Tuijin Jishu/Journal of Propulsion Technology
ISSN: 1001-4055
Vol. 45 No. 1 (2024)

Effect of Combination of Cow Manure and Grass Organic Matter on Growth and Yield of Honey Melon (*Cucumis melo* L.) in Ancient Planting Method

Faozi Muhamad [1*], Indi Millatul Maula [2], Achmad Faqih [3], Tety Suciaty [4]

[1,2,3,4] Agronomy Study Program, Graduate School, Swadaya Gunung Jati University,

Abstract

The addition of organic fertilizer is an important strategy in increasing melon crop production. This study aimed to identify the effect and optimal dose of combined application of cow manure and grass organic matter on the growth and yield of honey melon (*Cucumis melo L.*). The research was conducted from March to July 2023 using a Randomized Block Design combination pattern consisting of 16 treatments, namely cow manure with 4 levels (PK: 0, 10, 15, and 20 tons/ha) and grass organic matter with 4 levels (BO: 0, 10, 15, and 20 tons/ha). The parameters observed in this study were plant height, stem diameter, number of leaves, leaf area, plant growth rate, fruit weight per plant, and fruit weight per plot. The data generated were then analyzed using ANOVA, Scott Knott's at the 5% level, and Product Moment correlation. The research results showed that the combination of cow manure and grass organic material significantly affected the growth components of melon plants, namely the number of leaves, leaf area, and LPT. The treatment composition of 20 tons/ha of cow manure and 0 tons/ha of grass organic material had the best effect on fruit weight per plot of 4.16 kg, equivalent to 6.93 tons/ha. There was a correlation between growth components and melon weight per plot except for the leaf area component at 35 HST.

Keywords: *Cow Manure; Grass Organic Matter; Melon Plants*

1. Introduction

Population growth continues to increase in 2018-2021 consecutively, namely 264.16 million, 266.91 million, 269.60 million, and 273.88 million (Badan Pusat Statistik, 2022). Melon consumption will increase along with changes in people's consumption patterns and is supported by the increasing population (Ishak & Daryono, 2018). More sustainable production is needed to meet public consumption of melon (Ishak dan Daryono, 2018; Nurpanjawi et al., 2021). The content per 100 g of melon flesh contains 0.6 g of protein, 0.4 mg of iron, 30 mg of vitamin C, 0.4 g of fiber, and 6.0 g of carbohydrates. The short harvest time and high prices of melons make melons a leading business commodity (Samadi, 2010). Melon production in 2017-2021 is 92,434 tons, 118,700 tons, 122,105 tons, 138,177 tons, and 129,147 tons, while the demand for melons in 2017-2021 is 158,009 tons, 160,139 tons, 162,265 tons, 164,319 tons, and 166,349 tons (Badan Pusat Statistik, 2022). Based on the BPS data, efforts are needed to increase melon production, one of the efforts made is by organic fertilization. Fertilization with organic matter is an effort in sustainable agriculture and improving soil physical, chemical, and biological properties. Plant growth and development are strongly influenced by the application of fertilizers and the availability of nutrients in the soil (Irfan, 2013).

Cow manure is organic matter that has undergone decomposition and can be used as organic fertilizer (Sutanto, 2002). Cow manure is better than other fertilizers because it is humus-containing organic compounds and is a source of macronutrients important for plant growth and development (Manyun, 2007). Cow manure contains

many nutrients plants need, such as nitrogen, phosphorus, potassium, calcium, and magnesium. The content of cow manure includes 1.1% N, 2.5% P, 0.5% K, 3.0% Ca, and 0.66% Mg (Pranoto, 2016).

Grass can be used as organic material in the form of compost. It can reduce environmental pollution due to discarded grass waste and growing wild everywhere, causing environmental problems such as odors, toxic gases, pests, and plant diseases. Grass can be combined with animal or livestock pens as organic fertilizers whose functions complement each other in a 1:1 ratio (Sudadi & Suryanto, 2001). The macro and micro nutrient content in grass includes 1.97% nitrogen (N), 0.13% phosphorus (P), 1.65% potassium (K), with an additional 0.27 ppm calcium (Ca) and 0.19 ppm other elements (Triansyah et al., 2018).

Providing organic grass material and manure can influence plant growth. The combination treatment of grass organic material and manure gave the best results on dry weight, plant root length, and plant fresh weight (Triansyah et al., 2018).

Ancient planting methods have the same criteria as organic farming. Modern organic farming is an agricultural cultivation system that relies on natural ingredients without synthetic chemicals (Mayrowani, 2016). The ancient planting method is a newly developed method to realize healthy and environmentally friendly agriculture. The difference between agriculture and ancient planting methods is that the cultivation of plants uses planting media provided by the MOL (Local Micro Organisms) consortium. The process of composting planting media with MOL can be shorter, save space, and the planting media can be used immediately (Alfaridzi, 2022).

The objectives of this study are:

a) To analyze the effect of the combination of cow manure and grass organic matter on the growth and yield of honey melon (*Cucumis melo* L.).

b) To determine the best composition of doses of cow manure and grass organic matter on the growth and yield of honey melon (*Cucumis melo* L.).

c) To analyze the correlation of growth and yield of honey melon (*Cucumis melo* L.).

