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Response of growth and production of pagoda mustard (Brassica narinosa L.) to the application of Nitrophoska fertilizer and kascing fertilizer

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ABSTRACT

The study was conducted from September to October 2024, using a factorial randomized block design (RBD) with two treatment factors. The first factor was the application of Nitrophoska fertilizer, with N0: no treatment, N1: 200 kg/ha (20 g/plot), N2: 300 kg/ha (30 g/plot), N3: 400 kg/ha (40 g/plot). The second factor was the application of Kascing fertilizer: K1: 4 tons/ha (400 g/plot), K2: 6 tons/ha (600 g/plot), K3: 8 tons/ha (800 g/plot). The parameters observed were Plant Height (cm), Number of Leaves (pieces), Gross Weight per Plant (g), Net Weight per Plant (g), and Net Weight per Plot (g). The results showed that the Nitrophoska fertilizer treatment had a significant effect on Plant Height at 14, 21, and 28 days after sowing (DAS), Number of Leaves at 14, 21, and 28 DAS, Gross Weight per Plant, Net Weight per Plant, and Net Weight per Plot. The Kascing fertilizer treatment showed a significant response on Plant Height at 14, 21, and 28 days after sowing (DAS), Number of Leaves at 14, 21, and 28 DAS, and Net Weight per Plot, but no significant response on Gross Weight per Plant and Net Weight per Plant. The combination of Nitrophoska and Kascing fertilizer treatments showed no significant response to any of the parameters.

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1. INTRODUCTION

Pagoda mustard is a type of mustard green, also known by the other name Ta Ke Chaidan Tatsoi. Pagoda mustard greens have a unique shape and color, similar to a blooming flower, the shape of the leaves is oval with a very striking deep green color. The weight of the plant can reach 200 grams (Purnamasari, et al. 2023).

Pagoda mustard has a beautiful and unique shape aesthetically with curly and green leaf surface characteristics, pagoda mustard is also a vegetable that has a delicious taste and crispy texture and a lot of nutritional content that is good for the health of this chemical substance, including alkaloids, potassium, iodine. Pagoda mustard greens are easy to cultivate and suitable for growing in highlands and lowlands so that it is very possible to be used as a cultivation plant as well as an ornamental plant that can beautify the yard of the house (Jayati, et al. 2019). Pagoda mustard is a vegetable plant that has high nutritional content and has many benefits for health. The nutritional content in mustard pagoda includes protein, fat, carbohydrates, Ca, P, Fe, Vitamins A, B, and C which have many benefits for health. The benefits of mustard pagoda for the body are

that it can relieve itching in the throat when coughing, cure headaches, cleanse blood, improve kidney function and facilitate digestion (Ibrahim, et al. 2018).

The production of mustard greens continues to increase along with the growing population and the increasing public awareness of the importance of consuming vegetables to maintain health. One type of mustard that is starting to be favored by the community and is starting to be cultivated by farmers is the pagoda mustard green. The community's need for mustard pagoda is currently increasing, but it is known that the production of mustard pagoda is still limited. According to (Syifa, et al. 2020) fertilization can be done with the aim of increasing soil fertility and increasing the availability of nutrients in the soil so that plant growth is better.

Efforts to increase the yield of pagoda mustard greens can be done by using organic fertilizers such as casncing fertilizer. The application of organic fertilizer for cascading is very good, because the nutrients contained directly can be available to the plant so that the quality of casshing, is much better than other organic fertilizers (Ansyahri, 2021).

In addition to the addition of kascing fertilizer to the pagoda mustard greens, there is a need for additional inorganic fertilizers, namely nitrophoska compound fertilizer. Nitrophoska is a complete compound fertilizer that contains the elements N, P and K that plants need to be in it. Organic fertilizers are considered to have small amounts of nutrients so inorganic fertilization is needed, one of which is NPK fertilizer.

