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Growth and Performance of Melon (*Cucumis melo L*) in Respect of Payments and Fruit Trimming

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Abstract: This study used a completely randomized design (CRD), factorial with 2 intervention factors: M0 = 0 g/tree, M1 = 40 g/tree, M2 = 80 /tree. The second factor of fruit pruning (P), P0 = no size, P1 = remaining 1 fruit, P2 = remaining two fruits. This study was organized according to a 3x3 factorial design. Treatments were repeated three times and resulted in 27 experiments. The parameters observed included: Tree height, number of leaves, number of flowers, fruit weight, fruit diameter. Observation of plant growth will be done within 7 days after planting. Analysis using variance fingerprints. If there are significant differences between treatments, do the BNJ test at the 5% level. From the results of the analysis of variance in the table above shows that the application of organic fertilizer does not give a real effect on the height of the tree at the age of 70 hst, the number of leaves, fruit weight and diameter. Pruning treatment gives a real effect on the parameters of plant height after 70 days of planting, but does not give a real effect on the number of leaves, fruit weight and diameter.

Keywords: Biofertilizer; Growth and production of melon; Pruning

Introduction

Melon is a fruit native to Africa, belonging to the gourd or squash family. The fruit is often consumed fresh mixed with fruit ice cream (Khumaero et al., 2015). The part that is eaten is the pulp (Ishak et al., 2018). The texture is soft, the color is white to red depending on the variety, melon is also a type of C3 plant, because the photosynthesis process produces carbon compounds with 3 atoms as the main output (Sa'diah et al., 2022). This plant does not tolerate light intensity that is too high. This plant requires 10 to 12 hours of light/day (Nora et al., 2020).

The scarcity of chemical fertilizers makes farmers look for alternative fertilizers that can encourage growth and increase yields (Prajnanta, 2004). In addition to fertilizer scarcity, the impact of using chemical fertilizers is increasingly harmful to the environment (Samadi, 2010). NPK chemical fertilizers are very good for plants, but if used excessively, they will damage agricultural soil. Organic fertilizers can be used as a substitute for plant food (Harsh, 2022). Organic fertilizers have various forms and benefits (Hs, 2022). Organic fertilizers are abundant in nature, the raw materials come from plants, animals, and human remains (Later et al., 2010). Organic fertilizers are available in various solid, liquid, and biological (microbial) forms (Harahap et al., 2020).

Organic fertilizers have growth-promoting and pest-controlling effects. They contain live microorganisms that, when applied to seeds, plant surfaces or soil, collaborate with plant roots. Biofertilizers are organic fertilizers that are beneficial to plants. Biofertilizers play a role, among others, in promoting plant growth by protecting plants from root pathogens and toxic factors. Biofertilizers play a role in biological defense against root pathogens. Mycorrhizal fungi can secrete antibiotics that can kill pathogens (Hs, 2022).

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The benefits of melon pruning aim to optimize the production process and reduce moisture in the plant cover (Handayani et al., 2019). This will reduce the risk of pest attacks, as well as stimulate the growth of productive shoots (Hadiwijaya et al., 2020). Based on the description above, it is necessary to carefully consider the growth and yield of melon plants in relation to organic fertilizers and fruit size (Akbar et al., 2022).

Method

This research was conducted in the greenhouse of Mataram University, Mataram city, West Nusa Tenggara. This research was conducted in January - August 2023.Using research materials: melon seeds, mycorrhizal biofertilizer, polybags, dolmit, kohokaming organic fertilizer, straw, NPK fertilizer (15:15:15), ZA, Hormones, bamboo poles, neat ropes.The tools used in the research are: scissors, ruler, tape measure, bucket, hoe, hammer, sickle, data book, stationery and analytical balance. This study used a completely randomized design (CRD), factorial with 2 factors. Dosage of biological fertilizer, factor 1: M0 = 0 g/tree, M1 = 40 g/tree, M2 = 80 g/tree. The second factor is fruit size (P), P0 = no fruit pruning, P1 = remaining 1 fruit, P2 = remaining two fruits. This study was organized according to a 3x3 factorial design. The treatments were repeated three times and 27 trials were obtained. The process of conducting the research included soil preparation, seed treatment, placement of substrate in plastic bags, making treatment codes, seed treatment, seeding, planting, watering and observing plants, and watering plants: Tree height, number of leaves, fruit weight, fruit diameter. Plant growth observations will be made within 7 days after planting. Analysis using variance fingerprints. If there is a significant difference between treatments, do the BNJ test at the 5% level.

