The Effect Of Nasa Liquid Organic Fertilizer Concentration And Planting Distance To Growth And Production Of Beans

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Abstract: Problems encountered in developing the cultivation of beans, the high use of inorganic fertilizer at the farmer level is not appropriate spacing one effort to increase bean production is to use the right spacing and use of liquid organic fertilizer. The purpose of this study was to analize the concentration of liquid Nasa organic fertilizer dosage and the appropriate spacing of plant spacing on the growth and production of beans (Phaseolus vulgaris L). The reseach was conducted Karang Jaya village, Namlea District, Buru Regency, the implementation of the study began from March to May 2019. This study used a Randomized Block Design (RBD) which was arranged in fact from two factors with three replications. The first factor of spacing (J) consists of three levels, namely 20 x 60 cm, 30 x 60 cm and 40 x 60 cm. The second factor is the consentration of liquid organic fertilizer (C) which consists of three levels, namely control(without treatment), 40 ml/liter of water and 50 ml/liter of water. Data of research factors were analyzed by statistical analysis. If there is a real difference the real or very fluid, then continued with the Honest Value Difference Test (BNJ)(0.05). The results showed that the concentration of liquid Nasa organic fertilizer with a dose of 40 ml/liter of water with a spacing of 40x60 cm gives an average value the highest average was observed by tall plants 172.13 cm, number of young pods was 31.69 fruits pod length of 12.50 cm and production of fresh adash were 5.53 kg.

Keywords: planting distance, liquid organic fertilizer, buncis bean

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1 INTRODUCTION

In addition to meeting the needs of the country, it turns out that Indonesian beans are also exported to Singapura, Hongkong, Australia, Malaysia and England. The shape that is exported various, there is a fresh pod and there is also the form of dry pods [1]. The beans have a significant role and contribution to farmers ' income, community nutrition improvement, national income through import reduction and export increase, agribusiness development and the expansion of employment opportunities. The development of farming beans in an intensive scale that leads to agribusiness systems can provide a large advantage. In order to make the production more maximally needed cultivation technique from the beans. Many factors influence how the plant in order to grow well is in terms of breeding, fertilization, maintenance and also appropriate planting distance treatment so that the growth is optimal in producing the expected results. One of the attention is determining the proper planting distance in the effort to optimize the cultivation of the beans [2].

In addition to setting spacing, one of the efforts made to increase the growth and production of chickpea crops is by providing liquid organic fertilizer. The goal is to provide less nutrients in the soil to support plant growth. Liquid Organic fertilizer does not cause adverse effects for the health of plants because of the basic natural ingredients, so it is easily absorbed thoroughly by plants. In addition, this fertilizer also has a binder so that the fertilizer solution that is given to the soil surface can be directly utilized by the plant [3]. Nasa Liquid Organic Fertilizer is one type of fertilizer that can be given to the leaves and soil, containing macro nutrients, micro complete, can reduce the use of ure, SP-36 and KCL + 12.5%-25%. Content of Nasa Liquid Organic fertilizer is N 0.12%, P2O5 0.03%, K 0.13%, Ca 60.4 ppm, Mn 2.46 ppm, Fe 12.89 ppm, Cu 0.03 ppm, Mo 0.2 ppm.

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2 LITERATURE REVIEW

Chical (*Phaseolus vulgaris L.*) is a fruit vegetable that belongs to the family Leguminosae. Beans are suitable for cultivation and production in both the Medium and Highland plains. Chicory plants can be distinguished into two types that are the type of vines (indeterminate) and the upright type (shrub-shaped and determinate). Cultivars are more likely to have more branches and more flower books, resulting in more potential results. Beans have an excellent economic potential, because the market opportunities are wide enough to target the domestic markets and foreign markets. Exports of beans can be fresh pods, frozen pods and seeds (jogo nuts). Beans have a huge

