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EDUCATION ON THE USE OF CHICKEN MANURE AND VOLCANIC ASH IN SHALLOT CULTIVATION

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Abstract
This study aims to determine the response of growth and production as well as the availability of silica to the application of chicken manure and volcanic ash in shallot plants (Allium ascalonicum l.). This study used a Randomized Group Design (RAK) with 2 factors. The first factor is chicken manure consisting of 4 levels, namely: A0 = Control (No chicken manure), A1 = 3.75 kg/plot (10 tons/ha), A2 = 7.5 kg/plot (20 tons/ha), A3 = 11.25 kg/plot (30 tons/ha). The second factor is volcanic ash consisting of 4 levels, namely: V0 = Control (No volcanic ash), V1 = 1.9 kg/plot (5 tons/ha), V2 = 3.8 kg/plot (10 tons/ha), V3 = 5.6 kg/plot (15 tons/ha). The results showed that chicken manure up to a dose of 11.25 kg/plot had a significant effect on leaf length, plant wet weight/sample, plant wet weight/plot, plant dry weight/sample, plant dry weight/plot, base saturation, C-organic, pH H2O, but had no significant effect on the number of tubers, CEC and Si availability in paddy fields. Volcanic ash dose treatment had no significant effect on all parameters observed. The interaction between the doses of chicken manure and volcanic ash had no significant effect on leaf length at 2, 3, and 5 weeks of planting, wet weight of plants/sample, dry weight of plants/sample, base saturation, C-organic, pH H2O, number of tubers, CEC and availability of Si in the paddy field, but had a significant effect on leaf length at 4 weeks of planting with the best combination that produced the highest average leaf length, namely treatment A2V3 (7.5 kg/plot of chicken manure and 5.62 kg/plot of volcanic ash): 5.62 kg/plot of volcanic ash), and significantly affected the wet weight of plants/plot and dry weight of plants/plot with the best combination that produced the heaviest average weight, namely treatment A1V2 (3.75 kg/plot of chicken manure : 3.75 kg/plot of volcanic ash).

Keywords: Chicken Manure, Volcanic Ash, Shallot

1. Introduction

Shallots (Allium ascalonicum L.) are one of the horticultural commodities that are favored by several regions in Indonesia, both in terms of economic value and nutritional content. Although shallots are not a staple commodity, the need for shallots cannot be avoided from household consumers as a complement to daily cooking spices. Another use of shallots is as a traditional medicine whose benefits have been felt by the wider community. Shallots are utilized as medicines because they contain several substances that are beneficial to health including anti-cancer antibiotic substitutes, lowering blood pressure, cholesterol and lowering blood sugar levels. Similarly, the rapid growth of the food processing industry lately also tends to increase the need for shallots in the country (Jahung et al., 2022).

Silica is not an essential nutrient for plants, but it has beneficial effects on many plants. Silica is absorbed by plants in the form of monosilicic acid or orthanosilicic acid

(H4SiO4) and then silica is translocated through evapotranspiration and polymerized and accumulated in stem and leaf tissues as silica gel (SiO2.nH2O). Silica is a beneficial element for plant growth and is agronomically important for increasing and maintaining crop productivity. In addition to increasing crop yields, silica can also increase nutrient availability (N, P, K, Ca, Mg, S, Zn), reduce nutrient toxicity (Fe, Mn, P, Al), and minimize biotic and abiotic stress in plants. Silica plays a role in plant tolerance to abiotic stress by increasing enzyme activity and antioxidant metabolites and helps increase the efficiency of osmoregulators by influencing water content levels, reducing water loss from transpiration, regulating nutrient adequacy, and limiting the uptake of toxic ions. Silica also plays a role in reducing the level of pest and disease attack through two mechanisms, namely being a mechanical barrier and physiological mechanisms in increasing resistance to pests and diseases. A 2.5 µm-thick layer of silica under the cuticle produces a cuticle-silicon double layer that can inhibit or delay pest penetration (Sugiyanta et al., 2018).

