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Application of Mulch and Organic Fertilizer to Increase Growth and Yield of Eggplant Plants (*Solanum melongena* L.)

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Abstract

This research aims to determine the effect of the type of organic mulch and the dose of manure on the growth and production of eggplants. This research was carried out in Mohoni Village, East Petasia District, North Morowali Regency. The research was carried out from September to November 2020. In this research, a factorial Randomized Block Design (RAK) was used, consisting of two factors. The first factor is the application of several types of organic mulch, consisting of: without mulch (Mo), empty oil palm bunch mulch (M1); rice straw mulch (M2), and corn straw mulch (M3). The second factor of application of various doses of cow manure consists of: without manure (D0), 10 t/ha (D1); 20 tons/ha (D2); and 30 tons/ha (D3). The research results showed (1) There was no significant interaction between the type of organic mulch treatment and the dose of manure on the growth and yield of eggplant; (2) Rice straw mulch provides higher growth and yield of eggplant and is significantly different from without mulch, but not different from empty palm fruit bunch mulch and corn straw, and (3) A dose of 10 tons/ha of manure produces growth and yield of eggplant plants. higher and significantly different from without application of cow manure, but not significantly different from doses of 20 t/ha and 30 t/ha.

Keywords: *organic; production; vegetable.*

Introduction

Eggplant is one type of vegetable that is very popular, because it tastes good when used as a vegetable or raw vegetables. Eggplant contains quite high nutrition, especially vitamin A and phosphorus (Muldiana and Rosdiana 2017). The nutritional content of eggplant includes vitamin A, vitamin B-complex, iron, phosphorus, thiamine, riboflavin, manganese, potassium and pyridoxine. In addition, eggplant also has a high fiber content so it is good for digestion (Sahid, Murti, and Trisnowati 2014). Eggplant fruit has medicinal properties because it contains alkaloids, solanine and solasodine and is useful as a vegetable to meet family nutrition (Jumini and Marliah 2009).

According to BPS (2022) eggplant production in Indonesia is 691,738 tons, but this production still fluctuates from year to year and eggplant productivity in Central Sulawesi is still low, which is 5,169 tons. This is due to the application of technology that is not optimal, including the use of fertilizers to increase soil fertility. One important aspect of eggplant cultivation techniques that needs to be developed in increasing production is through mulching and fertilization technology, especially the use of organic materials. Mulching aims to prevent weed growth, keep soil temperature stable, prevent water splashes directly on the soil. Specifically, organic mulch is a ground cover material made from plant residues or other organic materials that are

useful for protecting the soil surface from rain, erosion, maintaining moisture, structure, soil fertility and inhibiting weed growth. Types of organic mulch include straw, empty oil palm bunches and corn, besides being easy to obtain, this mulch is also able to increase soil moisture, prevent erosion, reduce evaporation and is easy to decompose (Hayati, Ahmad, and Rahman 2010). In addition, plant residue mulch can maintain high soil moisture and the availability of organic matter as food for soil microorganisms which will help improve soil structure, maintain soil temperature and humidity and control weeds (Raksun, Mahrus, and Mertha 2020).

In addition to the use of mulch, fertilization using organic fertilizers is also important to do. The provision of manure as one type of organic fertilizer, in addition to increasing the availability of nutrients, can also improve the physical properties of the soil. Some physical properties of the soil that can be affected by manure include aggregate stability, volume weight, total pore space, plasticity and water holding capacity (Mayadewi 2007).

In eggplant cultivation, so far, many inorganic fertilizers with limited types of nutrient content are still used. Fertilization is carried out as an effort to meet the nutrient needs of plants, but if the use of fertilizers is not optimal, it can cause problems for plants, such as nutrient deficiencies, poisoning, susceptibility to pests and diseases, low production quality and in addition, high production costs and can cause pollution (Setiawan, Efendi, and Mawarni 2018).

