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EFFECT OF CHICKEN FERTILIZER COMBINATION AND CONCENTRATION OF ORGANIC LIQUID FERTILIZER (LOF) ON GROWTH AND RESULTS OF SAWI PLANT (*BRASSICA JUNCEAE* L.) SHINTA VARIETY

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ABSTRACT

This research was aimed to test the efficacy of organic liquid fertilizer and to know its effect on the growth and yield of sawi plant. The environmental design used was Randomized Block Design (RBD), consisting of nine treatments and each repeated three times. The combination treatment of chicken manure and liquid organic fertilizer were tested, namely : A = Stable chicken manure 0 ton ha^{-1} + LOF 0 ml L^{-1} Solution, B = Stable chicken manure 0 ton ha^{-1} + LOF 3 ml L^{-1} Solution, C = Stable chicken manure 0 ton ha^{-1} + LOF 6 ml L^{-1} Solution, D = Stable chicken manure 10 ton ha^{-1} + LOF 0 ml L^{-1} Solution, E = Stable chicken manure 10 ton ha^{-1} + LOF 3 ml L^{-1} Solution, F = Stable chicken manure 10 ton ha^{-1} + LOF 6 ml L^{-1} Solution, G = Stable chicken manure 20 ton ha^{-1} + LOF 0 ml L^{-1} Solution, H = Stable chicken manure (dung) 20 ton ha^{-1} + LOF 3 ml L^{-1} Solution, I = Stable chicken manure 20 ton ha^{-1} + LOF 6 ml L^{-1} Solution. The results showed that the combination of chicken manure and liquid organic fertilizer had a significantly different effect on all growth parameters and yield of Shinta variety mustard plants, using a combination of chicken manure dosage of 20 tons ha^{-1} and liquid organic fertilizer with a concentration of 6 ml L^{-1} Solution give a better influence on the growth and yield of Shinta variety mustard plants.

Contribution/ Originality
Using Randomized Block Design (RBD), this research tested the efficacy of organic liquid fertilizer and to know its effect on the growth and yield of sawi plant. The used design consisting of nine treatments and each repeated three times.

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1. INTRODUCTION

Vegetable plants are commodities that are mostly consumed fresh, as a source of vitamins and minerals for humans, even some of them contain antioxidants which are believed to inhibit cancer cells. Leaf vegetables are a source of essential vitamins and minerals that are needed by the human body, besides leaf vegetables contain lots of fiber. Fiber for the body functions to help facilitate digestion and can prevent cancer (Haryanto *et al*., 2006).

Sawi (*Brassica Juncea* L.) has a high economic value after cabbage and broccoli. In addition, this plant also contains minerals, vitamins, protein and calories. Therefore, this plant is a vegetable commodity that is quite popular in Indonesia (Rukmana, 1994). The nutrients contained in 100 g of mustard include: 95 g of water, 1.2 g of protein, 0.2 g of fat, 1.2 g of carbohydrates, 5800 IU of vitamin A, 0.04 mg of vitamin B1, 0.07 vitamin B2, 0.5 mg niacin, 53 mg of vitamin C, 102 mg of calcium, 2.0 mg of iron, 27 mg of magnesium, 37 mg of phosphorus, 180 mg of potassium and 100 mg of sodium (Opera and Tay, 1994).

The production of mustard commodities in Indonesia in 2016 with a harvest area of 60,600 ha, production reached 601,200 tons, then the average yield (productivity) reached 9.92 tons ha^{-1} (Central Statistics Agency and Directorate General of Horticulture, 2017; Mohamad *at al*., 2013). The average yield per hectare of mustard plants nationally is still low compared to the potential yields of the Shinta varieties of mustard plants which are between 25 tons ha^{-1} - 30 tons ha^{-1}. The average yield per hectare that is still low is thought to be caused by several factors, including how to cultivate crops that have not been intensive, one of which is unbalanced fertilization methods, in addition to declining agricultural productivity due to continued use of agricultural businesses. continuously without good management, also due to cultivation techniques that still prioritize high inorganic nutrient inputs regardless of plant needs, so that the fertilizer given does not have an impact on plants but causes problems for the environment or agricultural land nutrient inputs regardless of plant needs, so that they do not have an impact on plants but causes problems for the environment or agricultural land.