Result and Discussion

The results of the diversity analysis of all observed parameters are presented in Table 1.

Table 1. Results of Diversity Analysis of Growth and Production Responses of Melon (*Cucumis melo L*) to the Application of Biofertilizers and Fruit Pruning

Parameter	F_{Count}		
	Organic compos	Pangkas	Interaction
Height of Plant 70 hst	1.85 tn	5.13 *	2.3 tn
Number of leaf	0.87 tn	0.62 tn	1.07 tn
Weight of fruit	1.91 tn	2.22 tn	0.73 tn
Diameter of fruit	1.61 tn	0.77 tn	0.77 tn

tn : Not Significantly Affected
* : Significant Effect

Based on the results of the analysis of variance in the table above, biofertilizer does not have a significant effect on plant height at 70 days after planting, number of leaves, fruit weight, and fruit diameter. Biofertilizers and pruning had a significant effect on the parameters of plant height 70 days after planting, but had no significant effect on the number of leaves, fruit weight, and fruit diameter. While the interaction of biological fertilizer and pruning had no significant effect on plant height at 70 days after planting, number of leaves, fruit weight, and fruit diameter.

This is because the roots of melon plants have developed perfectly and are able to absorb nutrients optimally, so that plants can utilize the nutrients provided for optimal growth. Biofertilizer is one type of petrobio biofertilizer that contains active ingredients of non-symbiotic free N-binding bacteria and P-solubilizing microbes to meet the basic needs of melon plants (Iqbal et al., 2019). Plants need nitrogen, amino acids (proteins), nucleic acids, nucleotides and chlorophyll as building blocks. Sufficient N elements make plants greener and grow faster and contain proteins that support yield (Amiroh, 2017).

Petro biofertil biofertilizer contains several ZPT (Aspergillus and Azobacteria Sp and Pseudomonas) which play a role in the process of root formation, accelerate plant growth in the growth phase, stimulate flowering and fruiting plants, and prevent / reduce the loss of flowers and fruits (Badrudin et al., 2009). The function of Petro Biofertil biofertilizer is also to decompose organic matter by microbes, can provide nutrients to plants, protect roots from pests and diseases, provide growth regulator metabolic products and stimulate the perfect development of the root system (Prakoso et al., 2018).

Fruit pruning treatment has a significant effect on plant height parameters. When cutting fruit, root nutrient uptake and photosynthesis results are oriented to the length of the vine and the number of leaves, so that the less fruit left on the plant, the longer the vine will be (Anggara et al., 2020). Good leaf formation increases the process of photosynthesis which produces carbohydrates for fruit formation (Nur Huda, 2013). Another factor that influences the growth of the number of leaves is the genetic trait of the plant (Carsidi et al., 2021). The purpose of pruning is to concentrate the food juice produced in the photosynthesis process of the plant on the formation and growth of fruit so that it grows large and fast (R. R. Ginting et al., 2015). Melon plants can produce many fruits, but usually only one fruit remains on the plant (Anonymous, 2011). Each melon plant produces many flowers as it grows. Therefore, the proportion of fruits per plant is high, but the size of the fruits obtained is small, and the sweetness of the melon is reduced, because photosynthate is distributed to all

fruits (Hadiwijaya et al., 2020). Therefore, to increase productivity, fruit pruning is carried out so that the production yield on each plant is maximized (P. A. Ginting et al., 2017).

The combined effect of biofertilizer and pruning significantly affected the lifespan of female flowers (Purnamawati et al., 2019). Biofertilizer is a type of organic fertilizer that contains macro nutrients, micro nutrients, vitamins, minerals, organic acids, growth hormones, and is not toxic to soil rhizobia bacteria (Agustin et al., 2014). At the time of cutting the fruit, root nutrient uptake and photosynthetic products are oriented towards the length of the vine and the number of leaves, so that the less fruit left on the plant, the longer the vine will be (Huda et al., 2019). The formation of good leaves greatly improves the photosynthesis process (Panunggul, 2023).

