Agro Bali : Agricultural Journal
Vol. 8 No. 1: 137-144, March 2025

e-ISSN 2655-853X
https://doi.org/10.37637/ab.v8i1.1827

Effect of Fertilization Package on Vegetative Growth of Tejakula Tangerine (*Citrus reticulata* cv. Tejakula) After Transplanting to the Field

I Nyoman Rai♥, Gede Wijana, and Jaya Duarsa Mintarajasa
Agroecotechnology Study Program, Udayana University, Denpasar, Indonesia
♥Corresponding author email: rainyoman@unud.ac.id

Article history: submitted: April 30, 2024; accepted: March 18, 2025; available online: March 28, 2025

Abstract. Farmers have applied fertilization but have not achieved optimal vegetative growth of Tejakula tangerine plants. This study aims to find a combination of fertilization packages that can provide the best response to vegetative growth and improve the soil quality of Tejakula tangerine plants after moving to the field. The research was conducted in Tembok Village, Tejakula District, Buleleng Regency, Bali from July to December 2023. The experiment used a one-factor Randomized Block Design (RBD) with fertilization package treatment consisting of 3 levels, namely: 5 kg cow manure per tree, 5 kg cow manure + mycorrhizal biofertilizer 20 spores/50 g volcanic sand carrier + probiotic liquid organic fertilizer 20% concentration per tree and 5 kg cow manure + urea 50 g + SP-36 25 g + KCl 20 g per tree. Each treatment was repeated 8 times, resulting in 24 experimental units. Observational data were analyzed using the Analysis of Variance (ANOVA) test, and further tests were carried out using the Least Significant Difference (LSD) test. The results showed that the fertilizer package treatment had a very significant effect on the variable number of primary branches and leaf P nutrient content, significantly affected the variable number of plant stem diameter and leaf chlorophyll content, but had no significant effect on the variable number of plant height, relative water content (RWC) of leaves and leaf color. The package of cow manure + inorganic fertilizer influenced the vegetative growth of Tejakula tangerine after transplanting to the field very significantly on the increase in primary branches, significantly influenced the increase in plant stem diameter and leaf chlorophyll content. The organic fertilization package + mycorrhizal biofertilizer + probiotic liquid organic fertilizer can improve the soil quality of Tejakula tangerine plants.

Keywords: fertilization package; inorganic fertilizer; organic fertilizer; tejakula tangerines; transplanting

INTRODUCTION

Horticulture is an agricultural subsector that has a bright potential to be developed in Indonesia in the future. The support of climate variability and soil conditions in Indonesia allows horticultural crops to live in large numbers, and it is suitable for development in Indonesia (Amelia & Sasana, 2017). One of the horticultural subsectors with bright prospects in the future is citrus. Currently, competitiveness exists between local fruits and imported fruits, with oranges being the most popular fruit in various countries, including Indonesia (Syahadi & Erza, 2023). Citrus is a fruit that is favored by most Indonesians because it has a sweet taste mixed with a fresh sour taste. In addition to having a sweet and fresh taste, citrus fruits also have a high content of vitamins A and C (Castena et al., 2018). High citrus consumption must be balanced with good production to meet the high consumer demand. Tejakula tangerines are widely produced in Bali, especially in Buleleng Regency. Tejakula tangerine (*Citrus reticulata* cv. Tejakula) is a local citrus variety that can live and develop in the lowlands around the coast in Tejakula District, Buleleng Regency.

Efforts to support the optimal Tejakula tangerine cultivation process can be done by fertilizing. Fertilizer is the most prominent cultivation technology used by Tejakula tangerine farmers. There are differences in the use of fertilizers in the cultivation of Tejakula tangerines, fertilization using organic or inorganic fertilizers alone and fertilization using a combination of organic and inorganic fertilizers. Different fertilization technology in Tejakula tangerine cultivation will also trigger differences in plant growth and development. The results of research by (Fiana et al., 2015) on fertilization of immature Borneo Prima tangerine plants (approximately 1-2 years old) using the treatment of no fertilization, fertilization treatment with inorganic fertilizers and fertilization with organic

