

THE EFFECT OF GIVING *GANDASIL D* AND WATERING FREQUENCY ON THE GROWTH

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ABSTRACT

The research was conducted at the Food Security Office of Medan City Jl. Kramat Indah /Selambo Ujung . The purpose of this study was to determine the effect of Gandasil D fertilizer on the growth and yield of pakcoy (Brassica rapa L), to determine the effect of watering frequency on the growth and yield of pakcoy (Brassica rapa L) and to determine the effect of both on the growth and yield of pakcoy (Brassica rapa L). Based on the results of the study, the treatment of Gandasil D fertilizer had a very significant effect on plant height, number of leaves, leaf area, wet weight, selling weight with a fertilizer concentration of 3 g / l water and a watering frequency of 1 time in one day compared to 1 time in 3 days of watering and the interaction between the treatment of Gandasil D fertilizer and watering frequency had a significant effect on plant height, number of leaves, leaf area, wet weight, and selling weight.

Key words; Gandasil D fertilizer, watering frequency, plant growth

INTRODUCTION

Vegetables are a crop frequently cultivated by farmers in Indonesia. They are crucial sources of vitamins, minerals, and fiber. Vegetables offer significant benefits to consumers, making them a significant economic commodity for the agribusiness sector. Vegetable consumption is closely linked to vegetable production, which has seen an increase in Indonesia in recent years (as seen in Table 1.1).

Table 1.1. Pakcoy Production and Growth in Indonesia, 2017-2021

No	Year	Production (tons)	Growth (%)
1	2017	627,598	-
2	2018	635,990	1.33
3	2019	652,727	2.63
4	2020	667,473	2.25
5	2021	727,467	8.98
Average		662,251	3.80

Source: Central Bureau of Statistics of Indonesia, 2021

As seen in Table 1.1, from 2017 to 2021, the production of Chinese cabbage (petsai/mustard greens/pak choy) increased

year-on-year, with an average annual production of 662,251 tons, representing a year-on-year increase of 3.80%. One of the crucial factors for successful plant cultivation is fertilization, both through plant parts (leaves) and the soil. Applying nutrients through the leaves (leaf surface) is an alternative way to supplement the nutrients needed by plants (Ristianah et al., 2024).

Gandasil-D foliar fertilizer is an inorganic fertilizer designed as a complete, balanced diet containing macronutrients (N, P, K, Ca, Mg, and S) and micronutrients (B, Fe, Mn, Cu, Zn, Mo, Co, and Cl) for various plant types. Therefore, the application of organic NPK combined with Gandasil-D fertilizer can increase the growth and yield of lettuce plants. (Munir et al., 2025)

In addition to fertilization, proper watering is also essential to boosting bok choy's growth and yield. Water plays a role in plant metabolism. Therefore, it can be said that water significantly influences plant growth and development. Sumarni (2014) adds that water serves as a raw

material for photosynthesis, a nutrient solvent, a nutrient translocation medium, and a medium for metabolism.

The purpose of this study was to determine the effect of Gandasil D fertilizer on the growth and yield of pakcoy plants (*Brassica rapa L*), to determine the effect of watering frequency on the growth and yield of pakcoy plants (*Brassica rapa L*) and to determine the effect of both on the growth and yield of pakcoy plants (*Brassica rapa L*).

RESEARCH MATERIALS AND METHODS

1. Place and Time

This activity took place at the Medan City Food Security Office, Jl. Kramat Indah / Selambo Ujung , with the implementation period starting from May to the end of June 2023.

2. Research Tools and Materials

The tools used in the research were hoes, digital scales, label boards, sprayers, measuring tape, pipe rulers, raffia rope, cameras , writing instruments, dippers, and watering cans. The materials used in this activity were Nauli F1 variety pakcoy plant seeds, leaf fertilizer (Gandasil D) , Santador 25 EC insecticide, water, and soil .

3. Research methods

The experimental design used in this study was a 3 x 3 factorial Randomized Block Design (RBD) with 3 replications. The factors studied included the administration of Gandasil D fertilizer and watering frequency .

Factor I, Dosage of Gandasil D (G) Fertilizer , namely:

G₁ : 1 gram/liter of water

G₂ : 2 grams/liter of water

G₃ : 3 grams/liter of water

Factor II, Watering Frequency (F) :

F₁ : Watering once a day

F₂ : Watering once every 2 days

F₃ : Watering once every 3 days

4. Data Analysis Methods

Data analysis was carried out using the mathematical formula for the Factorial

Randomized Block Design (RAK) with the following equation:

$$\hat{Y}_{ijk} = \mu + \rho_i + \alpha_j + \beta_k + (\alpha\beta)_{jk} + \varepsilon_{ijk}$$

RESULTS AND DISCUSSION

RESEARCH RESULT

1. Plant Height (cm)

Data on the height of pak choy plants aged 7-28 days after planting and a list of variance analysis results show that the effect of giving Gandasil D fertilizer and watering frequency has a very significant effect on plant height.

