

# Effect of Number Seedlings Per Planting Hole and Seeding Media on The Growth And Yield of TSS Shallots

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**Abstract.** The research aims to determine the effect of the number of seeds per planting hole and the composition of the shallot seeding media on the growth and yield of TSS shallots. This research was conducted in rice fields in Torongrejo Village, Junrejo District, Batu City, from March to July 2024. Factorial research using a Randomized Block Design (RAK) which was repeated three times. The first factor is the treatment of the composition of the seedling media. with different varieties; there are 6 levels, namely humus seedling media of the Merdeka (HM) variety; seeding media for Merdeka variety (KM) goat manure waste; soil seedling media for the Merdeka (TM) variety; humus seedling medium for the Lokananta variety (HL); seeding media for goat manure waste of the Lokananta variety (KL); soil seedling medium for the Lokananta variety (TL), while the second factor was the treatment of the number of seeds per planting hole, namely 1 seed per hole (T1), 2 seeds per hole (T2) and 3 seeds per hole (T3). Next, the data obtained was analyzed using Analysis of Variance and tested further using a BNJ level of 5%. Based on the results of the observations, there is an interaction between seeding media, variety, and the number of plants per planting hole, which affects the growth and yield of TSS shallots. TSS shallot production per unit area (Ha) in the goat fertilizer seedling media treatment; cocopeat; soil: dolomite with a ratio of 4; 4; 6; ¼ of the Merdeka and Lokananta varieties gave better growth and results compared to the control (using soil only), while in the treatment the number of seeds per planting hole affected growth and the best results were the implementation of planting 2 seeds per hole which was more effective and efficient.

**Keywords:** Number Seedlings, Planting Hole, Seeding Media, TSS Shallots

## 1. Introduction

Shallots (*Allium ascalonicum* L.) are a significant vegetable commodity in Indonesia. The increasing demand for shallots every year has led to an increase in shallot production in Indonesia from 2018 to 2023, with an average increase of 6.73% every year [1]. The market demand for shallots, which tends to increase yearly, incentivizes farmers to produce better quality crops. The



need for a large amount of planting material for the following planting forces farmers to incur high costs to meet the demand for planting material, especially bulbs [2]. Seeds are an important component of shallot cultivation, and farmers in Indonesia are still very accustomed to using bulb seeds. At present, shallot seed technology has developed from seeds or what is known as True shallot seed (TSS), which has advantages, namely seed health, fewer seed requirements compared to seeds from bulbs, lower seed prices and distribution costs, larger bulb size, and automatically heavier bulb production [3]. Seeds in the form of tubers have several disadvantages, including being unable to be stored longer after the planting season, off-season, or rainy season, the supply of seeds for the next season is limited, and prices increasing. One solution to overcome these problems is the use of botanical seeds (TSS = True Shallot Seed) [4]. The advantages of TSS are that it increases production up to two times compared to the use of bulb seeds (production of 26 tonnes/ha), free from diseases and viruses, and the need for fewer seeds; TSS shallot seeds only require 2-3 kg/ha, while bulb seeds require around 1-1.2 tonnes/ha. Transporting bulbs is more accessible and has a longer shelf life than bulbs [5]. The use of TSS seeds causes the planting time and farmer activities in maintaining TSS plants to be longer because they go through the nursery first. Thus, farmers can choose to use seed tubers that are organised to be obtained from producing seed tubers of TSS origin [6].

The use of TSS planting material has several problems, namely in terms of the growth power and resistance of seedlings, which tend to be low in the environment. So, it is necessary to have the technology to overcome these problems and use it as a source of primary shallot planting material that has good potential in the future [2]. Plant media for seedlings can come from various organic materials such as manure, compost, husk charcoal, and cocopeat. Organic matter is fundamental in planting media because it helps the soil structure become crumblier and can increase the soil's Organic C content [7]. Adding organic matter decreases the soil's content weight and specific gravity, improves soil porosity, stabilizes soil aggregates, and stabilizes soil water content at pF 4.2 [8].