2. Theoretical Background

Volcanic ash is a fallen volcanic material that is sprayed into the air during an eruption. In general, the composition of volcanic ash consists of silica and quartz. Volcanic ash contains minerals needed by soil and plants with the highest total element composition of Ca, Na, K and Mg, other macro elements are P and S, while micro elements consist of Fe, Mn, Zn, Cu. The layer of volcanic dust that potentially contains soil fertilizing nutrients for agriculture can actually only be utilized about 10 years after the volcanic ash dispersal event. Soil fertilization can be accelerated if mixed with organic matter. The role of organic matter is very large in improving soil fertility, and will determine soil productivity (Marko et al., 2015).

The role of organic matter not only plays a role in the provision of plant nutrients, but is much more important to the improvement of physical, biological and other chemical properties of the soil such as soil pH, cation and anion exchange capacity, soil buffering capacity and neutralization of toxic elements such as Fe, Al, Mn and other heavy metals including neutralization of insecticides. Organic matter plays a role in improving soil structure through soil aggregation and aeration, improving water holding capacity, facilitating tillage and increasing soil resistance to erosion. (Triadi et al., 2022).

This study aims to determine the response of growth and production as well as the availability of silica to the application of chicken manure and volcanic ash on shallot plants.

3. Methods

Place and Time of Research

The research was conducted in paddy fields at Jln. Harmonika Baru Pasar II, Tanjung Sari Urban Village, Medan Selayang District with an altitude of ± 30 meters above sea level. This research will be conducted from December 2019 to February 2020.

Research Materials and Tools

The materials used in this study were shallot seeds of the Bima Brebes variety, volcanic ash of Mount Sinabung, chicken manure, Trichoderma fungicide, sample labels, plastic ropes, sample stakes and other materials used during the study. The tools used in this research are hoes, rakes, machetes, meters, rulers, paddles, buckets, cameras, analytical scales, stationery and other tools used during the research.

Research Methods

This study used a Randomized Group Design (RAK) with 2 treatment factors, namely:
Factor I chicken manure (A) with 4 levels:
A0 = Control (Without chicken manure)
A1 = 3,75 kg/plot (10 ton/ha)
A2 = 7,5 kg/plot (20 ton/ha)
A3 = 11,25 kg/plot (30 ton/ha)
Factor II volcanic ash (V) with 4 levels:
V0 = Control (No volcanic ash)
V1 = 1,9 kg/plot (5 ton/ha)
V2 = 3,8 kg/plot (10 ton/ha)
V3 = 5,6 kg/plot (15 ton/ha)

The number of treatment combinations is 4 x 4 = 16 :

A0V0	A1V0	A2V0	A2V0
A0V1	A1V1	A2V1	A3V1
A0V2	A1V2	A2V2	A3V2
A0V3	A1V3	A2V3	A3V3

Number of replays : 2 replications
Number of plots : 32 plots
Number of plants/plots : 64 plants
Number of sample plants : 5 plants
Number of destructive samples/plots : 2 samples
Total number of plants : 2,112 plants
Total plants sampled : 160 plants
Distance between plots : 100 cm
Distance between replicates : 100 cm
Plots area : 250 cm x 150 cm
Land Area : 41 m x 8 m

Data Analysis Method

Data analysis was carried out with variance analysis with the following linear model:

$$\mathbf{Yijk = \mu + \lambda i + Kj + Jk + (KJ)jk + \varepsilon ijk}$$

Where:
Yijk = The observation result of the chicken manure factor at the jth level and the volcanic ash factor at the kth level in the i-th replication.
μ = Center value
λi = Effect of the i-th replicate
Kj = Effect of chicken manure factor at the jth level
Jk = Effect of volcanic ash factor at the jth level
(KJ)jk = Interaction effect of chicken manure factor at level j and volcanic ash factor at level k
εijk = The effect of error in the i-th replication with the chicken manure factor at the j-th level and the volcanic ash factor at the k-th level.