Table 1.1. Results of the Difference Test of Average Plant Height (cm) for Gandasil D(G) Fertilizer Treatment with Watering Frequency (F) of 7-28 Planting Days

Treat ment	Plant Height (cm)			
	7 HSP T	14 HSPT	21 HSPT	28 HSPT
G1	8, 83a	12.91 a	14.88 a	17.85 a
	9, 43ab	14.38 b	17.05 b	20.24 b
G2	9.9 5b	16.49 c	20.31 c	22.82 c
	10.0 2c	15.29 c	18.46 c	21.44 b
F1	9, 44ab	14.71 b	17.77 b	21.23 b
	13.79 8.75b	16.01 a	18.24 a	21.23 a
F3				

Description: Numbers followed by the same letter in the same column mean no difference with the DMRT test at the 5% level.

From the table, it can be seen that the highest average plant height at 7 days after planting was obtained from the Gandasil D fertilizer treatment (G), namely G3 (9.95 cm) , while for the watering frequency treatment (F), the highest average plant height was obtained from the F1 treatment (10.02 cm) .

At the age of 14 days after planting, the highest average plant height was obtained from the Gandasil D

fertilizer treatment (G), namely G3 (16.49 cm) , while for the watering frequency treatment (F), the highest average plant height was obtained from the F1 treatment (15.29 cm) .

At the age of 21 days after planting, the highest average plant height was obtained from the Gandasil D fertilizer treatment (G), namely G3 (20.31 cm) , while for the watering frequency treatment (F), the highest average plant height was obtained from the F1 treatment (18.46 cm) .

At the age of 28 days after planting, the highest average plant height was obtained from the Gandasil D fertilizer treatment (G), namely G3 (22.82 cm) , while for the watering frequency treatment (F), the highest average plant height was obtained from the F1 treatment (21.44 cm) .

The development of plant height (cm) at the age of 7, 14, 21 and 28 days after planting in the treatment of Gandasil D (G) leaf fertilizer can be seen in Figure 1.1.

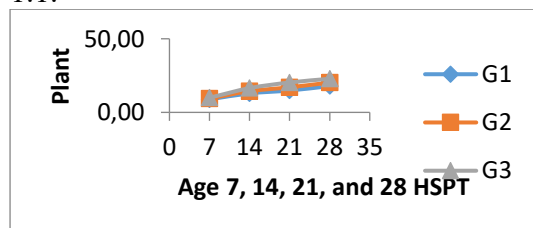


Figure 1.1. Development of Plant Height (cm) in the Treatment of Gandasil D(G) Leaf Fertilizer at the ages of 7, 14, 21 and 28 days after planting.

Figure 1.1 shows that the development of plant height in the treatment of Gandasil D fertilizer increased simultaneously from 7 HS P T to 14 HS P T with slight differences.

At the age of 7-14 HST, the development of plant height occurs slowly, while at the age of 14-21 HS P T , rapid development is seen in plant height , and differences for each treatment are different. However, at the age of 28 HSPT There is a visible difference in plant

growth where G 3 (22.82 cm) is the tallest, followed by G 2 (20.24 cm) , and G1 (17.85 cm) is in the lowest value position .

The development of plant height (cm) at 7, 14, 21, and 28 days after planting in the watering frequency (F) treatment can be seen in Figure 1.2.

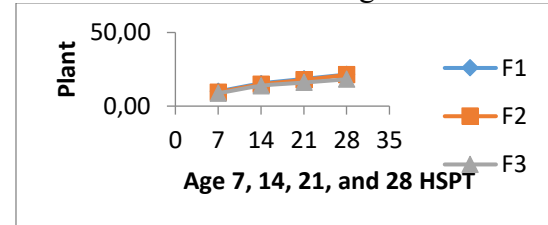


Figure 1.2. Development of Plant Height (cm) in Watering Frequency Treatment (F) at 7, 14, 21, and 28 days after planting.

Figure 1.2 shows that the development of plant height in the treatment of watering frequency (F) increased simultaneously starting from 7 HS P T, the administration of Gandasil D Leaf Fertilizer at the age of 7-14 HSPT, the growth of plant height experienced a slow change but at the age of 14-21 HSPT, plant growth became faster.

At the age of 21 HS P T, the frequency of watering (F) can be seen that the F1 treatment experienced the fastest growth in plant height, followed by the F2 treatment. F2 and F1 which is the watering frequency treatment (F) with the smallest plant height value at the age of 28 days after planting There is a visible difference in plant growth where F1 (21.44 cm) is the highest, followed by F2 (21.23 cm) which has almost the same value , and F3 (18.24 cm) is in the lowest value position .

2. Number of Leaves (Shells)

Data on the number of leaves of pak choy plants aged 7-28 days after planting and a list of variance analysis showed that the effect of Gandasil D fertilizer and watering frequency had a very significant effect on the number of plant leaves at the ages of 7, 21 and 28

days after planting but had no significant effect at the age of 14 days after planting .

