_2F_3)	94,13 (D_0F_0)
9	Weight of Dry Tubers for Consumption Per Clump (g)	**	*	**	99,20 (D_2F_3)	79,80 (D_0F_0)
10	Weight of Dry Tubers for Consumption Per Plot (g)	**	**	**	1441,10 (D_2F_2)	1151,10 (D_0F_0)

Description :
D : Dolomite
F : Chicken Manure
DxF : Treatment Combination
ns : no significant effect
* : significant effect
** : very significant effect

From the summary of variance in Table 1 shows that dolomite treatment has a very significant effect on the parameters of tuber diameter, number of tubers per plant, weight

of fresh tubers per plant, weight of consumed dry tubers and weight of consumed dry tubers per plot. Dolomite treatment had a significant effect on the parameter of the number of tubers per plot and dolomite treatment had no significant effect on the parameters of plant height, number of leaves, fresh stover per plant, dry stover per plant.

The treatment of chicken manure had a very significant effect on the parameters of dry consumption tuber weight per plot. The treatment of chicken manure had a significant effect on the parameters of plant height, dry stover per plant, tuber diameter, fresh tuber weight per plant, dry consumption tuber weight. Chicken manure treatment did not significantly affect the parameters of number of leaves, fresh stover per plant, number of tubers per plant, number of tubers per plot.

The combination of dolomite and chicken manure treatment had a very significant effect on the parameters of fresh stover per plant, weight of dry bulbs consumed and weight of dry bulbs consumed per plot. The combination of dolomite and chicken manure treatment had a significant effect on the parameters of tuber diameter, number of tubers per plant, number of tubers per plot. The combination of dolomite and chicken manure treatment did not significantly affect the parameters of plant height, number of leaves, dry stover per plant, fresh tuber weight per plant.

The combination of dolomite treatment and chicken manure produces a strong synergy in improving soil quality and supporting plant growth. Chicken manure as an organic fertiliser functions to add organic matter, improve soil structure, and increase the soil's ability to retain water. In addition, chicken manure encourages soil biological activity and increases cation exchange capacity (CEC), which in turn helps maintain the availability of essential nutrients such as N, P, K, S, and micronutrients through gradual decomposition. The N content in chicken manure plays an important role in the synthesis of amino acids and proteins that are essential for plant growth. Meanwhile, the application of dolomite plays a role in increasing the magnesium (Mg) and calcium (Ca) content in the soil, as well as raising the pH of slightly acidic soil. With increased Mg levels, plants can absorb these nutrients more effectively, supporting optimal growth. Liming with dolomite also serves to lower exchangeable aluminium levels, providing additional benefits to plants through neutralisation of aluminium which is detrimental in acid soils. The combination of chicken manure and dolomite provides a complementary effect, where dolomite helps maintain soil pH balance and increases Mg availability, while chicken manure adds other nutrients and improves soil structure, creating ideal conditions for plant growth (Putra & Hanum, 2018).

Growth Parameters of Red Onion (Allium ascalonicum L)

To determine the effect of the treatment of dolomite and chicken manure on the growth of shallot plants (*Allium ascanolicum* L.), the variance test was conducted, which is presented in Table 1. Meanwhile, to determine the effect of the dose level of dolomite and chicken manure on the growth of shallot plants (*Allium ascanolicum* L.), the DMRT (Duncan's Multiple Range Test) test at the 5% level is presented in Table 2.

Table 2. DMRT test of shallot growth (*Allium ascanolicum* L.)

Treatment	Plant Height (cm)	Number of leaves (blade)	Fresh Stalk Weight Per Clump (g)	Dry Stalk Weight Per Clump (g)
D				
D_0	28,94	29,22	12,10	3,22
D_1	29,51	29,63	13,27	3,55
D_2	29,27	29,07	14,13	3,99
F				
F_0	28,04a	28,42	11,53	2,86a
F_1	29,90b	29,75	13,31	3,76a
F_2	30,20c	30,06	13,60	3,41a
F_3	28,82a	28,98	14,22	4,31b
DxF				
D_0F_0	28,33	28,33	10,20a	2,13
D_0F_1	30,60	29,33	14,73b	3,80
D_0F_2	28,57	30,53	12,80b	2,67
D_0F_3	28,27	28,67	10,67a	4,27
D_1F_0	28,03	30,40	10,33a	3,27
D_1F_1	30,13	29,33	11,27a	3,28
D_1F_2	30,67	30,13	15,60b	3,57
D_1F_3	29,23	28,67	15,87b	4,07
D_2F_0	27,77	26,53	14,07b	3,17
D_2F_1	28,97	30,60	13,93b	4,20
D_2F_2	31,37	29,53	12,40a	4,00
D_2F_3	28,97	29,60	16,13c	4,60

Description :
D : Dolomite
F : Chicken Manure
DxF : Treatment Combination
DMRT Statement: Treatments in columns followed by the same letter show no significant difference in the DMRT test at the 5% level.

Effect of Dolomite Application on the Growth of Red Onion (*Allium ascalonicum* L.)

The dolomite treatment (D) had no significant effect on the height of shallot plants (*Allium ascanolicum* L.), due to neutral soil conditions, so that the addition of dolomite was less effective in increasing nutrient availability.

The dolomite treatment (D) had no significant effect on the number of leaves of shallot plants (*Allium ascanolicum* L.), due to neutral soil conditions, so the addition of dolomite is less effective in increasing microbiological activity and the availability of essential nutrients for plants. The treatment of chicken manure (F) had no significant effect on the growth parameters of the number of leaves of shallot plants (*Allium ascanolicum* L.).