Chicken manure (dung) at this time has been widely used by farmers, because many large-scale chicken farms in Indonesia provide an opportunity to use chicken manure as fertilizer. From the results of several studies chicken manure has a very good influence on soil fertility and plant growth, even better than other manure. (Lingga and Marsono, 2007; Subandi, 2012), state that plants are not enough to rely solely on nutrients from the soil. Therefore, plants need to be given nutrients from outside. Because manure has a low nutrient content, to supplement it, additional fertilizer is needed in the form of Liquid Star Organic Fertilizer as a supplier of nutrients for plants. Star Nutrition Organic Fertilizer contains organic C: 6.7%, N Total: 5.63%, P2O5: 3.87%, K2O: 4.71%, pH: 5.12 amino acids, vitamins, and acids other organics (chelating agent), growth regulators and bioactive compounds to increase the growth of beneficial organisms in the soil and in leaves. The advantages of Liquid Nutrient Organic Star Nutrition include: Macro and micro nutrients, stimulate flowering and fertilization initiation, reduce flower and fruit loss, improve yield quality, plant growth regulators, bioremediators and soil bioactivators, increase nutrient absorption and fertilizer efficiency, reduce fertilizer use NPK around 25% and manure around 50%, improve plant health and reduce the use of pesticides and are environmentally friendly (El-Hamady, 2017).

The provision of chicken manure through the soil as well as the provision of liquid organic fertilizer through leaves must pay attention to the balance and suitability of the types of plants, regarding nutrients and concentrations and doses needed, so that the crop yield can be maximized. Therefore it is necessary to conduct research on the Effect of Combination of Chicken Cage

Fertilizer Measurements and Liquid Organic Fertilizer Concentration (LOF) on the Growth and Yield of Sawi Plants (Brassica junceae L.) of Shinta Varieties.

2. RESEARCH METHODS

2.1. Place and time of research

This experiment was conducted in Pasigaran Village, Tanjungsari District, Sumedang Regency with an altitude of 892 meters above sea level (asl). The type of rainfall is C (slightly wet) according to Schmidt and Ferguson (1951), which is presented in Appendix 1. The trial period is held from May to July 2018.

2.2. Materials and tools

The materials used in this experiment were Shinta varieties of mustard seeds (description listed in Appendix 2), chicken manure, Bintang Nutrient liquid organic fertilizer, and Rizotin 100 EC insecticide. The tools used are ruler, rool meter, hoe, camera, stationery, treatment label, drop pipette, rapia rope, measuring cup, hand sprayer, emitter and digital scales.

2.3. Research methods

The environmental design used in this experiment was a simple Randomized Block Design (RBD) consisting of 9 treatments and 3 replications. Namely: A = 0 tons ha-1 Chicken Manure + 0 ml L^{-1} Liquid Organic Fertilizer, B = 0 tons ha^{-1} Chicken Manure (Dung) + 3 ml L^{-1} Liquid Organic Fertilizer, C = 0 tons Fertilizer ha^{-1} Chicken Cage + 6 ml L^{-1} Liquid Organic Fertilizer, D = 10 tons ha^{-1} Chicken Manure + 0 ml L^{-1} Liquid Organic Fertilizer, E = 10 tons ha^{-1} Chicken Manure + 3 ml L^{-1} Organic Fertilizer Liquid, F = 10 tons ha^{-1} Chicken Manure + 6 ml L^{-1} Liquid Organic Fertilizer, G = 20 tons ha^{-1} Chicken Manure + 0 ml L^{-1} Liquid Organic Fertilizer, H = 20 tons of Fertilizer ha-1 Chicken Cage + 3 ml L^{-1} Liquid Organic Fertilizer, I = 20 tons ha^{-1} Chicken Manure + 6 ml L^{-1} Liquid Organic Fertilizer.