Table 2.1. Results of the Difference Test for the Average Number of Leaves (strands) in the Treatment of Gandasil D(G) Fertilizer with Watering Frequency (F) of 7-28 Plants Per Day

Treatment	Number of Leaves (strand)	14	21	28
		7 HSP T	HSP T	HSP T
G1	4.88 a	7.61	10.1	12.4
		7.39	10.6	15.6
G2	4.93 a	a	3 ab	5 b
		7.98	12.1	17.5
G3	5.13 ab	b	1 b	7 c
		7.94	11.3	16.5
F1	5.01 ab	b	5 a	7 c
		7.37	10.8	15.3
F2	4.89 a	a	7 a	5 b
		7.67	10.6	13.7
F3	5.04 b	ab	7 ab	6 a

Description: Numbers followed by the same letter in the same column mean no difference with the DMRT test at the 5% level.

From Table 2.1 it can be seen that the largest number of leaves in plants aged 7 days after planting was obtained in the treatment of Gandasil D fertilizer (g), namely G3 (5.13 leaves) , while for the watering frequency treatment (F), the largest average number of leaves was obtained from the F3 treatment (5.04 leaves) .

At the age of 14 HSPT, the largest average number of leaves was obtained in the treatment of Gandasil D fertilizer (G), namely G3 (7.98 leaves) , while for the treatment of watering frequency (F), the largest average number of leaves was obtained from the F1 treatment (7.94 leaves) .

At the age of 21 HSPT, the largest average number of leaves was obtained in the treatment of Gandasil D fertilizer (G), namely G3 (12.11 leaves) , while for the treatment of watering frequency (F), the largest average number of leaves was obtained from the F1 treatment (11.35 leaves) .

At the age of 28 HSPT, the largest average number of leaves was obtained in the treatment of Gandasil D fertilizer (G), namely G3 (17.57 leaves) , while for the treatment of watering frequency (F), the largest average number of plant leaves was obtained from the F1 treatment (16.57 leaves) .

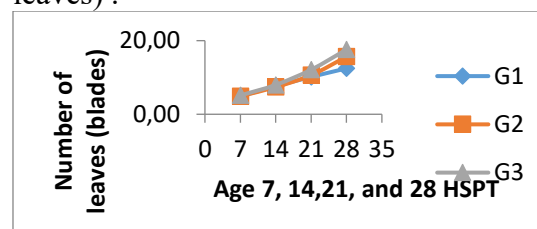


Figure 2.1. Development of the Number of Leaves (strands) in the Treatment of Giving Gandasil D(G) Leaf Fertilizer at the Ages of 7, 14, 21, and 28 Days After Planting .

Figure 2.1 shows that the development of the number of leaves in the treatment of Gandasil D fertilizer increased simultaneously from 7 HS P T to 14 HS P T with a difference that was not very clear.

At the age of 7 – 14 days after planting, the number of leaves increases progressed slowly, while at the age of 14-21 HS P T , rapid development was seen in the number of leaves, and differences for each treatment were different. However, at the age of 28 HSPT there is a visible difference plant growth where G 3 (17.57 strands) was the highest, followed by G 2 (15.65 strands) , and G1 (12.46 strands) is in the lowest value position .

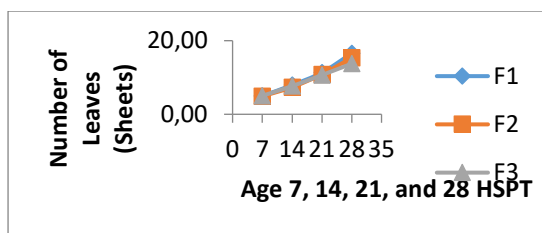


Figure 2.2. Development of the Number of Leaves (strands) in the Watering Frequency Treatment (F) at 7, 14, 21, and 28 Planting Days After Planting

Figure 2.2 shows that the development of the number of leaves in the Watering Frequency (F) treatment increased simultaneously starting from 7 HS P T, the treatment of watering frequency at the age of 7-14 HSPT, the growth in the number of leaves experienced a slow change, but at the age of 14-21 HSPT, plant growth became faster.

At the age of 21 HS P T, it can be seen that the F1 treatment experienced the fastest growth in the number of leaves, followed by the F2 treatment. F2 and F1 which is the watering frequency treatment (F) with the smallest number value at the age of 28 days after planting. There is a visible difference in plant growth where F1 (16.57 strands) is the highest, followed by F2 (15.35 strands) which has almost the same value, and F3 (13.76 strands) is in the lowest value position.

3. Leaf Width (cm)

The data on the width of pak choy leaves aged 7-28 days after planting and the list of analysis of variance, show that the effect of Gandasil D fertilizer and watering frequency has no significant effect at 7 days after planting, a very significant effect for the group at 14 days after planting and a very significant effect at 21 and 28 days after planting on the width of plant leaves.