2. METHOD

This research was carried out in the Huta I Dolok Malela area, Simalungun Regency, Gunung Malela District, with an altitude of 194 m above sea level. This research was conducted from September to October 2024. The materials used in this study are pagoda mustard seeds of the F1 TA TO CAI variety, curacron 500 EC, antracol 70 WP, cow manure, Nitrophoska fertilizer, and Kascing fertilizer. Meanwhile, the tools used in this study are hoes, gembor, meters, scales, machetes, name pamphlets, cameras, and stationery. The study used a factorial Group Random Design (RAK), with 2 treatment factors, the first factor was the application of Nitrophoska fertilizer, namely, N0: Without treatment, N1: 200 kg/ha (20 g/plot), N2: 300 kg/ha (30 g/plot), N3: 400 kg/ha (40 g/plot). While the second factor is the application of Kascing fertilizer, namely K1: 4 tons/ha (400 g/plot), K2: 6 tons/ha (600 g/plot), K3: 8 tons/ha (800 g/plot). The parameters measured were Plant Height, Number of Leaves, Gross Weight per Plant, and Net Weight per Plot. The research data were analyzed using Analysis of Variance (ANOVA) with Factorial Randomized Block Design (RAK). If the results are significantly different, it is continued with a mean difference test according to BNT (Smallest Significant Difference) at a 5% confidence level.

3. RESULTS AND DISCUSSION

3.1 Plant Height

The average height of Nitrophoska fertilizer and Kascing fertilizer treatment plants showed a real response of plants at the ages of 14, 21, and 28 HST. Meanwhile, the results of the combination of Nitrophoska fertilizer and Kascing fertilizer showed an unreal response to the height of the pagoda mustard greens plant.

Table 1. Average Height of Pagoda Mustard Plants Due to the Application of Nitrophoska Fertilizer and Hunting Fertilizer

Treatment	14 HST	21 HST	28 HST
N0	5.47 b	7.78 b	10.07 b
N1	6.40 from	8.53 b	10.29 b
N2	5.90 b	8.52 b	10.69 ab
N3	6.70 a	9.65 a	11.18 a
BNT	0.66	0.87	0.79
K1	6.27 a	8.06 b	10.62 ab
K2	5.65 b	8.68 ab	10.07 b
K3	6.43 a	9.12 a	10.98 a
BNT	0.57	0.75	0.69
N0K1	5.36	6.89	10.50
N0K2	4.70	7.21	8.70
N0K3	6.36	9.25	11.00
N1K1	7.15	8.08	10.08
N1K2	5.79	9.19	10.58
N1K3	6.26	8.32	10.21
N2K1	5.73	8.00	11.08
N2K2	5.98	8.83	10.25

N2K3	5.98	8.75	10.75
N3K1	6.85	9.29	10.83
N3K2	6.15	9.50	10.75
N3K3	7.10	10.16	11.96

Description: Numbers that are not the same notation in the same treatment and columns are significantly different according to BNT 0.05%

In Table 1, it can be explained that the highest crop due to fertilizer application Nitrophoska at age 14 HST was N3 (40 g/plot) 6.70 cm, 21 HST was N3 (40 g/plot) 9.65 cm, and 28 HST is N3 (40 g/plot) 11.18 cm. At age 14 HST N3 is significantly different from N0 (No treatment) and N2 (30 g/plot), but is not noticeable from N1 (20 g/plot). At the age of 21 HST N3 is noticeably different from all treatments. At the age of 28 HST N3 is significantly different from N0 (No treatment) and N1 (20 g/plot), but the difference is not real with N2 (20 g/plot). Lingga, 2001 *in the* (Ansyahri, 2021) states that a sufficient amount of nitrogen plays a role in accelerating the overall growth of plants, especially stems and leaves. The element nitrogen plays a role in the formation of plant cells, tissues, and organs. The element phosphorus, nitrogen is used to regulate the overall growth of the plant. Highest crop due to fertilizer application Kascing at age 14 HST is K3 (800 g/plot) 6.43 cm, 21 HST is K3 : 9.12 cm, and 28 HST is K3 (800 g/plot) 10.98 cm. At the age of 14 HST K3 is significantly different from K2 (600 g/plot), but not noticeable from K1 (400 g/plot). At age 21 HST K3 is significantly different from K1 (400 g/plot), but not noticeable from K2 (600 g/plot). At the age of 28 HST K3 is significantly different from K2 (600 g/plot), but is not real in contrast to K1 (400 g/plot). Mashur, 2001 *in the* (Gunawan, 2019) stated that casscing is a type of organic fertilizer. Soil used for worm maintenance which is a by-product of earthworm cultivation in the form of organic fertilizer, is suitable for plant growth because it can increase soil fertility. Kascing is rich in macro and micro nutrients, does not contain toxins, and is able to loosen marginal soils (dry and poor nutrients).