For factors that have a real or very real effect on the variance test, then the difference of means test is carried out using the DMRT (Duncan Multiple Range Test) at the 5% level and the response curve.

4. Results and Discussion

Leaf Length

The list of variance shows that the treatment of chicken manure dosage has a significant effect on the length of shallot leaves at all observation ages. The dose treatment of volcanic ash had no significant effect on the length of shallot leaves at all observation ages. The interaction between the two treatments had no significant effect on the length of shallot leaves at the age of 2, 3, and 5 weeks, but had a significant effect on the length of shallot leaves at the age of 4 weeks. Table 1 presents the average leaf length due to the treatment of different doses of chicken manure and volcanic ash and the interaction between the two treatments.

From table 2, it can be seen that at the age of 2 weeks after planting, the effect of chicken manure dose treatment on plant height obtained the highest average in A3 was significantly different from A0 and A1, but not significantly different from A2. At the age of 3 weeks after planting, the highest average in A3 was significantly different from A0 and A1, but not significantly different from A2. At the age of 4 weeks after planting, the highest average in A3 was significantly different from A0, but not significantly different from A1 and A2. While at the age of 5 weeks after planting, the highest average in A3 was significantly different from A0, but not significantly different from A1 and A2 and for the volcanic ash treatment, it had no significant effect on the length of shallot leaves at the age of 2, 3, 4, and 5 weeks after planting. The interaction between the two treatments had a significant effect on the length of shallot leaves at the age of 4 weeks after planting, the highest average in A2V3 was significantly different from A0V0, A0V1, A0V2, A0V3, A1V0, A1V1, and A2V2, but not significantly different from A1V2, A1V3, A2V0, A2V1, A3V0, A3V1, A3V2, and A3V3. And the interaction between the two treatments had no significant effect on leaf length at the age of 2, 3, and 5 weeks after planting. At 5 weeks after planting, the highest plant height was in the A2V3 combination (46.39cm).

Table 1. Average Leaf Length (cm) of Shallot in the Treatment of Chicken Manure and Volcanic Ash at the Age of 2, 3, 4 and 5 Weeks After Transplanting

Treatment	Leaf Length (cm)			
	2 WAT	3 WAT	4 WAT	5 WAT
A0	20,09b	25,25b	28,54b	33,24b
A1	23,64b	31,94b	38,19ab	43,11ab
A2	24,75ab	32,94ab	38,91a	44,05a
A3	25,00a	33,54a	39,41a	43,32a
V0	23,19	31,12	35,95	41,05
V1	23,20	30,56	36,47	40,53
V2	23,32	31,02	35,98	40,65
V3	23,76	31,00	36,66	41,49
A0V0	20,31	25,81	28,50d	33,47
A0V1	19,26	24,57	29,29d	33,82
A0V2	19,49	24,84	27,46d	31,75
A0V3	21,29	25,79	28,92d	33,93
A1V0	23,19	32,75	37,86bc	41,99

A1V1	23,98	31,93	37,61bc	41,54
A1V2	23,80	32,26	39,10abc	45,00
A1V3	23,60	30,83	38,19abc	43,89
A2V0	24,65	33,42	39,25abc	45,14
A2V1	23,61	32,27	38,97abc	43,00
A2V2	25,07	31,32	36,02c	41,69
A2V3	25,66	34,85	41,42a	46,39
A3V0	24,61	32,48	38,18abc	43,59
A3V1	25,96	33,45	40,01ab	43,74
A3V2	24,93	35,67	41,33a	44,17
A3V3	24,49	32,54	38,10abc	41,76

Description: Numbers followed by the same letter in the same column are not significantly different based on Duncan's test at the 5% test level.