Table 3.1 Results of the Difference Test of Average Leaf Width (cm) in

the Treatment of Gandasil D(G) Fertilizer with Watering Frequency (F) 7-28 HSPT

Treatme nt	Leaf Widt h			
	7 HSP T	14 HSP T	21 HSP T	28 HSP T
G1	3.38 a	4.55 a	6.84 a	7.96 a
G2	3.45 a	4.63 a	7.51 b	8.56 b
G3	3.54 ab	4.70 ab	7.91 b	9.05 c
F1	3.43 a	4.70 a	7.78 b	8.99 c
F2	3.46 a	4.62 a	7.53 b	8.54 b
F3	3.48 ab	4.56 ab	6.95 a	8.02 a

From Table 3.1 it can be seen that the largest leaf width of plants aged 7 days after planting was obtained in the treatment of Gandasil D fertilizer (g), namely G3 (5.54 cm), while for the watering frequency treatment (F), the largest average leaf width was obtained from the F3 treatment (3.48 cm).

At the age of 14 days after planting, the largest average leaf width was obtained in the treatment of Gandasil D fertilizer (G), namely G3 (4.70 cm), while for the treatment of watering frequency (F), the largest average leaf width was obtained from the F1 treatment (4.70 cm).

At the age of 21 HSPT, the largest average leaf width was obtained in the treatment of Gandasil D fertilizer (G), namely G3 (7.91 cm), while for the treatment of watering frequency (F), the largest average leaf width was obtained from the F1 treatment (7.78 cm).

At the age of 28 days after planting, the largest average leaf width was obtained in the treatment of Gandasil D fertilizer (G), namely G3 (9.05 cm), while for the treatment of watering frequency (F), the largest average leaf width was obtained from the F1 treatment (8.99 cm).

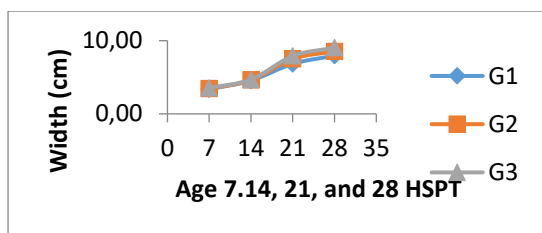


Figure 3.1. Development of Leaf Width (cm) in the Treatment of Gandasil D(G) Leaf Fertilizer at 7, 14, 21, and 28 days after planting.

Figure 3.1 shows that the development of leaf width in the treatment of Gandasil D fertilizer increased simultaneously from 7 HS P T to 14 HS P T with a difference that was not very clear.

At the age of 7 – 14 HST, leaf width development progressed slowly, while at the age of 14-21 HS P T , rapid development was seen in leaf width, and differences for each treatment were different. However, at the age of 28 HSPT there is a visible difference plant growth where G 3 (9.05 cm) was the highest, followed by G 2 (8.05 cm) , and G1 (7.96 cm) is in the lowest value position .

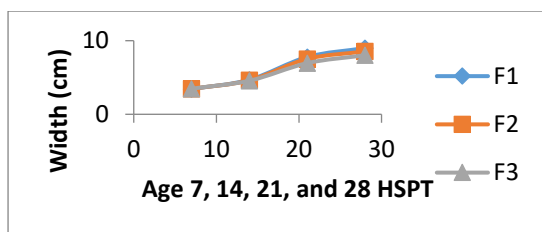


Figure 3.2. Development of Leaf Width (cm) in Watering Frequency Treatment (F) at 7, 14, 21, and 28 days after planting.

Figure 5.6 shows that the development of leaf width in the Watering Frequency (F) treatment increased simultaneously starting from 7 HS P T, the watering frequency treatment at the age of 7-14 HSPT, the growth in the number of leaves experienced a slow change, but at the age of 14-21 HSPT, plant growth became faster.

At the age of 21 HS P T , it can be seen that the F1 treatment experienced the fastest leaf width development, followed

by the F1 treatment. F2 and F1 which is the watering frequency treatment (F) with the smallest number value at the age of 28 days after planting There is a visible difference in plant growth where F1 (8.99 cm) is the highest, followed by F2 (8.54 cm) which has almost the same value , and F3 (8.02 cm) is in the lowest value position .

4. Leaf Length (cm)

The data on the length of pak choy leaves aged 7-28 days after planting and the fingerprint analysis list showed that the effect of Gandasil D fertilizer and watering frequency had a very significant effect for replications at 7 and 14 days after planting, and a very significant effect for each of the G and F treatments at 21 and 28 days after planting on leaf length.

Table 4.1. Results of the Test of Differences in Leaf Length (cm) for Water Stress Treatment (C) with Nasa POC (P) at Ages 7, 14, and 28 HSPT

	Treatment Leaf Length			
	7 HSPT	14 HSPT	21 HSPT	28 HSPT
G1	4.87 ab	6.13 ab	8.81 a	12.03 a
G2	4.79 a	6.10 a	8.82 ab	13.23 b
G3	5.03 b	6.38 b	9.23 c	14.47 c
F1	4.91 ab	6.29 ab	9.25 c	13.83 b
F2	4.95 a	6.24 a	8.92 ab	13.15 ab
F3	4.83 a	6.08 a	8.68 a	12.75 a

Description: Numbers followed by the same letter in the same column mean no difference with the DMRT test at the 5% level.