role in the income of farmers, improving public nutrition, state income through exports, agribusiness development, and expansion of employment opportunities[4]. For the economical increase of the plant beans, a plant development strategy is required one of them with fertilizer use. NASA Liquid Organic Fertilizer (POC NASA) is one of the fertilizers can be used as an alternative because it contains macro elements, micro, and substances grow stimulating and can reduce the use of manure because the content of 1 bottle (0.5 liters) POC Nasa Programmer With 0.5 tons of micro manure, while the content of macro elements on the Nasa POC less compare manure (PT. Nasa, 2005) [5]. In addition, the Nasa POC can also be given to soil to improve soil fertility. NASA Liquid Fertilizer can easily pour on large fields. NASA Liquid Fertilizer is made in a solution of concentration so it needs to be mixed with water for usage. Fertilizers can be stored and last long and can be used for wider areas. Fertilizer can be stored anywhere, as long as it is protected from the sun and heavy rain, while the manure of chicken manure to add nutrients and add microorganisms to the composition of organic materials, so as to improve the nature of chemistry and biology Land [6]. Liquid Organic Fertilizer is one of the many circulating in the market. Liquid organic fertilizer is mostly applied through the leaves or called as foliar liquid fertilizer containing macro and micro nutrients essential (N, P, K, S, Ca, Mg, B, Mo, Cu, Fe, Mn, and organic materials). Liquid Organic fertilizer has several benefits including it can encourage and improve the formation of chlorophyll leaves and the formation of root nits in leguminosae plants thereby increasing the ability of photosynthesis of plants and absorb nitrogen from the air. The provision of liquid organic fertilizer should pay attention to the concentration or dose applied to plants. From several studies showed that the provision of liquid organic fertilizer through the leaves provides better growth and crop yield compared with soil administration [7]. The higher the dose of fertilizer given then the content of nutrients received by plants will be higher, as well as the frequency of application of fertilizer leaves done in plants, the nutrient content is also higher. However, administration with excessive doses will precisely result in the onset of symptoms of withering in plants [8].

3. METHOD

This research was conducted in Karang Jaya village, Namlea District Buru District. The implementation of the research starts from March to May 2019. The materials used in this study are seeds of chickpeas, liquid organic fertilizer (Nasa) and pesticides. While the tools used are sickle/parang, hoe, handsprayer, scales, meter, Tali Faria, Pole, Ajir, bucket, name board treatment, camera and writing stationery [9]. The method used in this study is the group random Draft (RAK) consisting of 2 factors. Factor I (first) is the planting distance (J) There are 3 kinds, namely: J1: Planting distance 20 cm x 60 cm, J2:30 cm x 60 cm, and J3:40 cm x 60 cm. The second factor (two) is the liquid Organic fertilizer (C) contained in 3 kinds, namely: CO (without fertilizer), C1:40 ml/liter of water and C2 50 ml/liter of water. Of these two factors gained 3 x 3 = 9 treatment combinations repeated three times so that required 9x3 = 27 plots of treatment. Data on observations observed with statistical analysis. If there is a real or very real difference then it is followed by the Honest Value difference Test (BNJ) [10] [6]. Stage of implementation; (1) The preparation of land, before the processing of land, the research area cleared from weeds, then the land measured the extent in accordance with the research needs 4m x 1m; (2) The treatment of the minimum soil processing, done 1 week before planting, by digging as deep as ± 20-30 cm and then sprayed with herbicide; (3) Planting [11]. Planting is done with the system of Portugal (2-3 seeds beans per Portugal), as deep as 3-5 cm. Planting distance 20x60 cm (number of plants: 38 plants/plot), 30x60 cm (plant number 26 plants/plot and 40x60 cm (number of plants 20 plants/plot); (4) Fertilization, fertilizer administered (recommended dose in the study); (5) Installation of marker (Turus), the method of installation of marker is lined up the upright cropping by combining two turus ends to form a triangle. Ajir which is used in the form of small wooden saplings 2m [12]; (6) Pest and disease control, watering and weeding, namely pest and disease control in corn plants is done if the attack symptoms exist such as integrated pest control. Watering is done twice daily, morning and evening if not raining[13]. The weeding is done by removing weeds around the plant and removed from the cropping area. Fertilization is done time weeding and fertilizing; (7) Harvest, harvesting beans can be harvested when the young pods are easily broken that is when the plant is ± two months from planting time. Observation parameters; High crop height, crop height measurement done at plant time aged 2 weeks after planting until the emergence of first flower (as much as 3 observations) with the time interval of observation once a week the number of young cropping pods, namely by Summing the young pods from the first harvest until the last harvest that has fulfilled the harvest criteria of each plant sample length pods average cropping (cm), the long observation of pods is done by measuring the length of the pods from the cakes plant Samples were then averaged. Measurements are performed on each harvest [14]. Weight of pods per plant (kg), the observation figures at each time the weighing of each plant sample is eliminated (sum) until the last harvest is then averaged.

