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DATA IN SUMMARY | BIOLOGY, FORESTRY, AGRICULTURE

Performance of Organic and Inorganic Pupils on The Growth and Results of Sawi Plants (*Brassica Juncea L*)

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Abstract: Mustard plants are vegetables favored by people in Indonesia, they have nutritional value, are delicious, and are rich in protein, which is good and needed by the human body, vitamins A, B, and L-ascorbic acid. This study was conducted to determine the effect of organic, and inorganic fertilizers and their interaction on the growth and yield of mustard plants, carried out at UPTD. BIHedung Johor Medan, October 2023 to January 2024. Using RAK factorial 2 factors, I. dosage Organic fertilizer (organic) (A) 4 levels: A0 = 0 kg/plot (control), A1 = 1.5 kg/plot, A2 = 2 kg/plot, and A3 = 2.5 kg/plot. II Inorganic fertilizer dose (ANORGANIK) (N) 4 levels: N0 = 0 g/plot (control), N1 = 50 g/plo, N2 = 100 g/plot, and N3 = 150 g/plot. The results of his research from organic fertilizers were insignificant for plant height 7-28 HST, number of leaves 7-21 HST and 28 HST. The real effect is gross weight/sample, net weight/sample, gross weight/plot, and net weight/plot. Inorganic fertilizer (ANORGANIK) has a very real effect on plant height 21-18 HST, number of leaves 14 HST and 21-28 HST, leaf width, leaf length, gross weight/sample, net weight/sample, gross weight/plot, and net weight/plot. The interaction effect was very significant in plant height 7 HST, number of leaves 21, 28 HST, leaf width, leaf length, gross weight/sample, net weight/sample, gross weight/plot, and net weight/plot.

Keywords: Mustard, Organic Fertilizer, Inorganic Fertilizer.

1. INTRODUCTION

Mustard plants (*Brassica juncea L.*) include vegetable plants from the Cruciferae family which are high value because they are rich in fiber, have high nutritional content, and can be medicinal. Seeing the benefits of this plant, cultivation is no longer traditional but modern (Elsafiana, 2013). In terms of agro-climate, Indonesia has the potential to cultivate mustard greens (Heryanto, et al., 2006). Mustard vegetables have a higher economic value than cabbage and broccoli (Zulkarnain, 2010). Mustard has nutritional content per 100 grams of wet weight. There are calories, protein, fat, carbohydrates, fiber, and various vitamins, and minerals such as calcium, phosphorus, iron, vitamin A, vitamin B1, B2, B3, and vitamin C, is an important nutrient for the human body and is a great potential in agricultural businesses (Rukmana, 2007). Biological properties that are good for the growth of mustard plants are soils that contain a lot of organic matter (humus) and nutrients that are useful for plant growth and in the soil, there are microorganisms or soil organs decomposing organic matter so that the biological properties of good soil increase plant growth (Cahyono, 2003). According to Sutejo and Kartasaputra (2002), organic fertilizers have an important function, namely, to loosen the surface layer of soil (topsoil), increase the population of microorganisms, absorbency, and water storage capacity which can increase overall soil fertility.

Plants need appropriate fertilizers to meet the needs of nutrients to grow and develop properly. Organic fertilizers can increase nutrient reserves in the soil, improve soil structure, and increase soil organic matter content. Organic fertilizers contain macro and micro elements such as nitrogen (N), phosphate (P), potassium (K), magnesium (Mg), and manganese (Mn) that plants need and play a role in maintaining nutrient balance in the soil because manure has an effect for a long period of time and as nutrients for plants. (Fernando, 2020). Providing these elements through fertilization is necessary. One of the fertilizers containing N, P, and K elements is inorganic fertilizer which has macronutrients that are generally needed by plants and can provide a good nutrient balance for plant growth and production. Inorganic fertilizers contain nutrients consisting of Nitrogen (16%), Pospat (16%), Potassium (16%), Magnesium (1.5%), and Calcium (5%) (Alfrio, 2020).

2. RESEARCH DESIGN AND METHOD

The research was conducted at UPTD. Seeds of Horticulture Gedung Johor, JL. Karya Jaya No.22f, Pangkalan Masyhur Medan, North Sumatra. From October 2023 to January 2024. The tools that will be used are a hoe, meter, scale, book, pen, bucket, marker, ruler, paddle, calculator, knife, machete, plastic rope, water hose, bamboo, and label. Materials used: Mustard seeds, Organic fertilizer, ANORGANIC Puouk, Furadan 3G, water. The research method is factorial Randomized Group Design (RAK), with 2 factors: I. Organic Fertilizer (A) 4 levels, namely: A₀: 0 g/plot (control), A₁: 1.5 kg/plot, A₂: 2 kg/plot, and A₃: 2.5 kg/plot, and II. NPK 16-16-16 fertilizer (N) 4 levels, namely: N₀: 0 g/plot (control), N₁: 50 g/plot, N₂: 100 g/plot and N₃: 150 g/plot. Treatment combination: A₀N₀, A₁N₀, A₂N₀, A₃N₀, A₀N₁, A₁N₁, A₂N₁, A₃N₁, A₀N₂, A₁N₂, A₂N₂, A₃N₂, A₀N₃, A₁N₃, A₂N₃, **A₃N₃**. With a spacing of 20cm x 20cm, 3 replications, 48 plots, 30 plants/plot, 5 sample plants/plot, 100 cm x 120 cm plot size, 12,000 cm² plot area, 50 cm distance between plots, 70 cm distance between replications, 1,440 total plants and 32.6 m² total area.