According to Dewi, in 2008 *in* (Fransiska, 2021) the growth regulators of auxin, cytokinin, and gibberellin have different roles for each plant. Gibberellin plays a role in promoting seed and bud germination, stem elongation, leaf growth, promoting flowering and fruit development, and influencing root growth and differentiation. There was no interaction between the combination treatment of Nitrophoska fertilizer and Kascing fertilizer on the observed plant height parameters. This shows that plant growth and production are not only determined by sufficient and balanced nutrients, but also require a good environment including the physical and biological properties of the soil. This increase in nutrients can increase vegetative growth, including plant height.

3.2 Number of Leaves

The average data on the number of leaves treated with Nitrophoska fertilizer and Kascing fertilizer showed a real response of plants at the age of 14, 21, and 28 HST. Meanwhile, the results of the combination treatment of Nitrophoska fertilizer and Kascing fertilizer showed an unreal response to the number of pagoda mustard leaves.

Table 2. Number of Pagoda Mustard Leaves as a Result of Nitrophoska and Kascing Fertilizer Application.

Treatment	14 HST	21 HST	28 HST
N0	8.28 ab	13.92 b	23.36 b
N1	7.94 b	14.69 ab	25.19 a
N2	8.39 ab	14.36 b	25.94 a
N3	8.61 a	15.31 a	26.28 a
BNT	0.47	0.92	1.71
K1	8.06 b	14.63 ab	24.18 b
K2	8.27 ab	14.00 b	24.85 b
K3	8.58 a	15.08 a	26.54 a
BNT	0.40	0.80	1.48
N0K1	7.42	12.92	21.58
N0K2	8.33	13.83	23.58
N0K3	9.08	15.00	24.92
N1K1	7.92	15.42	25.58
N1K2	7.67	13.92	23.92
N1K3	8.25	14.75	26.08
N2K1	8.42	15.42	26.23
N2K2	8.33	13.25	25.58
N2K3	8.42	14.42	26.00
N3K1	8.50	14.75	23.33
N3K2	8.75	15.00	26.33
N3K3	8.58	16.17	29.17

Description: Numbers that are not the same notation in the same treatment and columns are significantly different according to BNT 0.05%

In Table 2, it can be explained that the highest number of leaves due to the application of Nitrophoska fertilizer at the age of 14 HST is N3 (40 g/plot) 8.61 sheets, 21 HST is N3 (40 g/plot) 15.31 sheets, and 28 HST is N3 (40 g/plot) 26.28 sheets. At age 14 HST N3 is significantly different from N1 (20 g/plot), but not significantly different from N0 (No treatment) and N2 (30 g/plot). At age 21 HST N3 was significantly different from N0 (No treatment) and N2 (30 g/plot), but not significantly different from N1 (20 g/plot). At the age of 28 HST K3 is significantly different from N0 (No treatment), but it is not noticeable from N1 (20 g/plot) and N2 (30 g/plot). The availability of nitrogen elements in Nitrophoska fertilizer is beneficial for the formation of chlorophyll which is very important for the photosynthesis process so that it can increase plant growth. The better the growth, the more leaves. Nutrients N play a major role in the process of cell division and enlargement, so a lack of N can inhibit leaf formation. In accordance with the opinion (Lakitan *in* Syah, et al. 2016) which states that the nutrient that has the most influence on the growth and development of leaves is nitrogen. The nutrient content of N found in the soil will be utilized by plants in cell division and cell enlargement to form young leaves.

In Table 2, it can be explained that the highest number of leaves due to the application of Kascing fertilizer at the age of 14 HST is K3 (800 g/plot) 8.58 sheets, 21 HST is K3 (800 g/plot) 15.08 sheets, and 28 HST is K3 (800 g/plot) 26.54 sheets. At the age of 14 HST K3 is significantly different from K1 (400 g/plot), but not significantly different from K2 (600 g/plot). At the age of 21 HST K3 is significantly different from K2 (600 g/plot), but not significantly different from K1 (400 g/plot). At age 28 HST K3 is significantly different from all treatments. According to Dewi, 2008 *in* (Fransiska, 2021) auxin plays a role in regulating growth through cell enlargement or cell division, stimulating cell differentiation, root formation on plant cuttings, and the formation of xylem and phloem tissue. Xylem and phloem have different and specific functions. Xylem functions to transport water and minerals from the soil through the roots, while phloem functions to transport the results of photosynthesis to all plant organs (Kurniawati, et al. 2015). Xylem and phloem work together to maintain the balance of water and nutrients in plants, allow for growth coordination between the upper and lower parts of plants, and support various metabolic processes that are essential for plant growth and development, therefore xylem and phloem are vital for plant growth, development, and survival.