3. RESULTS AND DISCUSSION

3.1. Plant height (cm)

Data analysis on plant height aged 10 DAP, 15 DAP, 20 DAP and 25 DAP can be seen in Appendix 6, Appendix 7, Appendix 8 and Appendix 9. From the results of variance analysis showed that there was a significant diversity between the combination treatment of chicken manure and the concentration of liquid organic fertilizer on plant height at the age of 10 DAP, 15 DAP, 20 DAP and 25 DAP. Data from the results of further analysis are presented in Table 1.

Table 1: Effect of combination of combination of chicken manure (dung) and liquid organic fertilizer on age plant height 10 DAP, 15 DAP, 20 DAP and 25 DAP

Treatments	Mean of Plant Height			
	10 DAP	15 DAP	20 DAP	25 DAP
Combination of Dung + LOF :	---------- cm ----------			
A (0 ton ha^{-1} + 0 ml L^{-1})	7,90 a	13,57 a	16,83 a	22,83 a
B (0 ton ha^{-1} + 3 ml L^{-1})	9,00 ab	14,45 a	19,67 abc	26,43 abc
C (0 ton ha^{-1} + 6 ml L^{-1})	8,09 a	13,39 a	18,25 ab	25,31ab
D (10 ton ha^{-1} + 0 ml L^{-1})	10,78 bc	16,45 cd	23,44 cd	30,17 cd
E (10 ton ha^{-1} + 3 ml L^{-1})	11,25 cde	14,69 ab	22,55 bcd	29,79 bcd
F (10 ton ha^{-1} + 6 ml L^{-1})	12,20 de	17,13 cd	24,93 d	31,06 cd
G (20 ton ha^{-1} + 0 ml L^{-1})	10,35 bc	16,32 bc	23,77 cd	30,19 cd
H (20 ton ha^{-1} + 3 ml L^{-1})	11,47 cde	17,54 cd	24,47 cd	31,35 d

I (20 ton ha^{-1} + 6 ml L^{-1})	12,71 e	18,20 d	25,56 d	32,69 d

Note: The average number followed by the same letters in each column that shows the same is not significant according to Duncan's Multiple Distance Test at the level of 5% real

Table 1. Shows that the combination treatment of chicken manure doses and the concentration of different liquid organic fertilizers have a significantly different effect on plant height aged 10 DAP, 15 DAP, 20 DAP and 25 DAP. At the age of 10 DAP the effect of the combination of chicken manure dose and the concentration of liquid organic fertilizer treatment I had a significantly different effect on treatments A, B, C, D and G but differed not significantly in treatment E, F and H. At the age of 15 DAP the effect the combination of dose of chicken manure and the concentration of liquid organic fertilizer treatment I had a significantly different effect on treatment A, B, C, E and G but differed not significantly in treatment D, F and H. At the age of 20 DAP and 25 DAP the effect of dose combinations chicken manure and the treatment of liquid I organic fertilizer concentrations had a significantly different effect on treatments A, B and C, but did not differ significantly in treatment D, E, F, G, and H.

3.2. Number of leaves (strands)

Analysis of data regarding the number of leaves aged 10 DAP, 15 DAP, 20 DAP and 25 DAP can be seen in Appendix 10, Appendix 11, Appendix 12 and Appendix 13. From the results of variance analysis showed that there was a significant variation between the combination treatment of chicken manure and the concentration of liquid organic fertilizer on the number of leaves at 10 DAP, 15 DAP, 20 DAP and 25 DAP. Data from the results of further analysis are presented in Table 2.