3. RESULT AND DISCUSSION

3.1. Plant Height

Based on the results of data analysis of organic fertilizer treatment, the effect is not real at the age of 7, 14, 21, and 28 HST. Inorganic fertilizer treatment did not significantly affect the age of 7-14 HST and the age of 21-28 HST had a very real effect on mustard plant height. The interaction of the effect is very real at the age of 7 HST and at the age of 14, 21, and 28 HST the effect is not real on the height of mustard plants. Observation data of mustard plant height with organic fertilizer and anorganic fertilizer treatment at 7, 14, 21, and 28 HST The results of the difference of means test with Duncan's Multiple Range Test (DMRT) can be seen in Table 1. Table 1 shows that the provision of Organic Fertilizer 7, 14, 21, 28, and NPK fertilizer is not significantly different until the plants are 7, 14, and HST. NPK fertilizer treatment differences began to appear after the plants were 21 HST where N₀ was significantly different from N₁, N₂, and N₃, at the age of 28 HST, N₀ was significantly different from N₁, N₂, and N₃.

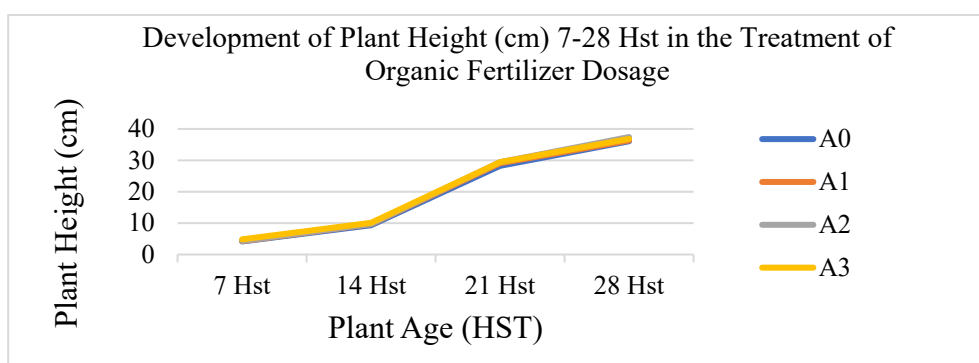
Table 1. Differential Test Results of Mean Plant Height (cm) at Various Dosage Treatments of Organic Fertilizer (A) with Inorganic Fertilizer (N) 7-28 HST.

Plant Height (cm) at Age				
Treatment	7 HST	14 HST	21 HST	28 HST
Organic Pupils				
A0 (0 kg/plot)	4,17 a	9,33 a	28,25 a	36,08 a
A1 (1.5 kg/plot)	4,25 a	9,67 a	29,08 a	36,33 a
A2 (2 kg/plot)	4,33 a	9,75 a	29,42 a	37,42 a
A3 (2.5 kg/plot)	4,83 a	10,08 a	29,42 a	36,83 a
An organic Fertilizer				

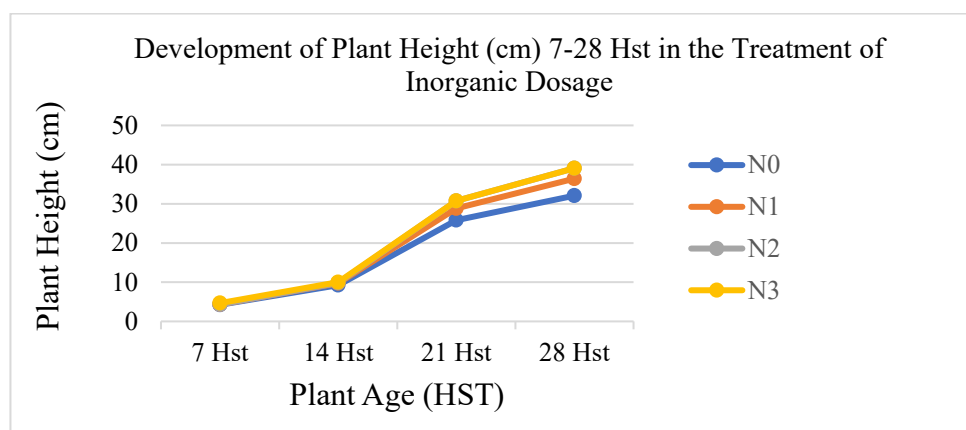
Plant Height (cm) at Age				
Treatment	7 HST	14 HST	21 HST	28 HST
N0 (0 g/plot)	4,25 a	9,25 a	25,83 a	32,08 a
N1 (50 g/plot)	4,33 a	9,75 a	28,83 b	36,42 b
N2 (100 g/plot)	4,33 a	9,83 a	30,75 b	39,08 b
N3 (150 g/plot)	4,67 a	10,00 a	30,75 b	39,08 b

Notes: Numbers followed by the same letter in the same column are not significantly different at the 0.05 level (lowercase letters) based on Duncan's distance test

Graph 1 Plant height growth at doses of Organic Fertilizer increased simultaneously starting from 7 HST to 14 HST with no significant difference, but at 21 HST, differences in growth were seen where A₂ and A₃ were the highest, followed by A₁ and the lowest. 7-14 HST growth was slow, 14 - 21 HST growth increased rapidly, as well as for the age of 21 - 28 HST also showed an increasing development, while the difference in the effect between each Organic Fertilizer treatment was seen more clearly since the age of 21 -28 HST.