2. Methods

The research was conducted on government land in Sarwadadi Village, Talun Sub-District, Cirebon Regency. The research location is at an altitude of ± 190 m above sea level. The soil type is classified as Red Podzolic soil, with a pH of around 5.61. The field experiment was conducted for 4 months (March - June 2023). Based on Schmidt and Ferguson's classification, the climate in Cirebon Regency belongs to type C and D. The characteristics of the area with this category are tropical, with a minimum temperature of 24 ℃ and an average temperature of 28 ℃ and a relative humidity of 70% to 90%.

The experimental design used is a Randomized Block Design combination pattern with PK (Cow Manure) BO (Grass Organic Material) treatment consisting of 16 treatments, and each treatment is repeated twice so that there are 32 experimental units. The following treatment combinations will be carried out in the field: A (PK: 0 ton/ha, BO: 0 ton/ha); B (PK: 0 ton/ha, BO: 10 tons/ha); C (PK: 0 ton/ha, BO: 15 tons/ha); D (PK: 0 ton/ha, BO: 20 tons/ha); E (PK: 10 tons/ha, BO: 0 ton/ha); F (PK: 10 tons/ha, BO: 10 tons/ha); G (PK: 10 tons/ha, BO: 15 tons/ha); H (PK: 10 tons/ha, BO: 20 tons/ha); I (PK: 15 tons/ha, BO: 0 ton/ha); J (PK: 15 tons/ha, BO: 10 tons/ha); K (PK: 15 tons/ha, BO: 15 tons/ha); L (PK: 15 tons/ha, BO: 20 tons/ha); M (PK: 20 tons/ha, BO: 0 ton/ha); N (PK: 20 tons/ha, BO: 10 tons/ha); O (PK: 20 tons/ha, BO: 15 tons/ha); and P (PK: 20 tons/ha, BO: 20 tons/ha).

The parameters observed in this study were plant height, stem diameter, number of leaves, leaf area, plant growth rate, fruit weight per plant, and fruit weight per plot. The data were then analyzed using the ANOVA variance test. If the results of the variance test showed a significant effect, the data analysis was continued using the Scott Knott Group Test at a real level of 5% and Product Moment correlation.

3. Results And Discussion

The results of observations of the combination of cattle manure treatment and grass organic matter with the application of MOL on the growth and yield of melon plants with ancient cultivation techniques resulted in the

treatment after the F test did not significantly affect almost all observations except for the number of leaves aged 21 HST (days after planting), 28 HST, leaf area age 21 HST, 28 HST, and Plant Growth Rate age 28 - 35 HST where the significant value <0.05 or <5%. This is the same as previous research, the results of which showed that there was no significant effect (P≥0.05) of cattle manure-based P on the number of leaves, vine length, number of stem branches at 9 weeks after planting, 50% flowering days and the number of fruits harvested (Oyewole & Oyewole, 2011).

Based on the results of the analysis of variance, it shows that the growth observation parameters are not significantly different or all treatment effects are homogeneous. This is because cattle manure can improve the soil structure to be looser which can affect the growth of plant height, number of leaves, leaf area, and the plant growth rate is more freely developed. This is in line with Leiwakabessy's (1988) and Roidah (2013) opinion that adding cow manure can increase growth and production because cow manure decomposes quickly so that it is easily absorbed for plant growth and development. According to Sutedjo, (2010), nitrogen is the main nutrient for plants, which plants for the formation or growth of vegetative parts of plants such as stems, leaves, and roots generally need. This is in line with Advinda's (2018) opinion that nitrogen is a constituent of amino acid compounds needed in the formation and growth of vegetative parts of plants such as stems, roots, and leaves.

Grass organic matter can improve soil structure by increasing soil organic matter content and will increase the soil's ability to retain water to retain soil water content. This ability is because compost contains a lot of added microorganisms, but microorganisms that exist in the soil are also encouraged to develop. This microbial activity helps plants absorb soil nutrients (Setyorini et al., 2020). This supports plant growth and development.

3.1 Plant Height

The results of the analysis of variance showed that the treatment of cow manure and grass organic matter had no significant effect on plant height at 21, 28, and 35 HST. This can be seen in Table 1.

Table 1. Effect of Combination Dosage of Cow Manure and Grass Organic Matter on Plant Height Age 21, 28, and 35 HST

Treatment	Plant Height		
	21 HST	28 HST	35 HST
A (PK: 0 ton/ha, BO: 0 ton/ha)	15,9a	48,0a	86,1a
B (PK: 0 ton/ha, BO: 10 tons/ha)	16,5a	56,9a	95,5a
C (PK: 0 ton/ha, BO: 15 tons/ha)	15,5a	49,6a	82,5a
D (PK: 0 ton/ha, BO: 20 tons/ha)	15,8a	52,7a	86,8a
E (PK: 10 tons/ha, BO: 0 ton/ha)	16,3a	50,4a	84,9a
F (PK: 10 tons/ha, BO: 10 tons/ha)	16,8a	53,9a	84,4a
G (PK: 10 tons/ha, BO: 15 tons/ha)	18,1a	57,2a	87,2a
H (PK: 10 tons/ha, BO: 20 tons/ha)	17,6a	54,3a	87,9a
I (PK: 15 tons/ha, BO: 0 ton/ha)	16,5a	51,8a	75,8a
J (PK: 15 tons/ha, BO: 10 tons/ha)	15,9a	50,6a	71,0a
K (PK: 15 tons/ha, BO: 15 tons/ha)	16,9a	55,5a	79,4a
L (PK: 15 tons/ha, BO: 20 tons/ha)	17,3a	56,1a	93,6a
M (PK: 20 tons/ha, BO: 0 ton/ha)	17,9a	56,7a	93,7a
N (PK: 20 tons/ha, BO: 10 tons/ha)	18,0a	56,1a	91,3a