The treatment of dolomite dose (D) had no significant effect on fresh yield per clump of shallot (*Allium ascanolicum* L.), due to the relatively fertile soil conditions and good nutritional balance, so that additional magnesium through dolomite was no longer a dominant factor in the process of photosynthesis and plant tissue formation. In addition, the genetic variability of shallot plants themselves may also affect the response to dolomite treatment, making the results less specific and insignificant. As a result,

dolomite treatment did not increase the economic or qualitative value of fresh yield per shallot plant.

The treatment of dolomite dose (D) had no significant effect on dry stover per clump of shallot (*Allium ascanolicum* L.). The dolomite treatment did not show a significant effect on dry stover per clump of shallot because the dose applied was not sufficient to significantly increase nutrient availability. In addition, environmental factors such as soil moisture and interaction with other fertilisers can affect the effectiveness of dolomite. With optimal soil conditions, the addition of dolomite did not have a significant impact on dry stover growth, so the results had no significant effect.

Effect of Chicken Manure on the Growth of Red Onion (*Allium ascalonicum* L.)

The treatment of dolomite dose (D) had no significant effect on dry stover per clump of shallot (*Allium ascanolicum* L.). The treatment of dolomite dose did not show a significant effect on dry stover per clump of shallot because the dose applied may not be sufficient to significantly increase nutrient availability. In addition, environmental factors such as soil moisture and interaction with other fertilisers may affect the effectiveness of dolomite. With optimal soil conditions, the addition of dolomite did not have a significant impact on dry stover growth, so the results had no significant effect.

The treatment of chicken manure (F) significantly affects the height of shallot plants (*Allium ascanolicum* L.). The highest F_2 treatment reached 30.20 cm, significantly influenced by F_0 treatment reached 28.04 cm, F_1 reached 29.90 cm, and F_3 reached 28.82 cm. The highest treatment of 10 tonnes/ha chicken manure (F_2) was caused by chicken manure improving soil physical properties such as structure, permeability, pores, consistency, and soil temperature. The hygroscopic nature of organic matter in the fertiliser makes the soil more moist and cooler, encourages microorganism activity and increases the number of soil pores, improves permeability, consistency, and soil chemical properties, including increased organic matter content, nutrients, and cation exchange capacity (Susikawati *et al.*, 2018). The DMRT test results show that the F_2 treatment has the highest average shallot plant height (90.60 cm) and is significantly different from all other treatments. F_1 treatment (89.70 cm) was not significantly different from F_2 but significantly different from F_0 (control) and F_3. Treatment F_0 (84.13 cm) and F_3 (86.47 cm) had a lower average and showed no significant difference from each other. F_3 highest manure treatment was in the F_2 treatment, which is 10 tonnes/ha chicken manure. Chicken manure can supply sufficient nutrients to support plant height growth. This is due to the higher nutrient content in chicken manure compared to other types of manure (Harbing *et al.*, 2023).

The chicken manure treatment had no significant effect on the number of shallot leaves, due to the increase in macronutrients such as nitrogen (N), phosphorus (P), and potassium (K) in the soil due to the application of chicken manure. Although nitrogen is important for vegetative growth such as leaves, stems, and roots, hot and sunny dry climate factors strongly favour the growth of shallot leaf number. Shallot plants require an optimum air temperature between 25-32°C, with the ideal temperature around 30°C (Susikawati *et al.*, 2018).

The treatment of chicken manure (F) had no significant effect on fresh yield per onion plant (*Allium ascanolicum* L.), due to the fact that chicken manure is rich in nutrients, the dose applied may not be sufficient to have a significant impact on fresh yield growth. In addition, factors such as soil conditions, moisture, and interaction with other nutrients in the soil can also affect the effectiveness of chicken manure in supporting

plant growth. In addition, if the shallot plants are already getting sufficient nutrients from other sources, then the addition of chicken manure will not provide a significant increase.

The acquisition of chicken manure treatment (F) has a significant effect on dry stover per clump of shallots (*Allium ascanolicum* L.). The highest treatment of F_3 reached 4.31 g, significantly influenced by the treatment of F_0 reached 2.86 g, F_1 reached 3.76 g, and F_2 reached 3.41 g. The highest treatment of chicken manure 10 tonnes/ha (F_2) was the highest. The treatment of 10 tonnes/ha chicken manure (F_2) was the highest, this was due to the application of organic fertiliser, such as chicken manure, takes time to be absorbed and utilised effectively by plants due to its low nutrient content and slow release. In general, the effectiveness of organic fertilisers is highly dependent on soil characteristics and the dose applied. Nutrients absorbed by plants support metabolic processes and maintain their physiological functions. Therefore, the proper use of chicken manure can have a significant effect on increasing dry stover per onion sample (Jahung *et al.*, 2022). The DMRT test results show that the treatment of chicken manure has a significant effect on dry stover per clump of shallots. The F_3 treatment had the highest average (12.93 g) and was significantly different from all other treatments. Meanwhile, treatments F_0, F_2, and F_1 showed no significant difference from each other, with a lower average than F_3. This occurred because plant growth continued to increase along with the application of large amounts of chicken manure, which was able to meet the nutrient needs of plants. The higher the dose of chicken manure applied, the better the plant growth, which in turn has a positive impact on increasing production. Application of chicken manure also supports shallot growth by enhancing physiological processes in plant tissues. This process allows photosynthetic products to be effectively translocated into the bulbs, supporting optimal bulb formation and development (Wuriesyliane *et al.*, 2021).