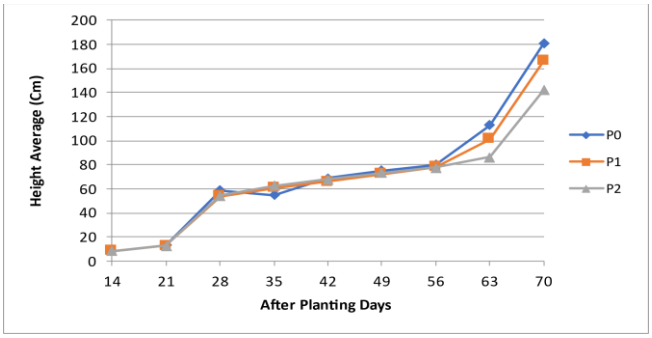

Figure 1. Plant height chart

Based on ANOVA and BNJ analysis of the slope value of the plant height growth curve in each treatment, it can be said that the M factor and the P factor significantly affect the plant height growth curve. Treatment with the M0 factor gives the best plant height growth pattern compared to other M factors and is significantly different from the M2 factor. While the P0 factor provides the best plant height growth pattern compared to other P factors and is significantly different from the P2 factor. This is because plant nutrition only focuses on creating plant vegetative growth. However, melon fruit with this treatment did not increase in size as shown in Figure 1.

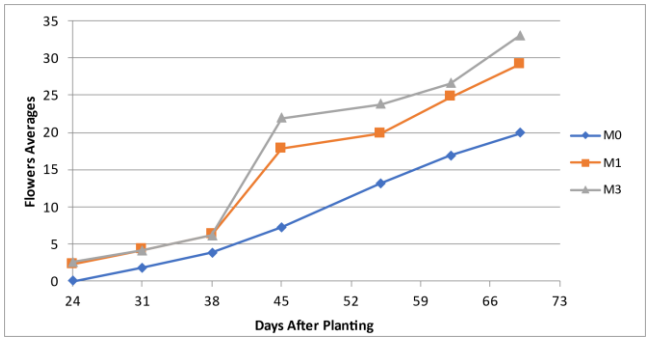

Figure 2. Graph of number of flowers

Based on the ANOVA results, the maximum number of flowers (assuming the last measurement on day 69) shows that the M factor and the P factor significantly affect the maximum number of flowers. The BNJ test shows that the M2 treatment supports the highest maximum flowering compared to other M factor treatments and is significantly different from each other. However, in the P factor, the P1 treatment is not significantly different from the P2 treatment in supporting the maximum number of flowers. However, both treatments were significantly different from the P0 treatment. The application of biological fertilizers to melon plants can stimulate flower formation.

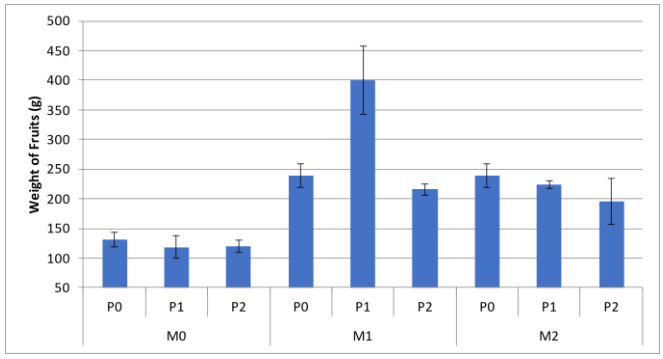

Figure 3. Fruit weight graph

ANOVA results showed that the M factor and the P factor had a significant effect on fruit weight. In addition, there is a significant interaction between factors. BNJ test results showed that the M1 treatment gave the highest fruit weight and was significantly different from the other M factor treatments. While the P1 treatment is the treatment that gives the best results with the P factor and significantly different from the P2 treatment. However, the P1 treatment was not significantly different from the P0 treatment. Fruit reduction affects fruit size and weight, with the remaining fruit on a single plant being the heaviest.

Conclusion

Based on the results of the study "Growth and Production of Melon (Cucumis Melo L.) Against the Application of Biofertilizers and Pruning" can be concluded that the interaction of biological fertilizer and pruning has no significant effect on all parameters; Biofertilizer treatment has no significant effect on all parameters; and Pruning treatment had a significant effect on the parameters of melon fruit weight and fruit diameter.

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Author Contributions
The authors' contributions include N. A. R.: preparing research needs, observing the growth and development of melon plants; R. E. S.: collecting data, analyzing data, discussing research results, writing the original draft; B. I. L.: reviewing the paper.

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Conflicts of Interest
The authors of this article declare no conflicts of interest.

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