

# INCREASING THE PRODUCTIVITY OF A FEW VARIETIES OF ONION (*ALLIUM ASCALONICUM* L.) WITH THE APPLICATION OF AMELIORANT

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## Abstract

The Onion (*Allium ascalonicum* L.) which is cultivated with the ameliorant can expand its conventional functions as a seasoning to different purposes such as medicines and growth regulator. The purpose of this study is to determine the type and dose of ameliorant which are suitable in improving the productivity of a few varieties of onion (*Allium ascalonicum* L.). This research was conducted in Labuhan Deli District in the province of Sumatera Utara, Socfindo Laboratory and Final Disposal from February – June 2017. The experiment was carried out using a Randomized Block Design with 2 factors and 3 replications. The first factor is varieties consisting of 3 varieties (Bima Brebes, Super Philip, and Medan). the second factor are Ameliorant consisting of 5 dose levels (Control (without ameliorant), Biochar 0,4 kg/m<sup>2</sup>, biochar 0,8 kg/m<sup>2</sup>, Urban waste compost 1 kg and Urban waste compost 2 kg/m<sup>2</sup>). Parameters observed ie plant height (cm), Number of tillers per hill (tillers), and fresh weight production per m<sup>2</sup>. The results showed that varieties factor gave significantly of difference to the urban waste compost application 1 kg can increase the production of super Philip varieties onion with total fresh weight production 1203,57 g.

**Keywords:** Onion, Varieties, Ameliorant

## 1. INTRODUCTION

Onion (*Allium ascalonicum* L.) is a vegetable commodity that can be cultivated from lowland to upland areas. Onion cultivation has long been farmed by farmers intensively and is largely characterized by a relatively small area of land. Onion has an important meaning for the community so that onion has a favorable business prospect and high economic value including products such as fried onions and spices (Napitupulu *et al.*, 2010).

Onions have high business prospects and opportunities where onion is needed daily by the community. Seasonal onion production causes the need beyond the harvest season to be unable to be met so that import action is required (Napitupulu *et al.*, 2010).

Onion cultivation can be directed as a business that is able to increase revenue and provide added value. Increased production and quality of onion yield should always be improved through intensification such as cultivation techniques in terms of soil enhancement, onion cultivation location and use of varieties (Sumarni *et al.*, 2005).

The use of Ameliorant is a way to accelerate the process of land quality restoration. Ameliorant are synthetic or natural materials, organic or mineral in the form solid or liquid that can improve soil structure, can change the soil capacity, improve soil ability in holding nutrients so that water and nutrients can be easily lost. However, the plant is still able to utilize the water and nutrients (Dariah *et al.*,). The purpose of this study is to determine the type and dose of ameliorant which are suitable in improving the productivity of few varieties of onion (*Allium ascalonicum* L.)

## 2. MATERIALS AND METHOD

This research was conducted in Labuhan Deli District in the province of Sumatera Utara, Socfindo Laboratory and Final Disposal from February – June 2017. The experiment was carried out using a Randomized Block Design with 2 factors and 3 replications. The first factor is varieties (Bima brebes, Super philip, and Medan). The second factor is ameliorant (control (without ameliorant), Biochar 0,4 kg/m<sup>2</sup>, Biochar 0,8 kg/m<sup>2</sup>, Urban waste compost 1 kg/m<sup>2</sup> and Urban waste compost 2 kg/m<sup>2</sup>).

This research begins with soil analysis, land preparation, tuber preparation, soil enhancement application, planting, maintenance such as watering, stitching, weeding, hatching, pest and disease control, and harvesting.

Soil analysis was carried out before the composite plots were made in a systematic method. Ameliorant Biochar and Urban waste compost were applied 1 week before planting in accordance with the treatment combination. Harvesting is done depending on the age of harvest of each variety. Harvesting is done when dry soil to facilitate the process of removal of tubers.

Parameters observed were plant height (cm), number of tillers per hill (tillers), and fresh weight production per m<sup>2</sup>. The data were analyzed statistically based on variance analysis on each observed variables measured evidently continued by using Duncan Multiple Range Test at 5 % level.

### 3. RESULTS AND DISCUSS

#### 3.1. Plant height (cm)

The results of the analysis test showed that the height of the plant age 2, 3, 4, 5, and 6 weeks after planting that the varieties factor gave a significant difference to the height of the plant but ameliorant applications and varieties interactions and ameliorant not significantly difference to height of the plant.