Effect of Treatment Combination on the Growth of Red Onion (*Allium ascalonicum* L.)

The combination of dolomite dose (D) and chicken manure (F) did not significantly affect the height of shallot plants (*Allium ascanolicum* L.), due to environmental factors such as soil moisture and temperature that affect the effectiveness of this treatment combination.

The combination of dolomite dose (D) and chicken manure (F) did not significantly affect the number of leaves of shallot plants (*Allium ascanolicum* L.), due to the nutrient content of chicken manure is sufficient to support growth, so the addition of dolomite does not have a significant effect in affecting the final result of growth.

The combination of dolomite dose (D) and chicken manure (F) had a very significant effect on fresh fruit per clump of shallot (*Allium ascanolicum* L.). The highest D_2F_3 treatment reached 16.13 g. The combination of 10 tonnes/ha dolomite and 15 tonnes/ha chicken manure (D_2F_3) treatment showed the highest yield, due to the provision of dolomite, which is able to raise soil pH and provide essential nutrients for plants. Dolomite also contains various cations and other useful micro elements, thus supporting the growth and development process of shallot plants. By increasing the soil pH, dolomite improves soil conditions that allow for more optimal nutrient absorption by plant roots. In addition, the microelements contained in dolomite help strengthen plants, accelerate metabolic processes, and improve soil structure, all of which contribute to healthier and more productive plant growth. Regular use of dolomite can also increase the resilience of shallot plants to less-than-optimal environmental conditions, such as acidic or less fertile soils (Ilham *et al.*, 2019). The use of organic fertilisers such as chicken manure is beneficial for increasing soil humus content, improving soil structure, and activating

microorganisms in the soil so that the balance of nutrients in the soil becomes more optimal. In addition, it helps neutralise soil pH, increase soil binding capacity to nutrients, and improve air circulation in the soil (Sutikarini *et al.*, 2023). The results of the DMRT test showed that the combination of dolomite and chicken manure treatments had a very significant effect on fresh fruit per clump of shallots. The D_2F_3 treatment had the highest average (16.13) and was significantly different from all other treatments. Treatments D_0F_2 to D_1F_3 had a lower average fresh yield than D_2F_3 but significantly different from groups D_0F_0 to D_2F_2, which had a lower average and showed no significant difference from each other. The treatment combination of D_2 (10 tonnes/ha dolomite) and F_3 (15 tonnes/ha chicken manure) showed significant potential in increasing shallot growth and production, especially on peat soils. The application of dolomite at 10 tonnes/ha acts as an effective ameliorant to increase soil pH, creating optimal conditions for shallot bulb growth. This increase in pH not only supports the absorption of nutrients such as potassium (K), calcium (Ca) and magnesium (Mg), but also accelerates the decomposition of organic matter through increased activity of soil microorganisms. This makes nutrients more quickly available to plants, so that shallot growth can be maximised (Ilham *et al.*, 2019). Meanwhile, the application of chicken manure at a dose of 15 tonnes/ha supplements the macronutrients such as nitrogen, phosphorus and potassium needed for bulb formation and development. Phosphorus, as one of the elements contained in chicken manure, plays a vital role in the bulb formation process of shallots, which are high phosphorus-absorbing plants (Jali *et al.*, 2022).

The result of the combination of dolomite dose (D) and chicken manure (F) had no significant effect on dry stover per clump of shallot (*Allium ascanolicum* L.), that other factors may be more dominant in affecting plant growth, thus the need for further research to understand the interaction between dolomite and overall shallot growth conditions. This indicates that other factors, such as soil conditions and cultivation techniques, may have a more dominant role in influencing shallot growth than the type of chicken manure used.

Yield Parameters of Red Onion (*Allium ascalonicum* L.)

To determine the effect of dosing dolomite and chicken manure on the growth of shallot plants (*Allium ascanolicum* L.), the variance test was conducted and presented in Table 1. Meanwhile, to determine the effect of the treatment level of dolomite dosing and chicken manure on the yield of shallot plants (*Allium ascanolicum* L.), the DMRT test was conducted at the 5% level to distinguish the results presented in Table 3.

Table 3. DMRT test on yield of shallots (*Allium ascalonicum* L.)

Treatment	Tubers Diameter (mm)	Number of Cloves Per Clump (fruit)	Number of Cloves Per Plot (fruit)	Fresh Tuber Weight Per Clump (g)	Weight of Dry Tubers for Consumption Per Clump (g)	Weight of Dry Tubers for Consumption Per Plot (g)
D						
D_0	29,78a	4,27a	63,25a	98,69a	83,83a	1223,83a
D_1	30,93b	4,60b	64,92b	105,63a	90,52a	1344,40a
D_2	31,57c	4,83c	66,17c	111,52b	94,95b	1408,28b
F						
F_0	29,63a	4,31	63,22	102,42a	87,35a	1279,00a
F_1	31,16a	4,53	65,89	105,60a	89,87a	1329,57a
F_2	30,78b	4,53	63,78	104,71a	89,22a	1345,20b
F_3	31,46c	4,89	66,22	108,38b	92,62b	1348,23c
DXF						
D_0F_0	28,06a	4,07a	61,33a	94,13	79,80a	1151,10a
D_0F_1	29,37a	4,20a	67,33b	99,27	84,60a	1222,40a
D_0F_2	29,84a	4,47a	62,00a	102,27	87,93a	1263,30a
D_0F_3	31,83b	4,33a	62,33a	99,07	83,00a	1258,50a
D_1F_0	31,05b	4,60a	61,67a	105,4	90,53a	1332,50a
D_1F_1	32,28b	4,67a	64,67b	103,8	88,73a	1333,80a
D_1F_2	30,18b	4,60a	65,67b	103,13	87,13a	1331,20a
D_1F_3	30,19b	4,53a	67,67b	110,2	95,67b	1380,10a
D_2F_0	29,77a	4,27a	66,67b	107,73	91,73a	1353,40a
D_2F_1	31,83b	4,73a	65,67b	113,73	96,27b	1432,50b
D_2F_2	32,32b	4,53a	63,67a	108,73	92,60a	1441,10c
D_2F_3	32,36c	5,80b	68,67c	115,87	99,20c	1406,10a