Dosing chicken manure into the soil will increase the content of essential nutrients, especially macro-nutrients N, P, and K. Nitrogen (N) is needed by plants in the vegetative phase in terms of the formation of plant tissues. The main role of nitrogen for plants is to stimulate overall growth, especially stems, branches and leaves. Because in the generative phase of shallot plants, in this case plant growth with leaf formation, if the plant experiences good growth and forms leaves perfectly, the process of bulb formation will also be maximized (Budianto et al., 2015)

Number of Tubers/Sample (Tubers)

The list of variance showed that the doses of chicken manure and volcanic ash, as well as the interaction between the two treatments had no significant effect on the number of bulbs. Table 2 presents the average number of bulbs of shallot plants due to the treatment of different doses of chicken manure and volcanic ash.

Table 2. Average Number of Bulbs (Tubers) of Shallot Plants in the Treatment of Chicken Manure and Volcanic Ash

Treatment	V0	V1	V2	V3	Average
A0	7,80	7,30	7,00	7,00	7,28
A1	9,00	10,10	7,90	9,70	9,18
A2	8,30	8,80	8,20	8,40	8,43
A3	7,50	9,90	7,80	8,30	8,38
Average	8,15	9,025	7,725	8,35	

In Table 2, it can be seen that the doses of chicken manure and volcanic ash had no significant effect on the number of shallot bulbs.

Plant Wet Weight/Sample (g)

The list of variance showed that the dose of chicken manure treatment significantly affected the wet weight of plants/sample, while volcanic ash and the interaction between the two treatments did not significantly affect the wet weight of plants/sample. Table 3 presents the average wet weight of plants/sample of shallot plants due to the treatment of different doses of chicken manure and volcanic ash.

Table 3. Average Plant Wet Weight per Sample of Shallot Plants in the Treatment of Chicken Manure and Volcanic Ash

Treatment	V0	V1	V2	V3	Average
A0	61,50	68,60	76,90	111,00	79,50b
A1	133,70	142,30	168,70	184,80	157,38a
A2	159,20	142,10	115,20	119,95	134,11ab
A3	140,40	156,40	104,10	109,70	127,65b
Average	123,70	127,35	116,23	131,36	

Description: Numbers followed by the same letter in the same column are not significantly different based on Duncan's test at the 5% test level.

In Table 3, it can be seen that in the treatment of chicken manure dose, the wet weight of plants per sample was heaviest in the A1 treatment, significantly different from A0 and A3, but not significantly different from A2. (Idris et al., 2018) which states that to form plant tissue, nutrients are needed, with the presence of balanced nutrients will increase the weight of the plant. High nutrient absorption causes the photosynthesis process to be high as well and this will increase tuber growth. Growth, development and yield of a plant will increase if the supply of nutrients is not a limiting factor.

Volcanic ash treatment had no significant effect on the wet weight of plants per sample, but the highest wet weight of plants per sample was found in treatment V3 and the lowest in treatment V2.

Plant Wet Weight/Plot (g)

The list of variance showed that the treatment of chicken manure dosage and the interaction between the two treatments significantly affected the wet weight of plants/plot, while volcanic ash did not significantly affect the wet weight of plants/plot. Table 4 presents the average wet weight of plants/plot of shallot plants due to the treatment of different doses of chicken manure and volcanic ash.

Table 4. Average Plant Wet Weight/Plot of Shallot Plants in the Treatment of Chicken Manure and Volcanic Ash

Treatment	V0	V1	V2	V3
A0	1307,50d	1743,00cd	2284,50bcd	2505,00bc
A1	2418,50bc	2761,50bc	4243,50a	2524,00bc
A2	3096,00b	1910,50cd	2176,00bcd	1742,00cd
A3	2152,00bcd	2232,00bcd	1270,50d	1298,50d

Description: Numbers followed by the same letter in the same column are not significantly different based on Duncan's test at the 5% test level.