In general, farmers still ignore how to restore soil fertility and only always use inorganic fertilizers, so it is necessary to try alternatives to change farmers' habits in order to increase the growth and productivity of eggplant by applying various types of organic materials as mulch, namely empty oil palm bunches, rice straw, corn straw and the use of organic fertilizer from cow manure. The use of organic fertilizers has the ability to improve the physical and biological properties of the soil (Assefa 2019). Based on the description above, it is necessary to conduct research on the effect of mulch types and doses of manure on the growth and yield of eggplant (*Solanum melongena* L.)"; with the aim of: (1) knowing the effect of interaction between the provision of different types of organic mulch and doses of manure on the growth and production of eggplant; (2) the effect of different mulches on the growth and production of eggplant, and (3) the effect of different doses of cow manure on the growth and production of eggplant.

Research Method

This research was conducted in Mohoni Village, Petasia Timur District, Morowali Utara Regency, in September-November 2022. This study used eggplant seeds of the Mustang F1 eggplant variety, empty oil palm bunches, rice straw, corn and cow manure as basic fertilizers. This study used a Randomized Block Design (RBD), two factors. The first factor is the application of several types of organic mulch (M), consisting of four levels, namely: Without mulch (Mo), Empty Oil Palm Bunches (M1), Rice Straw (M2), and corn straw (M3). The second factor is the application of various doses of manure (D) consisting of four levels, namely: without manure (Do), 10 tons/ha (D1), 20 tons/ha (D2), and 30 tons/ha (D3). Thus, there are 16 treatment combinations and each is repeated 3 times, so that a total of 48 plots are needed. Each experimental plot contained 15 plant populations and 3 plants were determined as samples in each plot. The size of the experimental plot was 200 cm long, 100 cm wide and 25 cm high. The

distance between treatment plots was 50 cm, while the distance between replications was 75 cm. The planting distance was 60 cm x 70 cm or 144 plants per plot.

Manure is applied 2 weeks before planting, by scattering and mixing evenly in each plot. The dose of manure given is according to the dose of each treatment, namely 10 tons/ha, 20 tons/ha and 30 tons/ha. The application of organic mulch is according to the treatment, namely empty oil palm bunch mulch, rice straw and corn straw.

Harvesting of eggplant fruit is at the age of 45-60 days after planting. Harvesting is carried out after the plants have the characteristics of having a shiny fruit color, the flesh of the fruit is not too hard and is medium in size (not too big and not too small).

The observation parameters of the study include: Plant height and number of leaves each at the age of 2, 4 and 6 weeks after planting (WAP); number of branches, fruit length, fruit diameter, number of fruits per plant, and fruit weight per plant. The observation data were analyzed using analysis of variance (ANOVA). If it showed a significant effect, it was continued with Duncan's Multiple Range Test at the 5% level according to (Gomez and Gomez 1984).

Results and Discussion

Plant Height

The results of the analysis of variance showed that the organic mulch treatment and the dose of manure tested had a very significant effect on plant height at the ages of 2, 4 and 6 WAP, but the interaction between the two had no significant effect.

Table 1. Effect of organic mulch type and manure dose on plant height (cm) at ages 2, 4 and 6 WAP.

Observation Age	Treatment	Manure Dosage				Average	DMRT
	Types of Organic Mulch	D0	D1	D2	D3		
2 WAP	M0	4.67	5.78	5.22	5.44	5.28b	0.82
	M1	5.33	6.44	6.00	6.11	5.97ab	0.86
	M2	5.89	8.11	7.00	6.11	6.78a	0.88
	M3	6.33	7.33	6.78	6.44	6.72ab	
	Average	5.56q	6.92p	6.25pq	6.03pq		
	DMRT	0.82	0.86	0.88			
4 WAP	M0	14.22	16.33	18.22	17.78	16.64b	4.65
	M1	15.00	23.22	17.89	16.11	18.06ab	4.89
	M2	16.67	25.67	24.22	24.2	22.69a	5.02
	M3	17.44	23.11	16.89	21.67	19.78ab	
	Average	15.83q	22.08p	19.31pq	19.94pq		
	DMRT	4.65	4.89	5.02			
6 WAP	M0	22.78	24.44	26.22	25.78	24.81b	4.81
	M1	23.00	31.22	25.89	24.44	26.14ab	5.06
	M2	24.67	33.67	31.89	32.22	30.61a	5.20
	M3	25.44	31.11	24.33	29.67	27.64ab	
	Average	23.97q	30.11p	27.08pq	28.03pq		
	DMRT	4.81	5.06	5.20			

