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# INFLUENCE OF COW MANURE IN PLANTING MEDIA AGAINST THE GROWTH OF BANANA CORM OF BANANA KEPOK (*Musa paradisiaca* L.)

**Renfiyeni, HeltiAndraini and Friza Elinda**

*Faculty of Agriculture, University of Mahaputra Muhammad Yamin, Solok – West Sumatra, Indonesia*

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**Corresponding Author:**
Renfiyeni, faculty of Agriculture University of Mahaputra Yamin, Solok West Sumatra Indonesia
*Email:renfiyeni@yahoo.com*

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**Abstract**

Demand for banana seeds has not been met, because the availability of seeds is lacking.one the factor that impact is the technical culture that has not been optimal enough. This study aims to obtain the composition of soil and cow dung that provides the best growth for kepok banana seedlings using banana corm. This research was conducted in Sijunjung Regency. Efforts to provide banana seeds are carried out by utilizing banana corm which will produce 3 and 4 tillers per tuber and the production time is much faster than seeds from tillers. To get the best banana corm growth, a study was conducted using a mixed planting medium of soil and cow manure with five comparisons. The treatments were: A. Soil with cow manure 1:1 ratio, B. Soil with cow manure 2:1 ratio, C. Soil with cow manure 3:1 ratio, D. Soil with cow manure 4:1 ratio, E .Soil only. The treatment was repeated 5 times. The design used was a randomized block design and continued with DNMRT (Duncan New Multiple Range Test). Parameters observed were when shoots appeared, percentage of growth, shoot height, stem diameter, number of leaves, leaf length, root length and number of roots. The results showed that the best planting medium for planting banana kepok from corm was a medium consisting of soil and cow manure with a ratio of 1:1. This treatment gives the best results for all parameters.

Keywords: banana kepok; banana corm, cow manure

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## 1. Introduction

Indonesia has produced as much as 6.20% of total world production, 50% of Asian banana production originated in Indonesia Banana (*Musa species*) is one type of fruit that is favored by many layers of society, because it tastes good and contains high nutrition. The complete content and efficacy for drugs such as Ambun bananas and plantains (Rukmana, 2004).

Along with population growth, the demand for bananas is increasing. Demand for banana seeds has not been met, because the availability of seeds is lacking. This is caused by the technical culture that has not been optimal and the presence of disease (Distan horti Sijunjung, 2004). Propagation of bananas by chopping or breaking the corm is one of the many seedling techniques that are being developed. The advantages of banana corm, among others, are that it can produce banana seedlings in greater numbers and is healthier than banana seedlings.

Kepok banana (*Musa paradisiaca*) is a type of processed banana that is most often processed, especially in processed fried bananas in various variations, very suitable to be processed into chips, fruit in syrup, various traditional preparations, and flour. Bananas can be used as an alternative staple food because they contain high carbohydrates, so that it can replace some of the consumption of rice and flour (Prabawati, et al., 2008). Besides that it can be used as a snack so that it can increase the economic value and family income (Hilman, et al., 2008). Whereas efforts to establish banana seeds from corm are very rarely carried out, whereas from one banana corm of bananas 3 and 4 chicks are produced and the time to produce is much faster than those from seedlings (Satuhu and Supriadi, 1999). According to Tumuhimbise and Talengera, (2018), banana is a very important plant in many tropical and subtropical countries in world and planted with a certain difficulty. Propagation can use detached shoots from the parent plant, but is limited by its low multiplication rate and the propensity for the spread of pests and diseases. Resulting in a decrease in banana productivity. Improvement of propagation techniques such as separation of parent plants, mini corm can increase the number of seeds, but have not reached the production and quality for large-scale seeds. According to Singh, et al., (2013) state the use of weevil will produce seeds faster. According Faturoti, et al.,(2002) by cutting the corm, it will reduce the apical dominance, there by stimulating the growth of more shoots. One bulb can produce 60 seeds

Types of manure based on the type of livestock or animals that produce manure include: cow manure, horse manure, goat manure and poultry manure (Hasibuan, 2006). There are several types of manure, cow manure which has a high fiber content such as cellulose, cow manure can provide several benefits namely providing macro and micro nutrients for plants, loosening the soil, improving soil texture and structure, increasing porosity, aeration and composition soil microorganisms, facilitate the growth of plant roots, and longer water absorption in the soil. According Renfiyeni, et al., (2019) the right mixture of media will provide optimum growth and plant yield.