In Table 4, it can be seen that the interaction between the two treatments significantly affects the wet weight of plants/plot of shallot at the heaviest average in A1V2 significantly different from A0V0, A0V1, A0V2, A0V3, A1V0, A1V1, A1V3, A2V0, A2V1, A2V2, A2V3, A3V0, A3V1, A3V2, and A3V3. Application of chicken manure accompanied by volcanic ash can increase production. It is suspected that chicken manure accelerates the decomposition of volcanic ash so that it provides nutrients needed in the growth and production of shallot plants. According to (Suntoro et al., 2014), mixing volcanic ash with manure will accelerate the decomposition process of volcanic ash so that soil absorption of nutrients is more optimal. To accelerate the decomposition process

of Merapi volcanic ash, the ash was mixed with manure and soil ameliorants in various combinations in an effort to improve soil chemical properties.

Plant Dry Weight/Sample (g)

The list of variance showed that the dose of chicken manure treatment significantly affected the dry weight of plants/sample, while volcanic ash and the interaction between the two treatments did not significantly affect the dry weight of plants/sample. Table 5 presents the average dry weight of plants/sample of shallot plants due to the treatment of different doses of chicken manure and volcanic ash.

Table 5. Average Dry Weight of Plants/Sample of Shallot Plants in the Treatment of Chicken Manure and Volcanic Ash

Treatment	V0	V1	V2	V3	Average
A0	34,50	40,10	45,10	49,10	42,28b
A1	82,30	92,50	85,60	105,20	91,40a
A2	103,60	95,00	68,40	59,88	81,72ab
A3	79,80	80,60	60,50	61,70	70,65b
Average	75,13	77,05	64,90	68,97	

Description : Numbers followed by the same letter in the same column are not significantly different based on Duncan's test at the 5% test level.

In Table 5, it can be seen that in the treatment of chicken manure doses, the dry weight of plants/sample is heaviest in the A1 treatment, significantly different from A0 and A3, but not significantly different from A2. According to (Aisyah & Ariani, 2018), the nutrients contained in chicken manure have a significant effect on plants by stimulating the growth of roots, stems, leaves and height and bulb growth of shallot plants. N nutrients from chicken manure play a role in various plant physiological processes, P plays a role in root development and K acts as an enzyme activator and regulates cell turgor pressure. According to (Saragih & Kamarlin Pinem, 2016) the application of chicken manure gives the highest average on the wet weight parameter of bulbs per plot because chicken manure at certain doses meets the needs of shallot nutrients so that plant growth and production are optimal.

Volcanic ash treatment had no significant effect on the dry weight of plants per sample, but the highest dry weight of plants per sample was found in treatment V1 and the lowest in treatment V2.

Plant Dry Weight/Plot (g)

The list of variance showed that the treatment of chicken manure dose and the interaction between the two treatments had a significant effect on the dry weight of plants/plot, while volcanic ash had no significant effect on the dry weight of plants/plot. Table 6 presents the average dry weight of plants/plot of shallot plants due to the treatment of different doses of chicken manure and volcanic ash.

Table 6. Average Plant Dry Weight Per Plot of Shallot Plants in the Treatment of Chicken Manure and Volcanic Ash

Treatment	V0	V1	V2	V3
A0	874,00d	1250,50cd	1475,50bcd	1545,50bc
A1	1761,50bc	1962,50bc	2528,00a	1626,00bc

A2	2018,00b	1225,00cd	1442,00bcd	977,50cd
A3	1299,00bcd	1328,00bcd	752,50d	708,50d

Description : Numbers followed by the same letter in the same column are not significantly different based on Duncan's test at the 5% test level.

In Table 6, it can be seen that the interaction between the two treatments has a significant effect on the dry weight of plants/plot of shallots on the heaviest average in A1V2 which is significantly different from A0V0, A0V1, A0V2, A0V3, A1V0, A1V1, A1V3, A2V0, A2V1, A2V2, A2V3, A3V0, A3V1, A3V2, and A3V3.