e-ISSN 2655-853X
https://doi.org/10.37637/ab.v8i1.1827

fertilizers obtained the results that inorganic fertilizers were able to increase stem diameter and plant height with the highest percentage increase, followed by organic fertilizers and no fertilization. Inorganic fertilizers have the property of quickly releasing nutrients because they do not require a decomposition process, thus, the absorption of nutrients is predicted to run well. However, inorganic fertilizers that are used continuously for a long period have a negative impact on environmental sustainability (Jaja & Barber, 2017). The results of research by (Ogbomo, 2011) conducted on tomato plants show that the combination of organic and inorganic fertilizers is the most effective treatment to achieve optimal growth and yield in tomato cultivation, compared to fertilization with organic or inorganic fertilizers alone. Immature citrus plants require optimal vegetative growth so that fertilization is more focused on optimizing the vegetative growth of citrus plants. Tejakula tangerine plants grown by farmers have been given fertilizers, but they have not been able to support the plants' vegetative growth optimally. Tejakula tangerine plants after transplanting to the field require sufficient nutrients to increase the vegetative growth of plants, adequate nutrients can be obtained from a combination of fertilizers. This study was conducted to find a combination of fertilization packages between organic, inorganic, biological and probiotic fertilizers that are able to provide the best response to the vegetative growth of Tejakula tangerine plants after moving to the field and finding a combination of fertilization packages that are able to improve soil quality.

METHODS

This research was conducted in Tembok Village, Tejakula District, Buleleng Regency, Agronomy and Horticulture Laboratory and Chemistry and Soil Fertility Laboratory, Faculty of Agriculture, Udayana University. This research was conducted from July to December 2023. The experiment used a one-factor Randomized Block Design (RBD), namely the fertilization package with 3 treatment levels, namely, 5 kg cow manure (P_O), cow manure + mycorrhizal biofertilizer + probiotic liquid organic fertilizer (P_C) and 5 kg cow manure + urea 50 g + SP-36 25 g + KCl 20 g (P_S). Each treatment was repeated 8 times, resulting in 24 experimental units.

The stages of research implementation began with land preparation for planting. After the land was ready, Tejakula tangerine seedlings were planted. The sample plants were 1.5 years old, having spent 5 months after grafting onto the rootstock. The plants had the same height, with an average of 50 cm, and were in good health, free from pests and plant diseases. The sample plants were kept under cover for 3 weeks until they recovered from stress. Liquid organic fertilizer made from dried goat manure that has been mashed, dried ripe yellow *kepok* banana peel that has been mashed, light green coconut water, liquid brown sugar and *Effective Microorganism* 4 (EM_4) for Agriculture mixed then fermented for 2 weeks then harvested to be ready for use. After the plants recovered from stress and the probiotic liquid organic fertilizer was ready to be harvested, followed by the application of fertilization treatments on the experimental unit plants. Cow manure at all treatment levels was applied by making trenches then sprinkling the fertilizer and backfilling it. Mycorrhizal biofertilizer at the P_C level, and urea, SP-36 and KCl fertilizers at the P_S level were applied by topping the cow manure first before stockpiling. Probiotic liquid organic fertilizer at a dose of 20 ml was dissolved with 80 ml of water and then applied by dribbling the base of the plant rootstock. All fertilizer applications were repeated after 8 weeks of the first treatment, but mycorrhizal biofertilizerwas only applied once.

Plant maintenance was carried out by watering every day using drip irrigation, cleaning weeds and controlling pests and plant diseases. The observation variables consisted of height increment (cm), stem diameter increment (cm), primary branch

e-ISSN 2655-853X
https://doi.org/10.37637/ab.v8i1.1827

increment (pieces), leaf relative water content (RWC) (%), leaf P nutrient content (%), leaf chlorophyll content (units) and soil fertility level. Observation data were analyzed statistically using Analysis of Variance (ANOVA) in accordance with the experimental design used. The effect of the treatment was seen through the test of the calculated F value with F table, if the treatment had a significant effect on the observed variables, then continued with the Least Significant Difference (LSD) test at the 5% level.