From Table 4.1 it can be seen that the largest leaf length of plants aged 7 days after planting was obtained in the

treatment of Gandasil D fertilizer (g), namely G3 (5.03 cm) , while for the watering frequency treatment (F), the largest average number of leaves was obtained from the F2 treatment (4.95 cm) .

At the age of 14 days after planting, the largest average leaf length was obtained from the Gandasil D fertilizer treatment (G), namely G3 (6.38 cm) , while for the watering frequency treatment (F), the largest average leaf length was obtained from the F1 treatment (6.29 cm) .

At the age of 21 HSPT, the largest average leaf length was obtained in the treatment of Gandasil D fertilizer (G), namely G3 (9.23 cm) , while for the treatment of watering frequency (F), the largest average leaf length was obtained from the F1 treatment (9.25 cm) .

At the age of 28 days after planting, the largest average leaf length was obtained from the Gandasil D fertilizer treatment (G), namely G3 (14.47 cm) , while for the watering frequency treatment (F), the largest average leaf length was obtained from the F1 treatment (13.83 cm) .

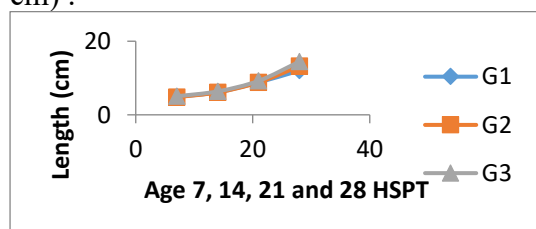


Figure 4.1 Development of Leaf Length (cm) in the Treatment of Gandasil D(G) Leaf Fertilizer at the ages of 7, 14, 21, and 28 days after planting.

Figure 4.1 shows that the development of leaf length in the treatment of Gandasil D fertilizer increased simultaneously from 7 HS P T to 14 HS P T with a difference that was not very clear.

At 7 – 14 HST, leaf length development progressed well. At the age of 14-21 HS P T , rapid growth was seen in leaf length, and differences were

observed for each treatment. However, at the age of 28 HSPT there is a visible difference plant growth where G 3 (14.47 cm) was the highest, followed by G 2 (13.23 cm) , and G1 (12.03 cm) is in the lowest value position .

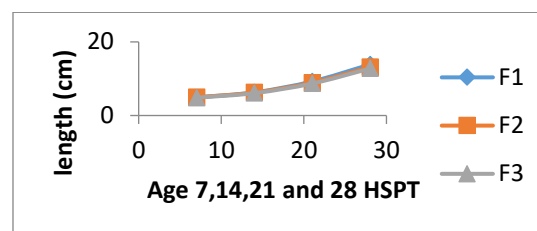


Figure 4.2. Development of Leaf Length (cm) in Watering Frequency Treatment (F) at 7, 14, 21, and 28 days after planting.

Figure 4.2 shows that the development of leaf length in the Watering Frequency (F) treatment increased simultaneously starting from 7 HS P T, the treatment of watering frequency at the age of 7-14 HSPT, the growth in the number of leaves experienced a slow change, but at the age of 14-21 HSPT, plant growth became faster.

At the age of 21 HS P T , it can be seen that the F1 treatment experienced the fastest leaf length development , followed by the F1 treatment. F2 and F1 which is the watering frequency treatment (F) with the smallest number value at the age of 28 days after planting There is a visible difference in plant growth where F1 (13.83 cm) is the highest, followed by F2 (13.25 cm) which has almost the same value , and F3 (12.75 cm) is in the lowest value position .

5. Leaf Area (cm²)

Data on the leaf area of pak choy plants aged 7-28 days after planting and a list of variance analysis, show that the effect of giving Gandasil D fertilizer and watering frequency has a very significant effect on the number of plant leaves at the age of 7-28 days after planting.

Table 5.1. Results of the Difference Test for Average Length and Width

(cm^2) of Gandasil D(G) Fertilizer Treatment with Watering Frequency (F) of 7, 14, 21, and 28 days after planting.

Treatment	Leaf Area			
	7 HSPT	14 HSPT	21 HSPT	28 HSPT
G1	15.37 a	21.19 a	45.72 a	72.88 a
G2	15.47 ab	21.47 ab	50.28 b	86.26 b
G3	16.62 ab	22.74 ab	55.66 c	100.16 c
F1	15.58 ab	22.54 ab	54.89 c	95.86 c
F2	16.12 ab	21.89 ab	50.99 b	85.56 b
F3	15.76 a	20.97 a	45.78 a	77.89 a

Description: Numbers followed by the same letter in the same column mean that they are not different from the DMRT test at the 5% level.

From Table 5.1 it can be seen that the largest leaf area of plants aged 7 days after planting was obtained in the treatment of Gandasil D fertilizer (g), namely G3 (16.62 cm^2), while for the watering frequency treatment (F) the largest average leaf area was obtained from the F2 treatment (16.12 cm^2).