In Table 2, it can be explained that in 14 HSTs the combination treatment N0K3 (9.08) had the highest average number of pagoda mustard leaves from the other treatments, the combination treatment N0K1 (7.42) had the lowest average number of leaves, but it was not significantly different from the other treatments. At age 21 HST the N3K3 treatment (16.17) had the highest average number of pagoda mustard leaves than the other treatments, and the N0K1 treatment (12.92) had the least average number of leaves, but it was not significantly different from the other treatments. And at age 28 HST the N3K3 treatment (29.17) had the highest average number of pagoda mustard leaves than the other treatments, and the N0K1 treatment (21.58) had the least average number of leaves, but it was not significantly different from the other treatments. There was no interaction between the combined treatment of Nitrophoska fertilizer and Kascing fertilizer on the observed leaf count parameters. This happens because there are other factors that cause the number of leaves to be unreal, namely leaves that are susceptible to fungus (powdery mildew), because within a month when the research rains continuously. So that it causes the leaves to be damaged and become rotten, in order to minimize damage to the leaves of the cut leaves so that they do not spread to other leaves.

3.3 Gross Weight per Plant

The average data of gross weight per plant in Nitrophoska fertilizer treatment showed a real response to gross weight per pagoda mustard plant, but Kascing fertilizer treatment showed an unreal response to gross weight per pagoda mustard plant and the combination of Kascing fertilizer and Nitrophoska fertilizer showed an unreal response to gross weight per pagoda mustard plant. To know difference between the treatment was carried out with the smallest real difference test (BNT) at the level of 5% which can be seen from table 3.

Table 3. Average Gross Weight per Pagoda Mustard Plant Due to the Application of Nitrophoska Fertilizer and Casting Fertilizer

Treatment	Gross Weight Per Plant
N0	61.31 b
N1	60.69 b
N2	64.53 ab
N3	68.58 a
BNT	5.04

K1	62.08
K2	63.02
K3	66.23
N0K1	56.42
N0K2	62.17
N0K3	65.33
N1K1	63.00
N1K2	59.67
N1K3	59.42
N2K1	64.50
N2K2	65.33
N2K3	63.75
N3K1	64.42
N3K2	64.92
N3K3	76.42

Description: Numbers that are not the same notation in the same treatment and columns are significantly different according to BNT 0.05%

In Table 3, it can be explained that the highest gross weight per plant due to the application of Nitrophoska fertilizer is at N3 (40 g/plot) which is 68.58 grams, which is significantly different from N0 (No treatment) and N1 (20 g/plot), but not real from N2 (30 g/plot). Novizan, 2013 *in* (Antoni, 2019) stated that the application of fertilizer will greatly help plants to grow and develop properly. Elements N, P and K are macronutrients that plants absorb from the soil, needed in sufficient quantities and if there is a lack of these elements, plant growth will be inhibited. Therefore, the provision of these elements through fertilization is absolutely carried out.

In Table 3, it can be explained that the highest gross weight per plant due to the application of Kascing fertilizer is at K3 (800 g/plot) which is 66.23 grams, which is not real in all treatments. Cascading fertilizer plays an important role in increasing soil fertility, providing nutrients for plants, improving soil structure, neutralizing soil pH and improving water holding ability. The pH of the cascading fertilizer ranges from 5.0 to 7.4 and the average is 6.9. Cascading particles smaller than soil particles are organic matter that can affect plant growth, Cascading particles are smaller than soil particles which are 0.002 – 2 mm in size and are good for plant growth because they have a high nutrient content (Lidar, et al. 2022). However, Kascing fertilizer does not respond significantly to the observed gross crop weight parameters. This is due to weather factors, where at the time of this study it continued to rain for several days, so that the Kascing fertilizer in the sample plants continued to be eroded to the side, which caused a lack of nutrients in the sample plants.