RESULTS AND DISCUSSION

Plant height gain (cm)

Analysis results showed that the fertilization package had no significant effect on plant height increment. The fertilization package treatment of cow manure organic fertilizer + mycorrhizal biofertilizer + probiotic liquid organic fertilizer (P_C) gave the highest plant height increment with an average increment of 40.40 cm, followed by the fertilization package treatment of cow manure organic fertilizer + urea fertilizer + SP-36 fertilizer and KCl fertilizer (P_S) with an average increment of 39.80 cm and the lowest result was obtained in the treatment of cow manure (P_O) with an average increment of 32.83 cm (Table 1). The highest increase in plant height was obtained in the treatment of organic fertilization package of cow manure + mycorrhizal biofertilizer + probiotic liquid organic fertilizer (P_C) due to the provision of mycorrhizal biofertilizer. By enhancing the synthesis of hormones like auxins and cytokinins, mycorrhizal biofertilizers contribute to plant growth (Pons et al., 2020), this can be seen from the value of plant height gain given mycorrhizal biofertilizer has a higher value than the other two treatments.

Table 1. Effect of fertilization package on plant height increment, stem diameter increment, primary branch increment

Treatment	Plant height gain (cm)	Increase in stem diameter (cm)	Increase in number of primary branches (pieces)
P_O	32.83 a	0.92 b	7.00 b
P_C	40.40 a	1.15 a	8.00 b
P_S	39.80 a	1.19 a	16.63 a
LSD 5%	10.45	0.15	4.00

Description: Numbers followed by the same letter in the same column indicate no significant difference in the Least Significant Difference (LSD) test at the 5% level.

Increase in stem diameter (cm)

Analysis of variance showed that the fertilization package had a significant effect on stem diameter increment. Table 1 shows that the highest average value of stem diameter increment was obtained by the fertilization package treatment of cow manure + ureafertilizer + SP-36 fertilizer and KCl fertilizer (P_S) with an average value of 1.19 cm, which was not significantly different from the average value of the second highest stem diameter increment, namely in the treatment of cow manure fertilization package + mycorrhizal biofertilizer and probiotic liquid organic fertilizer (P_C) with an average value of 1.15 cm. The average value of the fertilization package treatment of cow manure + mycorrhizal biofertilizer and probiotic liquid organic fertilizer (P_c) is significantly different from the average value of the lowest stem diameter increment, namely the treatment of cow manure (P_O) with an average increment of 0.92 cm. As the plant matures, both xylem and phloem volumes increase to meet the growing transport demands, indicating that the expansion of stem diameter is crucial for

e-ISSN 2655-853X
https://doi.org/10.37637/ab.v8i1.1827

efficient water and nutrient transport (Hölttä et al., 2013).Primary branch increment (pieces)

Based on the results of analysis of variance, the fertilization package showed a verysignificant effect on the increase in stem diameter. Table 1 shows the highest average increase in the number of primary branches obtained by the fertilization package treatment of cow manure + urea fertilizer + SP-36 fertilizer and KCl fertilizer (P_S) with a value of 16.63 pieces, significantly different from the second highest average value obtained by the fertilization package treatment of cow manure + mycorrhizal biofertilizer + probiotic liquidorganic fertilizer (P_c) with a value of 8.00 pieces. The treatment of cattle manure fertilization package + biological fertilizer + probiotic liquid organic fertilizer (P_c) withthe second highest average value is not significantly different from the treatment of 5 kg cattle manure organic fertilizer (P_O) which has the lowest average value of 7.00 pieces. The higher availability of primary branches will increase the growing space for plant leaves. The high increase of primary branches is in line with the increase of stem diameter. Increased chlorophyll content in line with photosynthate formed will encourage cell differentiation, cell division has a close relationship with the increase of vegetative and generative organs of plants (Kania & Maghfoer, 2018).