The use of TSS-origin seed bulbs in shallot cultivation requires improved cultivation technology to obtain optimal results. Among them are the use of appropriate seedling media and the regulation of the number of seedlings per planting hole. Setting the number of seedlings per planting hole is necessary so that plants can grow optimally and provide higher production without increasing the area and reducing the possibility of pest and disease attacks [9]. The use of superior varieties and plant population size can affect crop productivity. Superior varieties can increase national crop productivity. The use of more than one seed per planting hole has the potential to increase productivity [10]. The correct number of plants per planting hole can affect the growth and production of TSS shallot plants. According to [11], fewer plants per hole will cause the quality of production to decrease or be bigger. This is due to competition for sunlight and nutrients between plants to obtain optimal growth factors. While planting fewer plants per planting hole affects lower productivity, it saves seed use [12]. Thus, setting the correct number of plants per planting hole can maximise production in quality and quantity because the number of plant populations per unit area is high.

According to [13], determining the number of plants per planting hole is closely related to the number of plant populations. Plant population density affects plant growth and production. However, plant population density that is too high can interfere with plant growth and productivity due to competition in the interception of sunlight radiation, absorption of water and nutrients as well as CO<sub>2</sub> and O<sub>2</sub> uptake [14] and soil conditions that are too humid can cause disease attacks on plants [15]. Thus, effective technology is needed to increase TSS shallot production, including adjusting the number of seeds per planting hole and the composition of seedling media.

Based on this explanation, research is necessary to determine the effect of the right number of seeds per hole in order to obtain good and optimal growth and yield of TSS shallot

plants and to find the seedling media that is good for the growth and yield of TSS shallot seedlings in the field.

## 2. Methods

The research was conducted in the paddy field of Torongrejo village, Junrejo sub-district, Batu City, at an altitude of 800 m above sea level from March to July 2024. Factorial research using Randomised Group Design (RAK) repeated three times.

Research with the first treatment was the type of seedling media using 2 TSS shallot varieties, namely Lokananta (L) and Merdeka (M), among others:

HL = Soil; organic humus with a ratio of 2 ; 1 Lokananta variety

HM = Soil; organic humus with a ratio of 2 ; 1 Merdeka Variety

KL = Goat fertilizer; cocopeat; soil: dolomite with a ratio of 4; 4; 6; ¼ Lokananta var.

KM = Goat fertiliser; cocopeat; soil: dolomite with a ratio of 4 ; 4 ; 6 ; ¼ var Merdeka

TL = Soil 100% Lokananta variety

TM = Soil 100% variety of Merdeka

Moreover, the second treatment is the number of seeds per planting hole, among others:

A1 = 1 seedling per planting hole

A2 = 2 seedlings per planting hole

A3 = 3 seedlings per planting hole

The materials used were 10 tonnes ha<sup>-1</sup> of manure and 300 kg ha<sup>-1</sup> of SP-36 spread on the field at planting time, 400 kg ha<sup>-1</sup> of NPK, 20 kg ha<sup>-1</sup> of red KNO<sub>3</sub>, 20 kg ha<sup>-1</sup> of white KNO<sub>3</sub> and 200 kg ha<sup>-1</sup> of white KCl. Pesticides used include Score 25 EC, Decis for Insect 25 EC, and Metromil 50 SP.

This study used a group randomised design with three replications. The research procedure was carried out as follows:

### 2.1 Land preparation

Land cultivation is done one month before planting, and manure is added two weeks before planting. Loosening is done at a depth of up to 40 cm. One-metre-wide beds are made, with the length adjusting to the planting distance used, which is 100 cm × 200 cm. The planting distance used was 10 cm x 15 cm.

### 2.2 Fertilisation and Maintenance

SP 36 base fertilizer was applied three days before planting, and NPK 16-16-16 was applied when the plants were 2 weeks old and 3 weeks after planting. When the plants are 4 weeks old, red KNO<sub>3</sub> is given. When the plants were 6 weeks old, white KNO<sub>3</sub> was given, then white KCl was given at the age of 7 weeks. Maintenance was carried out by watering every day in the morning and weeding weeds at 30, 45 days after planting, and 60 days after planting.

### 2.3 Observation

The parameters observed included plant growth and yield. Growth parameters included plant height (cm), number of leaves, and stem diameter (mm). Yield parameters included the number of tubers, the weight of tubers per plant (grams), and the weight of tubers per bed (kg).