Description :
D : Dolomite
F : Chicken Manure
DxF : Treatment Combination
DMRT Statement: Treatment in the column followed by the same letter shows no significant difference in the DMRT test at the 5% level.

Effect of Dolomite Application on the Yield of Red Onion (*Allium ascalonicum* L.)

The results of the acquisition of dolomite treatment dose (D) had a very significant effect on the diameter of the bulbs of shallot plants (Allium ascanolicum L.). The highest D_2 treatment reached 31.57 mm with a very significant effect with D_0 reaching 29.78 mm and D_1 reaching 30.93mm. The highest dolomite dose treatment of 10 tonnes/ha (D_2), the diameter of shallot bulbs is strongly influenced by nutrient availability and soil conditions, in which dolomite plays an important role. The use of dolomite, which is rich in magnesium (Mg) and calcium (Ca), can increase the pH of acidic soil, thus improving soil structure and fertility. Dolomite helps neutralise acidity and increases the availability of essential nutrients such as phosphorus (P) which plays a role in tuber enlargement. With healthier soil and more available nutrients, the diameter of onion bulbs tends to increase, producing onions with larger size and better quality (Manurung & Vindo, 2019).

The DMRT test results showed that dolomite treatment had a very significant effect on the diameter of shallot bulbs. D_2 treatment had the highest average (94.71) and was significantly different from D_1 (92.78) and D_0 (89.33). The D_1 treatment has a higher average than D_0, but both do not show significant differences from each other. Onion bulb formation is strongly influenced by the increase in soil pH and nutrient availability resulting from the application of 10 tonnes/ha of dolomite. Dolomite provides potassium element which plays an important role in supporting the bulb formation process. Increasing the dolomite dose increases the availability of essential nutrients for plants, including potassium, which plays a role in increasing photosynthetic activity. Higher photosynthetic activity results in the accumulation of photosynthate that can be translocated to generative organs, especially shallot bulbs. With the increase in assimilate material produced, the process of bulb enlargement and filling becomes more optimal, producing high quality shallots (Delina *et al.*, 2019).

Results The dolomite dose (D) had a very significant effect on the parameter of the number of bulbs per clump of shallots (Allium ascanolicum L.). The highest D_2 treatment reached 4.83 fruits, which had a very significant effect with D_0 reaching 4.27 fruits and D_1 reaching 4.60 fruits. The highest dolomite treatment of 10 tons/ha (D2), the provision of dolomite in the early stages provides an opportunity for fertilizer to react with the soil, so that it can neutralize the chemical properties of the soil and increase the soil pH to a neutral level. The optimal soil acidity level for shallot growth is between 6.0 and 6.8. Meanwhile, soil with a pH below 5.5 contains high levels of aluminum (Al) salts, which can bind important nutrients for plants. Therefore, the proper use of dolomite can increase the number of shallot bulbs per plant by creating soil conditions that are more suitable for its growth (Delina *et al.*, 2019). The results of the DMRT test showed that dolomite treatment had a very significant effect on the number of bulbs per clump of shallots. Treatment D_2 had the highest average (14.50 pieces) and was significantly different from treatments D_1 (13.80 pieces) and D_0 (12.80 pieces). Treatment D_1 had a higher average than D_0, but both did not show significant differences from each other. Application of 10 tons/ha of dolomite can increase the number of bulbs per clump of shallots. This is because dolomite is able to improve the physical and chemical properties of the soil and increase pH, thus supporting plant growth. Higher doses of dolomite increase the availability of nutrients such as Ca and Mg, which are important for metabolism, including photosynthesis. The Ca and Mg elements from dolomite can stimulate the formation of chlorophyll and cell turgor, thereby accelerating photosynthesis and encouraging the growth of shallots (Delina *et al.*, 2019).

Dolomite (D) dose treatment significantly affected the number of bulbs per plot of shallots (Allium ascanolicum L.). The highest D_2 treatment reached 66.17 pieces significantly affected D_0 reaching 63.25 pieces and D_1 reaching 64.92 pieces. The highest dolomite treatment of 10 tons/ha (D_2), Early dolomite application helps increase soil pH to the ideal level (6.0-6.8) for shallots. This prevents aluminum (Al) salts from binding nutrients, so that nutrients are more available to plants. With optimal soil conditions, the number of shallot bulbs per plot can increase (Delina *et al.*, 2019). The DMRT test results showed that dolomite treatment had a significant effect on the number of bulbs per plot of shallots. Treatment D_2 had the highest average (198.50 pieces) and was significantly different from treatments D_1 (194.75 pieces) and D_0 (189.75 pieces). Treatment D_1 had a higher average than D_0, but both did not show significant differences from each other. The application of 10 tons/ha of dolomite had a significant effect on the number of bulbs per plot of shallots. Dolomite, which contains Ca and Mg, is effective in reducing soil

acidity by neutralizing pH and overcoming the problem of excess aluminum (Al) in acidic soils. High Al content in acidic soils can inhibit the availability of nutrients for plants. By liming using dolomite, this inhibition is reduced, so that the soil becomes more fertile and supports optimal shallot growth, including increasing the number of bulbs per plot (Manurung & Vindo, 2019).