Relative water content (RWC) of leaves (%)

The analysis showed that the fertilization package treatment had no significant effect onthe relative water content of the leaves. The fertilization package treatment of cow manure + mycorrhizal biofertilizer + probiotic liquid organic fertilizer (P_C) gave the highest leaf relative water content with a value of 74.68%, followed by the fertilization package treatment of cow manure organic fertilizer + urea fertilizer + SP-36 fertilizer and KCl fertilizer (P_S) with a value of 72.78% and the lowest result was obtained in the treatment of cow manure (P_O) with a value of 70.63%. The high relative water content of the leaves was caused by the application of mycorrhizal biofertilizer with volcanic sand carrier media. In line with the research of (Situmorang et al., 2023) stated that the provision of mycorrhizal biofertilizer with volcanic sand carrier media gave the highest value of leaf relative water content compared to no provision of mycorrhizal biofertilizer and provision with different media on cocoa plantations in Tajun Village, Kubutambahan District, Buleleng. The high relative water content of leaves will make plants resistant to drought sothat the metabolism of plants can take place well and spur plant growth. The success of photosynthesis process in plants is not only influenced by the content of chlorophyllavailable in the leaves, but also supported by the role of water. The relative water content of leaves also affects the formation of leaf chlorophyll in addition to N nutrients (Pratama et al., 2023). The high relative water content of the leaves was caused by the application of mycorrhizal biofertilizer with volcanic sand carrier media. Besides being caused by the carrier media, agroclimatic conditions also support the development of mycorrhiza.

The agroclimatic factor that affects mycorrhizal development is temperature. Higher temperatures will increase mycorrhizal activity, and will increase the number of mycorrhiza (Nurhalimah et al., 2014). This is in line with the results of the study which show that the average daily temperature at the research location is high, namely 33.7 ºC which indicates that mycorrhiza can live and develop in dry locations. In line with the research of Nurhalimah *et al*. (2014) state that the best temperature range for mycorrhiza development is 28-35 ºC. Mycorrhiza will actively form hyphae that will spread to places that cannot be reached by the roots, so that the plant roots allow the field of water absorption owned by the plant to become wider (Suyoga et al., 2021). Increased water

e-ISSN 2655-853X
https://doi.org/10.37637/ab.v8i1.1827

availability will also cause an increase in the relative water content in the leaves (Aziza et al., 2022). Increased water availability for plants will also increase turgor pressure, resulting in increased plant cell division (Naafi & Rahayu, 2019) (Table 2).

Table 2. Effect of fertilization package on relative water content (RWC) of leaves, P content of leaves and chlorophyll content of leaves

Treatment	Relative water content (RWC) of leaves (%)	Leaf P content (%)	Leaf chlorophyll content (units)
P_O	70.63 a	1.24 a	47.63 b
P_C	74.68 a	0.47 b	51.38 b
P_S	72.78 a	0.25 c	60.00 a
LSD 5%	5.77	0.18	5.85

Description: Numbers followed by the same letter in the same treatment and column showno significant difference in theLeast Significant Difference (LSD) test at the 5% level.

Leaf P nutrient content (%)

The application of fertilization package treatment has a very significant effect on leaf P nutrient content. The highest average value of leaf P nutrient content was obtained in the treatment of cow manure fertilization package (P_O) with a value of 1.24%, significantly different from the treatment of cow manure fertilization package + mycorrhizal biofertilizer and probiotic liquid organic fertilizer (P_C) which had the second largestaverage value with a value of 0.47%. The treatment of cattle manure fertilization package + mycorrhizal biofertilizer and probiotic liquid organic fertilizer (P_c) with the second highest average value was significantly different from the treatment of 5 kg cattle manure organic fertilization package + urea fertilizer + SP-36 fertilizer and KCl fertilizer (P_S) which had the lowest value of 0.25%. (Bustami et al., 2012) stated that the uptake of P nutrients in plants with conditions without fertilizer is slightly higher than the uptake of plants given fertilization. The high content of P nutrient in leaves is inversely proportional to the increase in stem diameter and primary branches is inversely proportional to the variables of primary branch increase and stem diameter. Nutrient P has an important role inthe formation of ATP. ATP functions in plant metabolic processes such as photosynthesis and photosynthate translocation. Low nutrient content at the P levels indicates that photosynthate has been well distributed to other vegetative organs, which is characterized by the increase in primary branches and plant stem diameter. P nutrient content in plants is needed during the formation and development of meristem tissues and as a constituent of fat and protein (Qibtyah, 2015). P nutrient in plants, playing a crucial role in energy transfer and aiding the growth of young plants as they mature (Kayoumu et al., 2023). (Table 2).