### 2.4 Statistical analysis

Analysis of variance was conducted on quantitative data of observation results on each parameter analyzed using the analysis of variance (F-test) at  $\alpha = 5\%$ . If there are parameters that show a real effect, then the BNJ test at  $\alpha = 5\%$  is continued. Data analysis was conducted using Ms. Excel DSTAAT software.

### 3. Results and Discussion

The results of the variance analysis show that there is an interaction between seedling media and the number of seedlings per planting hole. The difference between the combination treatment of seedling media with the varieties used and the number of seedlings per hole affects the height of TSS shallot plants produced at the age of 4 and 5 weeks after planting (Table 1).

**Table 1.** Effect of planting media and number of seedlings per hole on the average plant height of TSS shallots of Lokananta and Merdeka varieties at the age of 4 and 5 weeks after planting.

Treatment	Plant Height Treatment		
	Number of seedlings per hole		
Age 4 weeks after planting			
Planting media	A1	A2	A3
HL	20 ab	27 abcde	34 e
HM	18,67 a	21,67 abc	28,27 bcde
KL	22 abc	30 cde	33 de
KM	29 bcde	28,67 bcde	34,83 e
TL	24 abcd	30 cde	30 cde
TM	18 a	21,67 abc	29,33 bcde
Coefficient of variation (%)	18,22		
LSD (5%)	8,066		
Age 5 weeks after planting			
HL	34,33 bcde	36,67 cdef	40 def
HM	38,1 cdef	32,33 bcd	41,3 ef
KL	32 bcd	30,33 bc	36,33 cdef
KM	41,83 ef	44,47 f	32 bcd
TL	27 ab	19,33 a	30,33 bc
TM	26,13 ab	34,67 bcde	33 bcde
Coefficient of variation (%)	13,54		
LSD (5%)	7,62		

Notes: The Numbers followed by the same letter in the same column showed no significant difference based on the Least Significant Difference (LSD) test at the 5% level, LSD = Least Significant Difference; KK = Coefficient of Variance.

In the treatment of several seedlings, one planting hole in different seedling media shows lower growth and is not significantly different between the different treatments of seedling media composition except for the treatment of goat composition, cocopeat; soil:Dolomite with a ratio of 4; 4; 6; ¼ var Merdeka (KM) which is higher and not significantly different from the treatment of the number of seedlings two plants per planting hole and the number of seedlings three plants per planting hole at the age of 4 weeks after planting, when the plants are 5 weeks after planting there is a decrease in plant height in the treatment of the number of seedlings three plants per planting hole (KM. A3).

When the plants were 5 weeks old, the treatment of the number of seedlings of 3 plants per plant hole with seedling media composition of goat manure; cocopeat; soil: dolomite in the ratio of 4; 4; 6; ¼ var Merdeka (KM) showed the highest growth and did not differ from the use of the variety Lokananta in the HM treatment (soil; organic humus in the ratio of 2; 1 variety Lokananta)

at the number of seedlings of 2 plants per hole. This is following the research of [16], which states that the number of seeds per hole significantly affects plant height at 2 weeks of age. The highest results were obtained in planting 4 seeds per hole, and it was found that there was no interaction effect between planting distance and the number of seeds per hole on all parameters; moreover, in accordance with the findings reported by [17] which highlighted the importance of organic matter in seedling media for optimal growth of horticultural crops. This suggests that media-rich humus and organic fertilizers can provide balanced nutrition and support the growth of shallot seedlings, in line with research by [18], which found that humus improves moisture retention and provides essential micro-nutrients to plants [18]. The results of the study [19] showed that with increasing doses of humus and humic acid applied to the soil, plant growth and the amount of plant nutrients increased, where increasing doses of humus gave the highest values in both plant growth parameters and plant nutrient content values.

**Table 2.** The effect of planting media and the number of seedlings per hole on the average height of TSS shallot plants of Lokananta and Merdeka varieties at the age of 6 and 7 weeks after planting.