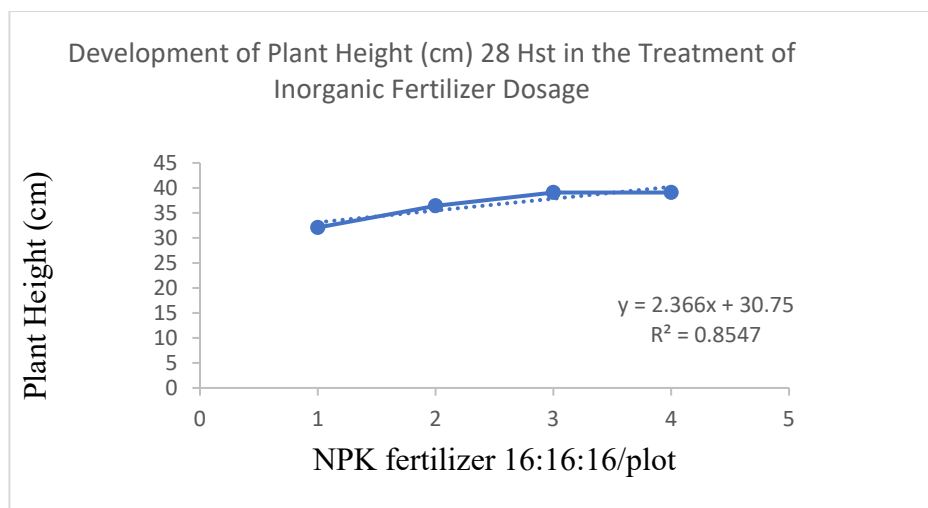


Graph 1. Development of Plant Height (cm) in Various Treatments of Organic Fertilizer Dosage (A) Age 7-28 HST



Graph 2. Development of Plant Height (cm) at Various Dosage Treatments of Inorganic Fertilizers Age 7 - 28 HST

Graph 2 plant height growth of inorganic fertilizer age 7 - 14 HST is not real, HST - 28 HST plant growth is real 21 HST ANORGANIC treatment N₃ and N₂ very real growth then N₁ lower and N₀ last. At the age of 28 HST inorganic treatment N₃, N₂ real growth of treatment N₁ and the slowest growth N₀. In Graph 3. the height of mustard green plants formed a positive linear relationship with the equation $Y = 2.366 N + 30.75$ with a value of $R^2 = 0.8547$. Based on this equation, it can be shown that the increasing dose of inorganic fertilizer decreases the height of mustard plants or does not develop at all in the height of mustard plants.



Graph 3. Plant Height Growth (cm) Treatment of Inorganic Fertilizer Age 28 HST

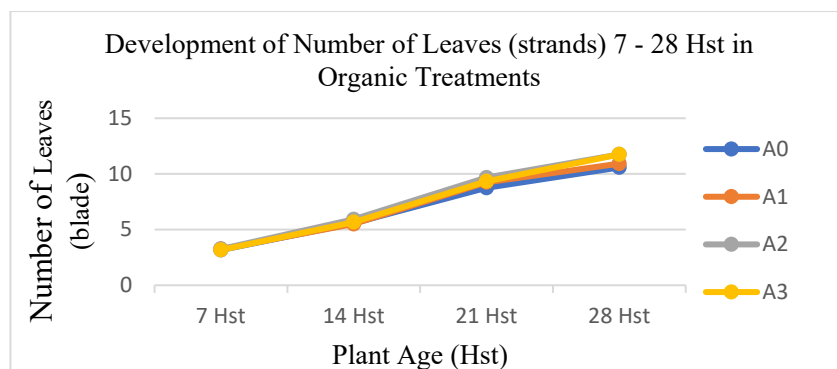
3.2. Number of Leaves (Helai)

Based on the results of data analysis, the treatment of organic fertilizer has no real effect at the age of 7, 14, 21 HST, and 28 HST on the number of leaves of mustard plants. AN ORGANIC fertilizer treatment 16:16:16 had no real effect at 7 HST, 14 HST had a real effect, and 21 - 28 HST had a very real effect on the number of leaves of mustard plants. The interaction of the effect is not real at the age of 7 - 14 HST, 21 HST real effect, and 28 HST very real effect on the number of leaves of mustard plants. Data on the number of leaves of mustard plants with the treatment of organic fertilizers and Inorganic fertilizers at the age of 7, 14, 21, and 28 HST. The results of different tests of means with Duncan's Multiple Range Test (DMRT) are in Table 2.

Table 2. Differential Test Results of Average Number of Leaves (strands) on Various Dosage Treatments of Organic Fertilizer (A) with Inorganic Fertilizer (N) 7-28 HST.