Cation Exchange Capacity in Soil (cmol(+)/kg)

The list of variance showed that the doses of chicken manure and volcanic ash, as well as the interaction between the two treatments had no significant effect on cation exchange capacity in soil. Table 7 presents the average of cation exchange capacity in soil due to different doses of chicken manure and volcanic ash.

Table 7. Average Cation Exchange Capacity in Soil in the Treatment of Chicken Manure and Volcanic Ash

Treatment	V0	V1	V2	V3	Average
A0	23,47	22,38	22,93	19,82	22,15
A1	22,52	28,67	27,52	23,83	25,64
A2	20,82	20,78	24,38	19,71	21,42
A3	19,91	24,50	22,08	20,81	21,83
Average	21,68	24,08	24,23	21,04	

In Table 7, it can be seen that the dose of chicken manure treatment has no significant effect on cation exchange capacity in soil. The highest cation exchange capacity in soil is found in A1 and the lowest in A2 treatment. Volcanic ash treatment has no significant effect on cation exchange capacity in soil. The highest cation exchange capacity in soil is found in V2 and the lowest in V3 treatment.

Base Saturation in Soil (%)

The list of variance showed that the dose of chicken manure treatment significantly affected the base saturation in the soil, while the volcanic ash treatment and the interaction between the two treatments did not significantly affect the base saturation in the soil. Table 8 presents the average of base saturation in soil due to different doses of chicken manure and volcanic ash treatments.

In Table 8, it can be seen that in the treatment of chicken manure dosage, the highest base saturation in the soil is found in the A3 treatment, significantly different from A0, but not significantly different from A1 and A2. Increasing the dose of chicken manure increases the saturation of bases, C-organic and pH H2O caused by organic matter of chicken manure that undergoes decomposition to produce organic compounds. The increase in soil pH due to the application of manure given to rice fields, because the added manure will be further decomposed/mineralized releasing minerals in the form of basic cations (Ca, Mg, Na, K) which causes the concentration of OH- ions to increase resulting in increased pH.

Table 8. Average Saturation of Bases in Soil in the Treatment of Chicken Manure and Volcanic Ash

Treatment	V0	V1	V2	V3	Average

A0	53,79	54,66	51,98	55,51	53,98b
A1	82,19	86,09	95,06	93,37	89,17ab
A2	127,37	85,07	85,01	100,18	99,41a
A3	110,90	95,76	89,53	121,46	104,41a
Average	93,56	80,39	80,39	92,63	

Description : Numbers followed by the same letter in the same column are not significantly different based on Duncan's test at the 5% test level.

C-organic in Soil (%)

The list of variance showed that the dose of chicken manure treatment had a significant effect on C-organic in soil, while the volcanic ash treatment and the interaction between the two treatments had no significant effect on C-organic in soil. Table 9 presents the average of C-organic in soil due to different doses of chicken manure and volcanic ash treatments.

Table 9. Average C-organic in Soil in the Treatment of Chicken Manure and Volcanic Ash

Treatment	V0	V1	V2	V3	Average
A0	1,56	2,35	1,50	1,40	1,70b
A1	2,40	2,94	3,43	2,59	2,84a
A2	3,52	2,39	2,84	2,72	2,87a
A3	2,61	2,98	2,80	2,80	2,80ab
Average	2,52	2,67	2,64	2,38	

Description : Numbers followed by the same letter in the same column are not significantly different based on Duncan's test at the 5% test level.

In Table 9 it can be seen that in the treatment of chicken manure dose, the highest C-organic in the soil is found in the A2 treatment, significantly different from A0, but not significantly different from A1 and A3. Volcanic ash treatment has no significant effect on C-organic in the soil, but the highest C-organic in the soil is found in the V1 treatment and the lowest in the V3 treatment.

pH H2O in Soil (%)

The list of variance showed that the dose of chicken manure treatment had a significant effect on the pH of H2O in the soil, while the volcanic ash treatment and the interaction between the two treatments had no significant effect on the pH of H2O in the soil. Table 10 presents the average pH H2O in soil due to different doses of chicken manure and volcanic ash treatments.