Table 2: Effect of combination of manure (dung) and liquid organic fertilizer measurements on the number of leaves at 10 DAP, 15 DAP, 20 DAP and 25 DAP

Treatment	Mean of Leaf Number			
	10 DAP	15 DAP	20 DAP	25 DAP
Combination of Dung and + LOF :				
A (0 ton ha^{-1} + 0 ml L^{-1})	4,33 a	4,40 a	5,40 a	5,80 a
B (0 ton ha^{-1} + 3 ml L^{-1})	4,47 ab	5,27 a	5,67 ab	6,13 b
C (0 ton ha^{-1} + 6 ml L^{-1})	4,33 a	5,33 b	5,80 abc	6,00 ab
D (10 ton ha^{-1} + 0 ml L^{-1})	4,67 ab	5,67 bc	6,07 bc	6,27 b
E (10 ton ha^{-1} + 3 ml L^{-1})	4,67 ab	5,60 bc	5,93 bc	6,27 b
F (10 ton ha^{-1} + 6 ml L^{-1})	4,73 b	5,80 bc	6,07 bc	6,33 b
G (20 ton ha^{-1} + 0 ml L^{-1})	4,47 ab	5,47 b	6,07 bc	6,33 b
H (20 ton ha^{-1} + 3 ml L^{-1})	4,53 ab	5,80 bc	6,20 c	6,33 b
I (20 ton ha^{-1} + 6 ml L^{-1})	5,53 c	6,13 c	6,93 d	7,27 c

Note: The average number followed by the same letters in each column that shows the same is not significant according to Duncan's Multiple Range Test at the level of 5% real

Table 2. It shows that the combination treatment of chicken manure (dung) doses and the concentration of different liquid organic fertilizers had a significantly different effect on the number of leaves aged 10 DAP, 15 DAP, 20 DAP and 25 DAP. At the age of 10 DAP, 20 DAP and 25 DAP the effect of the combination of chicken manure dosage and the concentration of the treated liquid organic fertilizer I gave the highest number of leaves. At the age of 15 DAP the effect of the combination of chicken manure dose and the concentration of liquid I organic fertilizer gave a significantly different effect on treatments A, B, C and G but did not differ significantly in treatment D, E, F and H.

3.3. Wet weight per plant (gr)

Analysis of data of wet weight per plant can be seen in Appendix 14. From the results of the variance analysis, it was shown that there was a significant effect between the treatment combinations of chicken manure doses and the concentration of liquid organic fertilizer against wet weight per plant. Data from the results of further analysis are presented in Table 3.

Table 3: Effect of combination of chicken manure and liquid organic fertilizer measurements on wet weight per plant

Perlakuan	Rata-rata Bobot Basah per Tanaman
Combination of Dosage of Dung and teh LOF Kandang Ayam + LOF :	---------- g ----------
A (0 ton ha^{-1} + 0 ml L^{-1})	25,53 a
B (0 ton ha^{-1} + 3 ml L^{-1})	32,20 a
C (0 ton ha^{-1} + 6 ml L^{-1})	29,53 a
D (10 ton ha^{-1} + 0 ml L^{-1})	60,47 ab
E (10 ton ha^{-1} + 3 ml L^{-1})	62,00 ab
F (10 ton ha^{-1} + 6 ml L^{-1})	63,47 ab
G (20 ton ha^{-1} + 0 ml L^{-1})	61,47 ab
H (20 ton ha^{-1} + 3 ml L^{-1})	73,00 b
I (20 ton ha^{-1} + 6 ml L^{-1})	84,87 b

Notes: The average number followed by the same letter in the same column shows that it is not significant according to Duncan's Multiple Range at 5%

Different liquid organic fertilizers had a significantly different effect on wet weight per plant. The results of further analysis showed that the combination o f doses of chicken manure and the concentration of liquid organic fertilizer on treatments H and I had significantly different effects on treatments A, B and C but were not significantly different from treatments D, E, F and G.