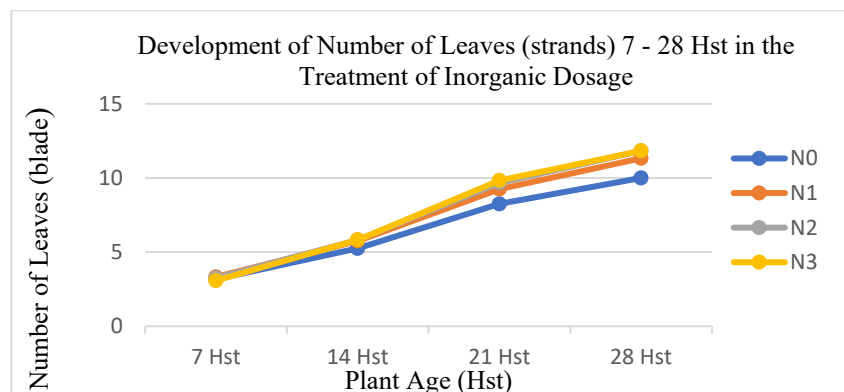
Number of Leaves (blade) at Age				
Treatment	7 HST	14 HST	21 HST	28 HST
Organic Pupils				
A0	3,17 a	5,58 a	8,75 a	10,58 a
A1	3,25 a	5,50 a	9,25 a	10,92 ab
A2	3,25 a	5,92 a	9,67 a	11,75 b
A3	3,17 a	5,67 a	9,33 a	11,75 b
Inorganic Fertilizer				
N0	3,17 a	5,25 a	8,25 a	10,00 a
N1	3,33 a	5,75 a	9,25 b	11,33 b
N2	3,25 a	5,83 a	9,67 b	11,83 b
N3	3,08 a	5,83 a	9,83 b	11,83 b

From Table 2 Organic Fertilizer A₀ did not significantly affect the age of 7 HST to 28 HST, A₁, A₂, and A₃ did not significantly affect 7 HST aged 21 HST and 28 HST, A₀ was significantly different from A₁ and the age of 28 HST, A₁ was significantly different from N₂ and N₃. The average number of leaves of plants, inorganic fertilizers at 21 HST and 28 HST, N₀ is significantly different from N₁, N₂, and N₃.



Graph 4. Development of Number of Leaves (strands) at Various Dosage Treatments of Organic Fertilizer (A) Age 7 - 28 HST.

Graph 4, no significantly different at age 7 HST - 14 HST, 14 HST - 21 HST real A_2 was highest, and not significantly different A_3 , at the age of 21 HST - 28 HST and very real A_2 and A_3 not significantly different and the highest 28 HST. Graph 4 growth increases at the age of 7 HST - 14 HST at the age of 14 HST - 21 HST the leaves increasing, and at the age of 21 HST - 28 HST the number of leaves decreases in A_0 and A_1 while in A_2 remains and A_3 is increasing.



Graph 5. Development of Number of Leaves (strands) on Various Dosage Treatments of Inorganic Fertilizers (N) Age 7 HST - 28 HST.

Graph 5. treatment level N_3 very real effect of, N_2 , N_1 , and N_0 . In Graph 5 that the number of leaves is not significantly different from the age of 7 HST - 14 HST all treatments, from 14 HST - 21 HST very real N_2 and N_3 not real N_0 least, from the age of 21 HST - 28 HST N_2 same N_3 and N_1 more N_2 and N_3 , and N_0

3.3. Leaf Width (cm)

The results of data analysis of Organic Fertilizer treatment did not significantly affect the age of 28 HST. For ANORGANIC fertilizer treatment, the effect is very real at 28 HST. While the interaction of the two treatments had no significant effect at the age of 28 HST.

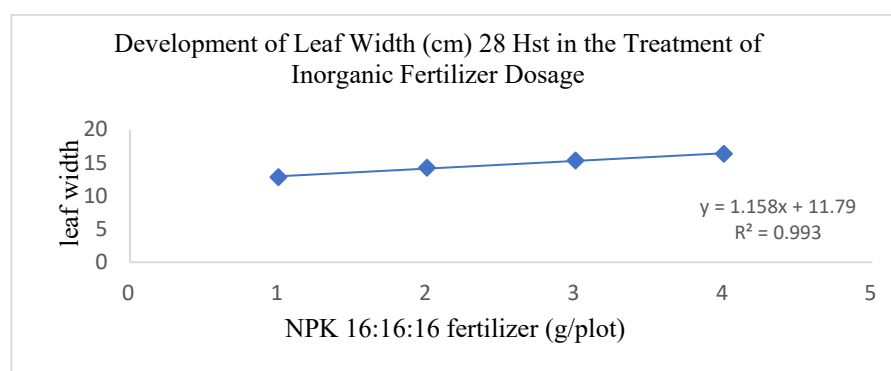
Table 3. Leaf Width of Mustard Plants (cm) 28 HST in the Treatment of Organic Fertilizers and Inorganic Fertilizers

LEAF WIDTH (cm)	
Treatment	28 HST
Organic Pupils	
A0	14,25 a
A1	14,83 a

LEAF WIDTH (cm)	
Treatment	28 HST
A2	15,00 a
A3	14,66 a
Inorganic Fertilizer	
N0	12,83 a
N1	14,25 b
N2	15,33 c
N3	16,33 d

Notes: Numbers followed by the same letter in the same column are not significantly different at level $\alpha = 0.05$ (lower case) based on Duncan's distance test.