Results Dolomite dose treatment (D) has a very significant effect on the weight of fresh bulbs per clump of shallots (Allium ascanolicum L.). The highest D_2 treatment reached 111.52 g with a significant effect with D_0 reaching 98.69 g and D_1 reaching 105.63 g. The highest dolomite dose treatment of 10 tons/ha (D_2), Early dolomite application allows fertilizer to react more optimally with the soil, helps neutralize the chemical properties of the soil and increases the pH towards neutral conditions. The ideal soil pH for shallot growth is 6.0-6.8. Soil with a pH below 5.5 tends to contain a lot of aluminum (Al) salts that can bind important nutrients for plants. If dolomite is applied too late, some nutrients become slowly available to plants, resulting in slow growth and yields. Magnesium (Mg) acts as an important macronutrient for the formation of chlorophyll, essential enzyme components, and plant metabolism and respiration processes. Mg functions in the formation of chlorophyll, carbohydrates, and as an active driver in photosynthesis, while calcium (Ca) plays an important role in stimulating meristem division and the development of plant organs (Tanari *et al.*, 2018). The results of the DMRT test showed that dolomite treatment had a very significant effect on the fresh weight of shallot bulbs. Treatment D_2 had the highest average (334.55 g) and was significantly different from treatments D_1 (316.90 g) and D_0 (296.05 g). Treatment D_1 had a higher average compared to D_0, but both did not show significant differences from each other. The use of 10 tons/ha of dolomite as a soil ameliorant effectively increased soil pH to an optimal level to support the growth of shallot bulbs. Dolomite also plays a role in providing important nutrients such as potassium (K), calcium (Ca), and magnesium (Mg), which are essential for plants. Increasing the pH of peat soil not only reduces acidity but also increases the activity of microorganisms, which accelerates the decomposition of organic matter. As a result, nutrients become more quickly available, supporting maximum growth and yield of shallots (Ilham *et al.*, 2019).

The results of dolomite treatment (D) had a very significant effect on the dry weight of shallots (Allium ascanolicum L.) for consumption. The highest D_2 treatment reached 94.95 g, which had a very significant effect with D_0 reaching 83.83 g and D_1 reaching 90.52 g. The highest dolomite treatment of 10 tons/ha (D_2) was thought to be because the calcium (Ca) nutrient in dolomite plays an important role in improving product quality. Ca is often associated with fruit quality, especially its hardness. Ca directly plays a role in strengthening plant cell walls through its ability to bind to pectin. Pectin is a cell component that functions to strengthen or harden plant tissue. Calcium contained in dolomite can also affect metabolic processes, such as respiration rates during storage (Tanari *et al.*, 2018).

The results of dolomite treatment (D) had a very significant effect on the weight of dry bulbs consumed per plot of shallots (Allium ascanolicum L.). The highest D_2 treatment reached 1,408.28 g, which had a very significant effect with D_0 reaching 1,223.83 g and D_1 reaching 1,344.40 g. The highest dolomite dose treatment of 10 tons/ha (D_2) was thought to be because liming played a role in neutralizing toxic compounds, suppressing the development of plant diseases, and increasing soil pH, which accelerated the aminization, ammonification, and sulfur oxidation processes. This increase in pH also improved the availability of macronutrients such as nitrogen (N), phosphorus (P), and

potassium (K), as well as micronutrients needed by plants. In Indonesia, the lime commonly used is calcite ($CaCO_3$) and dolomite ($CaMg(CO_3)_2$). In relation to the dry weight of shallot bulbs for consumption, liming can also increase soil fertility and nutrient availability, which supports plant growth and bulb development, thus contributing to increased yields and quality of shallot bulbs (Delina *et al.*, 2019).

The Effect of Chicken Manure on Shallot Yield (*Allium ascalonicum* L.)

The results of chicken manure treatment (F) significantly affected the diameter of shallot bulbs (*Allium ascanolicum* L.). The highest F_3 treatment reached 31.46 mm significantly affected the F_0 treatment reaching 29.63 mm, F_1 reaching 31.16 mm, and F_2 reaching 30.78 mm. The highest chicken manure treatment of 15 tons/ha (F_3), Application of organic fertilizers, such as chicken manure, takes time to be absorbed and utilized effectively by plants because of the low nutrient content and slow release. In general, the effectiveness of organic fertilizers is highly dependent on soil characteristics and the dosage given. Nutrients absorbed by plants support the metabolic process and maintain their physiological functions. Therefore, the proper use of chicken manure can have a significant effect on increasing the diameter of shallot bulbs (Susikawati *et al.*, 2018). The DMRT test results showed that chicken manure treatment had a significant effect on the diameter of shallot bulbs. Treatment F_3 had the highest average (94.39 mm) and was significantly different from all other treatments. Treatments F_1 (93.49 mm) and F_2 (92.33 mm) also showed higher averages than F_0 (88.88 mm), but both did not show significant differences from each other. Chicken manure 15 tons/ha is very effective in increasing shallot growth because it contains high nutrients, including nitrogen, phosphorus, and potassium, which are greater than other manures. Nitrogen in this fertilizer plays an important role in the formation of chlorophyll and enzymes, supports photosynthesis, and encourages cell division and differentiation, which contributes to the formation of leaves and shallot bulb yields. The phosphorus and potassium content also strengthens plant growth and harvest quality (Susikawati *et al.*, 2018).

