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Response of Giving Liquid Organic Fertilizer (POC) Banana weevil to Growth and Production of Several Varieties of Chili (Capsicum frutenens L Var. Cengek)

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Abstract

This study aims to determine the response of growth and production of several varieties of cayenne pepper (Capsicum frutencens L Var Cengek) to various concentrations of liquid organic fertilizer of banana weevil and whether or not the interaction between these two factors is significant. This research was carried out in the Mampang Village where the research was conducted starting from April 1, 2022 until its completion. The design used in this study was a 5 x 5 factorial randomized block design (RAK) with 3 replications. Factors studied include the concentration of liquid organic fertilizer banana weevil and varieties. The banana weevil POC concentration factor (K) consists of 6 levels, namely K0 = 0 (Control), K1 = 10% (100 ml POC / 900 ml water), K2 = 20% (200 ml POC / 800 ml water), K3 = 30% (300 ml POC/ 700 ml water), K4 = 40% (400 ml POC/ 600 ml water) and K5 = 50% (500 ml POC/ 500 ml water). The variety factor (V) consists of 3 levels, namely V1 = Genie, V2 = Genie, and V3 = Genie. The variables observed were plant height, stem diameter, number of fruit, fruit weight and production per hectare. The results of the F test on analysis of variance showed that the concentration of banana weevil POC had a very significant effect on stem diameters at 20 and 30 DAP, number of fruits, fruit weight and production per ha. Significant effect on plant height 20, 30 and 40 DAP, stem diameter 40 DAP. Varieties significantly affected plant height 30 and 40 DAP, stem diameter 20, 30 and 40 DAP, number of fruits, fruit weight and production per ha. However, it had no significant effect on plant height at 20 DAP. There was no interaction between the concentration of banana weevil POC and varieties on all observed variables.

Keywords
chili rawit; POC bonggol banana; varieties.

I. Introduction

Cayenne pepper (Capsicum frutescens L Var. Cengek) belongs to the eggplant family and is classified as an annual or short-lived plant. The habitat of cayenne pepper plants is in the highlands and lowlands(Karim et al., 2019). Cayenne pepper (Capsicum frutescens) has the potential as a type of vegetable to be developed because chili is a horticultural agricultural product that has become part of the food culture of the Indonesian people.(Sujitno & Meksy Dianawati, 2015). The uniqueness of Indonesian cuisine with a spicy taste is one of the factors that makes chilies widely consumed in Indonesia(Hardila, 2018). The increasingly diverse human needs have led to the development of the use of chilies as medicines, cosmetics, dyes, mixing drinks and others, so that the need for chili raw materials will continue to increase every year.(Hardila, 2018). In the development of

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the world of education, especially after the rolling reforms, new phenomena have arisen in educational institutions, which are schools that use the term Integrated Islamic Schools (Titik, 2010: 42). The school is essentially aimed at helping parents teach good habits and add good character, also given education for life in society that is difficult given at home. Thus, education in schools is actually part of education in the family, which is also a continuation of education in the family (Daulay in Ayuningsih, W. et al. 2020).

Nutrients are one of the factors supporting plant growth and development. One way to increase nutrients is the use of fertilizers. Most of the fertilizers used to increase nutrients are chemical fertilizers (Nur et al., 2018). The use of chemical fertilizers has many negative impacts if used continuously and in a relatively long time. The negative effects given include the soil hardening quickly, the soil is less able to store water and becomes acidic, and ultimately results in a decrease in the productivity of the plant itself.(Sado, 2018). Apart from causing damage to the soil, chemical fertilizers are also widely complained of because of the high selling price in the market. One solution to reduce the excessive use of inorganic fertilizers is to use organic fertilizers, but the weakness of using organic fertilizers in general is the low nutrient content and slow availability to plants. (Oviyanti et al., 2016).

Seeing the problems above, it takes maximum effort to explore and utilize the potential of organic materials that are naturally available, including the use of banana plant weeds. Banana plants are found in almost all parts of Indonesia, so that the area planted and production is classified as the highest among fruit commodities in Indonesia (Karim et al., 2019). The main product of the banana plant is the fruit. Meanwhile, leaves, pseudo weeds, corms, flowers and fruit skins are waste. According toZahroh et al., (2018) that banana hump contains carbohydrates (66%), protein, water, and essential minerals. Banana hump contains 45.4% starch and 4.35% protein content. Banana weevil contains microbes that decompose organic matter, including Bacillus sp, Aeromonas sp, and Aspergillus nigger. These microbes usually decompose organic matter, or will act as decomposers of organic matter to be composted. Liquid Organic Fertilizer (POC) banana weevil has a role in the vegetative growth of plants and plants are tolerant to disease, high levels of phenolic acid help bind Al, Fe and Ca ions so that it helps the availability of phosphorus (P) in the soil which is useful in the flowering and flowering process fruit formation (Zahroh et al., 2018).