At the age of 14 days after planting, the largest average leaf area was obtained from the Gandasil D fertilizer treatment (G), namely G3 (22.74 cm^2), while for the watering frequency treatment (F), the largest average leaf area was obtained from the F1 treatment (22.54 cm^2).

At the age of 21 HSPT, the largest average leaf area was obtained in the treatment of Gandasil D fertilizer (G), namely G3 (55.66 cm^2), while for the treatment of watering frequency (F), the largest average leaf area was obtained from the F1 treatment (54.89 cm^2).

At the age of 28 days after planting, the largest average leaf area was obtained from the treatment of Gandasil D fertilizer (G), namely G3 (100.16 cm^2), while for the treatment of watering frequency (F), the largest average plant leaf area was

obtained from the F1 treatment (95.86 cm^2).

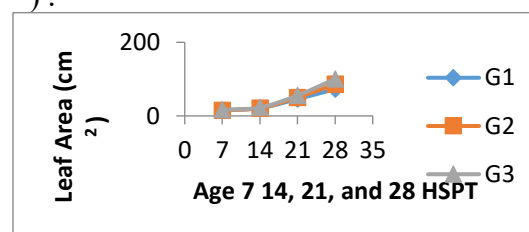


Figure 5.1. Development of Leaf Area (cm^2) in the Treatment of Gandasil D(G) Leaf Fertilizer at the ages of 7, 14, 21, and 28 days after planting.

Figure 5.1 shows that the development of leaf area in the treatment of Gandasil D fertilizer increased simultaneously from 7 HSPT to 14 HSPT with a difference that was not very clear.

At the age of 7 – 14 HST, leaf area development progressed slowly, while at the age of 14-21 HSPT, rapid development was seen for leaf area, and differences for each treatment were different. However, at the age of 28 HSPT There is a visible difference in plant growth where G3 (100.16 cm^2) is the highest, followed by G2 (86.26 cm^2), and G1 (72.88 cm^2) is in the lowest value position.

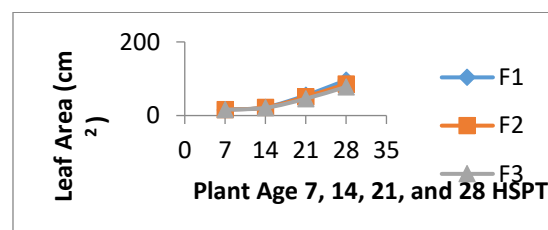


Figure 5.2. Development of Leaf Area (cm^2) in Treatment Watering Frequency (F) at ages 7, 14, 21, and 28 days after planting.

Figure 5.10 shows that the development of leaf area in the Watering Frequency (F) treatment increased simultaneously starting from 7 HSPT, the watering frequency treatment at the age of 7-14 HSPT, the growth of leaf area experienced

a slow change, but at the age of 14-21 HSPT, plant growth became faster .

At the age of 21 HS P T, the watering frequency treatment (F) can be seen that the F1 treatment experienced the fastest leaf area development, followed by the F1 treatment. F 2 and F3 which is the watering frequency treatment (F) with the smallest leaf area value at the age of 28 days after planting There is a visible difference in plant growth where F1 (95.86 cm ²) is the highest, followed by F 2 (85.56 cm ²) which has almost the same value , and F3 (77.89 cm ²) is in the lowest value position .

6. Wet Weight Per Plant (g)

The data on the wet weight of pak choy plants at 28 days after planting and the list of variance analysis show that the effect of Gandasil D fertilizer and watering frequency have a very significant effect on the wet weight of plants at 28 days after planting.

Table 6.1 Results of the Wet Weight Difference Test (g) for Gandasil D(G) Fertilizer Treatment with a Watering Frequency (F) of 28 Plants per Day

Treatment	Wet Weight 28 HSPT
Gandasil D Fertilizer	
G1	44.41 a
G2	52.48 b
G3	69.04 c
Watering frequency	
F1	69.61 c
F2	51.93 b
F3	44.39 a

Description: Numbers followed by the same letter in the same column mean no difference with the DMRT test at the 5% level.

Table 6.1 shows the average wet weight of pak choy plants at 28 hspt. The highest average wet weight was obtained in the Ganadil D(G) fertilizer treatment, namely

G3 (69.04 g) , while the lowest average wet weight value was obtained from the Gandasil D(G) fertilizer treatment, namely G1 (44.41 g) .

The average wet weight for the watering frequency treatment (P) which had the highest value was F1 (69.61 g) while the smallest value for the watering frequency treatment (F) was F3 (44.39 g) .

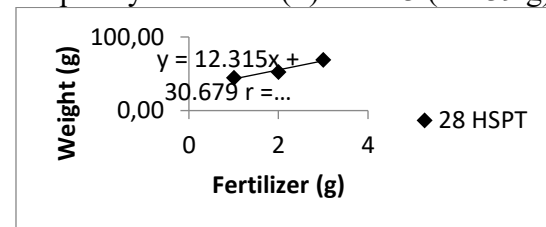


Figure 6.1. Response Curve of Fresh Sale Weight (g) in the Treatment of Gandasil D(G) Fertilizer at 28 Planting Days After Planting.

