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Influence of Organic Fertilizer Cow Manure and Chicken Manure on The Growth of Acacia Tree (Delonix Regia) Nursery

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Abstract

The benefits of acacia tree are antimicrobial, anticancer, anthelmintic, nervous system agent Antifungal, anti-inflammatory, antimalarial, antirheumatic, hepatoprotective, nongastro protective. From the bark and trunk parts of acacia contain tannin, β-sitosterol, leucocyanidin, lupeol saponin, alkaloids, carotene, and flavonoid. The part of the athletic flower that is rich in zeaxanthin. The stem contains tannin, lupeol and β-sitosterol, and the flower contains lectin. The research design used in this part of the research is Randomized Block Design or Randomized Group Design (RDB), with 2 (two) factors. The treatment will be formed with a factorial model. The first factor is the treatment of organic fertilizer for cattle manure at level 4 and the second factor is the treatment for manure for poultry manure at level 4. Each treatment will be repeated three times (3). Treatment totals 16 treatment units. The combination of each treatment will be repeated three (3) times so 48 polybag treatment units are required. Observation of acacia tree growth in polybag will be conducted 2 weeks per month after transplanting to polybag, data will be collected such as height (cm), stem diameter (mm) and stem quantity. Data collected from the research according to the procedure used by the author in this methodology will be analysed with ovarian (analysis of Varian) based on the experimental design used, if there is an influence of the right interaction with the observed variable will continue with the use of different DMRT (Duncan Multiple Range Test). To see the influence of each interaction of factors, use BNT 5% to know about the influence of each treatment and use BNJ 5% to see about the influence of each factor of treatment. Influence of cow manure organic fertilizer and poultry manure organic fertilizer on maximum growth of acacia tree.

INTRODUCTION

The habitat of the acacia tree is formed by curved branches and a tall stem that can reach 12 m, its brown and gray trunk composed of two stems and a length of 70 cm, and 20-40 small stems and many stems form a bird's nest 8-10 mm long and its stem ends. Large flowers reach 7-10 cm, pure yellow, dark yellow or orange, located together or axillary shown inside the crown on the sides of the upper white and left: ten stems with yellow splint resistance ii 30-50 cm long. When the fruit

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is ripe and shaped like an egg (Bose et al ., 1998). Acacia trees begin to flower in 4-5 years and can produce flowers once. It occurs in summer as well as in rainy season (Yusuf, 2011). Acacia grows in a safe and exposed place to the sun. This plant is suitable for dry soils. During the long summer, acacia leaves fall for a long time, from regions of the world such as Suriname and Indonesia (Syarifah 2006).

The benefits of acacia tree are antimicrobial, anticancer, anthelmintic, nervous system agent. Antifungal,anti inflammatory,antimalarial,antirheumatic,hepatoprotective,nongastroprotective (Chitra et al ., 2011). From the bark and trunk parts of acacia contain tannin, β-sitosterol, leucocyanidin, lupeol (saponin, alkaloids, carotene, and flavonoid (Jungalwala, 1967). The part of the athletic flower that is rich in zeaxanthin. The stem contains tannin, lupeol and β-sitosterol, and the flower contains lectin. Organic fertilizer is an instrument that is full of nutrition, so that when sowing plant seeds always use organic fertilizer so that the plant that we sow can be consumed to transform into its roots and branches to make changes to plant life quickly (Dalzell 1991).

Acacia plants need nutrition, to support the growth of acacia plants that can usually be supplied naturally but can also be through the process of fertilization. Fertilizers that can be given to plants can be chemical fertilizers can also be organic fertilizers as an alternative. Organic fertilizers are of various types, for example, black soil (compost) is a soil that has good conditions to be used for agricultural needs, as we know black soil is also an important material for life and death. When we plant or plant a we need soil so that to plant plants to expert (Dalzell 1991, said that soil is a natural material that is formed from horizontal materials that come from chemical materials, minerals and organic materials, usually its thickness that is compared in the morphology of plants, plant biology, 2011).