Research resultKarim et al., (2019), that the application of liquid organic fertilizer (POC) banana gong at various concentrations showed a significant effect on plant height, production per plot, production per plant, weight of 100 seeds and number of pods per plant of green beans. One way to increase the production of cayenne pepper is to use new high yielding varieties.

The use of superior quality seeds is absolutely necessary to increase chili productivity. Each variety has different adaptations to its environment, both climate and growth media (Ainun et al., 2011). According toBastian (2016) the availability of germplasm is not always available in the surrounding environment, so it is necessary to bring in superior varieties from outside through the introduction method. The character of the introduced varieties is not expected to be identical to the area of origin, this is due to the difference in agro-climate between the area of origin and the area of introduction. Research resultAdelia et al. (2018) that the testing of several varieties of cayenne pepper showed a significant effect on the wet weight of the crown and the wet weight of the roots. The Sitangan variety has the highest mean on all observed parameters. Based on the problems above, it is necessary to conduct research to determine the response of banana weevil liquid organic fertilizer (POC) to the growth and production of several varieties of cayenne pepper (Capsicum frutencens L var. Cengek).

II. Review of Literature

2.1 Place and time

This research was carried out in Mampang Village, Kota Pinang District, South Labuhanbatu Regency, from April 1, 2022 to May 31, 2022

2.2 Tools and materials

The materials used in this study were cayenne pepper seeds of the Genie variety, POC banana hump, polybag and black soil. While the tools to be used include hoes, machetes, gembor, buckets, measuring cups, caliper, analytical scales, rulers, nameplates, cameras and writing instruments.

2.3 Research design

The design used in this study was a 6 x 3 factorial randomized block design (RAK) with 3 replications. Factors studied include the concentration of liquid organic fertilizer banana weevil and varieties. The banana weevil POC concentration factor (K) consists of 6 levels, namely: K0 = 0 (Control), K1 = 10% (100 ml POC / 900 ml water), K2 = 20% (200 ml POC / 800 ml water), K3 = 30% (300 ml POC/ 700 ml water), K4 = 40% (400 ml POC/ 600 ml water), K5 = 50% (500 ml POC/ 500 ml water) (Wea, 2018). The variety factor (V) consists of 3 levels, namely: V1 = Genie, V2 = Genie, V3 = Genie. Thus there were 10 treatment combinations with 3 replications and a total of 30 experimental units.

If the F test shows a significant effect, it will be continued with a further test, namely the Least Significant Difference (BNT) test at the 5% level. Research Implementation Research activities carried out include preparation of nurseries, seed nurseries, preparation of planting media, planting, treatment of liquid organic fertilizer application of banana weevil, maintenance, installation of stakes, attachment, harvesting and observation. The variables observed included: plant height, stem diameter, number of fruit, fruit weight and production per hectare.

III. Result and Discussion

Effect of POC Concentration of Banana Weevil The results of the F test on analysis of variance showed that the concentration of POC banana weevil had a very significant effect on stem diameters at 20 and 30 DAP, number of fruits, fruit weight and production per ha. Significant effect on plant height 20, 30 and 40 DAP, stem diameter 40 DAP. The average plant height, stem diameter 20, 30 and 40 DAP, number of fruit, fruit weight and production per ha of chili plants at various concentrations of POC banana weeds after being tested with BNT 0.05 are presented in Table 1.

Table1. Average plant height, stem diameter 20, 30 and 40 DAP, number of fruit, fruit weight and production per ha of chili plants at several concentrations of banana weevil POC

Variable	Plant Age	Concentration of POC Banana Hump						
		Control (K0)	10% (K1)	20% (K2)	30% (K3)	40% (K4)	50% (K5	BNT 0.05
Plant height	20 HST	8.71 a	9.18 ab	9.13 ab	9.56 b	9.69 b	9.89 b	0.68
	30 HST	14.16 a	14.83 ab	16.36 b	15.81 b	16.79 b	16.97 b	1.75
	40 HST	23.67 a	24.19 ab	25.06 ab	25.67ab	26.75 b	27.58 b	2.34