Chicken manure treatment (F) did not significantly affect the number of bulbs per shallot plant (Allium ascanolicum L.). In the combination treatment of dolomite (D) and chicken manure (F) significantly affected the number of bulbs per clump of shallots (Allium ascanolicum L.). The highest D_2F_3 treatment reached 5.80 pieces. The combination of dolomite doses of 10 tons/ha and chicken manure of 15 tons/ha (D_2F_3) showed the highest results. Dolomite functions to neutralize soil pH and provide calcium and magnesium, which are important for plant growth. Meanwhile, chicken manure is rich in nutrients such as nitrogen, phosphorus, and potassium, which support root development and bulb formation. The synergy between these two treatments creates optimal conditions for shallot plants, resulting in a greater number of bulbs compared to other treatments. The results of the DMRT test showed that the combination of dolomite and chicken manure treatments significantly affected the number of bulbs per clump of shallots. Treatment D_2F_3 had the highest average (5.80 fruits) and was significantly different from all other treatments, showing a lower average than D_2F_3, but there was no significant difference between the treatments.

Chicken manure (F) treatment did not significantly affect the number of bulbs per plot of shallots (*Allium ascanolicum* L.). In the combination treatment of dolomite (D) and chicken manure (F) treatment significantly affected the number of bulbs per plot of shallots (*Allium ascanolicum* L.). The highest D_2F_3treatment reached 68.67 pieces.

The results of chicken manure treatment (F) significantly affected the weight of fresh bulbs per clump of shallots (*Allium ascanolicum* L.). The highest F_3 treatment

reached 108.38 g significantly affected the F_0 treatment reaching 102.42 g, F_1 reaching 105.60 g, and F_2 reaching 104.71 g. The highest treatment of chicken manure 15 tons/ha (F_3), It is suspected that the provision of chicken manure is able to provide nitrogen (N), phosphorus (P), and potassium (K) nutrients in balanced amounts, so that plants can carry out their physiological processes well. This encourages the formation of shallot bulbs, which is also supported by the hot temperature conditions at the location, in accordance with the preferences of shallots which prefer to grow in lowlands with a sunny climate. The average temperature during bulb formation ranges from 29.89°C to 30.35°C. If the nitrogen content is higher, plant growth will be greater due to increased carbohydrate production, which ultimately contributes to increased bulb weight (Susikawati *et al.*, 2018). The results of the DMRT test showed that the chicken manure treatment had a significant effect on the fresh weight of shallot bulbs. Treatment F_3 had the highest average (325.13 g) and was significantly different from all other treatments. Treatments F_1 (316.80 g), F_2 (314.13 g), and F_0 (307.27 g) did not show any significant differences between each other. Application of 15 tons/ha of chicken manure fertilizer requires time for nutrients to be available and optimally absorbed by plants. This fertilizer helps maintain the physiological function of plants by providing the nutrients needed for metabolism. The impact of fertilizer application can be seen from plant production, which reflects growth, accumulation of organic compounds, and plant nutritional status. With the right dose of fertilizer, nutrients are better absorbed, improving metabolism, and encouraging optimal plant growth (Jahung *et al.*, 2022).

Chicken manure treatment (F) significantly affected the dry weight of shallot (*Allium ascanolicum* L.) bulbs. The highest F_3 treatment reached 92.62 g significantly affected the F_0 treatment reaching 87.35 g, F_1 reaching 89.87 g, and F_2 reaching 89.22 g. The highest chicken manure treatment of 15 tons/ha (F_3), The amount of photosynthate stored in shallot bulbs directly affected the increase in dry weight of shallot bulbs for consumption. The increase in dry weight of bulbs was determined by the photosynthate produced during the bulb formation process. In addition, the dry weight of bulbs was also influenced by the absorption of phosphorus (P), which is the second essential element after nitrogen (N). Phosphorus plays an important role in the formation of dry plant matter (Susikawati *et al.*, 2018). The results of the DMRT test showed that the chicken manure treatment had a significant effect on the dry weight of shallots for consumption. The F_3 treatment had the highest average (277.87 g) which was significantly different from the F_0 (262.07 g), F_2 (267.67 g), and F_1 (269.60 g) treatments. The provision of 15 tons/ha of chicken manure had a significant effect on the dry weight of shallots for consumption. Manure plays a role in increasing the soil's ability to retain water, increasing cation exchange capacity, and improving soil structure. This supports the provision of important nutrients, including potassium, which are more optimal for plants. Potassium as the main macronutrient plays an important role in the process of cell formation, enzyme activation, root development, and supporting the upright strength of plants. With the availability of sufficient potassium from chicken manure, the metabolic process and growth of shallots become more optimal, which ultimately contributes to an increase in the dry weight of shallots for consumption (Armaini *et al.*, 2021).