<b>Treatment</b>	<b>Plant Height Treatment</b>		
Age 6 weeks after planting	Number of seedlings per hole		
Planting media	<b>A1</b>	<b>A2</b>	<b>A3</b>
HL	36 bcdefgh	42,67 fgh	40 efgh
HM	29,93 bc	31 bcd	38,27 defhg
KL	20,67 a	28,67 b	36 bcdefgh
KM	37,6 cdefgh	42,1 fgh	44 h
TL	41 fgh	30,67 bcd	32 bcd
TM	32,97 bcde	34,8 bcdef	34,8 bcdefg
<b>Coefficient of variation (%)</b>	11,55		
<b>LSD (5%)</b>	6,74		
Age 7 weeks after planting			
HL	37 bcde	41,33 cde	44 e
HM	26,5 a	38,57 bcde	45,07 e
KL	31,67 ab	31,67 ab	44,33 e
KM	42,5 de	38,83 bcde	39 bcde
TL	34,67 abcd	34 abcd	40 bcde
TM	35 bcd	33,27 abc	39,57 bcde
<b>Coefficient of variation (%)</b>	11,88		
<b>LSD (5%)</b>	7,41		

Notes: The Numbers followed by the same letter in the same column showed no significant difference based on the Least Significant Difference (LSD) test at the 5% level, LSD = Least Significant Difference; KK = Coefficient of Variance

Table 2 shows the variance analysis results, showing an interaction between seedling media and the number of seedlings per planting hole. The difference between the combination of seedling media treatment with the varieties used and the number of seedlings per hole affects the height of TSS shallot plants produced 6 and 7 weeks after planting. This is following the results of research by [21] that the treatment of a planting distance of 25 x 25cm and the number of seedlings 3 per planting hole is still able to support plant growth so that it can give the best response trend of the plant height parameter. Meanwhile, the treatment of using a spacing of 25 x

25cm and the number of 5 seedlings per planting hole causes competition in getting nutrients and water from the soil, causing the lowest plant height tendency. This follows the opinion of [21], which states that the number of rice seedlings per planting hole affects growth because it directly deals with competition between plants in one clump. According to [22], planting distance is closely related to the presence of leaves to get sunlight and CO<sub>2</sub> from the air. In the KM treatment (Goats; cocopeat; soil: dolomite with a ratio of 4; 4; 6; ¼ Merdeka var) and HM (Soil; organic humus with a ratio of 2; 1 Merdeka variety) at the age of 6 weeks after planting did not show significant differences when combined with the treatment of the number of seedlings 1 plant per hole with the number of seedlings 2 plants per hole and the number of seedlings 3 plants per hole. This also occurred in the KM treatment (Goat; cocopeat; soil: dolomite in a ratio of 4; 4; 6; ¼ Merdeka variety) at the age of 7 weeks after planting; there was no significant difference when combined with the treatment of the number of seedlings 1 plant per hole with the number of seedlings 2 plants per hole and the number of seedlings 3 plants per hole. The results of research by [23] showed that the treatment of the number of seedlings 4 plants per hole is the best treatment of all treatments because it has many advantages and the most minor weaknesses. Meanwhile, the treatment of 3 seedlings per hole gave higher yields than the treatment of 1 seedling and 2 seedlings per hole. It is suspected that there is no competition in plant growth and no competition for growing space for stems or leaves in obtaining sunlight. The more plants, the more production will increase [24].

**Table 3.** Effect of planting media and number of seedlings per hole on the average number of leaves of TSS shallot plants of Lokananta and Merdeka varieties at 4 and 5 weeks after planting

Number of Leaves			
Age 4 weeks after planting	Number of seedlings per hole		
	A1	A2	A3
Planting media			
HL	5 ab	11 de	12 def
HM	4,67 ab	5,33 ab	15,33 fg
KL	3a	11 de	13 efg
KM	5,67 abc	12,33 def	16,33 gh
TL	4 ab	6 abc	9 cd
TM	7 bc	14,67 fg	19,67 h
Coefficient of variation (%)	19,82		
LSD (5%)	3,198526		
Age 5 weeks after planting			
HL	10,67 bcd	15 fgh	22 k
HM	8,67 b	13 ef	21 jk
KL	4,67 a	11,67 de	16,67 h
KM	11 cde	17 hi	19 ij
TL	9,33 bc	9 bc	14 fg
TM	5a	20,33 jk	16 gh
Coefficient of variation (%)	8,97		
LSD (5%)	2,0189		

Notes: The Numbers followed by the same letter in the same column showed no significant difference based on the Least Significant Difference (LSD) test at the 5% level, LSD = Least Significant Difference; KK = Coefficient of Variance.