Diameter of the base of the stem	20 HST	1.67 a	1.72 ab	1.75 b	1.78 bc	1.82 bc	1.84 c	0.07
	30 HST	2.78 a	2.80 a	2.85 ab	2.88 b	2.90 b	2.91 b	0.07
	40 HST	3.89 a	3.94 ab	3.95 ab	3.98 b	4.00 b	4.01 b	0.07
Number of fruit		14.85 a	16.11 ab	16.85 ab	17.63 b	18.85 bc	20.30 c	2.61
fruit weight		10.89 a	11.16 ab	11.37 ab	13.08 b	13.37 b	14.02 b	1.93
Production per Ha		0.91 a	0.93 ab	0.95 ab	1.09 b	1.11 b	1.17 b	0.16

Table 1 shows that chili plant height in the treatment of banana weevil POC concentration K5 (50%) was significantly different from treatment K0 (control), but not significantly different from treatment K1 (10%), K2 (20%), K3 (30%) and K4 (40%). The diameter of the base of the stem of chili plants in the treatment of banana weevil POC concentration K5 (50%) was significantly different from K0 (control) and banana weevil POC concentrations of K1 (10%) and K2 (20%), but not significantly different from the K3 treatment (30%)) and K4 (40%).

The number of chili plants in the banana weevil POC concentration treatment K5 (50%) was significantly different from K0 (control) and the banana weevil POC concentration K1 (10%), K2 (20%) and K3 (30%), but not significantly different from K4 treatment (40%). The fruit weight of chili plants in the banana weevil POC concentration treatment K5 (50%) was significantly different from K0 (control) and the banana weevil POC concentrations K1 (10%) and K2 (20%), but not significantly different from the K3 treatment (30%) and K4 (40%). The fruit weight of chili plants in the banana weevil POC concentration treatment K5 (50%) was significantly different from K0 (control) and the banana weevil POC concentrations K1 (10%) and K2 (20%), but not significantly different from the K3 treatment (30%) and K4 (40%).

Almost all Indonesian people like spicy taste. So it's no wonder chili is so popular. Even the need at the household level for fresh chili is almost 61%, the rest is for industry. The data shows how the tendency of Indonesian people to consume fresh chilies rather than processed ones. Because of that, chili price fluctuations also affect the national economy.

Commodity prices can be used as a leading indicator of inflation because commodity prices are able to respond quickly to shocks that occur in the economy in general and other events that hinder commodity distribution channels. This is particularly the case for agricultural and industrial commodities, where they are highly sensitive to changes and macroeconomic uncertainty.

The results of the research that have been carried out indicate that the highest plants were found in the treatment of POC concentrations of banana weevil K5 (50%), presumably because the higher the concentration given, the more concentrated the intake of nutrients N, P and K so that it could trigger better plant height growth. that the nutrient content contained in the liquid fertilizer of banana weevil is nitrogen (N) 0.02%, phosphorus (P2O5) 0.02% and potassium (K2O) 0.05%.

Treatment of POC concentration of banana weevil K5 (50%), this indicates that the nutrient content is the highest among other concentrations, thus providing the highest plant height yield. In accordance with the research that has been doneChaniago et al. (2017)The results showed that high concentrations had high nutrient content to stimulate plant height growth. Kusumawati (2015) stated that banana weevil is one of the ingredients for making liquid organic fertilizer containing N, P2O5 and K2O. Nitrogen element in the banana hump is what can support the plant growth process, especially at plant height.Aslamiah & Sularno (2018)states that nitrogen is the main nutrient for plant growth, which in general is

needed to stimulate the formation or growth of vegetative parts of plants, one of which is plant height growth.

In liquid fertilizer banana hump contained nutrients. nitrogen (N) 0.02%, phosphorus (P2O5) 0.02% and potassium (K2O) 0.05%. The increase in the diameter of the base of the stem in the treatment of banana weevil POC concentration K5 (50%) and the lowest in the treatment K0 (control). This is because the concentration of POC banana weevil K5 (50%) is the most concentrated concentration and has a high nutrient content to stimulate the growth of stem diameter.

According to Kartika (2013) research in Cahyono (2016) that the highest concentration of treatment produces the most optimal nutrients for plant growth. According toChaniago et al., (2017)that banana weevil contains P2O5 439 ppm, K2O 574 ppm and Ca 700 ppm. According to researchUtami & Handayani (2013)that the elements P, K, and Ca function in stimulating the growth of young plant stems, as well as hardening plant stems. The highest number of fruits was found in the K5 banana weevil POC concentration treatment (50%). This shows that the use of POC concentration of banana weevil K5 (50%) with a higher nutrient content provides a good contribution of nutrients derived from liquid organic fertilizers, namely N, P, and K, which are needed by plants for growth, thereby increasing the number of fruits. per plant.