Table 3 Organic fertilizer treatment does not significantly affect the age of 28 HST on the width of the leaves of mustard plants. Organic fertilizer treatment A₀ is significantly different from A₁ with A₂ and A₃ at the age of 28 HST on the width of the leaves of mustard plants. Regression and correlation analysis, the relationship between the application of inorganic fertilizers and the width of the leaves of 28 HST mustard plants can be seen in Graph 6.



Graph 6. Development of Leaf Width (cm) in the Treatment of Inorganic Fertilizer Dosage (N) Age 28 HST

Graph 6. that the leaf width of mustard plants given inorganic fertilizer has a positive linear relationship with the equation $y = 1.158x + 11.79$ with a value of $R^2 = 0.993$. Indicates that the higher the dose of inorganic fertilizer given spurs the growth of leaf width in mustard plants.

3.4. Leaf Length (cm)

The results of data analysis of organic fertilizer treatment did not significantly affect the length of the leaves of mustard plants at 28 HST. Inorganic treatment has a very real effect at 28 HST. The interaction of the two treatments had no significant effect at the age of 28 HST.

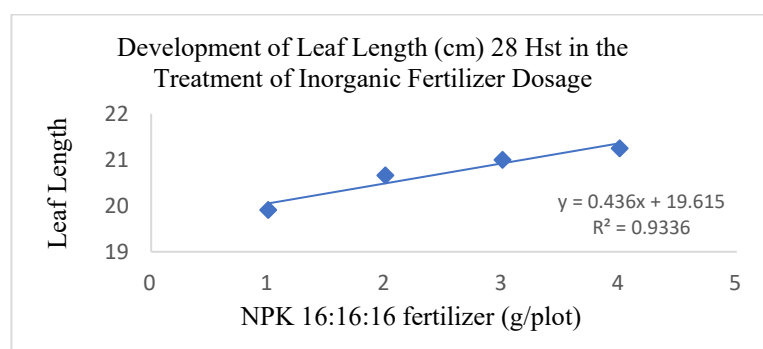
Table 4. Leaf Length of Mustard Plants (cm) 28 HST in the Treatment of Organic Fertilizers and Inorganic Fertilizers

LEAF LENGTH (cm)	
Treatment	28 HST
Organic Pupils	
A0	18,33 a
A1	19,91 a
A2	21,50 a
A3	23,08 a
Inorganic Fertilizer	
N0	19,91 a

LEAF LENGTH (cm)	
Treatment	28 HST
N1	20,66 b
N2	21,00 c
N3	21,25 d

Notes: Numbers followed by the same letter in the same column are not significantly different at level $\alpha = 0.05$ (lower case) based on Duncan's distance test.

Table 4 leaf length organic fertilizer unreal effect of 28 HST on leaf length, NPK fertilizer 16: 16: 16 A_0 is significantly different from A_1 and A_2 , and A_3 very real effect of 28 HST on leaf length of mustard plants. The results of regression and correlation analysis, the relationship between the application of inorganic fertilizers and the width of the leaves of 28 HST mustard plants, Graph 7.



Graph 7. Development of Leaf Length (cm) in the Treatment of Inorganic Fertilizer Dosage (N) Age 28 HST

Inorganic fertilizer mustard plant leaf width positive linear relationship with the equation $y = 0.436x + 19.615$ with a value of $R^2 = 0.9336$. Indicates the higher dose of inorganic fertilizer given can spur the development of leaf length in mustard plants.

3.5. Gross Weight/sample (grams)

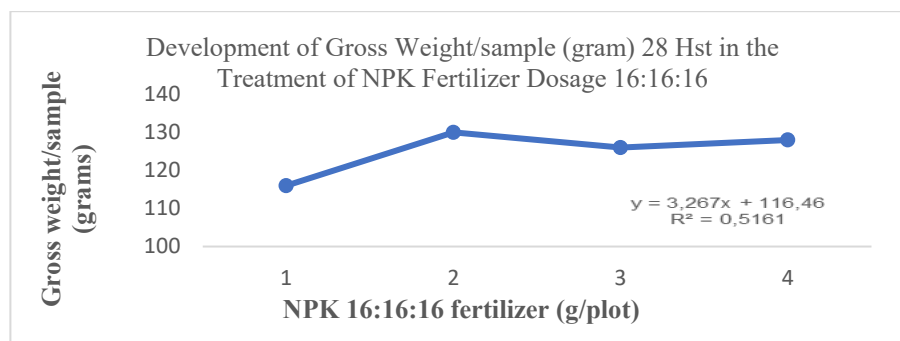
The results of data analysis of organic fertilizer treatment had no significant effect on the gross weight/sample of 28 HST mustard plants. Inorganic fertilizer has a very real effect on the gross weight/sample of 28 HST. The interaction of the two treatments had no significant effect at the age of 28 HST. Data on the gross weight/sample of mustard plants treated with organic fertilizers and inorganic fertilizers 28 HST and the results of the difference test with *Duncan's Multiple Test (DMRT)* Table 5.

Table 5. Gross Weight/sample of Mustard Plants (gram) 28 HST in the Treatment of Organic Fertilizers and Inorganic

Gross weight/sample (grams)	
Treatment	28 HST
Organic Pupils	
A0	85,91 a
A1	115,08 a
A2	140,58 a
A3	156,91 a
Inorganic Fertilizer	
N0	116,08 a
N1	128,83 b
N2	125,50 bc
N3	128,08 c

Notes: Numbers followed by the same letter in the same column are not significantly different at level $\alpha = 0.05$ (lower case) based on Duncan's distance test.