Table 10. Average pH H2O in Soil in the Treatment of Chicken Manure and Volcanic Ash

Treatment	V0	V1	V2	V3	Average
A0	5,24	5,09	5,28	5,31	5,23b
A1	6,29	6,72	6,60	6,54	6,53a
A2	6,57	6,29	6,57	6,53	6,49ab
A3	6,74	6,65	6,27	6,59	6,56a
Average	6,21	6,19	6,18	6,24	

Description : Numbers followed by the same letter in the same column are not significantly different based on Duncan's test at the 5% test level.

In Table 10, it can be seen that in the treatment of chicken manure dosage, the highest pH H2O in the soil is found in the A3 treatment, significantly different from A0, but not significantly different from A1 and A2. According to (Elisabeth et al., 2019) C-organic is carbon contained in the soil which will be used to increase plant productivity and sustainability of plant life because it can increase soil fertility and efficient use of nutrients. This C-Organic will determine the high and low content of organic matter in the soil. Organic matter added to the soil will be broken down by soil microorganisms resulting in improved physical, chemical and biological properties of the soil.

Volcanic ash treatment did not significantly affect the pH H2O in the soil, but the highest pH H2O in the soil was found in treatment V3 and the lowest in treatment V2.

Availability of Si in Soil (ppm)

The list of variance showed that the doses of chicken manure and volcanic ash as well as the interaction between the two treatments had no significant effect on the availability of Si element in the soil. Table 11 presents the average availability of Si in the soil due to different doses of chicken manure and volcanic ash.

Table 11. Average Availability of Si in Soil in the Treatment of Chicken Manure and Volcanic Ash

Treatment	V0	V1	V2	V3	Average
A0	71,38	73,49	68,51	392,65	151,51
A1	121,67	122,11	125,48	110,93	120,05
A2	236,38	97,92	125,14	123,49	145,73
A3	108,22	141,42	125,36	211,19	146,54
Average	134,41	108,73	111,12	209,57	

In Table 11, it can be seen that the dose of chicken manure treatment had no significant effect on the availability of Si in the soil, but the highest Si content was found in the A3 treatment and the lowest in the A0 treatment. Volcanic ash treatment had no significant effect on the availability of Si in the soil, but the highest availability of Si in the soil was found in the V3 treatment and the lowest in the V1 treatment.

5. Conclusion

From this research, it can be concluded that:

1. Dosage treatment of chicken manure up to a dose of 11.25 kg/plot had a significant effect on leaf length, plant wet weight per sample, plant wet weight/plot, plant dry weight per sample, plant dry weight/plot, base saturation, C-organic, pH H2O, but had no significant effect on the number of tubers, CEC and Si availability in paddy fields.
2. Volcanic ash dose treatment has no significant effect on all shallot observation parameters.
3. The interaction between the doses of chicken manure and volcanic ash had no significant effect on leaf length at 2, 3, and 5 weeks of planting, wet weight of plants/sample, dry weight of plants/sample, base saturation, C-organic, pH H2O, number of bulbs, CEC and availability of Si in the paddy field, but had a significant effect on leaf length at 4 weeks of planting with the best combination that produced

the highest average leaf length, namely the A2V3 treatment (7.5 kg/plot of chicken manure and 5.62 kg/plot of volcanic ash): 5.62 kg/plot of volcanic ash), and significantly affected the wet weight of plants/plot and dry weight of plants/plot with the best combination that produced the heaviest average weight, namely treatment A1V2 (3.75 kg/plot of chicken manure : 3.75 kg/plot of volcanic ash).

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