Yunita et al. (2016)states that the elements N, P, and K contained in POC can accelerate flowering, seed and fruit development, help the formation of carbohydrates, proteins, fats and various other compounds. For plants, element P is needed to get plant growth and optimal yields. If the phosphorus and potassium content is not optimal then fruit formation will be reduced. According toYunita et al. (2016)that for vegetative and generative growth of plants, nutrients are needed, especially N, P and K. N is needed for the formation of carbohydrates, proteins, fats and other organic compounds. Element P plays a role in the formation of the generative parts of plants.

The increase in fruit weight in the treatment of POC concentration of banana weevil K5 (50%) is suspected at high concentrations the need for N, P, and K elements can meet the needs of chili plants. This is because the availability of N, P, and K elements is needed to increase fruit weight. The results of the absorption of nutrients are used for the photosynthesis process which can produce carbohydrates so that the results obtained in fruit weight will increase. This is because the absorption of N, P, K elements can increase carbohydrates in the photosynthesis process, because the N element is to form chlorophyll and which functions to absorb sunlight and as a place for the photosynthesis process to take place. While the element K increases CO2 absorption in relation to the opening and closing of leaf stomata, then the carbohydrates after the plant enters the reproductive phase are stored in the fruit. The heaviest fruit weight was found in the POC concentration treatment of banana weevil K5 (50%). Giving banana weevil POC with a high concentration of K5 (50%) resulted in a lot of fruit production, because POC has affected the growth of the vegetative part of the plant, it will also directly affect the generative parts of the plant such as the formation of flowers and fruit.

According toJamilah et al. (2018)that a plant that grows healthy, due to its metabolism running well, the plant will flower at the right time, not too fast or too late. Nutrients that are not accepted by plants cause plant metabolism to run abnormally, so that it will result in the formation or production of fruit. Table 2 shows that the concentration of K5 (50%) has the best effect on all vegetative growth parameters, and it turns out that this also affects the generative part of the plant. This proves that if the plant grows healthy, then the plant will produce well and optimally.

3.1 Variety Effect

The results of the F test on analysis of variance showed that varieties significantly affected plant height 30 and 40 DAP, stem diameter 20, 30 and 40 DAP, number of fruits, fruit weight and production per ha. However, it had no significant effect on plant height at 20 DAP. The average plant height, stem diameter 20, 30 and 40 DAP, number of fruit, fruit weight and production per ha of chili plants in several varieties after being tested with BNT 0.05 are presented in Table 2.

Table 2. Average plant height, stem diameter 20, 30 and 40 DAP, number of fruits, fruit weight and production per ha of chili in several varieties

Variable	Age Plant	Varieties			BNT 0.05
		Genie (V1)	Genie (V2)	Genie (V3)	
Plant height	20 HST	9.55	9.46	9.07	-
	30 HST	16.68 b	16.03 b	14.75 a	1.24
	40 HST	26.54 b	25.74 ab	24.18 a	1.66
Stem Base Diameter	20 HST	1.79 b	1.77 ab	1.73 a	0.05
	30 HST	2.89 b	2.86 ab	2.82 a	0.05
	40 HST	4.00 b	3.96 ab	3.92 a	0.05
Number of Fruits		18.65 b	17.63 ab	16.02 a	1.85
Fruit Weight		13.43 b	12.25 ab	11.27 a	1.37
Production per Ha		1.12 b	1.02 ab	0.94 a	0.11

Table 2 shows that plant height, stem diameter 20, 30 and 40 DAP, number of fruits, fruit weight and production per ha of the best chili plants were found in the treatment of variety V1 (Genie) significantly different from the treatment of variety V3 (Genie), but not different. significantly with V2 (Genie) treatment. The high growth of cayenne pepper obtained in the V1 (Genie) and V2 (Genie) varieties is due to the fact that these two varieties are suitable for the environment in the Mampang Village area, while the V3 (Genie) variety is not resistant due to weather factors at the time of the research. tall one.

Aditya et al (2013)states that each variety consists of a number of different genotypes and has different adaptability to certain environments. GardnerAditya et al (2013)states that certain characteristics of a growth are influenced by the genotype while others are influenced by the environment. According toBuntoro et al (2014)that plant growth and development is influenced by two factors, namely internal and external factors of the plant. Internal factors are often described as the genetic capabilities possessed by a plant. External factors are factors that come from outside the plant, such as environmental factors. Plant growth and development is closely related to these two factors, if one or all of the factors do not support the growth and development of plants can not run properly thereby reducing plant production.