Organic fertilizer is a tool that is composed of cattle manure and transformed into organic fertilizer so that it can be used for acacia plants that we plant so that it can make changes to plant life and can guarantee the sustainability of plants. 1.58%), Ca (1.14%) Mg (0.33%) Mn 175 ppm and Zn 70.5 ppm (Andayani and Larido 2013). Manure is an animal manure to be applied to the soil where acacia plants are planted to increase growth. Chicken manure is an organic fertilizer that is used to replace the black soil in the ground to grow acacia trees. Animal manure contains macro and micro nutrients, macro nutrients such as N, P and K micro elements such as calcium, magnesium, copper. Organic materials in chicken manure are formed as follows N 3.21%, P 3.21% and K 1.57% high and its percentage depends on the organic material's high concentration of N and can attract microorganisms in the soil can live well and quickly (Sutejdo, 1999).

The use of organic fertilizer for cattle and organic fertilizer for poultry is likely to support the growth of acacia trees and production of quality and quantity, ecological sustainability. Biological, and cultural soil. On the other hand, cashew plants will also be dependent on organic fertilizer from cow dung and organic fertilizer from poultry, because organic fertilizer and organic fertilizer from poultry have good nutrition and pH, to develop and become a storehouse for the roots of acacia trees. (Merdekawati, 2015).

METHOD

This experiment was carried out in the plant nursery located in the hamlet of Green house Faculty of Agriculture Technology in Liquisa , Village Dato, Sub District Liquisa, Municipality Likisa. The land is low-lying land dry climate. The experiment was carried out starting on August 26, 2022 until 26 October 2022. The materials used in the experiment was cow dung manure by as much as 3600 g , fertilizer Chicken Coop retrieved 5400 grams.

The tools used include; plow, hoe, sickle, marker, plastic bucket, a flush (gembor), shovels, measuring cup, scales, analytical scales, meter, a ruler, a rope, a plastic pouch of Raphia, handcounter, stationery writing, soil pH and a digital camera. Observation of variable growth; high plant on four

plant samples and the amount of onion leaf plant red onion/sample, the variable component of the result; fresh weight on four plant samples, summing the saplings, fresh heavy economical per hide, on four plant samples, heavy dry performed on four plant samples. The data were analyzed statistically observations with analysis of variants in accordance with the draft used i.e. Full Group of Random Design (RDB). If the influence of real interactions ($P < 0.005$) of the observed variables, then continued with a different test average value by using the double distance test Duncan 5%. When only a single factor in a real influence, then continued with test Duncan Multi Range Test 5% and LSD 5% (Gomez and Gomez, 1995).

RESULT AND DISCUSSION

During the research, the acacia tree nurseries were not threatened by pests and diseases as well as other threats. The results of statistical analysis indicated that organic fertilizer cow manure (KT) did not have a significant influence (F count (<0.05)) on the height variable of acacia tree nurseries 2, 4 and 6 weeks.

However, the number of stems 6 weeks after cultivation did not give a significant influence (F count (<0.05). The root diameter variable of acacia tree nurseries 2, 4, and 6 weeks after cultivation did not give a significant influence (F count (<0.05)) (Table 1.). count (<0.05) for the variable height of acacia tree nurseries weeks 2, 4, and 6. The variable quantity of stems acacia tree nurseries 2, 4 weeks and gives a significant influence (F count (<0.05). However, the number of stems 6 weeks after cultivation did not give a significant influence (F count (<0.05). The root diameter variable of acacia tree nurseries 2, 4, and 6 weeks after cultivation did not give a significant influence (F count (<0.05) (Table 1.). chicken ten (KT x MT) did not significantly influence (F count (<0.05)) the height variable of acacia tree nurseries 2, 4 and 6 weeks. The stem diameter variable of acacia tree nurseries 2, 4 and 6 weeks did not significantly influence (F count (<0.05). cultivation gave a significant influence (count (<0.05). For the variable of resistance quantity acacia tree nurseries 6 weeks after cultivation did not give a significant influence F count (<0.05).

