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DIFFERENCES IN THE GROWTH RATE OF TOMATO PLANTS (SOLANUM LYCOPERSICUM L) WHEN APPLYING NPK FERTILIZER AND COMPOST FERTILIZER

Dewi Rofita [a*)] , Yuliana Wangung [a)], Selestinus Foriman [a)], Gordianus Rendo [a)], Yulius Frit Abu [a)], Karmelita Gresiana Mita [a)]

[a)] *Universitas Katolik Indonesia Santu Paulus Ruteng, Manggarai, Indonesia*

[*)]*Corresponding Author: dewirofita@gmail.com*

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Abstract. This research was conducted in Cancar, Ruteng District, Manggarai Regency in the Wae Bahi 1 Farmer Group starting from September-November 2023. This research aims to determine the difference in the growth rate of tomato plants when applied with NPK fertilizer and compost fertilizer. This research is a type of experimental research with 4 levels of treatment, namely: P1: 2 g NPK + 200 g compost/planting hole, P2: 4 g NPK + 200 g compost/planting hole, P3: 6 g NPK + 200 g compost/planting hole, P4: 8 g NPK + 200 g compost/planting hole. The parameters observed in this research were plant height, stem diameter, number of leaves and leaf length. The observation data was then analyzed using Excel. The results of the research show that the combination of 6 g NPK fertilizer and 200 g compost fertilizer is the best combination in increasing the growth of tomato plants (more efficiently) regarding the parameters of plant height, stem diameter, leaf length and number of leaves when observed 2 to 5 weeks after planting (MST)

Keywords: NPK fertilizer, compost and tomato fertilizer

I. INTRODUCTION

Tomatoes (Solanum lycopersicum L) are one type of plant that is widely used and has a fairly high economic value, so that it is in great demand by Indonesian farmers. Tomato plants are important vegetable plants that can be used as basic ingredients for cosmetics or medicines (Setiawan Roni , 2019). Tomatoes have a high vitamin content and substances that are rarely found in other plants that function for health (Nazimah, 2020). Tomatoes contain carbohydrates, protein, fat and calories (Sahetapy, 2017). Therefore, the demand for commodities tomatoes continue to increase along with the increasing population and public awareness of the importance of Health (Ndolu and Puling, 2022). In increasing growth and yield, this plant requires complete nutrients, both macro and micro with a balanced composition supplied from

fertilizers. The use of fertilizers for plant growth is very good and will also produce good production. Fertilizers will provide the nutrients needed by plants in their growth and development. The use of fertilizers can also improve soil conditions both physically, chemically, and biologically. One of the environmentally friendly fertilizers is bokashi. Bokasi fertilizer is a fertilizer made from animal waste and several plants that are believed to contain the nutrients needed by plants. Bokasi fertilizer has an organic material content that is good for the soil and will have a positive impact on plant growth and production (Sitti Arwati, 2018)

Compost fertilizer is an organic material with good quality so that it can increase the pH and availability of nutrients and the work of microorganisms (Sundari, 2020) in line with the opinion of Fevi, (2021) who stated that the provision of organic material to the soil needs to pay attention to its quality, even though a lot is given but the quality is low it cannot provide optimal production, because organic material determines the speed of decomposition and mineralization of organic material.

Fertilization is carried out to overcome common problems in agricultural land in Indonesia, namely soil fertility due to low nutrient content. The use of inorganic fertilizers, especially NPK, is still the main choice for farmers, because of its fast-release nature and easy absorption by plants. Compound NPK fertilizer is one of the fertilizers that has a balanced nutrient composition in solid form that is needed by plants during their growth period. NPK fertilizer is a compound fertilizer that contains elements N, P, K. This fertilizer is easily soluble in water and can increase production and harvest quality, stimulate root growth, flower formation, accelerate harvest, make stems strong and can reduce the risk of lodging, increase the size of fruit and seeds (Saprianto et al., 2021).

II. RESEARCH METHODS

This research was conducted in Cancar, Ruteng District, Manggarai Regency at the Wae Bahi 1 Farmer Group from September-November 2023.
Tools and materials

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The materials used in this experiment are tomato seeds, NPK fertilizer and organic fertilizer . compost . While the tools used are hoes, raffia rope, cameras, analytical scales, plastic buckets, scissors, stationery and so on.

This research was conducted using an experimental research type. In this study there are 4 treatments, namely:

P1: 2 g NPK + 200 g compost/planting hole
P2: 4 g NPK + 200 g compost/planting hole
P3: 6 g NPK + 200 g compost/planting hole
P4: 8 g NPK + 200 g compost/planting hole

The research procedures include : (1) land preparation, (2) sowing, (3) basic fertilization, (4) planting, (5) replanting, (6) installing stakes, (7) tying and pruning, (8) fertilization and (9) pest and disease control. The parameters observed in this study were (1) plant height, (2) stem diameter, (3) number of leaves and (4) leaf length. The observation data were then analyzed using the Excel application.