Table 3 shows the variance analysis results, which show an interaction between seedling media and the number of seedlings per planting hole. The difference between the combined treatment of seedling media with the varieties used, and the number of seedlings per hole affects the number of TSS shallot leaves produced at 4 and 5 weeks after planting. In the treatment of

different seedling media compositions, it shows that the TM treatment (100% soil of Merdeka variety) combined with the number of seedlings per hole treatment (A1) produces a higher number of leaves than the treatment of other seedling media compositions with the number of seedlings per hole treatment (A1). The HL A1, HM A1, KL A1, KM A1, and TL 1 treatments produced fewer leaves than the HL A2, HM A2, KL A2, KM A2, and TL 2 treatments, with the TM A3 treatment producing the highest number of leaves that was not significantly different from the KM A3 treatment at 4 weeks after planting. This is different when the plants are 5 weeks after planting; there is an increase in the number of leaves when the number of seedlings per hole of 1 plant per hole produces a small number of leaves due to a small population. The number of leaves will increase when the holes are 2 seeds, and the number of leaves increases when the plants are planted with the number of seedlings 3 plants per hole in the HL treatment (Soil; organic humus with a ratio of 2; 1 Lokananta variety) followed by the HM treatment (Soil; organic humus with a ratio of 2; 1 Merdeka variety) which is not significantly different. This follows the results of research by [25] that using humus, both as a single medium and in a mixture with cocopeat, has shown positive results on the growth of potato plantlet cuttings. The results of the observation of the parameters of this study showed that the use of humus as a single medium had significantly increased the number of leaves, starting from the observation of 14 HST to the observation of 42 HST. This finding is in line with previous research conducted by [26] on red betel plants, which also showed an increase in the growth of the number of leaves and the number of flowers when using bamboo leaf humus as a treatment.

**Table 4.** Effect of planting media and number of seedlings per hole on the average number of leaves of TSS shallot plants of Lokananta and Merdeka varieties at the age of 6 and 7 weeks after planting.

Treatment	Number of Leaves		
Age 6 weeks after planting			
	Number of seedlings per hole		
Planting media	<b>A1</b>	<b>A2</b>	<b>A3</b>
HL	15 cd	19,67 ef	22 fg
HM	11 ab	8,33 a	8,5 a
KL	8,33 a	11,67 b	22,33 fg
KM	13 bc	<b>24,67 g</b>	<b>24 g</b>
TL	17,33 de	10,67 ab	22 fg
TM	8a	10,67 ab	17 de
Coefficient of variation (%)	11,002		
LSD (5%)	2,780811		
Age 7 weeks after planting			
HL	16,67 bc	27,33 f	40 g
HM	13,67 ab	13 ab	21,67 cde
KL	10,67 a	23,67 def	29 f
KM	17 bc	18 bc	26,67 ef
TL	13 ab	13,33 ab	18,67 bcd
TM	13 ab	8 a	19,67 cd
Coefficient of variation (%)	15,905		
LSD (5%)	5,029213		

Notes: The Numbers followed by the same letter in the same column showed no significant difference based on the Least Significant Difference (LSD) test at the 5% level, LSD = Least Significant Difference; KK = Coefficient of Variance

The results of the variance analysis show that there is an interaction between seedling media and the number of seedlings per planting hole. The difference between the combination treatment of seedling media with the varieties used and the number of seedlings per hole affects

the number of TSS shallot leaves produced at the age of 6 and 7 weeks after planting (Table 4). This is inversely proportional to the results of research by [27], which stated that the treatment of the number of seeds per planting hole did not significantly affect the number of leaves. At the age of 6 weeks after planting, the treatment of various planting media compositions showed that the KM treatment (Goat fertilizer; cocopeat; soil: dolomite in a ratio of 4; 4; 6; ¼ Merdeka varieties) combined with the treatment of the number of seedlings of 2 plants per hole (A2) produced a high number of leaves and was not significantly different from the KM treatment with the number of seedlings of 3 plants per hole (A3) and the treatment of HL A3, KL A3. The treatment of HL A1, HM A1, KL A1, KM A1, and TL 1 produced fewer leaves than the treatment of HL A2, HM A2, KL A2, KM A2, and TL 2, where the treatment of TM A3 produced the least number of leaves. When the plants were 7 weeks old after planting, it showed that the treatment combination HL A3 (Soil; organic humus with a ratio of 2; 1 Lokananta varieties with the number of seedlings 3 plants per hole) produced the highest number of leaves. The level below is the treatment of KL A3, KM A3, HL A2, and KL A2, where the treatment with the least number of leaves is TM A2 (100% soil of Merdeka variety with 2 seedlings per hole). Providing humus-rich compost increases nutrient absorption by stimulating mycorrhizal colonization and ensuring the sustainability of soil fertility by keeping the risk of environmental pollution at a minimum level and obtaining maximum productivity and quality of crop production [28].