Description: The numbers in the same row (p, q) and column (a, b, c) followed by the same letter are not significantly different at the 5% DMRT test level.

The results of the DMRT test (Table 1) showed that the tallest eggplant plants were obtained in the M2 treatment (rice straw), namely 6.78 cm at the age of 2 WAP, 22.69 cm at the age of 4 WAP, and 30.61 cm at the age of 6 WAP, and significantly different from without mulch (Mo), but not different from the M1 and M3 treatments, while the shortest plant height was obtained in the M0 treatment (without mulch) at the ages of 2, 4 and 6 WAP. This is due to the effective role of mulch in suppressing the rate of evaporation, so that soil moisture remains high and soil temperature fluctuations are lower, so that the availability of water absorbed by the roots for plant growth can be guaranteed (Istiqomah et al. 2023). This is in accordance with opinion of Alhadi (2018) that the benefits of mulching include maintaining soil moisture and soil temperature, thereby supporting the absorption of nutrients by plant roots.

Furthermore, the treatment of 10 tons/ha of manure (D1) produced the tallest eggplant and was significantly different from the treatment without organic fertilizer (Do), but did not differ from the treatments D2 and D3. While the shortest plants were obtained in the treatment without organic fertilizer (D0) at the ages of 2. 4 and 6 WAP. This shows that the provision of organic fertilizer from cow manure at a dose of 10-30 t/ha provides greater plant height growth compared to the treatment without organic fertilizer, but a dose of 10 t/ha can provide the highest results. This is because the provision of manure can guarantee the availability of nutrients. especially N, P and K which are needed for plant growth and development. Low N nutrients cannot increase vegetative growth; the P content in the soil accelerates root growth and the number of shoots and the K element in the soil which is sufficient to help in plant growth metabolism (Triadiawarman et al. 2022).

Number of Leaves

The results of the analysis of variance showed that the organic mulch treatment and the dose of manure that were tried had a very significant effect on the number of leaves. while the interaction between the two treatments had no significant effect on the number of leaves at the ages of 2, 4 and 6 WAP.

The results of the DMRT test (Table 2) showed that the highest number of eggplant leaves was obtained in the rice straw treatment (M2) and was significantly different from the treatment without mulch (M0), but did not differ from the treatments M1 and M3. While the lowest number of leaves was obtained in the treatment without mulch (M0) at the ages of 2, 4 and 6 WAP. This is due to the role of mulch which is able to modify environmental factors; especially humidity and soil water content. In addition. the organic matter content of soils that were mulched tended to increase compared to soils that were not mulched tended to decrease the organic matter content of the soil. The provision of straw mulch will increase soil organic matter, control weed growth, prevent erosion and evaporation by sunlight, increase soil biological activity, keep the soil surface permeable and increase P nutrients so that plant nutrient needs are met to support plant growth (Habi et al. 2014).

Table 2. Effect of organic mulch type and manure dose on the number of eggplant leaves (blades) at the ages of 2, 4 and 6 WAP.