Chicken manure treatment (F) had a very significant effect on the dry bulb weight of consumption per plot of shallots (*Allium ascanolicum* L.). The highest F_3 treatment reached 1,348.23 g, which had a very significant effect with F_0 treatment reaching 1,279 g, F_1 reaching 1,329.57 g, and F_2 reaching 1,345.20 g. The highest chicken manure treatment of 15 tons/ha (F_3), The amount of photosynthate stored in shallot bulbs has a

direct effect on increasing the dry bulb weight of consumption. Chicken manure affects the dry bulb weight of consumption per plot of shallots by increasing soil fertility and providing nutrients needed by plants. Fertile soil supports plant growth and improves soil conditions from the negative impacts of inorganic fertilizers. The content of P and K nutrients in manure plays a role in tuber formation, carbohydrate metabolism, and root development, which ultimately contributes to increasing tuber yields (Setiawati *et al.*, 2024). The results of the DMRT test showed that the chicken manure treatment had a very significant effect on the dry bulb weight of consumption per plot of shallots. The F_3 treatment had the highest average (4,044.70 g) which was very significantly different from the F_0 (3,837 g), F_1 (3,988.70 g), and F_2 (4,035.60 g) treatments. The provision of 15 tons/ha of chicken manure had a significant effect on the dry bulb weight of consumption of shallots. Chicken manure affects the dry bulb weight of consumption per plot of shallots because it contains complete macro and micro nutrients, which support plant growth and increase bulb production. The availability of nutrients such as Nitrogen, Phosphorus, and Potassium, as well as micro elements such as Calcium, Magnesium, and Sulfur, allows plants to absorb nutrients optimally. Thus, the use of chicken manure contributes to increasing the dry bulb weight of consumption of shallots per plot (Mubarok *et al.*, 2022).

Effect of Combination Treatments on Shallot Yield (*Allium ascalonicum* L.)

In the combination of dolomite (D) and chicken manure (F) treatments, there was a significant effect on the diameter of shallot bulbs (*Allium ascanolicum* L.). The highest D_2F_3 treatment reached 32.36 mm. The combination of dolomite doses of 10 tons/ha and chicken manure of 15 tons/ha (D2F3) showed the highest results, due to the ability of dolomite to increase soil pH and nutrient availability, while chicken manure provides essential nutrients needed for plant growth. When these two treatments are combined, they create optimal conditions that support root development and bulb formation. The results of the DMRT test showed that the combination of dolomite doses and chicken manure had a significant effect on the diameter of shallot bulbs. The D_2F_3 treatment had the highest average (32.36 mm) and was significantly different from all other treatments. The D_0F_2, D_2F_1, D_1F_1, D_0F_3, D_2F_0, D_1F_3, and D_1F_2 treatments had lower averages than D_2F_3, but were still significantly different from each other. Meanwhile, the D_0F_0 to D_0F_2 treatments showed smaller differences, and there were no significant differences between the groups. The combination of 10 tons/ha of dolomite and 15 tons/ha of chicken manure gave the best results due to its synergistic effect in increasing soil fertility and shallot growth. Dolomite increases soil pH by neutralizing acidity through the absorption of H+ ions in soil colloids, while increasing the supply of Mg and Ca which are important for plant growth. In addition, dolomite reduces the risk of aluminum toxicity, increases the availability of phosphorus, and supports the process of nitrogen mineralization and the release of nutrients from organic matter (Susikawati *et al.*, 2018). Meanwhile, chicken manure provides essential nutrients such as nitrogen, phosphorus, potassium, calcium, and organic matter with an ideal C/N ratio. This content helps increase soil microbial activity and supports plant physiological processes, such as photosynthesis and bulb formation. This combination produces optimal soil conditions and supports increased quality and quantity of shallot production (Susikawati *et al.*, 2018).

The combination of 10 tons/ha of dolomite and 15 tons/ha of chicken manure gave the best results in the number of bulbs per clump of shallots. Dolomite increases the availability of Ca and Mg in the soil and neutralizes pH, which supports soil fertility and improves soil physical properties. Meanwhile, chicken manure provides organic matter

that through the decomposition process produces essential nutrients for plants. Its nutritional content encourages generative plant growth, especially in the formation of shallot bulbs, thus increasing optimal harvest yields (Delina *et al.*, 2019).

The combination of 10 tons/ha dolomite and 15 tons/ha chicken manure (D_2F_3) showed the highest results. Dolomite increases soil pH and provides calcium and magnesium, which are essential for plant growth. In addition, chicken manure which is rich in nitrogen, phosphorus, and potassium also supports root development and bulb formation. Therefore, this combination creates optimal conditions for shallot plants, producing a significantly greater number of bulbs than single treatments or without any treatment. The results of the DMRT test showed that the combination of dolomite and chicken manure doses had a significant effect on the number of bulbs per plot of shallots. The D_2F_3 treatment had the highest average (68.67 pieces) and was significantly different from all other treatments. The combination of 10 tons/ha dolomite and 15 tons/ha chicken manure doses had a significant effect on the number of bulbs per plot of shallots. Dolomite, with its Ca and Mg content, is able to neutralize acidic soil pH and reduce the negative effects of excess aluminum (Al), thereby increasing the availability of nutrients for plants. This improvement creates more fertile soil conditions, supporting the optimal formation and growth of shallots (Manurung & Vindo, 2019). Meanwhile, chicken manure, which is rich in macronutrients such as nitrogen, phosphorus, and potassium, provides balanced nutrition that is easily absorbed by plants compared to other manures. Phosphorus, in particular, is very important for the formation and development of bulbs, because tuber plants require high amounts of phosphorus. With this combination, the nutritional needs of shallots are optimally met, resulting in a greater number of bulbs per plot and of good quality (Jali *et al.*, 2022).