**Table 5.** Effect of planting media and number of seedlings per hole on the average stem diameter of TSS shallot plants of Lokananta and Merdeka varieties at the age of 4 and 5 weeks after planting.

Treatment	Plant stem diameter		
	Number of seedlings per hole		
Age 4 weeks after planting			
Planting media	<b>A1</b>	<b>A2</b>	<b>A3</b>
HL	2,9 ab	5,3 efg	5,4 efg
HM	3,43 abc	5,07 def	7,83 h
KL	5,7 fg	4 bcd	4,3 cde
KM	6,43 g	6 fg	9,6 i
TL	3 ab	5,4 efg	3,6 abc
TM	4 bcd	2,5 a	5,07 def
Coefficient of variation (%)	12,689		
LSD (5%)	1,047		
Age 5 weeks after planting			
HL	8,3 f	6,63 cde	6,367 cd
HM	8,467 f	4,133 a	5,967 bcd
KL	6,4 cd	6,73 cde	8,033 f
KM	5,767 bc	5,9 bcd	4,567 a
TL	7,567 ef	4,567 a	5,1 ab
TM	6,867 de	5,83 bcd	4,967 ab
Coefficient of variation (%)	8,92		
LSD (5%)	0,922		

Notes: The Numbers followed by the same letter in the same column showed no significant difference based on the Least Significant Difference (LSD) test at the 5% level, LSD = Least Significant Difference; KK = Coefficient of Variance

Table 5 shows the results of the analysis of variance, which show an interaction between seedling media and the number of seedlings per planting hole. At the age of 4 weeks after planting, KL A1 and KM A1 treatments produced larger stem diameters than HL A1, HM A1, TL A1, and TM A1. HL A3, HM A3, and TMA3 produced larger diameters than HL A1, HL A2, HM A1, HM A2, TM A1, and

TM A2. Along with the increase in plant age at the age of 5 weeks after planting, it shows that seedlings of one plant per hole in several planting media compositions (HL A1, HM A1, KM A1, TL A1, and TM A1) produce a larger diameter than seedlings planted with 2 plants per hole in several planting media compositions (HL A2, HM A2, KM A2, TL A2 and TM 32) and 3 plants per hole (HL A3, HM A3, KM A3, TL A3, and TM A3) produced a larger stem diameter than the HL A2, HM A2, KL A2, KM A2 and TL 2 treatments, The TM A3 treatment produced the highest number of leaves which was not significantly different from the KM A3 treatment at 4 weeks after planting.

**Table 6.** The effect of planting media and the number of seedlings per hole on the average stem diameter of TSS shallot plants of Lokananta and Merdeka varieties at the age of 6 and 7 weeks after planting.

Treatment	Plant stem diameter		
	Number of seedlings per hole		
Age 6 weeks after planting Planting media	A1	A2	A3
HL	11,8 hi	10,77 gh	7,8 de
HM	6,97 cd	6,67 bcd	8,33 e
KL	12,8 i	9,67 fg	6,23 bc
KM	12,33 i	9 ef	6 bc
TL	9,03 ef	3,167 a	6,6 bcd
TM	6,167 bc	5,53 b	4,167 a
Coefficient of variation (%)	8,93		
LSD (5%)	1,177		
Age 7 weeks after planting			
HL	6,67 a	13,7 f	7,967 abc
HM	9,767 bcde	7a	9,167 abcd
KL	10,1 cde	8,93 abcd	10,13 cde
KM	11,4 def	9,7 bcde7	8,23 abc
TL	9,33 abcd	7,3 ab	7,167 ab
TM	12,37 ef	9,9 bcde	6,8 a
Coefficient of variation (%)	15,481		
LSD (5%)	2,365		