O (PK: 20 tons/ha, BO: 15 tons/ha)	17,2a	54,1a	80,6a
P (PK: 20 tons/ha, BO: 20 tons/ha)	17,9a	55,6a	88,1a

Note: Numbers followed by the same letter in the same column are not significantly different at α= 5% and tested using Duncan multiple range test.

Based on Table 1. The effect of the application of 20 tons/ha cow manure and 0 ton/ha grass organic matter gave no significantly different effect on plant height. Plant height at the age of 21, 28, and 35 HST did not show significantly different results to the treatment of a combination of cow manure and grass organic matter, this is thought to be due to the availability of nutrients N, P, and K needed for plant growth in the soil has been fulfilled. In line with previous research which states that there is no significant effect between plant growth components and fertilization with cow manure (Iqbal et al., 2019).

3.2 Stem Diameter (cm)

The results of the analysis of variance showed that the treatment of cow manure and organic grass material had no significant effect on stem diameter at 21, 28, and 35 HST. This can be seen in Table 2.

Table 2. Effect of Combination of Cow Manure and Grass Organic Material on Stem Diameter at 21, 28 and 35 HST

Treatment	Stem Diameter (cm)		
	21 HST	28 HST	35 HST
A (PK: 0 ton/ha, BO: 0 ton/ha)	0,25a	0,47a	0,73a
B (PK: 0 ton/ha, BO: 10 tons/ha)	0,27a	0,49a	0,77a
C (PK: 0 ton/ha, BO: 15 tons/ha)	0,20a	0,44a	0,69a
D (PK: 0 ton/ha, BO: 20 tons/ha)	0,23a	0,41a	0,64a
E (PK: 10 tons/ha, BO: 0 ton/ha)	0,21a	0,44a	0,77a
F (PK: 10 tons/ha, BO: 10 tons/ha)	0,27a	0,46a	0,77a
G (PK: 10 tons/ha, BO: 15 tons/ha)	0,30a	0,57a	0,87a
H (PK: 10 tons/ha, BO: 20 tons/ha)	0,25a	0,46a	0,75a
I (PK: 15 tons/ha, BO: 0 ton/ha)	0,21a	0,36a	0,57a
J (PK: 15 tons/ha, BO: 10 tons/ha)	0,15a	0,31a	0,62a
K (PK: 15 tons/ha, BO: 15 tons/ha)	0,25a	0,48a	0,93a
L (PK: 15 tons/ha, BO: 20 tons/ha)	0,23a	0,44a	0,62a
M (PK: 20 tons/ha, BO: 0 ton/ha)	0,31a	0,51a	0,76a
N (PK: 20 tons/ha, BO: 10 tons/ha)	0,26a	0,45a	0,74a
O (PK: 20 tons/ha, BO: 15 tons/ha)	0,21a	0,43a	0,77a
P (PK: 20 tons/ha, BO: 20 tons/ha)	0,27a	0,46a	0,72a

Note: Numbers followed by the same letter in the same column are not significantly different at α= 5% and tested using Duncan multiple range test.

The effect of applying 20 tonnes/ha of cow manure and 0 tonnes/ha of grass organic matter did not have a significantly different effect on stem diameter. Stem diameter at the ages of 21, 28, and 35 HST did not show significantly different results from the combination treatment of cow manure and grass organic material. This is

thought to be because the availability of nutrients in the soil needed for plant growth is sufficient. This is supported by research (Suriadikarta & Setyorini, 2005), namely that the imbalance of nutrients in compost causes the accumulation of certain nutrients, the content of macro and micronutrients is low so that it is needed in large quantities and requires a certain period for the decomposition of the nutrients contained in it.

3.3 Number of Leaves (blade)

The results of the analysis of variance showed that the treatment of cow manure and grass organic material had a significant effect on the number of leaves at 21 and 28 DAT, whereas at 35 DAT there was no significant effect on the combination of cow manure and grass organic matter treatment. This can be seen in Table 3.