Table 3 shows that the N3K3 combination treatment (76.42 grams) had the highest average gross weight per pagoda mustard plant compared to the other treatments, while the N0K1 combination treatment (56.42 grams) had the lowest average gross weight per plant, but this difference was not significant compared to the other treatments. There was no interaction between the combination treatments of Nitrophoska fertilizer and Kascing fertilizer on the observed parameter of average gross weight per plant. This occurred because both Nitrophoska fertilizer and Kascing fertilizer contain essential nutrients. Using them together but with improper calculations can lead to nutrient excess or imbalance, which may hinder plant growth.

3.4 Net Weight per Plant

The average data of net weight per plant in Nitrophoska fertilizer treatment showed a noticeable response to weight net per pagoda mustard plant, but the treatment of Kascing fertilizer showed an unreal response to the net weight per pagoda mustard plant and the combination of Kascing fertilizer and Nitrophoska fertilizer showed an unreal response to the net weight per pagoda mustard plant. To find out the difference between treatments, the smallest real difference test (BNT) is at the level of 5% which can be seen from table 4.

Table 4. Average Net Weight per Pagoda Mustard Plant Due to the Application of Nitrophoska Fertilizer and Hunting Fertilizer

Treatment	Net Weight Per Plant
N0	55.08 b
N1	54.81 b
N2	58.94 ab
N3	62.33 a
BNT	4.77

K1	56.04
K2	57.10
K3	60.23
N0K1	49.92
N0K2	56.17
N0K3	59.17
N1K1	57.00
N1K2	53.67
N1K3	53.75
N2K1	58.67
N2K2	60.33
N2K3	57.83
N3K1	58.58
N3K2	58.25
N3K3	70.17

Description: Numbers that are not the same notation in the same treatment and columns are significantly different according to BNT 0.05%

In Table 4, it can be explained that the highest net weight per plant due to the application of Nitrophoska fertilizer is at N3 (40 g/plot) which is 62.33 grams, which is significantly different from N0 (No treatment) and N1 (20 g/plot) but not real from N2 (30 g/plot). NPK fertilization in addition to increasing the availability of nitrogen, phosphorus and potassium nutrients for plants, is also a source of macronutrients for soil bacteria. The content of NPK fertilizer is that the element phosphorus (P) plays a role in the formation of ATP which is used for cell growth and the element potassium (K) acts as an enzyme activator involved in the synthesis process of proteins and carbohydrates (Manan, et al. 2016).

In Table 4, it can be explained that the net weight per plant is the highest due to the application of Kascing fertilizer is in K3 (800 g/plot) i.e. 60.23 grams, which is not noticeable with all treatments. Nick 2008 *in the* (Lubis, et al. 2020) said that kascing is one of the organic fertilizers that has advantages over other organic fertilizers because its nutrients can be readily available, contain complete microorganisms and also contain growth hormones so that it can accelerate plant growth. However, Kascing fertilizer does not respond significantly to the observed parameters of the net weight of the plant. This is due to weather factors, where at the time of this study it continued to rain for several days, so that the Kascing fertilizer in the sample plants continued to be eroded to the side, which caused a lack of nutrients in the sample plants. In table 4 it can be explained that on combination treatment of N3K3 (70.17 grams) has the highest average net weight per pagoda mustard plant of any other treatment, on combination treatment of N0K1 (49.92 grams) It has the lowest average net weight per plant, but it differs not noticeably from other treatments. There was no interaction between the combination of Nitrophoska and Kascing fertilizers on the observed net weight per plant parameter. This was due to insufficient fertilizer application in the soil and environmental factors such as high rainfall and pests attacking the plants, causing the net weight per plant to decrease.

3.5 Net Weight per Plot

The data on the average net weight per plot in the treatment of Nitrophoska fertilizer and Kascing fertilizer showed a real response to the net weight per plot of pagoda mustard greens. Meanwhile, the combination treatment of Nitrophoska fertilizer and Kascing fertilizer showed an unreal response to the net weight per pagoda mustard plot.