Notes: The Numbers followed by the same letter in the same column showed no significant difference based on the Least Significant Difference (LSD) test at the 5% level, LSD = Least Significant Difference; KK = Coefficient of Variance

At the age of 6 weeks after planting, the treatments HL A1, KL A1, KM A1, TL A1, and TM A1 produced larger stem diameters than HL A2, KL A2, KM A2, TL A2 and TM A2 and HL A3, KL A3, KM A3, TL A3 and TM A3. HM A1 treatment produces a smaller stem diameter than HM A2 and HM A3. When the plants were 7 weeks after planting, the treatments showed that HL A3, HM A3, KL A3, KM A3, TL A3, and TM A3 produced smaller diameters than HL A2, HM A2, KL A2, KM A2, TL A2 and TM A2 and HL A1, HM A1, KL A1, KM A1, TL A1 and TM A1.

The results of the variance analysis show that there is an interaction between seedling media and the number of seedlings per planting hole. The difference between the combination treatment of seedling media with the varieties used, and the number of seedlings per hole affects the weight of bulbs per planting hole of TSS shallot plants (Table 7). The treatment for KM A3 (goat manure; cocopeat; soil: dolomite in a ratio of 4; 4; 6; ¼ var Merdeka) planted with 3 seedlings per planting hole produced the highest weight of perbedeng tubers and was not significantly different from KM A2 and KL A2 and KL A3 and HL A3. This shows that a mixed seedling media of goat fertilizer, cocopeat, and dolomite can produce higher tuber. This is to the research of [29], which states that the application of 30 t.ha-1 bokashi goat manure gives higher

fresh tuber weight per plant than without goat manure. Besides that, it also helps accelerate the synthesis of amino acids and proteins to accelerate plant growth. This happens because livestock manure compost can provide macro and micronutrients to plants, improve soil texture and structure, loosen the soil, increase soil microbial composition so as to facilitate plant root growth and absorb water in the soil longer [30]. The availability of nutrients increases the size and number of cells, thus triggering the enlargement of shallot bulbs [31]; [32]. Some potential sources of organic matter include cows, goats, and chickens. The study's results [33] stated that the use of goat and cow fertilizers had a significant effect on the number of tubers per clump, and plant height but had no significant effect on the wet and dry weight of tubers. Organic fertilizer also affects K content but does not affect N, P, Ca, Mg [34]. Adding organic matter will improve the physical and chemical properties of the soil, making it more fertile and nutrient dense. Organic matter in the soil increases water retention, soil structure, microbiological activity, cation exchange capacity [35], and the availability of P and S nutrients [36]. Organic matter is a complete source of nutrients, although its availability varies. The use of organic fertilizer affects shallot growth and yield.

**Table 7.** Effect of planting media and the number of seedlings per hole on the weight of bulbs of TSS shallots of Lokananta and Merdeka varieties

Treatment	tuber weight per plant		
	Number of seedlings per hole		
Planting media	A1	A2	A3
HL	843,33 a	1168,274 abcde	<b>1860,153 fgh</b>
HM	1014,67 ab	1031,33 abc	1209,69 abcde
KL	862,23 a	<b>2101,53 ghi</b>	<b>2214 hi</b>
KM	1108,47 abcde	<b>2168,33 hi</b>	<b>2678,94 i</b>
TL	927,30 a	1032,33 abcd	1545,33 bcdef
TM	827,85 a	1009,33 ab	1606,35 cdefg
Coefficient of variation (%)	21,88		
LSD (5%)	508,48		

Notes: The Numbers followed by the same letter in the same column showed no significant difference based on the Least Significant Difference (LSD) test at the 5% level, LSD = Least Significant Difference; KK = Coefficient of Variance

#### 4. Conclusion

Seedling media with goat manure, cocopeat, soil: dolomite in a ratio of 4 4; 6; ¼ is the best composition to produce TSS shallot plant production both using the Lokananta variety and using the Merdeka variety shows the best results, while planting TSS shallots as many as 2 seedlings per hole and 3 seedlings per hole is also good showed results that were not significantly different. Thus, the implementation of planting seedlings of 2 seedlings per hole was more effective and efficient in carrying out the planting of TSS shallot seedlings, which were able to produce a production of 2,168 kg per hole, equivalent to 6.5 t/ha.

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