Observation Age	Treatment Types of Organic Mulch	Manure Dosage D0	D1	D2	D3	Average	DMRT
2 WAP	M0	4.56	5.44	6.00	6.11	5.53b	1.24
	M1	5.11	6.33	6.56	5.44	5.86ab	1.31
	M2	5.33	8.33	6.67	7.22	6.89a	1.34
	M3	5.56	6.44	5.89	5.78	5.92ab	
	Average	5.14q	6.64p	6.28pq	6.14pq		
	DMRT	1.24	1.31	1.34			
4 WAP	M0	7.89	11.56	14.56	14.78	12.19b	3.35
	M1	9.00	16.56	12.33	14.00	12.97ab	3.53
	M2	11.11	19.56	16.56	16.44	15.92a	3.62
	M3	10.56	15.33	11.89	15.44	13.31ab	
	Average	9.64q	15.75p	13.83p	15.17p		
	DMRT	3.35	3.53	3.62			
6 WAP	M0	12.44	16.44	18.67	19.78	16.83b	3.36
	M1	13.67	21.44	17.78	18.33	17.81ab	3.53
	M2	15.89	24.56	21.00	21.56	20.75a	3.62
	M3	15.67	20.33	17.00	19.22	18.06ab	
	Average	14.42q	20.69p	18.61p	19.72p		
	DMRT	3.36	3.53	3.62			

Description: The numbers in the same row (p, q) and column (a, b, c) followed by the same letter are not significantly different at the 5% DMRT test level.

Furthermore, the treatment of manure with a dose of 10 tons/ha (D1) produced the highest number of leaves and was significantly different from D0, but did not differ from treatments D2 and D3. The least number of leaves was found in the treatment without manure (D0) at the ages of 2, 4 and 6 WAP. This condition is caused by the addition of organic fertilizer from manure which can increase the availability of N, P, K nutrients for plant growth. This is in line with the results of research by Evanita et al. (2014) that nitrogen is a component of amino acid compounds needed in the formation and growth of vegetative parts of plants such as stems. roots. and leaves.

Number of Branches

The results of the analysis of variance showed that the interaction of mulch type and manure dose treatments did not significantly affect the number of eggplant plant branches. However. the mulch type and manure dose treatments that were tried each had a very significant effect on the number of productive eggplant branches per plant.

Table 3. Effect of organic mulch type and manure dose on the number of productive branches of eggplant

Treatment	Manure Dosage				Average	DMRT
Types of Organic Mulch	D0	D1	D2	D3		
M_0	1.89	3.00	3.67	4.56	3.28^{b}	1.42
M_1	2.33	6.11	2.44	2.33	3.31^{ab}	1.49
M_2	4.22	6.67	5.89	4.33	5.28^{a}	1.53
M_3	3.67	3.00	4.00	6.11	4.19^{ab}	
Average	3.03^{q}	4.69^{p}	4.00^{pq}	4.33^{pq}		
DMRT	1.42	1.49	1.53			

Description: The numbers in the same row (p. q) and column (a, b, c) followed by the same letter are not significantly different at the 5% DMRT test level.

The results of the DMRT test (Table 3) showed that the highest number of eggplant branches (5.28 pieces) was obtained in the rice straw mulch treatment (M2) and was significantly different from without mulch (M0), but not different from M1 and M3. This shows that the use of rice straw mulch is able to modify environmental factors. especially humidity and water content which will encourage the absorption of nutrients so as to increase plant growth and production. The use of various types of mulch can increase plant photosynthesis and affect plant growth and production (Suhendra. 2015). Alhadi (2018) further stated that providing mulch can increase plant growth and yields. because it can protect soil aggregates. increase water absorption. reduce the volume and speed of surface flow. maintain soil temperature and humidity. maintain soil organic matter content and control weed growth.

Likewise, the application of manure at a dose of 10 t/ha (D1) produced the largest number of branches (4.64 pieces) and was significantly different from without manure, but not significantly different from doses of 20 t/ha and 30 t/ha. This illustrates that the provision of organic fertilizer of 10 t/ha can meet nutrient needs optimally to support better plant growth. The addition of organic fertilizer from manure will increase nutrient content, especially N, P, K and organic C. Nitrogen. phosphorus and potassium are the main nutrients for plants; which are generally very much needed by plants for the formation or growth of vegetative parts of sugarcane plants such as stems. leaves and roots (Hayati et al. 2010).