**Table 1. Plant height (cm) some onion varieties at age 2 - 6 weeks after planting against the ameliorant applications.**

	Variety	Ameliorant					Average
		P <sub>0</sub>	P <sub>1</sub>	P <sub>2</sub>	P <sub>3</sub>	P <sub>4</sub>	
		..... (cm).....					
2	V <sub>1</sub> (Bima Brebes)	19,93	19,94	20,88	18,33	18,84	19,58 a
	V <sub>2</sub> (Super Philip)	15,00	12,73	14,38	12,28	14,03	13,69 b
	V <sub>3</sub> (Medan)	11,41	12,54	14,32	11,34	11,42	12,21 c
	Average	15,45	15,07	16,53	13,98	14,76	
3	V <sub>1</sub> (Bima Brebes)	24,04	23,93	25,30	22,68	23,86	23,96 a
	V <sub>2</sub> (Super Philip)	18,66	16,04	17,96	16,33	17,39	17,28 b
	V <sub>3</sub> (Medan)	16,38	16,88	18,42	15,85	16,50	16,81 b
	Average	19,70	18,95	20,56	18,29	19,25	
4	V <sub>1</sub> (Bima Brebes)	28,53	27,99	29,17	27,64	27,05	28,07 a
	V <sub>2</sub> (Super Philip)	22,53	19,64	22,73	21,07	21,29	21,45 b
	V <sub>3</sub> (Medan)	19,31	19,46	22,14	18,51	19,34	19,75 c
	Average	23,46	22,36	24,68	22,40	22,56	
5	V <sub>1</sub> (Bima Brebes)	31,93	30,03	31,15	31,60	31,05	31,15 a
	V <sub>2</sub> (Super Philip)	25,98	23,45	28,35	25,48	26,70	25,99 b
	V <sub>3</sub> (Medan)	21,50	23,13	22,44	20,07	21,61	21,75 c
	Average	26,47	25,53	27,31	25,72	26,46	
6	V <sub>1</sub> (Bima Brebes)	33,30	31,28	31,49	35,70	35,24	33,40 a
	V <sub>2</sub> (Super Philip)	28,04	26,51	31,31	29,40	30,69	29,19 b
	V <sub>3</sub> (Medan)	22,38	25,96	26,22	22,48	23,46	24,10 c
	Average	27,91	27,92	29,67	29,19	29,80	

Note : The numbers in unequal columns followed by unequal notation show significant differences according to Duncan Multiple Range Test at 5 % level.

P<sub>0</sub> = control, P<sub>1</sub> = Biochar 0,4 kg/m<sup>2</sup>, P<sub>2</sub> = Biochar 0,8 kg/m<sup>2</sup>, P<sub>3</sub> = Urban waste compost = 1 kg/m<sup>2</sup>, P<sub>4</sub> = Urban waste compost 2 kg/m<sup>2</sup>

The data in table 1 shows that varieties Bima brebes differ significantly with Super Philip and Medan at age 2 - 6 weeks after planting. This shows the genetic diversity of each variety. The genetic nature of the variety it self causes the difference in the height of the plants owned by each variety (Ramija *et al.*, 2010). Due to the genetic influence and environmental varieties of crops there is always a difference in response to soil conditions and where the growth of plants against environmental conditions (Harjadi, 1991). Due to the nature of the plant or the environmental differences will both cause the diversity of appearance to occur between varieties.

### 3.2. Number of Tillers per hill (tillers)

The results of the analysis test showed that the height of the plant age 2, 3, 4, 5, and 6 weeks after planting that the varieties factor gave a significant difference to the number of tillers per hill but ameliorant applications dan varieties interactions and ameliorant not significantly difference to number of tillers per hill.

**Table 2. Number of tillers per hill (tillers) of Few Onion varieties at age 2 - 6 weeks after planting against the Ameliorant Applications.**

	Variety	Ameliorant					Average
		P <sub>0</sub>	P <sub>1</sub>	P <sub>2</sub>	P <sub>3</sub>	P <sub>4</sub>	
		.....tillers.....					
2	V <sub>1</sub> (Bima Brebes)	3,42	3,25	3,25	2,79	3,04	3,15 b
	V <sub>2</sub> (Super Philip)	3,71	3,13	3,25	3,63	3,71	3,48 a
	V <sub>3</sub> (Medan)	2,17	2,33	2,42	2,08	2,63	2,33 c
	Average	3,10	2,90	2,97	2,83	3,13	
3	V <sub>1</sub> (Bima Brebes)	4,00	3,71	3,79	3,00	3,38	3,58 b
	V <sub>2</sub> (Super Philip)	4,75	4,08	3,83	4,04	3,88	4,12 a
	V <sub>3</sub> (Medan)	2,58	2,63	2,79	2,42	2,67	2,62 c
	Average	3,78	3,47	3,47	3,15	3,31	
4	V <sub>1</sub> (Bima Brebes)	4,33	4,42	4,42	3,50	3,88	4,11 b
	V <sub>2</sub> (Super Philip)	5,54	4,58	4,54	5,00	4,96	4,93 a
	V <sub>3</sub> (Medan)	2,75	2,88	3,17	2,75	3,25	2,96 c
	Average	4,21	3,96	4,04	3,75	4,03	
5	V <sub>1</sub> (Bima Brebes)	4,38	4,58	4,67	3,63	4,33	4,32 b
	V <sub>2</sub> (Super Philip)	6,00	5,29	4,79	5,42	5,92	5,48 a
	V <sub>3</sub> (Medan)	2,96	3,13	3,49	2,67	3,29	3,11 c
	Average	4,44	4,33	4,32	3,90	4,51	
6	V <sub>1</sub> (Bima Brebes)	4,63	4,83	4,96	4,04	4,63	4,62 b
	V <sub>2</sub> (Super Philip)	6,21	5,42	4,96	5,38	6,08	5,61 a
	V <sub>3</sub> (Medan)	3,08	3,17	3,24	2,71	3,58	3,16 c
	Average	4,64	4,47	4,38	4,04	4,76	