Many efforts have been made to increase crop production, such as fertilization and the application of growth regulators. The high growth of a variety is due to the variety being able to adapt to its environment. Therefore, even though genetically there are varieties that have high yield potential, these results can only be achieved after interacting with the environment, and in this case varieties V1 (Genie) and V2 (Genie) have better genotypic characteristics and are able to adapt to environmental conditions. environment compared to the V3 (Genie) variety. The diameter of the base of chili plants in the treatment of V1 (Genie) variety was significantly different from that of the V3 (Genie) variety, but not significantly different from that of V2 (Genie).

The results of the research that have been carried out show that the largest diameter of the base of the stem is found in the treatment of the V1 variety (Genie), this is presumably because it is influenced by the genetic nature of the plant itself on its growing environment. According toKarmaita (2018)that genetic traits will emerge through organ growth if environmental factors are appropriate. This is in accordance with the statementSetyowati et al (2018)that different plant varieties have different growth even though they are planted on the same soil with the same conditions.Setyowati et al (2018)added that each variety there is always a different genotype response to the environmental conditions where it grows. The number of fruits increased in the treatment of the V1 (Genie) variety and decreased in the treatment of the V3 (Genie) variety, this was related to the high number of fallen fruits, while the V1 (Genie) variety had a higher number of fruits per plant associated with a lower number of fruit fall.

The use of superior varieties is an important technological component to achieve high production. The advantages of superior varieties compared to local varieties are high production, resistance to pests and diseases, response to fertilization so that the production obtained can be increased. The heaviest fruit weight was found in the treatment of the V1 (Genie) variety. This is because the differences between varieties are strongly influenced by the genetic characteristics of each variety, according to the opinion of Hu et al., (2013) in Subiadi et al. (2015) suggested that plant production is largely determined by gene pairs in plant cells which play an important role in determining yield.

Broadly speaking, crop yields are a complex main character controlled by gene pairs and influenced by environmental factors(Subiadi & Motulo, 2014).Nur et al. (2018)states the same thing that differences in genetic traits of a variety can show different responses to varietal factors. Plants have many varieties, each variety will provide a different production response. Each variety has different genetic characteristics, this can be seen from the appearance and character of each variety. The results of the research that have been carried out show that the largest production per ha was found in the treatment of the V1 (Genie) variety.

This shows that the V1 (Genie) variety is a hybrid chili variety that is easy to adapt to its growing environment so that it can produce high yields.Setyowati et al (2018)states that the high production of a variety is caused by the variety being able to adapt to the environment. Although genetically other varieties have good production potential, but because they are still in the adaptation stage, so their production is lower than it should be. Therefore, environmental factors such as climate and soil greatly affect the production of crop products.

3.2 Interaction

The results showed that there was no significant interaction between the concentration of POC banana weevil and varieties on all observed variables. This indicates that the difference in growth and yield of chili plants due to the application of several concentrations of POC banana weevil in various varieties does not depend on the concentration of POC banana weevil, and vice versa. However, this area that has the potential to improve the community's economy has not been touched for empowerment of natural resources in the form of banana plants. So far, what the villagers have done is to sell only bananas and leaves in the form of raw materials. While the benefits of banana plants, actually not only the fruit that can be taken, but the whole banana tree, starting from the leaves, banana peels, The benefits of the stems (fronds), banana heart, up to the banana hump can be taken advantage of and can be cultivated to be used as various processed materials that provide additional income. For example, banana peels can be processed into

nata (a type of food), banana humps are processed into chips, banana heart is made into beef jerky, and banana stems can be used as the basis for recycled paper.

IV. Conclusion

Concentration of POC banana weevil had a very significant effect on stem diameter 20 and 30 DAP, number of fruits, fruit weight and production per ha. Significant effect on plant height 20, 30 and 40 DAP, stem diameter 40 DAP. The best concentration was found in the K5 banana weevil POC concentration treatment (50%). 2. Varieties significantly affected plant height 30 and 40 DAP, stem diameter 20, 30 and 40 DAP, number of fruits, fruit weight and production per ha. However, it had no significant effect on plant height at 20 DAP. The best varieties were found in the treatment of variety V1 (Genie). 3. There was no interaction between the concentration of POC banana weevil and varieties on all variables of growth and yield of chili plants observed.

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