To maximize the use of cow manure composting should be done with a C / N ratio below 20. The composition of nutrients contained in organic fertilizer is derived from cattle compost, namely : N 2,33 %, P2O5 0,61 %, K2O 1,58 %, Ca 1,04 %, Mg 0,33 %, Mn 179 ppm dan Zn 70,5 ppm (Wiryanta and Bernardinus, 2002)

## 2. Materials and Methods

The study was conducted in Nagari Bukit Bual, Koto VII District, Sijunjung Regency with a height of ± 500 m from sea level, from February to May 2018. This research was conducted using a randomized block design (RBD) with 5 treatments, 5 replications, where each treatment unit consisted of 3 plants. So that the total number of treatments is 75 plants.

The treatments given are as follows:

A. Soil with cow manure 1: 1 ratio
B. Soil with cow manure 2: 1 ratio
C. Soil with cow manure 3: 1 ratio
D. Soil with cow manure 4: 1 ratio
E. Soil only

Planting media in the form of a mixture of soil with cow manure prepared according to the treatment dose was put into a polybag measuring 12.5 cm. The harvested stems of banana stems are taken from healthy banana corm, then cleaned of dirt, sterilized with 96% alcohol and then wait for them to dry. Then the stump examined several protrusions, shoots that can be taken, then made a rectangular line on shoots suitable for taking beets with a size of 9 x 9 cm with a thickness of 9 cm using a sharp knife that has been sterilized with 96% alcohol. Banana corm soaked with fungicide for about 60 minutes.

Before planting the beetroot are dipped in a ZPT IBA solution with a concentration of 20 ppm for 20 minutes. Then lifted beets of banana corm dried on top of the plastic-covered bin to dry. Then the weevil hemisphere is planted in a polybag. Then the polybag is placed in a place that has a shade. Corm given NPK solution with a concentration of 2-8 grams / liter, then leaked 10 cm around the tubers.

Cultivated the polybag soil contains enough water, for this reason it is necessary to water according to the need so that the growth of the buds of the banana corm is not disturbed. Watering is done twice a day, namely in the morning and evening. Fertilization is done by casting with a dose of ± 0.5 g/polybag. Fertilization is carried out three times after planting, the first fertilization is done after the tubers grow, the second fertilization is done when the plants are 21 days after planting, and the last fertilization is done when the plants are 60 days after planting. Observations were made onWhen Shoots appear, Shoot Percentage, Shoot Height, Number of Leaves, Leaf Length, Leaf Width, Longest Root Length, Number of Roots, and Rod Circle.

## 3. Results and Discussion

### When Shoots appear (days)

The results of the analysis of variance showed that the various ratios of soil media and cow manure showed very significant differences in the emergence of banana kepok shoots.Giving cow manure with several doses has a very significant different effects on when shoots appear. Table 1 shows the results of observations on average when the buds of Kepok banana corm buds appeared the most quickly appeared in treatment A, namely in the growing media consisting of soil and manure with a ratio of 1: 1 with an average of 5.08 days and different very significant with other treatments namely B, C, D, and E. This is caused by the higher dose of manure given to the growing media, the higher the nutrient content and the soil becomes more crumb or loose, because manure can change the physical properties of the soil and provide the necessary nutrients so that vegetative growth is better. According to Lakitan, (2000) Nitrogen that is absorbed has an impact on the formation of chlorophyll to be more because chlorophyll is formed largely by the elements of Nitrogen, Magnesium and Iron. Chlorophyll formation is related to the number of leaves and leaf area.

### Percentage of Growth of Buds (%)

The results of the analysis of variance showed that the various ratios of soil media and cow manure showed very significant differences in the growth of buds of banana kepok .Table 1 shows treatment A with a mixture of soil media compared with manure gives the highest average percentage growth of kepok banana corm which is 70.00% which is very significantly different from other treatments namely treatments B, C, D and E. This is caused by manure rich in nutrients needed by plants for its growth because manure is rich in elements N and P, besides that manure can improve soil physical properties so that the soil becomes loose. The lowest average growth percentage was in treatment E, namely on soil media without manure, the average percentage growth was 41.40% which was the lowest yield compared to other treatments. According to Damanik, et al., (2011) the N element is forming compounds in plants such as proteins, fats and so on, while the absorbed P element supports the formation of new cells and buds.