Table 3: Effect of Combination Dosage of Cow Manure and Grass Organic Material on Number of Leaves Aged 21, 28, and 35 HST

Treatment	Number of Leaves (blade)		
	JD 21 HST	JD 28 HST	JD 35 HST
A (PK: 0 ton/ha, BO: 0 ton/ha)	5,60 a	12,00 a	20,50a
B (PK: 0 ton/ha, BO: 10 tons/ha)	6,20 b	14,70 b	21,90a
C (PK: 0 ton/ha, BO: 15 tons/ha)	5,50 a	12,10 a	20,60a
D (PK: 0 ton/ha, BO: 20 tons/ha)	5.80 ab	13.50 ab	20,90a
E (PK: 10 tons/ha, BO: 0 ton/ha)	6.40 bc	13.30 ab	20,80a
F (PK: 10 tons/ha, BO: 10 tons/ha)	7.10 bc	15,40 b	21,50a
G (PK: 10 tons/ha, BO: 15 tons/ha)	8,20 c	**16,90 b**	22,80a
H (PK: 10 tons/ha, BO: 20 tons/ha)	7.80 bc	16,20 b	21,70a
I (PK: 15 tons/ha, BO: 0 ton/ha)	6,20 b	13.30 ab	20,80a
J (PK: 15 tons/ha, BO: 10 tons/ha)	6.40 bc	14,80 b	21,20a
K (PK: 15 tons/ha, BO: 15 tons/ha)	7.10 bc	15,50 b	21,20a
L (PK: 15 tons/ha, BO: 20 tons/ha)	7.80 bc	16,00 b	22,00a
M (PK: 20 tons/ha, BO: 0 ton/ha)	8,30 c	16,80 b	22,40a
N (PK: 20 tons/ha, BO: 10 tons/ha)	8,20 c	16,30 b	21,80a
O (PK: 20 tons/ha, BO: 15 tons/ha)	8,00 c	16,30 b	22,40a
P (PK: 20 tons/ha, BO: 20 tons/ha)	**8,40 c**	16,60 b	22,20a

Note: Numbers followed by the same letter in the same column are not significantly different at α= 5% and tested using Duncan multiple range test.

At the age of 21 HST treatments A, C, and D showed the lowest average number of leaves compared to other treatments, at the age of 28 HST treatments A, C, D, E and I showed the lowest number of leaves compared to other treatments. While at the age of 35 HST did not show a significant effect on the combination of cattle manure treatment and grass organic matter. The highest number of leaves at the age of 21 HST in treatments G, M, N, O, and P, while treatment G at the age of 28 HST. This is thought to be due to the provision of 10-20 tons/ha of cow manure and 0-20 tons/ha of grass organic matter that can provide the nutrients needed in leaf formation in plants. Cow manure and grass organic matter are rich in minerals, especially nitrogen, phosphorus, and potassium which are needed by plants and soil. It also supports the growth of beneficial microorganisms when mixed with soil, improves soil texture, and helps maintain moisture (Oyewole and Oyewole 2011). The element has an important role in good plant growth plays a major role in the photosynthesis process and provides energy for plants (George

& Richardson, 2008). More leaves result in better chlorophyll development and higher stomatal conductance hence, increasing photosynthesis (Martin et al., 2016; Noonari et al. 2016). Age 35 HST did not show a significant effect on the combination treatment of cow manure and grass organic matter, this is thought to be due to the age of 35 HST the plant has entered the generative period so that the photosynthate is more used for the formation of generative components and no longer for plant growth. Line with research by Safriyani et al., (2019) states that during the vegetative phase, the plant prepares its various organs, especially the leaves, to be better able to enter the generative phase, with the increase in radiation that can be absorbed by the leaves in this period will be used by plants to form generative organs.

3.4 Leaf Area

The results of the analysis of variance showed that the treatment of cow manure and grass organic material had a significant effect on leaf area at 21 and 28 HST, whereas at 35 DAP the cow manure and grass organic material had no significant effect. This can be seen in Table 4.

Table 4. Effect of Combination Dosage of Cow Manure and Grass Organic Matter on Leaf Area Age 21, 28, and 35 HST

Treatment	Leaf Area $(cm)^2$		
	Leaf Area 21 HST	**Leaf Area 28 HST**	**Leaf Area 35 HST**
A (PK: 0 ton/ha, BO: 0 ton/ha)	53,88 a	134,19 a	148,52a
B (PK: 0 ton/ha, BO: 10 tons/ha)	57.52 ab	139.05 ab	150,89a
C (PK: 0 ton/ha, BO: 15 tons/ha)	54.90 ab	135,52 a	148,73a
D (PK: 0 ton/ha, BO: 20 tons/ha)	56.48 ab	139.73 ab	149,34a
E (PK: 10 tons/ha, BO: 0 ton/ha)	64.51 bc	141,21 b	151,72a
F (PK: 10 tons/ha, BO: 10 tons/ha)	65.94 bc	149.98 bc	155,96a
G (PK: 10 tons/ha, BO: 15 tons/ha)	71,34 c	150,81 c	156,59a
H (PK: 10 tons/ha, BO: 20 tons/ha)	71,05 c	151,83 c	155,43a
I (PK: 15 tons/ha, BO: 0 ton/ha)	59,84 b	141,72 b	151,24a
J (PK: 15 tons/ha, BO: 10 tons/ha)	66.67 bc	146.59 bc	151,45a
K (PK: 15 tons/ha, BO: 15 tons/ha)	67.32 bc	145.32 bc	148,50a
L (PK: 15 tons/ha, BO: 20 tons/ha)	71,58 c	150,79 c	152,66a
M (PK: 20 tons/ha, BO: 0 ton/ha)	73,75 c	149.81 bc	154,28a
N (PK: 20 tons/ha, BO: 10 tons/ha)	73,25 c	150,92 c	156,51a
O (PK: 20 tons/ha, BO: 15 tons/ha)	73,12 c	150.13 bc	158,58a
P (PK: 20 tons/ha, BO: 20 tons/ha)	**73,97 c**	**151,92 c**	158,69a

Note: Numbers followed by the same letter in the same column are not significantly different at α= 5% and tested using Duncan multiple range test.