Table 1. The influence of organic fertilizer organic fertilizer of Cow Manure (CM) and organic fertilizer of organic fertilizer of chicken manure (CM) and the interaction between (Cow manure x chicken manure) on the growth of Acacia tree nurseries are as follows: treatment

No	Research Variable	CM	CM	CM x CM
1	Acacia tree height			
	2 weeks After Cultivation	40,66**	32,13**	0,85 ns
	4 weeks After Cultivation	91,18**	9,54**	0,63 ns
	6 weeks After Cultivation	102,85**	39,96**	0,94 ns
2	Acacia Leaves			
	2 weeks After Cultivation	182,69**	157,34**	8,03*
	4 weeks After Cultivation	43,55**	40,6*	2,64*
	6 weeks After Cultivation	43,34**	36,83**	1,23 ns
3	Diameter of Acacia			
	2 weeks After Cultivation	11,62**	9,9**	0,73 ns
	4 weeks After Cultivation	42,72**	8,6**	0,48 ns
	6 weeks After Cultivation	13,99**	2,81ns	0,80 ns

Observation ns= does not give a significant influence (F count (<0.05) *: Gives a significant influence (F. count (>0.05) **: Gives a very significant influence (F count (>0.01))

Discussion

Height Acacia Tree Nurseries.

Date of observation height of acacia tree with organic fertilizer treatment cow dung and organic fertilizer poultry dung supermation for weeks 2, 4, and 6 after cultivation both through the table see in table 4.1. Based on the results of analysis of variance (Anova) randomized Block design (RDB) showed that cow dung fertilizer treatment has an influence on the height of acacia trees.

Table 2. Average Value of Acacia Tree Nursery Height Caused by Combination of Organic Fertilizer cow manure and Organic Fertilizer chicken manure for different ages.

Table 2. Organic fertilizer Cow manure for 2 weeks

Treatment	Middle Value	Notation
Cow manure 0	7,16	a
Cow manure 1	8,58	b
Cow manure 2	9,33	c
Cow manure 3	10,25	d
Honest real difference 0.05	0,71	

The value indicated by the letter that is not different between the treatment and the concentration of organic fertilizer cow manure increased significantly shows the growth height of the acacia tree and increased sharply the high height and shows the treatment cow manure 3 and different from cow manure 0, cow manure 1, cow manure 2.

Table 3. Organic fertilizer chicken manure for 2 weeks

Treatment	Middle Value	Notation
chicken manure 0	7,25	a
chicken manure 1	8,75	b
chicken manure 2	9,41	bc
chicken manure 3	9,91	cd
Honest real difference 0.05	0,71	

The value indicated by the letter that is different between treatment and concentration of organic fertilizer chicken manure increased significantly shows that the growth of acacia tree height also increased. For the best treatment in chicken manure 3 is not different from chicken manure 2, but chicken manure 2 is not different from chicken manure 1.

Table 4. Organic fertilizer cow manure for 4 weeks

Treatment	Middle Value	Notation
cow manure 0	9,83	a
cow manure 1	11,66	b
cow manure 2	13,33	c
cow manure 3	14,75	d
Honest real difference 0.05	0,71	

The value indicated by the letter that is not different between the treatment and the concentration of organic fertilizer cow manure increased significantly shows the growth height of the acacia tree and increased sharply the height and shows the treatment cow manure 3 and different from cow manure 0, cow manure 1, cow manure 2.

Table 5. Organic fertilizer chicken manure for 4 weeks

Treatment	Middle Value	Notation
chicken manure 0	10,83	a
chicken manure 1	12,16	b
chicken manure 2	12,91	c
chicken manure 3	13,66	cd
Honest real difference 0.05	0,71	

The value indicated by the letter that is different between treatment and concentration of organic fertilizer chicken manure increased significantly shows that the growth height of acacia trees also increased. For good treatment in chicken manure 3 is not different from chicken manure 2, but chicken manure 2 is not different from chicken manure 1.