Table 5. Gross weight/sample organic fertilizer unreal effect of age 28 HST on gross weight/sample, organic fertilizer A_0 is significantly different from A_1 with A_2 and A_3 real effect of age 28 HST gross weight/sample mustard yield. Regression and correlation analysis, ANORGANIC fertilizer relationship with gross weight/sample yield of 28 HST mustard plants Graph 8.



Graph 8. Development of Gross Weight/sample (gram) in the Treatment of NPK Fertilizer Dosage (N) Age 28 HST

Graph 8 can be seen that the gross weight/sample yield of mustard plants with inorganic fertilizer has a positive linear relationship with the equation $y = 3.267x + 116.46$ with a value of $R^2 = 0.5161$. This shows that the higher the dose of inorganic fertilizer given can reduce the gross weight/sample of mustard plants.

3.6. Gross Weight/Plot (gram)

The results of data analysis of organic fertilizer treatment did not significantly affect the gross weight/plot of 28 HST mustard plants. Inorganic fertilizer has a very real effect on gross weight/plot 28 HST. The interaction of the effect is not real 28 HST. Data on gross weight/plot yield of mustard plants of Organic Fertilizer and inorganic 28 HST as well as the results of different tests of means with *Duncan's Multiple Test (DMRT)* can be seen in Table 7.

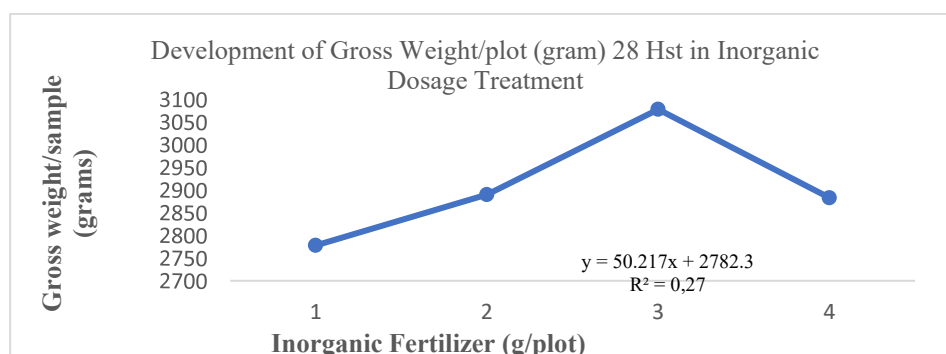
Table 1 Gross Weight/Plot of Mustard Plants (gram) 28 HST in the Treatment of Organic Fertilizer and Anorganic Fertilizer.

Gross weight/Plot (gram)	
Treatment	28 HST
Organic Pupils	
A0	2009,16 a
A1	2895,00 a
A2	3172,83 a
A3	3554,50 a
NPK Pupils	
N0	2778,75 a
N1	2890,66 b
N2	3078.58 bc
N3	2883,50 c

Notes: Numbers followed by the same letter in the same column are not significantly different at level $\alpha = 0.05$ (lower case) based on Duncan's distance test.

Table 7 Organic fertilizer has no significant effect 28 HST gross weight/plot, organic fertilizer A_0 is significantly different from A_1 and A_2 and A_3 has a significant effect 28 HST gross weight/plot

mustard yield. The results of regression and correlation analysis, the relationship between the provision of an arsenic Fertilizer gross weight/plot has mustard plants age 28 HST Graph 9.



Graph 9. Development of Gross Weight/plot (gram) in the Treatment of Inorganic Fertilizer Dosage (N) Age 28 HST

The gross weight/plot yield of mustard greens inorganic fertilizer application has a positive linear relationship with the equation $y = 50.217x + 2782.3$ with a value of $R^2 = 0.27$. This shows that the higher the dose of inorganic fertilizer given can reduce the gross weight/plot of mustard plants.

3.7. Net Weight/Sample (gram)

The results of data analysis of organic fertilizer had no significant effect on the net weight/sample yield of 28 HST mustard plants. Inorganic fertilizers have a very real effect on the net weight/sample 28 HST. The interaction had no significant effect on 28 HST. Observation data of the net weight/sample of mustard plants with the treatment of organic and inorganic fertilizers at the age of 28 HST and the results of the difference test with *Duncan's Multiple Test (DMRT)* Table 6.

Table 2 Net Weight/sample of Mustard Plants (gram) 28 HST in the Treatment of Organic Fertilizer and Inorganic Fertilizer.

Net weight/Sample (gram)	
Treatment	28 HST
Organic Pupils	
A0	58,08 a
A1	74,25 a
A2	84,25 a
A3	81,75 a
Inorganic Fertilizer	
N0	75,16 a
N1	78.25 ab
N2	79,41 b
N3	86,50 c

Notes: Numbers followed by the same letter in the same column are not significantly different at level $\alpha = 0.05$ (lower case) based on Duncan's distance test.

Table 6 shows that the net weight/sample of organic fertilizer does not significantly affect the age of 28 HST. Organic fertilizer A₀ is significantly different from A₁ and A₂ and A₃ very real influence 28 HST on the net weight/sample yield of mustard plants. The results of regression and correlation analysis, inorganic fertilizers with net weight/sample yield of 28 HST mustard plants Graph 10.