Table 5. Net Weight per Pagoda Mustard Plant Plot Due to the Application of Nitrophoska Fertilizer and Cascing Fertilizer

Treatment	Net Weight Per Plot
N0	938.67 b
N1	927.33 b
N2	925.78 b
N3	1039.89 a
BNT	78.42
K1	931.83 b
K2	931.08 b

K3	1010.83 a
BNT	67.91
N0K1	898.00
N0K2	910.00
N0K3	1008.00
N1K1	927.67
N1K2	851.00
N1K3	1003.33
N2K1	884.00
N2K2	956.67
N2K3	936.67
N3K1	1017.67
N3K2	1006.67
N3K3	1095.33

Description: Numbers that are not the same notation in the same treatment and columns are significantly different according to BNT 0.05%

In Table 5, it can be explained that the highest net weight per plot due to the application of Nitrophoska fertilizer was at N3 (40 g/plot) which was 1039.89 grams, which was significantly different from all treatments. In addition to the N element, the P element is also one of the primary macronutrients so that large quantities of plants are needed to grow and produce. Potassium as an enzyme activator. About 80 types of enzymes whose activation requires element K, help the absorption of water and nutrients from the soil by plants, and help transport assimilated results from leaves to plant tissues (Rahalus, et al. 2019).

In Table 5, it can be explained that the highest net weight per plot due to the application of Kascing fertilizer is in K3 (800 g/plot) which is 1010.83 grams, but it is not real in all treatments. According to Dewi, in 2008 *in* (Fransiska, 2021) cytokinin growth regulators in cascite fertilizer play a role in cell division and enlargement, aging, and transportation in plants. Cassing fertilizer also contains Azobacter. Azotobacter is a non-symbiotic nitrogen-fixing bacterium that lives freely in the soil and belongs to one of the groups of aerobic bacteria that colonize the root surface, so its use can increase root volume (Puspawati, et al. 2021).

In table 5, it can be explained that in the combination treatment N3K3 (1095.33 grams) had the highest average net weight per pagoda mustard greens from the other treatments, in the combination treatment N1K2 (851.00 grams) had the lowest average net weight per plot, but it was not noticeable from the other treatments. There was no interaction between the combined treatment of Nitrophoska fertilizer and Kascing fertilizer on the net weight parameters per observed plot. This is because the two do not have synergy so that they do not affect each other. The low net weight per plot is due to the fact that at the time of the research the land was flooded or flooded, which caused the plants to become dwarfed or did not grow optimally. Flooding of land occurs because the land is located around a benar area where when it rains continuously, the water will overflow and cause flooding on the research land.

4. CONCLUSION

There was a significant response to plant height at 14, 21, and 28 days after sowing (DAS), number of leaves at 14, 21, and 28 DAS, gross weight per plant, net weight per plant, and net weight per plot due to the application of Nitrophoska fertilizer. The tallest plants at 14 days after sowing were N3 (6.70 cm), at 21 days after sowing were N3 (9.65 cm), and at 28 days after sowing were N3 (11.18 cm). The highest number of leaves at 14 days after sowing was N3 (8.61 leaves), at 21 days after sowing was N3 (15.31 leaves), and at 28 HST was N3 (26.28 leaves). The highest gross weight per plant was in N3 (68.58 grams), the highest net weight per plant was in N3 (62.33 grams), and the highest net weight per plot was in N3 (1039.89 grams), indicating a significant response. There was a significant response to plant height at 14, 21, and 28 HST,

the number of leaves at 14, 21, and 28 HST, and net weight per plot due to the application of Kascing fertilizer, but there was no significant response to gross weight per plant and net weight per plant. The tallest plants at 14 days after sowing were K3 (6.43 cm), at 21 days after sowing were K3 (9.12 cm), and at 28 days after sowing were K3 (10.98 cm), the highest number of leaves at 14 days after sowing was K3 (8.58 leaves), at 21 days after sowing was K3 (15.08 leaves), and at 28 days after sowing was K3 (26.54 leaves), and the highest net weight per plot in K3 (1010.83 grams) showed a significant response. There was no significant response due to the combination of Nitrophoska and Kascing fertilizers on all observed parameters.

REFERENCES

Ansyahri. 2021. Pengaruh Pupuk Kascing Dan Npk Mutiara 16:16:16 Terhadap Pertumbuhan Serta Hasil Sawi Pagoda (*Brassica narinosa*). *Skripsi Universitas Islam Riau*, *Riau*.

Antoni. 2019. Pemberian Pupuk Kandang Puyuh Dan Npk Nitrophoska 15: 15: 15 Terhadap Pertumbuhan Dan Produksi Tanaman Gambas (*Luffa acutangula*). *Skripsi Universitas Islam Riau*, *Riau*.