Based on further test analysis, the combination treatment of cow manure and grass organic material significantly affected the combination treatment of 0 cow manure and 0-20 tons/ha of grass organic material at 21-28 HST. This is because grass organic material can improve soil structure so that the nutrients needed for leaf growth are more easily absorbed. Organic materials also have the property of storing water for longer so that water availability for plants is met. The availability of sufficient water is very important for plant growth. Water plays a role in

transporting nutrients from roots to leaves and in photosynthesis. Plants that get an adequate water supply can develop larger leaves. As research results from Tilly and Bareth (2019) explain, providing weed or grass compost can improve plant growth.

Table 4 shows that leaf area at 35 DAP gave results that were not significantly different from cow manure and organic grass material treatment. This could be because the two treatments provide almost identical nutrition to the plants so that the effect on leaf area at 35 DAT is not too different. Based on Tilly and Bareth (2019), cow manure and organic materials have high NPK content. At the age of 35 HST, plants have entered the generative phase so that plant growth is more focused on the growth of the generative component.

3.5 Plant Growth Rate (g/m2/day)

The results of the analysis of variance showed that the treatment of cow manure and grass organic matter had a significant effect on the Plant Growth Rate at 28 - 35 HST. This can be seen in Table 5.

Table 5. Effect of Combination Dosage of Cow Manure and Grass Organic Matter on Growth Rate Age 21-28 and 28-35 HST (g/m2/day)

Treatment	Plant Growth Rate 21-28 HST	Plant Growth Rate 28 - 35 HST
A (PK: 0 ton/ha, BO: 0 ton/ha)	4,76a	**5,71 c**
B (PK: 0 ton/ha, BO: 10 tons/ha)	6,32a	5,54 c
C (PK: 0 ton/ha, BO: 15 tons/ha)	5,04a	4.73 bc
D (PK: 0 ton/ha, BO: 20 tons/ha)	5,44a	4,99 c
E (PK: 10 tons/ha, BO: 0 ton/ha)	5,04a	5,08 c
F (PK: 10 tons/ha, BO: 10 tons/ha)	5,47a	4.53 bc
G (PK: 10 tons/ha, BO: 15 tons/ha)	5,82a	4.45 bc
H (PK: 10 tons/ha, BO: 20 tons/ha)	5,57a	4,97 c
I (PK: 15 tons/ha, BO: 0 ton/ha)	5,19a	3.60 ab
J (PK: 15 tons/ha, BO: 10 tons/ha)	5,22a	3,23 a
K (PK: 15 tons/ha, BO: 15 tons/ha)	5,54a	3.58 ab
L (PK: 15 tons/ha, BO: 20 tons/ha)	5,70a	5,53 c
M (PK: 20 tons/ha, BO: 0 ton/ha)	5,71a	5,46 c
N (PK: 20 tons/ha, BO: 10 tons/ha)	5,61a	5,21 c
O (PK: 20 tons/ha, BO: 15 tons/ha)	5,44a	3,96 b
P (PK: 20 tons/ha, BO: 20 tons/ha)	5,56a	4.74 bc

Note: Numbers followed by the same letter in the same column are not significantly different at α= 5% and tested using Duncan multiple range test.

Table 5. In general, the combination treatment of cow manure and grass organic matter at the plant growth rate of 21-28 HST showed results that were not significantly different. The cow manure and organic matter used are suspected to have relatively similar NPK nutrient content. If the content of nitrogen (N), phosphorus (P), and potassium (K) in the two types of fertilizer is not significantly different, the plants may not show significant differences in growth. In line with research conducted by Mauludiah et al., (2021) that the growth rate of melon plants is not significantly different with the addition of organic fertilizers.

The growth rate at 28-35 HST also showed similar results except for treatments I, J, and K of 15 tons/ha cow manure and 0-15 tons/ha grass organic matter. These results combine with an optimum nitrogen, phosphorus, and potassium nutrient content. According to Minanti (2011), compost made from a mixture of the two raw materials can produce complete nutrients for plant growth. Organic fertilizers also provide a significant increase in plant growth and yield. Organic fertilizers are reservoirs of nutrients released during mineralization and humification, thus supplying elemental needs for plant growth (Palm et al., 2001).

3.6 Fruit Weight per Plant and Plot

The results of the analysis of variance showed that the treatment of cow manure and grass organic matter did not significantly affect the weight of fruit per plant and per plot. This can be seen in Table 6.