### Shoot Height (cm)

The results of the analysis of variance showed that various ratios of soil media and cow manure showed very significant differences in the shoot height of kepok bananas. Table 2 shows the results of observations of the average height of the buds of banana corm from some of the highest treatments in treatment A (Soil: cow manure = 1: 1) with a height of 14.29 cm which was very significantly different from treatments B, C, D and E In treatment E (the media consisted of soil only) showed the lowest average shoot height of 10.48 cm. While treatments B and C were not significantly different nor were treatments D and E significantly different. This is caused by the higher dose of manure in the planting media, the higher the nutrient content and also causes the media to become loose so that plant growth is better. According to Supriyanto and Prakasa, (2011) the use of fertilizers is a source of nutrients for plants, cow manure in addition to being a source of nutrients also functions as a soil tumble. Furthermore, Syarief, (1986) stated that nitrogen (N) is indispensable for plants to stimulate vegetative growth such as stems, roots, leaves and branches. With the availability of N elements can stimulate shoot growth.

### Number of Leaves (slice)

The results of the analysis of variance showed that the various ratios of soil media and cow manure showed a very significant difference to the number of leaves of banana kepokseedlings.Table 2 shows the observations of the average number of leaves in treatment A on media (soil compared to manure 1: 1), which is an average of 3 leaves, where this treatment is not significantly different from treatment B with an average number of leaves 2 , 73 strands and very significantly different from treatments C, D and E. This is due to manure rich in nutrients, especially the element N which functions to form chlorophyll, protoplasm, nucleic acids and amino acids. According to Lakitan, 2000 that nitrogen is a constituent of amino acid compounds needed in the formation and growth of vegetative parts of plants such as stems, roots, and leaves. The addition of cow manure can increase the organic carbon content of the soil, so that may lead to increased activity soil microorganisms and soil fertility status by increasing the availability of nutrients for plants from the ground. Cow manure significantly increases growth and crop yields [Gudugi, 2013;Akande et al*., 2016*; Mehedi et al., 2012].

### Longest Leaf Length (cm)

The results of the analysis of variance showed that the various ratios of soil media and cow manure showed a very significant difference to the length of the longest leaf of banana kepokseedlings.Table 3 shows that the observations of the average longest leaf length were found in treatment A with soil media compared to 1: 1 manure with the longest leaf length averaging 23.43 cm, where this treatment was very significantly different from other treatments namely treatment B, C, D and E. The lowest average leaf length was obtained in treatments D and E, namely 10.40 cm and 10.50 cm. This is due to the higher dose of canal fertilizer on the growing media, the higher the N element in the planting media. Nitrogen is an essential and important element for plants to be absorbed in the form of $NH_4^+$ and $NO_3^-$ which functions to make up chlorophyll, protoplasm and nucleic acids and amino acids. The availability of the element Nitrogen in the soil is obviously more and more absorption by plants.. It was stated by Lakitan, (2007) chlorophyll formation is

related to the number of leaves and leaf area because most chlorophyll is found in the leaves so that more chlorophyll is formed, the leaf area and the number of leaves increases too. According to Umeri et al., (2016). In addition to releasing nutrient N, cow manure also affects the availability of P in the soil, thus affecting plant growth. P nutrient plays an important role in various plant growth processes, including biochemical reactions such as carbohydrate, fat and protein metabolism.