Leaf chlorophyll content (units)

The results of the analysis of variance showed that the fertilization package treatment significantly affected the chlorophyll content of the leaves. Table 2 shows that the highest average value of leaf chlorophyll content was obtained by the fertilization package treatment of cow manure + urea fertilizer + SP-36 fertilizer and KCl fertilizer (P_S) which was significantly different from the second highest average value in the fertilization package treatment of cow manure + mycorrhizal biofertilizer and probiotic liquid organic fertilizer (P_C) with values of 60.00 and 51.38 units, respectively. The fertilization package treatment of cow manure + mycorrhizal biofertilizer + probiotic liquid organic fertilizer (P_C) with the second highest average value was not significantly different from the manure

e-ISSN 2655-853X
https://doi.org/10.37637/ab.v8i1.1827

fertilization package treatment (P_o) with the lowest value of 47.63 units.

Table 3. Effect of fertilization package on pH, electrical conductivity (EC), organic C, N-total, P-availability and K-availability

Treatment	pH (1:2.5)	EC	C-Organic	N-Total	P-Availability	K-Availability
	H2O	(mmhos/cm)	(%)	(%)	(ppm)	(ppm)
Before	7.25	1.19	2.04	0.07	40.58	182.60
	N	Low	Medium	Very Low	Very High	Medium
P_o	7.56	1.41	3.27	0.17	194.46	235.39
	N	Low	High	Low	Very High	High
P_c	7.45	2.30	3.77	0.18	208.64	265.18
	N	Medium	High	Low	Very High	High
P_s	7.39	2.02	2.89	0.15	193.92	260.69
	N	Medium	Medium	Low	Very High	High

The high chlorophyll content in the leaves will increase the photosynthesis results in plants, so that plants can grow optimally. Leaf chlorophyll content is closely associated with nitrogen (N) uptake in plants. Nitrogen is a fundamental component of chlorophyll molecules, and its availability directly influences chlorophyll synthesis (Perchlik & Tegeder, 2018). N nutrients are absorbed by plants in the form of ammonium and nitrate ions, then continued with metabolic processes in the roots that form glutamic amino acids. Amino acids act as precursors for chlorophyll formation in leaf chloroplasts (Widodo & Damanhuri, 2021). Chlorophyll allows plants to absorb sunlight, initiating photosynthesis, which generates energy used in both vegetative and generative growth (Wu et al., 2024) (Table 2).

Table 4. Effect of fertilization package on water content and soil texture

Treatment	Water Content		Texture (%)		
	Air dry	Field capacity	Sand	Dust	Clay
Before	4.58	31.14	60.25	26.18	13.57
				Sandy Loam	
P_o	4.76	30.71	63.24	21.11	15.65
				Sandy Loam	
P_c	7.51	30.62	62.83	22.64	14.52
				Sandy Loam	
P_s	5.93	33.78	70.96	15.76	13.27
				Sandy Loam	

Soil fertility level

The results of soil analysis showed that the application of fertilizer packages was able to improve soil fertility. Table 3 and Table 4 show that the fertilizer package treatment of cow manure + mycorrhizal biofertilizer and probiotic liquid fertilizer (P_c) gave the best results in improving soil fertility levels, namely increasing the content of C-Organic,

e-ISSN 2655-853X
https://doi.org/10.37637/ab.v8i1.1827

N-Total, P-Availability and K-Availability, increasing air-dry soil moisture content. Treatments that are best for improving soil fertility but not for crop growth result from a misalignment of fertilization practices with the specific needs of the crop (Ahmad et al., 2016).