Table 6. Effect of Combination Dosage of Cow Manure and Grass Organic Matter on Fruit Weight per Plant and per Plot

Treatment	Fruit Weight/Plant (gram)	Fruit Weight/Plot (kg)
A (PK: 0 ton/ha, BO: 0 ton/ha)	627,0a	3,14a
B (PK: 0 ton/ha, BO: 10 tons/ha)	689,0a	3,55a
C (PK: 0 ton/ha, BO: 15 tons/ha)	625,0a	3,13a
D (PK: 0 ton/ha, BO: 20 tons/ha)	687,5a	3,44a
E (PK: 10 tons/ha, BO: 0 ton/ha)	712,5a	3,56a
F (PK: 10 tons/ha, BO: 10 tons/ha)	735,5a	3,68a
G (PK: 10 tons/ha, BO: 15 tons/ha)	830,5a	4,15a
H (PK: 10 tons/ha, BO: 20 tons/ha)	800,5a	3,70a
I (PK: 15 tons/ha, BO: 0 ton/ha)	615,0a	3,10a
J (PK: 15 tons/ha, BO: 10 tons/ha)	656,5a	3,28a
K (PK: 15 tons/ha, BO: 15 tons/ha)	721,5a	3,61a
L (PK: 15 tons/ha, BO: 20 tons/ha)	745,5a	3,73a
M (PK: 20 tons/ha, BO: 0 ton/ha)	832,5a	4,16a
N (PK: 20 tons/ha, BO: 10 tons/ha)	858,5a	4,29a
O (PK: 20 tons/ha, BO: 15 tons/ha)	747,5a	3,74a
P (PK: 20 tons/ha, BO: 20 tons/ha)	829,5a	4,15a

Note: Numbers followed by the same letter in the same column are not significantly different at α= 5% and tested using Duncan multiple range test.

Based on Table 6, the fruit weight per plant shows results similar to the combination treatment of cow manure and grass organic matter. This can occur because melon plants are thought to have received adequate nutrients from the soil or other sources, so adding manure or grass organic matter does not significantly benefit the weight per plant. The increase in fruit weight is closely related to leaf biomass because the bigger the plant, the bigger the fruit produced (Hartoyo, 2021). In this study, the leaf biomass produced was low, causing the low yield of melons per plant. Low yields are likely due to less than maximum nutrient absorption due to the long drought during the growth period of melon plants. Drought can affect nutrient absorption in plants through several mechanisms that affect the availability and mobility of nutrients in the soil. Drought can reduce soil moisture, which can slow the nutrient diffusion rate from soil to plant roots (Wahab et al., 2022).

Fruit weight per plot in Table 6 shows results that are not significantly different from cow manure and grass organic matter treatment. This can occur because the results of the weight of melons per plant are not significantly different, so the results of the weight per plot are also not significantly different. This could be due to drought in the generative period, resulting in drought stress due to long drought (El-Nino effect), which causes nutrients to be difficult to be absorbed by plants for melon fruiting. The increase in fruit weight is strongly related to several factors, including plant growth stage, drought intensity, and genetic adaptation of plants to dry conditions (Akhoundnejad & Dasgan, 2019).

3.7 Correlation Analysis between Growth and Yield Components

The correlation coefficient illustrates the level of closeness between one character and another, but the correlation value cannot clearly explain the relationship between the character components of plant growth and yield either directly or indirectly through other characters (Safriyani et al., 2019). The results of the correlation analysis of growth factors, namely plant height and stem diameter, can be seen in Table 7.

Table 7. Results of Correlation Analysis of Growth Factors (Plant Height and Stem Diameter) with Yield of Melon Plants

Description	Plant Height (cm)			Stem Diameter (cm)		
	21 HST	28 HST	35 HST	21 HST	28 HST	35 HST
R	0,922**	0,792**	0,631**	0,707**	0,746**	0,785**
Category r	Very high	High	Medium	High	High	High
r^2	0,850	0,627	0,398	0,500	0,556	0,617
t-count	13,025	7,106	4,425	5,478	6,127	6,952
$t_{0,025}$	2,042	2,042	2,042	2,042	2,042	2,042
Conclusion	Very real	Very real	Very real	Very real	Very real	Very real

Description: **. Correlation is significant at the 0.01 level (2-tailed)

*. Correlation is significant at the 0.05 level (2-tailed)

Based on Table 7, shows the results of the correlation between growth (plant height and stem diameter) at each observation time with melon plant yield, especially fruit weight per plot showed very real results. The correlation between plant height and stem diameter with plant yield can reflect the complex physiological relationship between various growth processes. These processes involve nutrient transport, photosynthesis, and energy allocation that can affect fruit production (Condon et al., 2013). The increase in fruit weight is closely related to plant biomass, because the bigger the plant the bigger the fruit produced, and vice versa (Hartoyo, 2021).