4 RESULT

Plant height

Table 1. *Effect of planting distance and administration of Nasa liquid organic fertilizer on bean plant height 45 days after planting.*

Treatment	CO	C1	C2	average	BNJ(0.05)
J1	155.40 a	162.13 b	168.c	161.86 a	4.46
J2	157.30 a	165.57 b	169.c	164.11 ab	
J3	161.90 ab	166.73 bc	172.cd	166.92 b	
average	158.20 a	164.81 b	169.c		

Note: Numbers followed by different letters mean significantly different at the BNJ test level of 0.05

The results of the BNJ test (0.05) in Table 2 show that the treatment of plant spacing of 40 cm x 60 cm (J3) shows the best plant height of 166.92 cm, significantly different from the treatment of spacing of 20 cm x 60 cm (J1), whereas with the treatment of spacing 30 cm x 60 cm (J2) is not significantly different. The use of liquid organic fertilizer Nasa (C2) showed

the best plant height of 169.88 cm, not significantly different from other treatments. In the combination of treatment between the spacing of 40 cm x 60 cm and the use of liquid organic fertilizer Nasa 50 ml / liter of water (J3C2) showed the best plant height, namely: 172.13 cm, significantly different from the J1C1 treatment but not significantly different from the J2C2 treatment.

Number of Young Pods

Table 2. *The effect of planting distance and administration of Nasa liquid organic fertilizer on the number of bean plants peas*

Treatment	CO	C1	C2	average	BNJ(0.05)
J1	19.90 a	23.20 b	24.91 a	22.67 a	3.76
J2	22.41 a	24.47 b	26.73 b	24.54 a	
J3	23.08 ab	26.64 b	31.69 c	27.14 a	
average	21.80 a	24.77 a	27.78 ab		

Note: Numbers followed by different letters mean significantly different at the BNJ test level of 0.05

BNJ test results (0.05) contained in Table 3 show that the treatment of spacing of 40 cm x 60 cm (J3) the best number of young pods of bean plants is 27.14 cm, significantly different from the treatment of spacing of 20 cm x 60 cm (J1), while the treatment distance of 30 cm x 60 cm (J2) was not significantly different.

Long Peas

Table 3. *The effect of planting distance and administration of Nasa liquid organic fertilizer on the number of bean plants peas*

Treatment	CO	C1	C2	Rataan	BNJ(0.05)
J1	7.83 a	8.80 a	10.13 b	8.92 a	1.77
J2	8.43 a	9.47 a	10.27 b	9.39 a	
J3	8.67 a	9.77 ab	12.50 c	10.31 a	
average	8.31 a	9.34 a	10.97 ab		

Note: Numbers followed by different letters mean significantly different at the BNJ test level of 0.05

BNJ test results (0.05) contained in Table 4 show that the treatment of spacing of 40 cm x 60 cm (J3) the best length of young pods of beans is 10.31 cm, significantly different from the treatment distance of 20 cm x 60 cm (J1), while the treatment distance of 30 cm x 60 cm (J2) was not significantly different.