The combination treatment of dolomite (D) and chicken manure (F) doses did not have a significant effect on the fresh bulb weight yield parameters per clump of red onion (*Allium ascalonicum* L.).

The combination of dolomite (D) and chicken manure (F) doses had a very significant effect on the dry bulb weight of shallots (Allium ascanolicum L.) for consumption. The highest D_2F_3treatment reached 99.20 g. The combination of dolomite doses of 10 tons/ha and chicken manure of 15 tons/ha (D_2F_3) showed the highest results. Dolomite, as a source of calcium and magnesium, helps neutralize soil pH and increases nutrient accessibility for plants. Meanwhile, chicken manure, which is rich in nitrogen, phosphorus, and potassium, contributes greatly to the process of photosynthesis and the formation of new cells. Thus, the synergy between these two components not only increases the size of the bulbs but also ensures the health and toughness of the plants as a whole. This combination provides better output, its use as the main strategy in increasing the productivity of vegetable land such as shallots. The results of the DMRT test showed that the combination of dolomite and chicken manure treatments had a very significant effect on the dry bulb weight of shallots for consumption. The D_2F_3 treatment had the highest average (99.20 g) which was very significantly different from the other treatments. The use of dolomite as a soil ameliorant is effective in increasing soil pH to an optimal level, which supports the growth of shallot bulbs. Dolomite not only increases soil pH but also provides important nutrients such as potassium (K), calcium (Ca), and magnesium (Mg), which support plant development. Increasing the pH of peat soil also increases the activity of microorganisms that accelerate the decomposition of organic matter, making nutrients more quickly available to plants, and supporting maximum shallot yields (Ilham *et al.*, 2019). Chicken manure with high organic content (53.49%)

also plays an important role in increasing the availability of nutrients for plants. This organic material improves the chemical properties of the soil by increasing the cation exchange capacity (CEC) of the soil, so that nutrients are easily available to plants and reduce nutrient loss due to leaching. In addition, chicken manure helps the formation of chelates that maintain microelements such as Fe, Zn, and Mn, which remain available to plants and support the growth and weight of dry onion bulbs (Shafira *et al.*, 2023).

The combination of dolomite (D) and chicken manure (F) doses had a very significant effect on the dry bulb weight of consumption per plot of shallots (Allium ascanolicum L.). The highest D_2F_3 treatment reached 1,441.10 g. The combination of dolomite treatment of 10 tons/ha and chicken manure of 15 tons/ha (D_2F_3) showed the highest results, dolomite plays a role in increasing soil pH, improving soil structure, and increasing the availability of macronutrients such as Calcium and Magnesium. Meanwhile, chicken manure provides macronutrients (N, P, K) and micronutrients (Ca, Mg, S), which play a role in plant metabolism processes, increase enzyme activity, and accelerate the formation and growth of bulbs. The interaction of these two treatments creates more fertile soil conditions and supports optimal nutrient absorption, thereby increasing the dry weight of shallots per plot. The results of the DMRT test showed that the combination of dolomite and chicken manure treatments had a very significant effect on the dry bulb weight of consumption per plot of shallots. The D_2F_3 treatment had the highest average (1,441.10 g) which was very significantly different from the other treatments. Dolomite, which is rich in Calcium (Ca) and Magnesium (Mg), plays a role in reducing soil acidity levels by balancing pH and reducing the negative impact of excess aluminum (Al) on acidic soils. Soil conditions that are too acidic can inhibit the absorption of essential nutrients, thereby reducing plant growth efficiency. With the application of dolomite, soil fertility increases, allowing shallot plants to absorb nutrients more optimally. This has an impact on increasing growth and bulb formation, which ultimately contributes to increasing the weight of dry bulbs consumed per plot of shallots (Manurung & Vindo, 2019). Increased plant growth contributes directly to the increase in dry weight of shallots. The better the vegetative growth, the greater the accumulation of biomass formed, which ultimately has an impact on increasing the dry weight of the bulbs. The use of chicken manure plays an important role in providing nutrients that support plant growth, including nitrogen that stimulates leaf growth and photosynthesis, as well as phosphorus and potassium that help the formation and development of bulbs. With optimal growth conditions, the dry weight of shallot consumption bulbs also increases significantly (Andini *et al.*, 2023).

Conclusion

The highest result of this research was in the D_2F_3 treatment combination, namely the dry tuber consumption weight parameter per plot, which was 1441.10 grams (25.60 tons/ha). The lowest result of this research was in the D_0F_0 treatment combination, namely the dry tuber consumption weight parameter per plot, which was 1151.10 grams (20.46 tons/ha). The provision of dolomite had a very significant effect on tuber diameter, number of tubers per plant, fresh tuber weight per plant, dry tuber consumption weight, dry tuber consumption weight per plot, had a significant effect on the number of tubers per plot. The provision of chicken manure had a very significant effect on the dry tuber consumption weight per plot, had a significant effect on plant height, dry stubble per plant, tuber diameter, fresh tuber weight per plant, dry tuber consumption weight per plant. The combination of dolomite and chicken manure had a very significant effect on fresh stubble

per plant, fresh stubble per plot, dry tuber consumption weight per plant, dry tuber consumption weight per plot, had a significant effect on tuber diameter, number of tubers per plant, number of tubers per plot.

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