3.4. Wet weight per plot (kg)

Data analysis on per plot wet weight can be seen in appendix 15. From the results of the variance analysis, it is shown that there is a significant diversity between the treatment combinations of chicken manure doses and the concentration of liquid organic fertilizer against wet weight per plot. Data from the results of further analysis are presented in Table 4.

Table 4: Effect of combination of measure of chicken cattle fertilizer and liquid organic fertilizer on wet weight per plot

Treatment	Mean of Wet Weight per Plot	Per Ha. (Conversioan per Ha
Combination of Dung and Ayam + LOF:	--kg--	--ton--
A (0 ton ha^{-1} + 0 ml L^{-1})	0,63 a	5,25
B (0 ton ha^{-1} + 3 ml L^{-1})	0,65 a	5,43
C (0 ton ha^{-1} + 6 ml L^{-1})	0,69 a	5,78
D (10 ton ha^{-1} + 0 ml L^{-1})	0,99 ab	8,50
E (10 ton ha^{-1} + 3 ml L^{-1})	1,10 ab	8,64
F (10 ton ha^{-1} + 6 ml L^{-1})	1,06 ab	8,83
G (20 ton ha^{-1} + 0 ml L^{-1})	1,04 ab	9,13
H (20 ton ha^{-1} + 3 ml L^{-1})	1,27 b	10,58
I (20 ton ha^{-1} + 6 ml L^{-1})	1,46 b	12,18

Note: The average number followed by the same letter in the same column shows that it is not significant according to Duncan's Multiple Distance Test at the 5% real level

4. CONCLUSIONS

Based on the results of the experiment and the discussion can be concluded as follows:

1. The combination of doses of chicken manure and the concentration of liquid organic fertilizer affect plant height, number of leaves, wet weight per plant and wet weight per plot of mustard plants.
2. The combination of doses of chicken manure 20 tons ha^{-1} and the concentration of liquid organic fertilizer 6 ml L^{-1} had a better effect on plant height, number of leaves, wet weight per plant and wet weight per plot of mustard plants.

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References

Central Bureau of Statistics and Directorate General of Horticultural Production Development. (2017). *Vegetable Production in Indonesia.*

El-Hamady, M. M. (2017). Growth and Yield of Onion Alum cepa L. as Influenced by Nitrogen and Phosphorus Fertilizers Levels. *Canadian Journal of Agriculture and Crops*, *2*(1), 34-41.

Haryanto, B., Suhartini, T., Rahayu, E., & Sunarjo, D. (2006). *Mustard and lettuce.* Self Help Spreader. Jakarta.

Lingga, P., & Marsono, M. (2007). *Directions for using fertilizers.* Penebar Swadaya, Jakarta.

Mohamad, A. S., Yeni, Y., & Opik, T. (2013). Production of biodiesel and growth of staurastrum sp. in response to CO2 Induction. *Asian Journal of Agriculture and Rural Development*, *3*(2), 67-73. *view at Google scholar*

Opera, R. T., & Tay, D. C. S. (1994). *Brasscia rapa L. Caisim Group*. Pp. 153-157. J. S. Simonsma and K. Pileuk. Plant Recource of Sout-East Asia, Vegetable. PROSEA Foundation. Red Arrow. 2018. Description of the Shinta Caisim Variety Plant. http://www.panahmerah.id/product/shinta.

Rukmana, R. (1994). *Planting pets and mustards*. Kanisius. Yogyakarta.

Schmidt, F. H., & Ferguson, J. H. A. (1951). *Rainfall types based on wet and dry periods for Indonesia with Wastern New Guinea.* Jakarta: ministry of transportation, meteorology and geophysics.

Subandi, M. (2012). The effect of fertilizers on the growth and the yield of ramie (Boehmeria Nivea L. Gaud). *Asian Journal of Agriculture and Rural Development*, *2*(2), 126-135. *view at Google scholar*