III. RESULT AND DISCUSSION

Location Overview: This research was conducted in Cancar, Langke Rembong District, Manggarai Regency. Geographically, Langke Rembong District is located at an altitude of 1115 meters above sea level, an area of 3,052 km2 with an average temperature from September to November of 21,650 0 C. There are several limitations in this study, one of which is the limited land to conduct the research. The experimental unit consisted of only 4 beds measuring 5 x 1 with 20 plants per bed and 4 as sample plants so that 16 sample plants were obtained.

Plant Height (cm)

Table 1 Treatment fertilizer compost (pk) and NPK fertilizer

Treatment	2 MST	3 MST	4 MST	5 MST	Average
2 g NPK + 200 g PK	6.5	14	33.25	50.5	104.3
4 g NPK + 200 g PK	6	13	27.75	53.75	100.5
6 g NPK + 200 g PK	6,124	12.5	34	55.5	108.1
8 g NPK + 200 g PK	6.8	12.25	28	57.75	104.8

Giving NPK fertilizer with dose 6 g and fertilizer 200 g compost shows response best on high parameters plant tomatoes . The influence of concentration fertilizer compost and NPK fertilizer in increase growth tall plant allegedly Because height N content in fertilizer compost that has been sufficient For need growth vegetative plant tomatoes . According to Jannah et al, (2012) the availability of more N elements Lots utilized by plants For growth vegetative .

Bar Diameter (mm)

Table 2 Treatment fertilizer compost (pk) and NPK

Treatment	2 MST	3 MST	4 MST	5 MST	Average
2 g NPK + 200 g PK	2	4.75	1	1,375	9,125
4 g NPK + 200 g PK	2	3.5	4.75	1,625	11,875
6 g NPK + 200 g PK	2	4.25	4,875	1,265	12.39
8 g NPK + 200 g PK	2	4	2.75	1,375	10,125

In the research this , the diameter of the stem plant tomato influenced by concentration different NPK fertilizers as well as combination with fertilizer compost applied at 2 MST (weeks) after planting). Giving NPK fertilizer with dose 6 g and fertilizer compost 200 g more more efficient in increase stem diameter plant tomato that is of 12.39 mm. The diameter of the rod can influenced by availability by the environment for example supply nutrition from fertilizer into the land that can absorbed through roots (Syukur et al., 2015).

Long leaves (mm)

Table 3 Treatment fertilizer compost (pk) and NPK

Treatment	2 MST	3 MST	4 MST	5 MST	Average
2 g NPK + 200 g PK	3.75	5,675	9,125	8.75	27.3
4 g NPK + 200 g PK	3,375	5,325	7,875	10.25	26.83
6 g NPK + 200 g PK	3,625	5.75	8.75	9,625	27.75
8 g NPK + 200 g PK	3.5	5,625	8,125	8,625	25.88

In the table This results analysis seen that long leaf plant tomato different its size in various treatment . Giving dose NPK fertilizer and different organic fertilizers will influential to Leaf Length plant Tomatoes . Concentration NPK fertilizer 6 g and fertilizer compost 200 g more efficient in increase Leaf Length Rate plant tomatoes . According to Nurlenawati , N et al (2007) fertilization will be very influential to growth plant caused by a combination fertilizer organic and inorganic with effective dose so that can fulfil need nutrition plant can in progress with Good .

Amount leaf (blade)

Table 4 Treatment fertilizer compost (pk) and NPK

Treatment	2 MST	3 MST	4 MST	5 MST	Average
2 g NPK + 200 g PK	4.5	19.5	41.25	63.25	128.5
4 g NPK + 200 g PK	4.5	18.75	34.75	61	119
6 g NPK + 200 g PK	4.75	22.25	49.25	64.25	141
8 g NPK + 200 g PK	4	18	43.25	56.75	122

Amount leaves on the table on influenced by the provision NPK fertilizer and fertilizer compost . Giving dose NPK fertilizer 6 g and fertilizer 200 g of compost is the most efficient concentration in increase amount leaves on plants tomatoes . This is Because dose fertilizer the can increase nutrients in land so that growth plant will the more good . Menur ut (Herry, 2011) combination fertilizer given to plants tomato allow For Work more optimal in provide nutrients for multiply amount leaf plant

IV. CONCLUSIONS

Based on results research that has been done can taken conclusion that combination NPK fertilizer 6 g and fertilizer 200 g of compost is combination best in increase growth plant tomatoes (more efficient) against high parameters plants , stem diameter , length leaves and number leaves on observation 2 to 5 weeks after planting (MST). Provision of fertilizer compost can improve soil media , roots plant tomatoes , and contain nutrients as essential nutrients For growth plant .Based on results research conducted , then It is recommended to use dose NPK fertilizer 6 g with combination fertilizer 200 g compost for produce growth plant more tomatoes good and optimal and for cultivation furthermore it is recommended that the land cultivation used Enough wide For add production plant .

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