Table 7. Results of Correlation Analysis of Growth Factors (Number of Leaves and Leaves Area) with Yield of Melon Plants

Description	Number of Leaves			Leaves Area		
	21 HST	28 HST	35 HST	21 HST	28 HST	35 HST
R	0,748**	0,419*	0,733**	0,522**	0,444*	0,184
Category r	High	Medium	High	Medium	Medium	No correlation
r^2	0,559	0,175	0,538	0,273	0,197	0,034
t-count	6,168	2,252	5,909	3,353	2,714	1,026
$t_{0,025}$	2,042	2,042	2,042	2,042	2,042	2,042

Conclusion	Very Real	Real	Very Real	Very Real	Real	Unreal

Description: **. Correlation is significant at the 0.01 level (2-tailed)

*. Correlation is significant at the 0.05 level (2-tailed)

Table 7 shows a significant relationship between the number of leaves at 21 HST, 35 HST, and the Leaf Area at 21 HST. Meanwhile, the number of leaves at 28 HST and Leaf Area 28 HST showed a significant relationship. These results illustrate that the increase in plant height, stem diameter, number of leaves, and Leaf Area after treatment can increase the ability of plants to produce photosynthate because leaves are the main organ that performs photosynthesis that will compose plant biomass. The photosynthate will be translocated to vegetative and generative organs that need it. During the vegetative phase, the plant prepares its various organs, especially the leaves, to be better able to enter the generative phase. Plants will use the increase in radiation that the leaves can absorb in this period to form generative organs. Thus, the increase in plant growth will also affect the yield of melon plants. Vegetative growth will determine the generative phase and plant production (Safriyani et al., 2019). The crown is one part of the plant that plays an important role in photosynthesis. In line with the research results by Iledun et al. (2020), plant height can increase organic rice yields.

4. Conclusions

1. The combination of treatment with a dose of cow manure of 10 – 20 tons/ha and grass organic matter of 0 – 20 tons/ha has a significant effect on the growth components of melon plants, including the number of leaves aged 21 and 28 HST, the area of leaves aged 21 and 28 HST, and plant growth rate aged 28 – 35 HST. Meanwhile, there was no significant effect on the components of plant height, stem diameter, number of leaves at 35 DAP, leaf area at 35 DAP, and plant growth rate at 21 – 28 DAP.

2. The combination of the treatment dose of cow manure 20 tons/ha and grass organic matter 0 ton/ha gave the best effect on the yield of melon fruit weight per plant weighing 832.5gram and 4.16 kg per plot or equivalent to 6.93 tons/ha.

3. There was a positive and significant correlation between the growth and yield components of melon fruit as a result of the combination treatment of cow manure and grass organic matter, except that leaf area at 35 HST was not significantly correlated with fruit weight per plot.

Suggestions

1. Research in the same conditions is recommended to use 20 tons/ha of cow manure and 0 tons/ha of grass organic material.

2. Further research should be carried out to support these results, especially the use of cow manure doses and the use of organic grass material and their respective comparisons to obtain optimal doses and ratios for the growth and production of melon plants.

References

[1] Advinda, L. (2018). *Basics of Physiology Plant.* Deepublish.

[2] Akhoundnejad, Y., & Dasgan, H. Y. (2019). Effect of different irrigation levels on physiological performance of some drought tolerant melon (Cucumis melo l.) genotypes. *Applied Ecology and Environmental Research, 17* (4). https://doi.org/10.15666/aeer/1704_999710012

[3] Alfaridzi, PD (2022). *Agricultural methods are ancient and believed to shorten pattern planting and harvesting.* Https://Www.Alinea.Id/Gaya-Hidup/Metode-Pertanian-Purba-Percepat-Pola-Tanam-Dan-Panen-B2fsi9H5m.

[4] Central Bureau of Statistics. (2022). *Horticulture Production Plant Melons (Tons).*

[5] Condon, A.G., Richards, R.A., Rebetzke, G.J., & Farquhar, G.D. (2013). Improving intrinsic water-use efficiency and crop yield. *Crop Science, 42* (1). https://doi.org/10.2135/cropsci2002.1220

[6] George, T. S., & Richardson, A. E. (2008). *Potential and limitations for improving crops for enhanced phosphorus utilization.* https://doi.org/10.1007/978-1-4020-8435-5_11

[7] Hartoyo, H. (2021). Influence giving dose fertilizer pen cows and mulch on growth and yield melon plant (Cucumis melo L.). *Grafting: Journal Scientific Knowledge Agriculture, 11* (1). https://doi.org/10.35457/grafting.v11i1.2554

[8] Iledun, C., Ozioma, A.B., & Simon, A.E. (2020). Effect of organic phosphorus (cow dung) on the growth and yield of watermelon (Citrullus lanatus (Thunb.) in Anyigba, Kogi state, Nigeria. *GSC Biological and Pharmaceutical Sciences, 10* (3), 95–103.

[9] Iqbal, M., Barchia, F., & Romeida, A. (2019). Growth and yield of melon plants (Cucumis melo L.) on planting media composition and frequency of different fertilization. _ *Journal Sciences Indonesian Agriculture, 21* (2). https://doi.org/10.31186/jipi.21.2.108-114

[10] Irfan, M. (2013). Response onion red (Allium ascalonicum L) against substance regulator growth and nutrients. *Journal Agrotechnology, 3* (2), 35–40.

[11] Ishak, MA, & Daryono, BS (2018). Stability character melon (Cucumis melo L.' Sun Lady') phenotype results in cultivation in the village Jamusan, Prambanan, DI Yogyakarta. *Proceedings of SNPBS (National Seminar on Biology and Science Education),* 118–125.