Figure 6.1 shows that the highest wet weight value was obtained from the G3 treatment, followed by the G2 treatment, while the lowest production results were obtained in the treatment of Gandasil D (G) fertilizer, namely G1 .

Based on the linear curve in the graph above, it is known that the G3 treatment has the most optimal effect when compared to other levels of Gandasil D fertilizer treatment. It can be seen that the G3 treatment level has a value above the highest value of the other treatments. The regression line equation can be calculated using the formula $\hat{Y} = a + bx$.

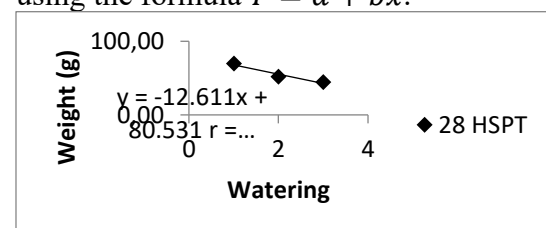


Figure 6.2. Response Curve of Selling Weight (g) in Watering Frequency Treatment (F) at 28 days after planting.

Figure 6.2 shows that the highest wet weight value was obtained from treatment F1, followed by treatment F2,

while the lowest wet weight value in the watering frequency treatment was F3 .

Based on the linear curve in the graph above, it is known that the G1 treatment has the most optimal effect when compared to other watering frequency treatment levels, it can be seen that the F1 treatment level has a value above the highest value of the other treatments. Thus, the watering frequency of once a day obtains the highest wet weight value. The regression line equation can be calculated using the formula $\hat{Y} = a + bx$.

7. Selling Weight Per Plant (g)

The data on the selling weight of pak choy plants at 28 days after planting and the list of variance analysis show that the effect of Gandasil D fertilizer and watering frequency have a very significant effect on the selling weight of plants at 28 days after planting.

The effect of giving Gandasil D (G) fertilizer and frequency.

Table 7.1. Results of the Test of Differences in Sales Weight (g) of Gandasil D(G) Fertilizer Treatment with Watering Frequency (F) of 28 Plants per Plant

Treatment	Selling Weight 28 HSPT
Gandasil D Fertilizer	
G1	37.24 a
G2	45.98 b
G3	61.87 c
Watering frequency	
F1	62.11 c
F2	45.09 b
F3	37.89 a

Description: Numbers followed by the same letter in the same column mean no difference with the DMRT test at the 5% level.

Table 7.1 shows the average selling weight of pak choy plants at 28 days after planting. The highest average selling weight was obtained from the Ganadil

D(G) fertilizer treatment, namely G3 (61.87 g) , while the lowest average wet weight value was from the Gandasil D(G) fertilizer treatment, namely G1 (37.24 g) . The average selling weight for the watering frequency treatment (P) which had the highest value was F1 (62.11 g) while the smallest value for the watering frequency treatment (F) was F3 (37.89 g) .

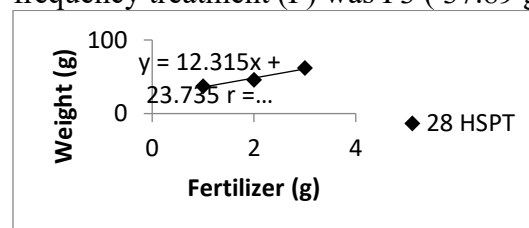


Figure 7.1. Response Curve of Sales Weight (g) in the Treatment of Gandasil D(G) Fertilizer at 28 Planting Days After Planting.

Figure 7.1 shows that the highest selling weight value was obtained from the G3 treatment, followed by the G2 treatment, while the lowest production results were obtained in the treatment of Gandasil D (G) fertilizer, namely G1 .

Based on the linear curve in the graph above, it is known that the G3 treatment has the most optimal effect when compared to other levels of Gandasil D fertilizer treatment. It can be seen that the G3 treatment level has a value above the highest value of the other treatments. The regression line equation can be calculated using the formula $\hat{Y} = a + bx$.

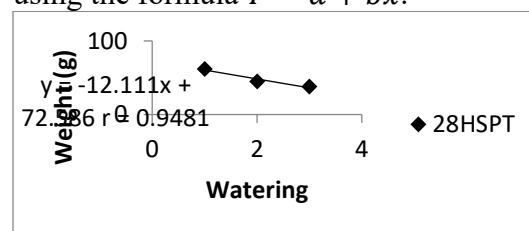


Figure 7.2. Response Curve of Selling Weight (g) in Watering Frequency Treatment (F) at 28 days after planting.