Fransiska S. 2021. Pengaruh Pemberian Zat Pengatur Tumbuh Alami Ekstrak Daun Kelor, Bawang Merah, Dan Air Kelapa Terhadap Pertumbuhan Dan Kualitas Hasil Tanaman Jagung Manis (*Zea mays saccharata Sturt*.). *Skripsi Universitas Lampung, Bandar Lampung*.

Gunawan. 2019. Pengaruh Berbagai Jenis Pupuk Organik Dan Dosis Npk 16: 16: 16 Terhadap Pertumbuhan Serta Hasil Tanaman Sawi Pagoda (*Brassica narinosa*). *Skripsi Universitas Islam Riau*, *Riau*.

Ibrahim Y, Tanaiyo R. 2018. Respon Tanaman Sawi (*Brasicca juncea* L.) Terhadap Pemberian Pupuk Organik Cair (Poc) Kulit Pisang Dan Bonggol Pisang. *Agropolitan*. 5(1):63–69.

Jayati Rd, Susanti I. 2019. Perbedaan Pertumbuhan Dan Produktivitas Tanaman Sawi Pagoda Menggunakan Pupuk Organik Cair Dari Eceng Gondok Dan Limbah Sayur. *Jurnal Biosilampari: Jurnal Biologi*. 1(2):73–77.

Kurniawati F, Zaenab S, Wahyuni S. 2015. Analisis Perbandingan Bentuk Jaringan Pembuluh Trakea Pada Preparat Maserasi Berbagai Genus Piper Sebagai Sumber Belajar Biologi. *Jpbi (Jurnal Pendidikan Biologi Indonesia)*. 1(2).

Lidar S, Purnama I, Indah Sari V. 2022. Aplikasi Kascing Terhadap Pertumbuhan Dan Produksi Tanaman Jahe Merah (*Zingiber officinale var. rubrum*). *Jurnal Agrotela*. 1(1):25–32.

Lubis A, Hasibuan S, Indrawati A. 2020. Pemanfaatan Serbuk Cangkang Telur Ayam Dan Pupuk Kascing Di Tanah Ultisol Terhadap Pertumbuhan Dan Produksi Terung Ungu (*Solanum melongena* L.). *Jurnal Ilmiah Pertanian (Jiperta)*. 2(2):109– 116.Doi:10.31289/Jiperta.V2i2.331.

Manan A, Al Machfudz Wdp. 2016. Pengaruh Volume Air Dan Pola Vertikultur terhadap pertumbuhan Dan Hasil sawi Hijau (*Brassica juncea* L.). *Nabatia*. 12(1):33–43.

Purnamasari Rt, Pratiwi Sh, Edision Aa. 2023. Pengaruh Pemberian Pupuk Kandang Kambing Dan Urea Terhadap Pertumbuhan Dan Hasil Sawi Pagoda (*Brassica rapa* L.). *Jurnal Agroteknologi Merdeka Pasuruan*. 7(1):32–42.

Puspawati Nimi, Khalimi K, Wirya Gnas. 2021. Pemanfaatan Bakteri Azotobacter Untuk Meningkatkan Efisiensi Penggunaan Pupuk Urea Pada Tanaman Padi (*Oryza sativa* L.). *Jurnal Agroekoteknologi Tropika Issn*. 2301:6515.

Rahalus Cy, Tumewu P, Tulungen Ag. 2019. Respons Tanaman Sawi (*Brassica juncea* L.) Terhadap Pupuk Anorganik Dan Pupuk Organik Bahan Dasar Gulma. Di Dalam: *Cocos*. Vol. 11.

Syah M, Dkk. 2016. "Pengaruh Pemberian Bokashi Dan Npk Terhadap Pertumbuhan Dan Produksi Tanaman Semangka (*Citrullus vulgaris schard*)." Jurnal Online Mahasiswa Fakultas Pertanian Universitas Riau, Vol. 3, No. 2, Oct. 2016, Pp. 1-10.

Syifa T, Isnaeni S, Rosmala A. 2020. Pengaruh Jenis Pupuk Anorganik Terhadap Pertumbuhan Dan Hasil Tanaman Sawi Pagoda (*Brassicae narinosa* L). *Agroscript Journal of Applied Agricultural Sciences*. 2(1).Doi:10.36423/Agroscript.V2i1.4 52.