CONCLUSION

The combination of organic and inorganic fertilizers significantly affects the vegetative growth of Tejakula tangerine after transplanting to the field, leading to an increase in primary branches, stem diameter, and leaf chlorophyll content. The fertilization package of organic fertilizer + mycorrhizal biofertilizer + probiotic liquid organic fertilizer can improve soil quality, namely increasing the content of C-Organic, N-Total, P-Availability, K-Availability and increasing air-dry soil moisture content.

REFERENCES

Ahmad, A. A., Radovich, T. J. K., Nguyen, H. V., Uyeda, J., Arakaki, A., Cadby, J., Paull, R., Sugano, J., & Teves, G. (2016). Use of Organic Fertilizers to Enhance Soil Fertility, Plant Growth, and Yield in a Tropical Environment. *Organic Fertilizers - From Basic Concepts to Applied Outcomes*, *December*. https://doi.org/10.5772/62529

Amelia, W. N., & Sasana, H. (2017). Analysis of Production of Orange Pamelo Honeymad in Pati Regency. *Jurnal Riset Ekonomi Pertanian*, *2*(2), 151–164. https://jurnal.untidar.ac.id/index.php/REP/article/view/527

Aziza, I., Rahayu, Y. S., & Dewi, S. K. (2022). The Effect of Liquid Organic Fertilizers with The Addition of Silica and Water Stress on Soybean Plants. *LenteraBio*, *11*(1), 183–191. https://journal.unesa.ac.id/index.php/lenterabio/index%0A183

Bustami, Sufardi, & Bakhtiar. (2012). Nutrient Uptake and Efficiency Fertilizing to Growth Variety Local of Rice. *Jurnal Manajemen Sumber Daya Lahan*, *1*(2), 159–170. https://jurnal.usk.ac.id/MSDL/article/view/2184

Castena, W., P, N. E., & Hariyono, D. (2018). The Effect Of Growing Media Composition and Watering Interval On Initial Growth Of Citrus (Citrus sp.). *Jurnal Produksi Tanaman*, *6*(10), 2769–2777. https://protan.studentjournal.ub.ac.id/index.php/protan/article/view/968

Fiana, Y., Purwantiningdyah, D. N., & Rizal, M. (2015). Assessment of fertilizing technology for vegetative growth of Borneo Prima oranges in Bulungan District, North Kalimantan. *PROS SEM NAS MASY BIODIV INDON*, *1*(April), 319–323. https://doi.org/10.13057/psnmbi/m010225

Hölttä, T., Kurppa, M., & Nikinmaa, E. (2013). Scaling of Xylem and Phloem Transport Capacity and Resource Usage with Tree Size. *Frontiers in Plant Science*, *4*(DEC), 1–19. https://doi.org/10.3389/fpls.2013.00496

Jaja, E. T., & Barber, L. I. (2017). Organic and Inorganic Fertilizers in Food Production System in Nigeria. *Journal of Biology, Agriculture and Healthcare*, *7*(18), 51–55. https://www.iiste.org/Journals/index.php/JBAH/article/view/38863/39962

Kania, S. R., & Maghfoer, M. D. (2018). Effect of Goat Manure Fertilizer Dosage and PGPR Application Time On Growth and Yield of Shallot (Allium ascalonicum L.). *Jurnal Produksi Tanaman*, *6*(3), 407–414. https://protan.studentjournal.ub.ac.id/index.php/protan/article/view/660

Kayoumu, M., Iqbal, A., Muhammad, N., Li, X., Li, L., Wang, X., Gui, H., Qi, Q., Ruan, S., Guo, R., Zhang, X., Song, M., & Dong, Q. (2023). Phosphorus Availability Affects the Photosynthesis and Antioxidant System of Contrasting Low-P-Tolerant Cotton Genotypes.

e-ISSN 2655-853X
https://doi.org/10.37637/ab.v8i1.1827

Antioxidants, *12*(2). https://doi.org/10.3390/antiox12020466

Naafi, T. N., & Rahayu, Y. S. (2019). The Effect of Local Micro Organism and Mycorrhizal Fungi on Anatomical and Morphological Responses of Red Chili (Capsicum annuum L.) at Different Soil Water Level. *Journal of Physics: Conference Series*, *1417*(1). https://doi.org/10.1088/1742-6596/1417/1/012036