Table 6. Organic fertilizer cow manure for 6 weeks

Treatment	Middle Value	Notation
cow manure 0	12,41	a
cow manure 1	14,58	b
cow manure 2	16,5	c
cow manure 3	18	d
Honest real difference 0.05	0,71	

The value indicated by the letter that is not different between the treatment and the concentration of organic fertilizer cow manure increased significantly shows the growth height of the acacia tree and increased sharply the high height and shows the treatment cow manure 3 and different from cow manure 0, cow manure 1, cow manure 2.

Table 7. Organic fertilizer chicken manure for 4 weeks

Treatment	Middle Value	Notation
chicken manure 0	13,33	a
chicken manure 1	15,25	b
chicken manure 2	16,08	c
chicken manure 3	16,83	d
Honest real difference 0.05	0,71	

The value indicated by the letter that is not different between the treatment and the concentration of organic fertilizer chicken manure increased significantly shows the growth height of the acacia tree and increased sharply the high height and shows the treatment chicken manure 3 and different from chicken manure 0, chicken manure 1, chicken manure 2.

Quantity leaves of Acacia Tree

The results of analysis of variance (Anova) for the quantity of leaves of acacia tree nurseries (Annex 3) indicate that the application of organic fertilizer cow manure (CM) gave a very significant influence (F.count >0.01) on the quantity of leaves of acacia trees 2 and 4 weeks after cultivation. (F.count <0.05). Application of organic manure fertilizer (CM) had a very significant influence (F.count. >0.01) on the amount of stem of acacia tree nurseries 2 and 4 weeks after cultivation. Cow manure organic fertilizer dose and chicken manure organic fertilizer dose (CMxCM) gave a significant

(F.count. >0.01) on the amount of resistance to acacia trees 2 weeks after cultivation on the variable resistance quantity of acacia trees 4 weeks after cultivation. acacia tree nursery 6 weeks after cultivation did not significantly influence F. count <0.05 (Table 1.).

The results of the 5% DNRT test (Annex 12.e) shown in (Table 8.) indicate that the amount of stem of acacia tree nurseries at the age of 2.4 weeks after cultivation showed that the average value of stem of acacia tree nurseries was higher than the average value indicated in the treatment (CM3CM3). The amount of 2-week-old acacia nursery stems after cultivation was mostly indicated for treatment (CM3CM3). But it is not different from treatment (CM1CM3), (CM2CM3), (CM3CM1) and (CM3CM2). But there are significant differences between treatment (CM0CM0), (CM0CM1), (CM0CM2), (CM0CM3), (CM1CM0), (CM1CM1), (CM1CM2), (CM2CM0), (CM2CM1), (CM2CM2 to (CM3CM0). The amount of stem of acacia tree nurseries aged 4 weeks after cultivation was more indicated for treatment (CM3CM3). But not different from treatment (CM3CM2). But significant differences with treatment (CM0CM0), (CM0CM1), to (CM3CM1). But not different from treatment (CM3CM2).

Application of organic fertilizer cow manure combined with organic chicken manure gave good results for the amount of resistance of acacia tree nurseries for all treatments. Except for treatment organic fertilizer is not applied. In general, the difference in dose application with various organic fertilizers combined with organic fertilizers has a significant influence on the vegetative growth of acacia tree nurseries.

Based on the average value data from the research results, it shows a tendency for increased growth of eucalyptus nurseries, which is also accompanied by an increase in the dose of organic fertilizers. With the increased amount of organic fertilizers applied to the soil, the nutrient content will also increase, ensuring sufficient nutrient availability in the soil required for eucalyptus nurseries. In other words, eucalyptus nurseries with adequate nutrient supply will be able to stimulate the growth of new shoots.

Table 8. The average value of the quantity of leaves from royal poinciana nurseries caused by the combination of doses of organic fertilizer with buffalo manure (Cow Manure) and doses of organic fertilizer with bird manure (Chicken manure) at different ages.