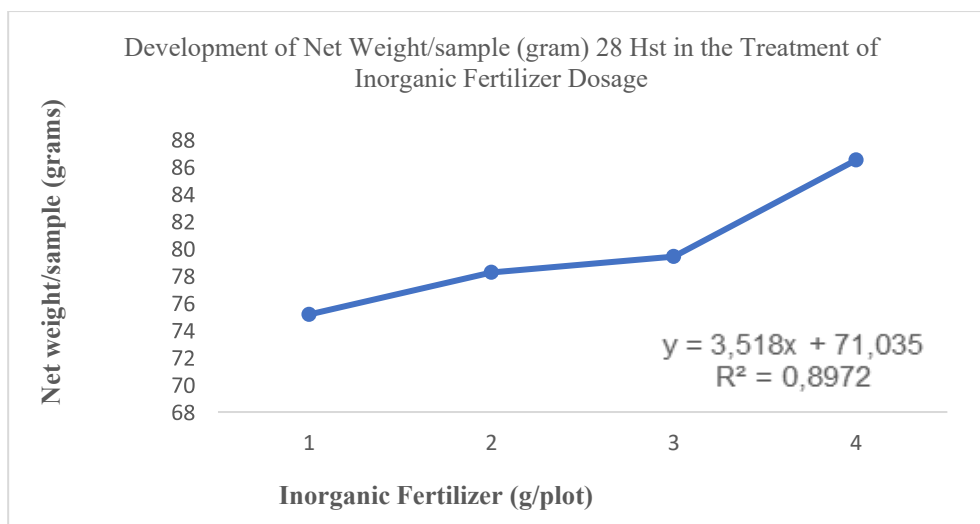


Image 10 Development of Net Weight/sample (gram) in the Treatment of Inorganic Dosage (N) Age 28 HST

Graph 10 the net weight/sample yield of mustard plants given inorganic fertilizer forms a positive linear relationship with the equation $y = 3.518x + 71.035$ with a value of $R^2 = 0.8972$, indicating the higher dose of inorganic fertilizer given the net weight/sample yield of mustard plants.

3.8. Net Weight/plot (gram)

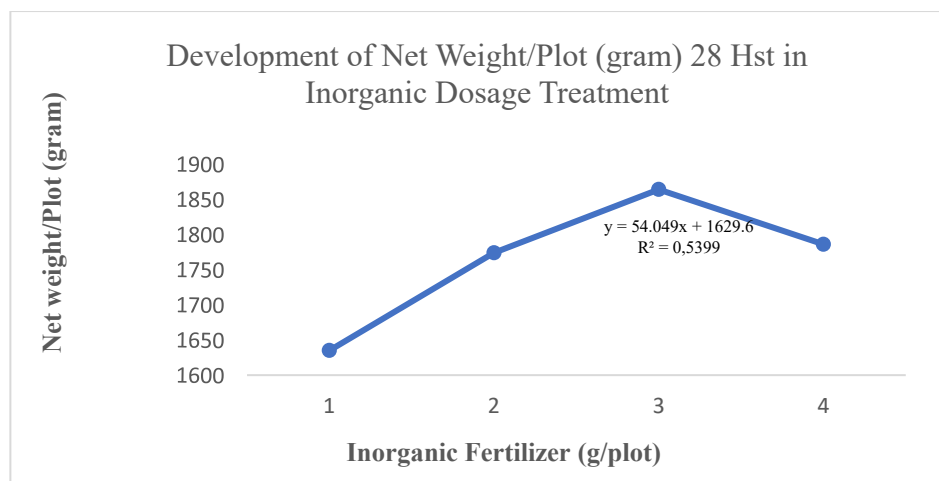
The results of data analysis of organic fertilizer treatment had no significant effect on the net weight/plot yield of 28 HST mustard plants. Inorganic treatment has a very real effect on net weight/plot 28 HST. The interaction was not significantly influenced by 28 HST. Observation data of net weight/plot yield of mustard plants Organic Fertilizer and inorganic 28 HST and the results of different tests of means with Duncan's Multiple Test (DMRT) can be seen in Table 7.

Table 3 Net weight/plot of Mustard Plants (gram) 28 HST in the Treatment of Organic Fertilizers and Inorganic

Net weight/Plot (gram)	
Treatment	28 HST
Organic Pupils	
A0	1238,25 a
A1	1787,50 a
A2	1913,00 a
A3	2120,25 a
Inorganic Fertilizer	
N0	1635,58 a
N1	1773,75 b
N2	1864,00 b
N3	1785,66 b

Notes: Numbers followed by the same letter in the same column are not significantly different at level $\alpha = 0.05$ (lower case) based on Duncan's distance test.

Table 7. Organic Fertilizer had no significant effect 28 HST on net weight / Plot, while A₀ was significantly different from A₁ and A₂ and A₃ had a very real effect 28 HST on net weight / Plot of mustard yield. Results of regression and correlation analysis, the relationship between the inorganic application and net weight/plot yield of 28 HST mustard plants, Graph 11.



Graph 11 Development of Net Weight/Plot (gram) in the Treatment of Inorganic Fertilizer Dosage (N) Age 28 HST.