Fruit Length

The results of the analysis of variance showed that the treatment of the manure dose tested had a very significant effect on the length of eggplant fruit;. while the organic mulch treatment and the interaction between the two treatments had no significant effect on the length of the fruit. The results of the DMRT test (Table 4) showed that the longest eggplant fruit (16.13 cm) was obtained in the treatment of manure dose 10 t/ha (D1) and was significantly different from without manure (D0), but not significantly different from treatments D1 and D3; while the shortest fruit (11.76 cm) was obtained in the treatment without manure (D0). The shortest eggplant fruit was obtained in the treatment without manure (D0). This shows that the cow manure added to the planting medium is able to improve the soil structure to be looser, so that the

growth of eggplant plants can develop freely, making it easier to absorb nutrients that have been contributed by cow manure. The addition of cow dung fertilizer can increase growth and production, because it contains macro and micro nutrients which are very useful in stimulating growth and yield, because each element contained in it has certain functions in the plant metabolism process (Zuhroh & Sulaiman. 2016).

Table 4. Effect of organic mulch type and manure dose on eggplant fruit length (cm)

Treatment	Manure Dosage				Average	DMRT
Types of Organic Mulch	D0	D1	D2	D3		
M_0	10.17	14.78	12.44	13.89	12.82	tn
M_1	11.39	16.56	13.00	15.33	14.07	
M_2	10.61	17.06	16.44	16.56	15.17	
M_3	14.89	16.11	15.56	12.06	14.65	
Average	11.76^{q}	16.13^{p}	14.36^{pq}	14.46^{pq}		
DMRT	3.92	4.12	4.23			

Description: The numbers in the same row (p. q) followed by the same letter are not significantly different at the 5% DMRT test level.

Fruit Diameter

The results of the analysis of variance showed that the organic mulch treatment and the dose of manure that were tried each had a very significant effect on the fruit diameter, while the interaction between the two treatments had no significant effect on the eggplant fruit diameter.

Table 5. Effect of organic mulch and manure dose on eggplant fruit diameter (mm)

Treatment	Manure Dosage				Average	DMRT
Types of Organic Mulch	D0	D1	D2	D3		
M_0	31.18	44.03	36.09	37.33	37.16^{b}	6.95
M_1	38.08	43.89	45.90	44.63	43.13^{ab}	7.31
M_2	42.02	50.56	44.30	48.20	46.27^{a}	7.51
M_3	41.88	46.06	44.90	38.29	42.78^{ab}	
Average	38.29^{q}	46.13^{p}	42.80^{pq}	42.11^{pq}		
DMRT	6.95	7.31	7.51			

Description: The numbers in the same row (p, q) and column (a, b, c) followed by the same letter are not significantly different at the 5% DMRT test level.

The results of the DMRT test (Table 5) showed that the largest eggplant fruit diameter (46.27 mm) was obtained in the rice straw mulch treatment (M2) and was significantly different from without mulch (M0), but significantly different from treatments M1 and M3. The smallest fruit diameter was obtained in the treatment without mulch (M0), which was 37.16 mm. This is because the use of rice straw mulch can create optimal soil environmental conditions, thus supporting good fruit formation. This is in line with the opinion of Sari et al. (2019) that the use of mulch can improve the physical, chemical, and biological properties of the soil which will facilitate the provision of nutrients needed by plants for fruit formation and development. Furthermore, for the treatment of manure doses the largest eggplant fruit diameter

(46.13 mm) was obtained in the treatment of 10 tons/ha of manure (D1) and was significantly different from without manure (D0), but did not differ from treatments D2 and D3. The smallest fruit diameter was obtained in the treatment without manure (D0). which was 38.29 mm. This is because the low nutrient content in the soil causes the fruit produced to tend to be small. Fruit filling is greatly influenced by the availability of nutrients for the photosynthesis process which produces carbohydrates, fats, mineral and proteins which will be translocated to the storage part, for example in the fruit (Prashar and Bakshi 2022).