Treatment	Quantity Of Leaves Acacia Tree (Cm)	
	2 SDK	4 SDK
CM0CM0	20.67 A	22.33 A
CM0CM1	22.00 ab	23.33 a
CM0CM2	23.33 bc	25.33 ab
CM0CM3	24.33 cde	26.00 ab
CM1CM0	21.67 ab	23.00 a
CM1CM1	25.33 def	26.67 b
CM1CM2	26.33 efg	28.00 b
CM1CM3	27.33 fg	28.67 b
CM2CM0	23.67 bcd	25.67 ab
CM2CM1	26.67 efg	28.33 b
CM2CM2	28.33 gh	29.33 bcd
CM2CM3	31.00 i	34.00 cd
CM3CM0	24.67 cdef	26.00 ab
CM3CM1	27.67 gh	29.00 bc
CM3CM2	32.33 ij	34.33 d
CM3CM3	34.33 j	36.00 e

Observation: The number accompanying each letter, which is the same for each column, does not exert a significant influence on the DMRT test at the 5% level.

Table 9. 6 weeks for Cow Manure (CT) After Cultivation

Treatment	Average Value	Notation
CT0	25,5	a
CT1	28,41	Ab
CT2	31	bc
CT3	32,75	cd
Honest real difference 0.05	1,67	

The value indicated by the letters that differ between the treatment and concentration of organic fertilizer from cow manure shows a significant increase, pointing to the growth in the quantity of royal poinciana leaves, which also increased. Regarding the treatment, CM3 is not different from CT2, but CT2 is not different from CT1.

Table 10. Chicken manure (CT) 6 Weeks after Cultivation

Treatment	Average Value	Notation
CT0	25,83	a
CT1	28,58	b
CT2	30,58	c
CT3	32,66	d
Honest real difference 0.05	1,67	

The value derived from the letters, which are not different between treatment and the concentration of organic fertilizer, shows a significant increase in the growth of the quantity of acfacia tree leaves. It also indicates a strong increase in height, especially under treatment CM3, which differs from CM 0, CM 1, and CM 2. By increasing the age of the royal poinciana nursery plants, the growth hormones necessary for the development process of trees will also increase. This indicates that the quantity of seed pods in Acacia tree nurseries at the ages of 2 and 4 weeks after cultivation shows a higher average quantity of seed pods in nurseries treated with the combination treatment (CT3CT3), and the difference is significant compared to treatments without the application of organic fertilizer (CT0CT0).

The research results indicate that the application of 250 grams of organic cow manure per plant (esp. trees)">plant combined with 250 grams of organic chicken manure per plant (esp. trees)">plant yields a significantly higher quantity of seed pods in acacia tree nurseries, reaching up to 36 pods. Research results show that the application of organic fertilizers has the potential to increase soil nutrition, thereby promoting the growth of plants. Plants whose nutritional needs are adequately met can stimulate the growth of new shoots. The quantity of shoots is positively correlated with the height of the plants—each time the height of the plants increases, the quantity of shoots also tends to increase. An increase in plant (esp. trees)">plant height leads to a rise in the number of internodes, which in turn contributes to an increase in the number of shoots. This occurs because internodes serve as spaces where shoots can emerge.

This finding is supported by the theory of Sitompul and Guritno (1995), which states that plant (esp. trees)">plant nodes formed from internodes act as areas where shoots can develop. Additionally, Rinsema (1986) emphasizes that nitrogen (N) is a critical element for shoot formation.

This is because the availability of nitrogen boosts the photosynthesis process, enabling plants to produce more photosynthates, which can then be utilized for shoot formation.

Diameter Acacia Seedlings (mm)

Observational data on the growth period of Acacia Tree seedlings under treatment with organic fertilizer derived from buffalo manure and Chicken manure was collected at weeks 2, 4, and 6 after planting. The measurements were taken based on rice plant growth data as shown in Table 4.1.

Based on the results of the randomized analysis of variance (ANOVA), it was demonstrated that treatments using cow manure and bird manure fertilizers influenced the growth period of acacia seedlings. Results from the Tukey Honest Significant Difference (HSD) test, with a significance level of 5%, indicated that the treatment using cow manure had a significant influence.

Table 4.4. Average Values of Nursery Diameter from Acacia tree Caused by the Combination of Organic Fertilizer Dosage from cow Manure (CT) and Organic Fertilizer Dosage from Chicken Manure (CT) for Different Ages.