Net weight/plot yield of mustard plants application of inorganic fertilizer has a positive linear relationship with the equation $y = 50.217x + 2782.3$ with a value of $R^2 = 0.27$. This shows the higher the inorganic dose given can reduce the gross weight/sample yield of mustard plants.

3.9. Discussion

3.9.1 Response of Mustard Plants to Growth and Yield in Organic Fertilizer Treatment

The results of data analysis of organic fertilizer treatment on plant height, number of leaves, leaf width, leaf length, and yield did not have a significant effect because manure decomposes for a long time and has not been absorbed by plants (Lingga and Marsono 2004) and had a significant effect on the number of leaves. Analysis of organic fertilizer treatment on all observations showed an unclear increase in each observation, this proves that the addition of organic fertilizer does not increase growth and yield to the optimal point.

The production of organic fertilizers requires time and resources, such as organic materials (animal manure) and composting processes (Wardio Detiagel, et al., 2023). Research by Kholidin et al (2012) Organic matter is the key to soil fertility Soil containing high organic matter tends to be more fertile. Fertile soil containing high organic matter tends to be more fertile than soil with low organic matter content. High organic matter content causes better soil porosity and permeability so that air aeration increases. This can avoid water saturation that causes root rot. Organic matter content is closely related to soil CEC which can increase the ability of soil to adopt nutrients. Organic matter content plays a very important role in soil fertility because it can affect soil properties, chemical properties, and soil biology. The content of organic matter needs not to decrease due to the mineralization decomposition process due to activities above the soil surface. The use of organic fertilizers is carried out with the aim of increasing yields in accordance with the opinion of Marthn Kalay (2020).

Organic fertilizers play a role in increasing the physical, chemical, and biological fertility of the soil and reducing the use of inorganic fertilizers (Hartatik et.al., 2015). Cow manure did not affect mustard growth but did affect mustard yield. The higher the dose of cow manure, the higher the mustard fresh weight. 10 tons of cow manure/ha increased mustard yield. (Saartje Sompotan, 2013)

3.9.2 Response of Mustard Plants to Growth and Yield in the Treatment of Fertilizer Anoganik

The growth and the results of statistical data analysis showed that inorganic treatment had a very significant effect on plant height, number of leaves, leaf width, leaf length, net weight/sample, net

weight/plot, gross weight/sample, and gross weight/plot of mustard plants (*Brassica juncea* L.). Inorganic influence has a significant effect on plant height and the number of leaves, this is in accordance with the literature by Aguslina (2009) which states that the element Nitrogen (N) is needed for the formation of carbohydrates, proteins, fats, and other organic compounds and the element Nitrogen plays an important role as a constituent of chlorophyll which makes the leaves green.

According to Fathini et al. (2014), the content of nutrients, such as N and P in plant growth is very important so their availability must be in accordance with the needs of the plant itself, and for plant growth, especially vegetative growth, nitrogen is needed in large quantities for each stage of plant growth. According to Fahmi et al. (2010), nitrogen and phosphorus nutrients are nutrients that are needed by plants in large quantities, if plants lack nitrogen their growth becomes slow, and plants become stunted, while phosphorus deficiency causes roots to not develop properly, and plant growth becomes slow.

3.9.3 *Response of Mustard Plants to Growth and Yield in the Interaction Treatment between Organic Fertilizer and ANORGANIC Fertilizer*

The interaction between the treatment doses of organic fertilizers and inorganic fertilizers had a significant effect on plant height and gross weight/plot while the number of leaves had a very real effect. This indicates that the interaction of the two treatments shows a relationship to support the growth and yield and yield of mustard greens, this is in accordance with the literature of Aguslina (2009) which states that the treatment of organic and inorganic fertilizers on the vegetative growth of mustard greens is expected. The element of nitrogen (N) is needed for carbohydrates, protein, glue, and other organic compounds and the element of nitrogen plays an important role as a constituent of chlorophyll which makes the leaves green. The element of phosphorus (P) which plays an important role in the transfer of energy in plant cells, encourages root development and early fertilization, strengthens the stem so that it does not easily collapse, and increases uptake at the beginning of growth. The element potassium (K) is also very instrumental in plant growth, for example, to spur the translocation of carbohydrates from leaves to plant organs.

The treatment of the effect of organic and inorganic fertilizers does not provide significant differences in the value of Relative Agronomic Effectiveness (RAE) (Simanullang, A.Y., 2019). This is in accordance with the opinion of Marsono and Lingga (2007), organic fertilizers have low macro and micronutrients and cannot be directly absorbed by plants so that plant needs for nutrients are still not met as a result plant growth is inhibited but inorganic fertilizers although the nutrients contained are only macronutrients, the dose of nutrients matches the needs of plants so that plant needs for nutrients can be met especially when combined with organic fertilizers so that plant needs for macro and micronutrients can be met and plant growth becomes better.

4. CONCLUSION

Organic fertilizer treatment had no significant effect on all parameters of mustard plants (*Brassica juncea* L.). The treatment of inorganic fertilizers has a significant effect on plant height and gross weight/plot while the number of leaves has a significant effect on mustard plants (*Brassica juncea* L.). The interaction of organic fertilizer and inorganic fertilizer treatments had a significant effect on plant height and gross weight/plot while the number of leaves had a significant effect on mustard plants (*Brassica juncea* L.).

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