[12] Leiwakabessy, F.M. (1988). Soil fertility. Soil *Department. Faculty Agriculture. Institute Bogor Agriculture. Bogor, 294.*

[13] Manyun, I. A. (2007). Effect mulch straw rice and fertilizer pen cow to growth and yield onion red in the area coast. *AGRITROP Journal, 26* (1).

[14] Martin M; Robert MG; Joshua OO. (2016). The Effect of different Phosphorus Levels on Yield and Quality of Watermelon (Citrulluslanatus (Thunb.) Matsumara & Nakai) grown in the Kenyan Coastal Region. *Annals of Biological Research, 7* (5), 12–17.

[15] Mauludiah, T., Radian, R., & Abdurrahman, T. (2021). Growth and yield of melon plants as a result of giving fertilizer cage and ashes husk rice on Ultisol Soil. *Journal Agriculture Agros, 23* (2), 241–250.

[16] Mayrowani, H. (2016). Development Agriculture Organic in Indonesia. *Research Forum Agro Economics, 30* (2). https://doi.org/10.21082/fae.v30n2.2012.91-108

[17] Minanti, N. (2011). *Giving type and dosage fertilizer pen to melon growth and yield.*

[18] Noonari, S., Kalhoro, S.A., Ali, A., Mahar, A., Raza, S., Ahmed, M., Shah, S.F.A., & Baloch, S.U. (2016). Effect of different levels of phosphorus and method of application on the growth and yield of wheat. *Natural Science, 08* (07). https://doi.org/10.4236/ns.2016.87035

[19] Nurpanjawi, L., Rahmawati, N., Istiyanti, E., & Rozaki, Z. (2021). Appropriateness melon farming in Kasreman Village, District Geneng, Regency Ngawi, East Java. *National Seminar…, March 2021.*

[20] Oyewole, CI, & Oyewole, A.N. (2011). Crop production and the livestock industry, the interplay: A case study of poultry manure and crop production. *Proceedings of the 16th Annual Conference of ASAN,* 124–127.

[21] Palm, C. A., Gachengo, C. N., Delve, R. J., Cadisch, G., & Giller, K. E. (2001). Organic inputs for soil fertility management in tropical agroecosystems: application of an organic resource database. *Agriculture, Ecosystems & Environment, 83* (1–2), 27–42.

[22] Pranoto, H. (2016). Response growth and quality of several kenaf varieties (Hibiscus cannabinus L.) against giving N fertilizer and manure chicken. *Ziraa'ah Magazine Scientific Agriculture, 41* (1), 27–32.

[23] Roidah, IS (2013). Benefits of using fertilizer organic For fertility land. *Journal Bonorowo, 1* (1), 30–43.

[24] Safriyani, E., Hasmeda, M., Munandar, M., & Sulaiman, F. (2019). Correlation Component Growth and Yield in Agriculture Integrated Rice-Azolla. *Journal of Suboptimal Lands, 7* (1), 59–65. https://doi.org/10.33230/jlso.7.1.2018.344

[25] Samadi, B. (2010). *Melons, Farming Business, and Post-Harvest Handling* (3rd ed.). Canisius.

[26] Setyorini, T., Hartati, RM, & Damanik, AL (2020). Growth seeds coconut palms in pre-nursery with giving fertilizer organic liquid (banana peel) and NPK fertilizer. *Agritrope: Journal Sciences Agriculture (Journal of Agricultural Science), 18* (1), 98–106.

[27] Sudadi, M., & Suryanto, WA (2001). Breakthrough technology fertilization in the agricultural era organic. *Cultivation Food Crops, Horticulture and Plantation, Publisher Kanisius, Yogjakarta, 78.*

[28] Suriadikarta, DA, & Setyorini, D. (2005). *Research Results Report Organic Fertilizer Quality Standards.*

[29] Sutanto, R. (2002). *Application Agriculture Organic: popularization and development.* Canisius.

[30] Sutedjo. (2010). Fertilizer and How to Fertilize. *Calcium nutrients in fertilizer organic from waste shell egg.* Rineka Cipta.

[31] Tilly, N., & Bareth, G. (2019). Estimating nitrogen from structural crop traits at field scale-a novel approach versus spectral vegetation indices. *Remote Sensing, 11* (17). https://doi.org/10.3390/rs11172066

[32] Verizza Triansyah, L., Setyaningsih, M., Biology Education Studies, P., Muhammadiyah Hamka, U., Tanah Merdeka, J., Rambutan, K., & Rebo, P. (2018). Influence Giving Bokashi a Mixture of Reeds (Imperata cylindrica L.) and Dirt Goat To Growth Mustard plant (Brassica rapa L.). *Online-Journal.Unja. Ac. Id, 04* (1).

[33] Wahab, A., Abdi, G., Saleem, MH, Ali, B., Ullah, S., Shah, W., Mumtaz, S., Yasin, G., Muresan, CC, & Marc, RA (2022). Plants' physio-biochemical and phyto-hormonal responses to alleviate the adverse effects of drought stress: a comprehensive review. *Plants, 11* (13). https://doi.org/10.3390/plants11131620