Table 11. Cow manure 2 weeks after Cultivation

Treatment	Average Value	Notation
CT0	1,03	A
CT0	1,37	B
CT0	1,49	Bc
CT0	1,76	Cd
Honest real difference 0.05	0,30	

The value expressed using letters that differ between the treatment and the concentration of organic fertilizer derived from chicken manure shows a significant increase, indicating growth in the diameter of the acacia tree's base, which also increases. For the best treatment, CT3 is not significantly different from CT2, but CT2 is not different from CT1.

Table 12. Chicken Manure 2 weeks After Cultivation

Treatment	Average Value	Notation
CM0	1,04	A
CM0	1,38	B
CM0	1,56	Bc
CM0	1,68	Cd
Honest real difference 0.05	0,30	

The value expressed through letters, which differ between the treatment and the concentration of organic fertilizer, shows that the growth of the diameter of the Acacia tree trunk also increases significantly. For the best treatment, MT3 is not different from CT2, but CT 2 is not different from CT1.

Table 13. Cow Manure (CT) 4 weeks After Cultivation

Treatment	Average Value	Notation
CT0	1,22	A
CT1	1,64	B
CT2	1,92	Bc

CT3	2,63	D
Honest real difference 0.05	0,31	

The value derived from the letters that differ between treatment and concentration of organic fertilizer from cattle shows a significant increase in growth, the quantity of acacia leaves, and also enhances the strength of the diameter, which is larger and demonstrated in the CT3 treatment. However, 2 does not differ from CT1 and CT0.

Table 14. Chicken Manure (CM) 4 Weeks After Cultivation

Treatment	Average Value	Notation
CM0	1,57	A
CM1	1,68	Ab
CM2	1,96	Bc
CM3	2,17	C
Honest real difference 0.05	0,31	

The value derived from the variation in treatments and the concentration of organic fertilizer shows a significant increase in the growth of the trunk diameter of teak Acacia trees. The best treatment in CT3 is not significantly different from CT2, but CT2 is not significantly different from CT1.

Table 15. Cow Manure (CT) 6 Weeks After Cultivation

Treatment	Average Value	Notation
CM0	2,40	A
CM1	2,44	Ab
CM2	2,72	Bc
CM3	3,29	D
Honest real difference 0.05	0,37	

The value derived from the letter indicating the difference between treatment and the concentration of organic fertilizer shows significant growth in the diameter of Acacia tree trunks and also increases the strength of the larger trunk diameters, demonstrated in treatment CT3, although CT2 is not different from CT1.

Table 16. Chicken Manure (CT) 6 Weeks after Cultivation

Treatment	Average Value	Notation
CM0	2,53	A
CM1	2,59	Ab
CM2	2,81	Ab
CM3	2,92	B
Honest real difference 0.05	0,37	

The value conveyed by the letters, which differ between the treatment and the concentration of organic fertilizer from cow manure, significantly indicates the growth of the diameter at the base of the acacia tree. It also shows a rapid increase in the diameter at the base, which is larger, and points out that in the CT3 treatment, there is no difference compared to CT2, but there is no difference when compared to CT1.

CONCLUSION

Based on the results of the research on "The Influence of Buffalo Dung Organic Fertilizer and Chicken Manure Organic Fertilizer on the Growth of Acacia tree (Delonix regia) Seedlings in Nurseries," the following conclusions were drawn:

1. The application of buffalo dung organic fertilizer and chicken manure organic fertilizer can enhance the growth of acacia tree planted at the Agricultural Technology Faculty Nursery Center located in the UNPAZ Satellite Campus, Liquiça Municipality.
2. A significant interaction occurs in the growth of acacia seedlings when treated with different doses of buffalo dung organic fertilizer and chicken manure organic fertilizer.
3. The application of buffalo dung organic fertilizer at a dose of 200 grams per seedling and chicken manure organic fertilizer at a dose of 150 grams per seedling indicates that these doses are optimal and yield the best results 5.2.

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