Note: The numbers in unequal columns followed by unequal notation show significant differences according to Duncan Multiple Range Test at 5 % level.

P<sub>0</sub> = control, P<sub>1</sub> = Biochar 0,4 kg/m<sup>2</sup>, P<sub>2</sub> = Biochar 0,8 kg/m<sup>2</sup>, P<sub>3</sub> = Urban waste compost = 1 kg/m<sup>2</sup>, P<sub>4</sub> = Urban waste compost 2 kg/m<sup>2</sup>

The data in Table 2 shows that Super Philip varieties differ significantly with Bima brebes and Medan at age 2 – 6 weeks after planting and is the best factor for increasing the number of tillers per hill (tillers). In the formation of saplings is influenced by genetic factors and the level of soil fertility. On the potential of superior varieties such as number of tillers is influenced by the interaction between varieties with the condition of the place of growth. The high number of tillers of a variety caused by these varieties are able to adapt to growing conditions such as the environment and soil (Simatupang, 1997).

### 3.3. Fresh Weight Production per m<sup>2</sup> (g)

The results of the analysis test showed that fresh weight production per m<sup>2</sup> shows that varieties factor gives significant difference to fresh weight production per m<sup>2</sup> but soil application and interactions of varieties and ameliorant gives no significant differences to fresh weight production per m<sup>2</sup>.

**Table 3. Fresh Weight Production per m<sup>2</sup> (g) of Few Onion Varieties (*Allium ascalonicum* L.) against the Ameliorant Application**

Variety	Ameliorant					Average
	P <sub>0</sub>	P <sub>1</sub>	P <sub>2</sub>	P <sub>3</sub>	P <sub>4</sub>	
V <sub>1</sub> (Bima brebes)	717,10	800,47	760,00	859,33	805,67	788,51 b
V <sub>2</sub> (Super Philip)	712,43	776,93	851,23	1203,57	877,00	884,23 a
V <sub>3</sub> (Medan)	418,87	451,40	431,03	338,67	397,23	407,44 c
Average	616,13	701,03	655,99	725,52	768,30	

Note : The numbers in unequal columns followed by unequal notation show significant differences according to Duncan Multiple Range Test at 5 % level.

P<sub>0</sub> = control, P<sub>1</sub> = Biochar 0,4 kg/m<sup>2</sup>, P<sub>2</sub> = Biochar 0,8 kg/m<sup>2</sup>, P<sub>3</sub> = Urban waste compost = 1 kg/m<sup>2</sup>, P<sub>4</sub> = Urban waste compost 2 kg/m<sup>2</sup>

The data in Table 3 shows Super Philip varieties differ significant Bima brebes and Medan and is the best factor for increasing fresh weight production per m<sup>2</sup> (g). production is a result that is influenced by many factors or variables. These factors will affect the production rate of shallots. The level of productivity is basically influenced by the level pf application of technology. Selection of varieties plays an important role in cultivation because to achieve a high level of productivity is largely determinined by its genetic potential (Allard, 2005).Onion plants need a structural crumb, medium to clay, drainase and aeration are good and contain enough organic material (Tim Prima Tani, 2011). Growing conditions also affect the varieties, soil and climate are very influential on the production of crops (Damanik, *et al.*, 2010). According to descriptions of vegetable research center that the Super Philip variety is capable of producing 9 – 18 bulbs per hill with potential production of 17.6 ton/ha. Varieties have different sensitivity to nutrient availability. Simatupang (1997) Crops have a sensitivity and limit in nutrient uptake for the necessities of life. Damanik *et al* (2010) Ameliorant when used appropriately will support, control and fill each other in the soil.

#### 4. CONCLUSIONS

Super Philip varieties are the best varieties to increase crop production. The urban waste compost application 1 kg can increase the production of super Philip varieties onion with total fresh weight production 1203,57 gram.

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