Number of Fruits Per Plant

The results of the analysis of variance showed that the interaction between the type of mulch and the dose of manure did not significantly affect the number of fruits per plant. Likewise, the treatment of the type of mulch did not significantly affect. but the single factor of the dose of manure that was tried had a very significant effect on the number of eggplant fruits per plant.

The results of the DMRT test (Table 6) showed that the highest number of fruits per eggplant plant was obtained in the treatment of manure with a dose of 10 t/ha (D1), namely 2.44 fruits/plant and was significantly different from without manure (D0), but did not differ from treatments D2 and D3. The lowest number of fruits per plant (1.53 fruits) was obtained in the treatment without organic fertilizer (D0). This shows that the addition of organic matter (manure) to the soil will support better plant growth. because it increases soil porosity which is related to soil aeration and water content in the soil.

Table 6. Single effect of organic mulch and manure dose on the number of fruits per eggplant plant

Treatment	Manure Dosage				Average	DMRT
Types of Organic Mulch	D0	D1	D2	D3		
M_0	1.35	1.91	1.91	1.53	1.68	tn
M_1	1.28	2.27	2.27	1.50	1.83	
M_2	1.78	2.93	2.08	1.90	2.17	
M_3	1.70	2.67	1.44	2.48	2.07	
Average	1.53^{q}	2.44^{p}	1.93^{pq}	1.85^{pq}		
DMRT	0.78	0.82	0.84			

Description: The numbers in the same row (p. q) followed by the same letter are not significantly different at the 5% DMRT test level.

The addition of organic matter to the soil will increase soil water content due to the increase in medium-sized pores and the decrease in micro pores so that the water binding capacity increases (Hafizah & Mukarramah. 2017).

Fruit Weight Per Plant

The results of the analysis of variance showed that the organic mulch treatment and the dose of manure that were tried each had a very significant effect on the fruit weight per plant, while the interaction between the two treatments had no significant effect on the fruit weight per plant. The results of the DMRT test (Table 7) showed that

the heaviest eggplant fruit weight per plant (146.31 g) was obtained in the rice straw mulch treatment (M2) and was significantly different from without mulch (M0), but not significantly different from treatments M1 and M3; while the lightest fruit weight per plant was obtained in the treatment without mulch (M0), which was 79.69 g. This shows that the provision of rice straw mulch. In addition to playing an important role in suppressing water loss through evaporation and suppressing plant competition with weeds. In addition, the use of organic mulch gives good results, because in addition to supplying P needs for plants. It can also supply other nutrients and maintain soil moisture so that water needs for plants can be available compared to without mulch (Agustiyanti et al.. 2021). With the availability of nutrients, the photosynthesis process takes place well and the photosynthate produced and distributed for fruit development is better (Jumini & Marliah. 2009).

Table 7. Effect of organic mulch type and manure dose on fruit weight (g) per plant

Treatment	Manure Dosage				Average	DMRT
Types of Organic Mulch	D0	D1	D2	D3		
M_0	63.78	103.89	73.33	77.78	79.69^{b}	25.67
M_1	103.22	139.44	121.33	122.56	121.64^{a}	27.01
M_2	108.89	152.89	158.11	165.33	146.31^{a}	27.72
M_3	125.22	126.89	124.89	121.33	124.58^{a}	
Average	100.28^{q}	130.78^{p}	119.42^{pq}	121.75^{pq}		
DMRT	25.67	27.01	27.72			

Description: The numbers in the same row (p. q) and column (a. b. c) followed by the same letter are not significantly different at the 5% DMRT test level.