## Leaf Width (cm)

The results of the analysis of variance showed that the various ratios of soil media and cow manure showed a very significant difference in the leaf width of the kepok banana seedlings. Table 3 shows that the results of observations of the average width of kapok banana leaves that were found were obtained in treatment A (soil : cow manure = 1: 1) with an average leaf width of 9.33 cm, this treatment was very significantly different from treatments B, C , D and E.The lowest average leaf width was obtained at treatment E (7.25 cm). This is caused by the higher dose of manure on the growing media, the higher the nutrient content, especially the element N and the faster the process of photosynthesis takes place so that the growth process is faster. According to Wudianto, (2022) nutrients that encourage growth, namely nitrogen, are widely available in leaf tissue to support the synthesis of carbohydrates into proteins and protoplasms, also take place more quickly, thus increasing cell size and will produce a lot of leaf growth. From the research of Zaman et al., (2017) it is known that cow manure at a dose of 10 tons per hectare can increase soil fertility and optimize stevia leaf biomass.

## Longest Root Length (cm)

The results of the analysis of variance showed that various ratios of soil media and cow manure showed a very significant difference to the longest root length of kepok banana seedlings.Table 4 shows the results of the observation that the longest root length was in treatment A (soil: cow manure = 1: 1) with root length 45.26 cm significantly different from treatments B, C, D, and E. Between treatments B and C were not found the difference in root length is real. This is due to the amount of manure given in treatment A is higher than other treatments. The shortest root length is treatment E which is planted on soil media with an average amount of 19.80 cm. This is because the higher the amount of manure given the more loose the media so that the roots will grow longer. Root growth will be influenced by soil structure. Roots will grow well if the soil has good drainage and aeration. With a ratio of soil and manure 1: 1, it will cause good drainage and aeration. Allows to grow long and many roots. It was stated by Juniyati et al.,(2016), cow manure has a dense texture with a lot of water and mucus content. This texture makes dirt when exposed to air will quickly dry and harden, so that ground water and air become difficult to seep into it. Such conditions help micro-organisms to convert the material in the fertilizer into nutrients so that the needs of plants to grow slowly are met.

## Number of Roots (fruit)

The results of the analysis of variance showed that the various ratios of soil media and cow manure showed a very significant difference to the number of roots of kepok banana seedlings. Table 4 shows the results of observations of the most variable number of Kepok banana seedlings in treatment A (soil: cow manure = 1: 1) with an average number of roots of 14.06 fruits that differ significantly with other treatments namely B, C, D, and E This is due to the amount of manure given at treatment A is higher than other treatments because the more manure the more loose the planting media and the easier the roots to penetrate it. While the smallest number of roots was in treatment E, which is planted in soil media without the provision of cow manure with an average number of roots of 9.7 pieces. A mixture of soil media and manure with a ratio of 1: 1 makes the soil structure better, thus allowing roots to grow well. Sutejo, (2002) states that physically organic matter can improve soil pores and soil aggregates so that aeration and soil drainage become better and the ability of roots to absorb nutrients increases.

## Circle of banana stems(cm)

The results of the analysis of variance showed that the various ratios of soil media and cow manure showed a very significant difference to the stem circle of the kepok banana seedlings. Table 4 shows the results of observations of the largest circle of Kepok banana seedling stem variables in treatment A, which is 15.30 cm in the medium (soil: cow manure = 1: 1) which differed significantly from the other treatments. While the lowest stem circle in treatment E on the soil media without cow manure with a stem circumference of 8.70 cm. This is due to the provision of manure which is rich in nutrients and can also affect the physical properties of the soil so that it becomes loose. The process of photosynthesis will run quickly and more photosynthesis results will be obtained so that growth is better. Gardner (1991), stated that photosynthesis that runs efficiently will spur plant growth and subsequently will increase plant biomass.

Organic materials also have almost balanced macro and micro pores so that the resulting air circulation is quite good and has a high water absorption capacity. High absorption and translocation of water in the plant body will trigger cell division and widening of the cell wall so that it greatly affects the increase in stem diameter (Prasetyo, 2008). According to Farhad, (2009) on corn the use of cow manure will affect the production of stems, seeds, and quality of corn plants.

## 4. Conclusions

The best results were obtained in treatment A, namely media consisting of soil and cow manure with a ratio of 1:1 for all observation parameters (when buds appeared, percentage of shoot growth, shoot height, number of leaves, leaf length, leaf width, root length, number of roots, and circle of banana stems). It can be suggested to use a mixture of soil and manure with a ratio of 1: 1 for kepok banana propagation using banana corm. Another advantage is that large quantities of seeds are obtained from cutting the banana corm.

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