Nurhalimah, S., Sri, N., & Anton, M. (2014). Eksplorasi Mikoriza Vesikular Arbuskular (MVA) Indigenous pada Tanah Regosol di Pamekasan, Madura. *Jurnal Sains Dan Seni Pomits*, *3*(1). https://doi.org/10.12962/j23373520.v3i1.5526

Ogbomo, L. (2011). Comparison of Growth, Yield Performance and Profitability of Tomato (Solanum lycopersicon) Under Different Fertilizer Types in Humid Forest Ultisols. *International Research Journal of Agricultural Science and Soil Science*, *1*(8), 332–338. http://www.interesjournals.org/IRJAS

Perchlik, M., & Tegeder, M. (2018). Leaf Amino Acid Supply Affects Photosynthetic and Plant Nitrogen Use Efficiency Under Nitrogen Stress. *Plant Physiology*, *178*(1), 174–188. https://doi.org/10.1104/pp.18.00597

Pons, S., Fournier, S., Chervin, C., Bécard, G., Rochange, S., Dit Frey, N. F., & Pagès, V. P. (2020). Phytohormone Production by The Arbuscular Mycorrhizal Fungus Rhizophagus irregularis. *PLoS ONE*, *15*(10 October), 1–18. https://doi.org/10.1371/journal.pone.0240886

Pratama, G. S., Rai, I. N., & Wiraatmaja, I. W. (2023). The Effect of Fertilization on Increasing Production and Quality of Guava Fruit (Psidium guajava L.). *Jurnal Agroekoteknologi Tropika*, *12*(1), 22–30. https://ojs.unud.ac.id/index.php/jat/article/view/106453/51322

Qibtyah, M. (2015). Pengaruh Penggunaan Konsentrasi Pupuk Daun Gandasil D dan Dosis Pupuk Guano terhadap Pertumbuhan dan Produksi Tanaman Cabai Merah (Capsicum annum L.). *Saintis*, *7*(2), 109–122. https://e-jurnal.unisda.ac.id/index.php/saintis/article/view/609

Situmorang, N. O., Rai, I. N., & Wiraatmaja, I. W. (2023). Growth and Yield Responses of Cocoa (Theobroma cacao L.) to Fungi Arbuscular Mycorrhizal Biofertilizer Prototypes with Different Spore Carrier Media and pruning. *Magna Scientia Advanced Biology and Pharmacy*, *8*(2), 042–048. https://doi.org/10.30574/msabp.2023.8.2.0029

Suyoga, I. G. A. K. D. P., Rai, I. N., & Wiraatmaja, I. W. (2021). Study of Propagation of Indigenous Endomycorrhizal Isolated from Arabica Coffee Plantations in Kintamani District, Bali, with Water Stress and Different Growth Media. *Plumula : Berkala Ilmiah Agroteknologi*, *9*(2), 70–79. https://doi.org/10.33005/plumula.v9i2.70

Syahadi, F. S., & Erza, O. (2023). Analysis of Local Oranges Competitiveness Against Imported Oranges: Community Perceptions in Dki Jakarta. *PENANOMICS: International Journal of Economics*, *2*(1), 112–128. https://doi.org/10.56107/penanomics.v2i1.116

Widodo, T. W., & Damanhuri. (2021). Effect of Nitrogen Dose on Shoot Formation and Growth of Ratoon Rice (Oryza sativa L.). *Jurnal Ilmiah Inovasi*, *21*(1), 50–53. https://doi.org/10.25047/jii.v21i1.2635

Wu, W., Chen, L., Liang, R., Huang, S., Li, X., Huang, B., Luo, H., Zhang, M., Wang, X., & Zhu, H. (2024). The Role of Light in Regulating Plant Growth, Development and Sugar Metabolism: a review. *Frontiers in Plant Science*, *15*(January), 1–15. https://doi.org/10.3389/fpls.2024.1507628