Furthermore, for the manure dose treatment the highest fruit weight per eggplant plant (130.78 g) was obtained at a manure dose of 10 tons/ha (D1) and was significantly different from without manure, but not different from treatments D2 and D3. The lightest fruit weight per plant was obtained in the treatment without manure (D0), which was 100.28 g. The availability of nutrients in the soil in a balanced manner allows plant production to take place better, because plant production is determined by the rate of photosynthesis which is controlled by the availability of nutrients and water. The availability of nutrients is very important in the metabolic process to support plant growth and yield. The addition of organic fertilizers can affect soil fertility conditions. both chemical, physical, and biological properties. where the soil chemical elements that are affected include pH, N, P, K, organic C and CEC (Triadiawarman et al. 2022). The nutrient P plays a role in carbohydrate synthesis in the plant body so that P can increase fruit weight (Setiawan et al. 2018). This is in line with the research results of Raksun et al. (2019) that the provision of N, P, K fertilizers increased growth and produced higher green eggplant yields compared to those without N, P and K fertilizers.

Conclusion

The research results showed (1) There was no significant interaction between the type of organic mulch treatment and the dose of manure on the growth and yield of eggplant; (2) Rice straw mulch provides higher growth and yield of eggplant and is significantly different from without mulch. but not different from empty palm fruit bunch mulch and corn straw. and (3) A dose of 10 tons/ha of manure produces growth and yield of eggplant plants. higher and significantly different from without application of cow manure. but not significantly different from doses of 20 t/ha and 30 t/ha.

References

Agustiyanti, Ervina, Bambang Fredickus, and Joko Purnomo. 2021. "Pengaruh Pemberian Mulsa Organik dan Jarak Tanam Terhadap Pertumbuhan dan Hasil Kedelai Edamame Pada Tanah Ultisol." *EnviroScienteae* 17(2):71. doi: 10.20527/es.v17i2.11497.

Alhadi, Budi al. 2018. "Pengaruh Jarak Tanam dan Mulsa Organik Terhadap Pertumbuhan Dan Hasil Tanaman Terung (*Solanum melongena* L.)." *Warta* 56(April):1–6.

Assefa, Sisay. 2019. "The Principal Role of Organic Fertilizer on Soil Properties and Agricultural Productivity -A Review." *Agricultural Research & Technology: Open Access Journal* 22(2). doi: 10.19080/artoaj.2019.22.556192.

BPS. 2022. *Data Produksi Sayuran Di Indonesia Tahun 2022*. Badan Pusat Statistik. Jakarta.

Evanita, Ely, Eko Widaryatno, and Y.Suwasono Heddy. 2014. "Pengaruh Pupuk Kandang Sapi Pada Pertumbuhan dan Hasil Tanaman Terong (*Solanum melongena* L.) Pada Pola Tanam Tumpangsari Dengan Rumput Gajah Tanaman Pertama." *Jurnal Produksi Tanaman* 2(7):533–41.

Gomez, A. G., and K. A. Gomez. 1984. *Statistical Procedures for Agricultural Research*. Second edi. John Wiley & Sons, Inc.

Habi, Misda, Wawan Pembengo, and Zainudin Antuli. 2014. "Dampak Aplikasi Mulsa Organik Pada Pertumbuhan dan Hasil Jagung Manis." *JATT* 3(1):57–63.

Hafizah, Nur, and Rabiatul Mukarramah. 2017. "Aplikasi Pupuk Kandang Kotoran Sapi Pada Pertumbuhan." *Ziraa'Ah* 42(1):1–7.

Hayati, Erita, A. Halim Ahmad, and Cut Taisir Rahman. 2010. "Respon Jagung Manis (*Zea mays*, Sacharata SHOUT) Terhadap Penggunaan Mulsa dan Pupuk Organik." *Agrista* 14(1):8–13.