Figure 7.2 shows that the highest selling weight value was obtained from the F1 treatment, followed by the F2 treatment, while the lowest wet weight value in the

watering frequency treatment is F3 . Based on the linear curve in the graph above, it is known that the G1 treatment has the most optimal effect when compared to other watering frequency treatment levels , it can be seen where the F1 treatment level has a value above the highest value of the other treatments. Thus, the watering frequency of once a day obtains the highest selling weight value. The regression line equation can be calculated using the formula $\hat{Y} = a + bx$.

DISCUSSION

1. The Effect of Gandasil D Fertilizer on the Growth and Yield of Pakcoy Plants

The results of the data analysis show that the treatment of the influence of the administration of Gandasil D fertilizer had a very significant effect on plant height, number of leaves, leaf area , wet weight and selling weight of pakcoy plants.

The application of Gandasil D fertilizer has a significant effect on the growth and production of pakcoy plants . This is because providing foliar fertilizer will accelerate the provision of nutrients for plants, where Gandasil D fertilizer contains micro nutrients that can stimulate plant roots.

The good growth and production response to the administration of Gandasil-D is due to the presence of nutrients such as N = 14%, P = 12%, K = 14%. So that the average fresh weight of the plant produces the best due to the presence of nutrients such as N, P and K contained in Gandasil-D fertilizer. Lingga (2001) stated that nitrogen in sufficient quantities plays a role in accelerating overall plant growth, especially stems and leaves. The nitrogen element plays a role in the formation of plant cells, tissues, and organs. The elements phosphorus and nitrogen are used for regulate overall plant growth.

The increase in fresh weight yield of bok choy plants is consistent with the application of Gandasil-D. The higher the concentration, the higher the yield. Lingga

(2007) stated that organic fertilizer, even in very small quantities, can have a significant impact on soil fertility, which can be beneficial for increasing productivity, accelerating harvests, and stimulating root, stem, leaf, and flower growth. This is thought to be due to the nutrient levels being just right for plant needs and its more effective and efficient use.

The results of the study showed that the application of foliar fertilizer increased the growth of the number, length, and width of sweet mustard leaves. The ability to form leaves is closely related to the availability of photosynthates, supported by the availability of the necessary micronutrients (Lakitan, 1994). One of these micronutrients is zinc (Zn), which plays a role as a constituent of metal-containing enzymes and an activator of the carbonic anhydrase enzyme found in chloroplasts. The more active the carbonic anhydrase enzyme, the greater the role of chloroplasts in the process of photosynthesis. This will ensure the availability of sufficient photosynthates for the formation of new leaves, which will result in an increase in the number of plant leaves.

Increasing plant height and leaf number will support increases in wet weight per plant, wet weight per plot, and wet marketable production. This is because increasing leaf number and plant height improves photosynthesis, where photosynthesis is needed for the formation of plant tissue, including roots. This will increase wet weight per plant, wet weight per plot, wet marketable production, and the plant's relative growth rate.

2. Interaction of Gandasil D Fertilizer Treatment and Watering Frequency on Pakcoy Plant Growth and Yield

The application of Gandasil D fertilizer and watering frequency showed an interactive effect on plant height, number of leaves, leaf area, fresh weight, and selling weight. Gandasil foliar

fertilizer contains the highest nitrogen content compared to other elements, namely 20%. Gandasil D is in the form of crystals dissolved in water so it can be easily absorbed and translocated to all parts of the plant, thus supporting the process of plant growth and development (Lingga and Marsono, 2007).

The results of the analysis of variance showed that the interaction of Gandasil D fertilizer application and watering frequency had a very significant effect on plant height, number of leaves, leaf area, fresh weight, and selling weight. The frequency of watering once in three days obtained the smallest value in various doses of Gandasil D fertilizer treatments because infrequent watering caused plants to lack water and resulted in thin and stunted plants, compared to the frequency of watering once a day and the application of Gandasil D fertilizer with a dose of 3g/l of water obtained the highest value from other interactions, this was because the water needs of the plants were met and also the nutrients provided were met. In accordance with the opinion of Arifin (2002) who stated that plants that lack water will trigger the formation of abscisic acid inhibitor hormones and growth-stimulating hormone inhibitors. The longer the frequency of watering the plant roots, the less. Water requirements for plants vary, depending on the type of plant and its growth phase. Plant roots grow into moist soil and draw water until a critical water potential is reached in the soil. Water deficiency can inhibit the rate of photosynthesis, especially because of its effect on the turgidity of the guard cells of the stomata. If there is a lack of water, the turgidity of the guard cells will decrease.

CONCLUSION AND SUGGESTIONS

CONCLUSION

Based on the research results, the treatment of giving Gandasil D fertilizer had a very real effect on plant height, number of leaves, leaf area, wet weight, selling weight with a fertilizer concentration of 3 g/l of water and The

frequency of watering once a day compared to once every 3 days of watering and the interaction between the treatment of giving Gandasil D fertilizer and the frequency of watering had a significant effect on plant height, number of leaves, leaf area, wet weight, and selling weight.

SUGGESTION

Based on the research results, it is recommended to conduct further research with a concentration of Gandasil D fertilizer of 3 g/l of water and a watering frequency of 1 time per day to obtain better results.

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