Weight Peas

Table 4. *Effect of planting distance and administration of Nasa liquid organic fertilizer on the weight of pods (kg) of bean plants*

Treatment	*CO*	*C1*	*C2*	*average*	*BNJ(0.05)*
J1	*2.73 a*	*3.33 a*	*3.82 b*	*3.29 a*	*0.98*
J2	*2.87 a*	*3.63 a*	*4.80 bc*	*3.77 ab*	
J3	*3.17 a*	*4.23 bc*	*5.53 c*	*4.31 b*	
average	*2.92 a*	*3.73 ab*	*4.72 b*		

Note: Numbers followed by different letters mean significantly different at the BNJ test level of 0.05

BNJ test results (0.05) contained in Table 5 show that the treatment of spacing of 40 cm x 60 cm (J3) the best weight of young pods of beans is 4.31 kg, significantly different from the treatment of spacing of 20 cm x 60 cm (J1), while the treatment distance of 30 cm x 60 cm (J2) was not significantly different.

5 Discussion

The use of Biobost fertilizer (C2) shows the number of young pods the best beans are 27.78 fruits, different not real with C1 treatment, while with different CO treatment real [15]. At a combination of treatment between the planting distance of 40 cm x 60 cm and the use of Nasa liquid Organic fertilizer 50 ml/liter (J3C2) showed that the number of young pods are the best beans are: 31.69 fruit, different from the real with all the treatment, but on the treatment J2C2 does not differ real with J2C1 and J3C1 treatments [16]. The use of Nasa Liquid Organic Fertilizer (C2) shows the length of the young peas the best beans that are 10.97 cm differ not real with the treatment of C1, while with a real different CO treatment. At a combination of treatment between the planting distance 40 cm x 60 cm and the use of Nasa liquid Organic fertilizer 50 ml/liter (J3C2) showed that the length of the young pods are the best beans that are 12.50 cm differ in real with all the treatment, but on the treatment J2C2 Does not differ real with the J2C1 and J3C1 treatments [17]. The use of Nasa Liquid Organic Fertilizer (C2) shows the weight of the young peas plant the best beans which are 4.72 kg, distinct from real with CO treatment, and not unlike real with C1 treatment [18]. At a combination of treatment between the planting distance 40 cm x 60 cm and the use of Nasa liquid Organic fertilizer 50 ml/liter (J3C2) showed that the length of the young pods are the best beans that are 12.50 cm differ in real with all the treatment, but on the treatment J2C2 Does not differ real with the treatment J2C1 and J3C [19]. The results showed that the administration of Nasa Liquid organic fertilizer and different planting distances gave a noticeable effect on the observed parameters. It can be seen on the high parameter of the plant, the number of young pods, the length of young pods. This suggests that the dosing of a different Nasa liquid organic fertilizer and different planting distances significantly affects the growth and production of total beans. According to the impact of effective fertilization will be seen in optimal plant growth and significant results. Fertilizer is one of the means of production that has an important role in increasing production and quality of crop cultivation [20]. Fertilization will be effective if the properties of fertilizer that is spread can add or complement the nutrients that have been available in the soil. While spacing will affect the efficiency of light use and competition between plants in using water and nutrients that will affect the outcome. An overly tightly planted distance will inhibit crop growth, and if it is too loose it will reduce the number of crop populations per unit area so that production is lower and the chances for weed growth are greater [21].

6 Conclusion

Based on the research results, it can be concluded that: Setting the spacing of the planting distance and the dose of Nasa liquid organic fertilizer Given the very real effect on the variable height of the plant, number of pods, length of pods and weight pods of young bean beans plant. There is a very real interaction between the concentration of Nasa Liquid

organic fertilizer at a dose of 50ml/liter of water with a planting distance of 40 x 60 cm, which gives the highest average value on the high observation of the plant is 172.13 cm, the number of pods 31.69 fruit, length Pods 12.50 cm and fresh weight production 5.53 kg.

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