Istiqomah, Istiqomah, Ana Amiroh, Choirul Anam, and Nur Fauziah Hasyim. 2023. "Pengaruh Pemberian Mulsa dan Beberapa Jenis Pupuk Daun Terhadap Pertumbuhan dan Hasil Tanaman Terung (*Solanum melongen*a L.)." *AGRORADIX : Jurnal Ilmu Pertanian* 6(2):61–69. doi: 10.52166/agroteknologi.v6i2.4670.

Jumini, and Ainun Marliah. 2009. "Pertumbuhan dan Hasil Tanaman Terung Akibat Pemberian Pupuk Daun Gandasil D dan Zat Pengatur Tumbuh Harmonik." *J. Floratek* 4:73–80.

Mayadewi, Ni Nyoman Ari. 2007. "Pengaruh Jenis Pupuk Kandang dan Jarak Tanam Terhadap Pertumbuhan Gulma dan Hasil Jagung Manis." *Agritrop* 26(4):153–59.

Muldiana, Sahri, and Rosdiana. 2017. "Respon Tanaman Terong (*Solanum malongena* L.) Terhadap Interval Pemberian Pupuk Organik Cair Dengan Interval Waktu

Yang Berbeda." *Jurnal Agrosains* 8(2):155–62.

Prashar, Nishant, and Manish Bakshi. 2022. "Role of Micro-Nutrients in Fruit Production : A Review." *The Pharma Innovation* 11(6):1158–64.

Raksun, Ahmad, Mahrus Mahrus, and I. Gde Mertha. 2019. "Pengaruh Jenis Mulsa dan Dosis Bokashi Terhadap Pertumbuhan Cabai Rawit (*Capsicum frutescens* L.)." *Jurnal Penelitian Pendidikan IPA* 6(1):57. doi: 10.29303/jppipa.v6i1.332.

Raksun, Ahmad, Mahrus Mahrus, and I. Gde Mertha. 2020. "Pertumbuhan Vegetatif Tomat (*Solanum lycopersicum* Mill) Pada Keragaman Tipe Mulsa dan Dosis Pupuk Organik." *Jurnal Biologi Tropis* 20(1):40–45. doi: 10.29303/jbt.v20i1.1420.

Sahid, Onis't Tresnawati, Rudi Hari Murti, and Sri Trisnowati. 2014. "Hasil dan Mutu Enam Galur Terung (*Solanum melongena* L.) Yield and Quality of Six Eggplant (*Solanum melongena* L.) Lines." *Vegetalika* 3(2):45–58.

Sari, Villa Afria, Rita Hartati, and Cukri Rahmi Niani. 2019. "Optimalisasi Produksi Tanaman Terung Dengan Pemanfaatan Mulsa Organik." *Optimalisasi* 5(1):45–51.

Setiawan, Muhammad Arief, Elfin Efendi, and Rita Mawarni. 2018. "Pengaruh Pemberian Pupuk Organik dan NPK TerhadapPertumbuhan dan Produksi Tanaman Kacang Hijau (*Vigna radiata* L .)." *Bernas Agriculture Research Journal* 14(3):133–44.

Suhendra, T. Rosmawaty dan Zulkifli. 2015. "Penggunaan Berbagai Jenis Mulsa dan Dosis Pupuk Kascing Terhadap Pertumbuhan dan Produksi Tanaman Pare (*Momordica charantia* L)." *Jurnal Dinamika Pertanian* 30(1):29–36.

Triadiawarman, Dian, Dhani Aryanto, and Joko Krisbiyantoro. 2022. "Peran Unsur Hara Makro Terhadap Pertumbuhan dan Hasil Bawang Merah (*Allium cepa* L.)." *Agrifor* 21(1):27. doi: 10.31293/agrifor.v21i1.5795.

Zuhroh, M. U., and Sulaiman. 2016. "Pengaruh Dosis Pupuk Kandang Sapi dan Jenis Mulsa Terhadap Pertumbuhan dan Hasil Tanaman Terung (*Solanum melongena* L.)." *Agrotechbiz* 3(1):14–20.