Syntax Literate: Jurnal Ilmiah Indonesia p–ISSN: 2541-0849
e-ISSN: 2548-1398
Vol. 7, No. 3, Maret 2022

GROWTH RESPONSE AND YIELD OF SWEET CORN (ZEA MAYS SACCHARATA STURT) BONANZA VARIETY DUE TO THE PROVISION OF ROCK PHOSPHATE AND COMPOST

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Abstrak

Penelitian ini bertujuan untuk mengetahui; (1) Pengaruh interaksi antara pupuk fosfat batu dan kompos terhadap pertumbuhan dan hasil jagung manis varietas Bonanza, (2) Dosis pupuk batu fosfat dan kompos yang berpengaruh baik terhadap pertumbuhan dan hasil jagung manis Bonanza varietas, dan (3) Hubungan pertumbuhan dengan hasil jagung manis varietas Bonanza. Penelitian dilaksanakan di lahan petani di Desa Pamijahan, Kecamatan Plumbon, Kabupaten Cirebon, pada bulan Juli sampai September 2021. Penelitian ini menggunakan pendekatan eksperimen dengan menggunakan Rancangan Acak Kelompok faktorial yang terdiri dari dua faktor yaitu batuan fosfat dengan empat taraf dan dua kompos terdiri dari tiga taraf (5 ton/ha, 10 ton/ha dan 15 ton/ha) sehingga pada setiap ulangan terdapat 12 kombinasi perlakuan dan diulang sebanyak tiga kali. Untuk mengetahui pengaruh perlakuan jarak tanam dan umur kecambah digunakan analisis ragam melalui uji F, dengan pengujian lanjutan menggunakan Uji Jarak Berganda Duncan pada taraf signifikansi 5 persen. Penelitian ini menggunakan analisis regresi kuadratik dengan model permukaan respon, dan analisis korelasi product moment. Hasil penelitian menunjukkan bahwa: (1) Batu fosfat berpengaruh secara bebas terhadap panjang tongkol, diameter tongkol, berat tongkol tanpa tongkol per tanaman, tetapi tidak berpengaruh nyata terhadap tinggi tanaman, jumlah daun, diameter batang dan indeks luas daun. (2) Dosis batuan fosfat 150 kg/ha dan kompos 10 ton/ha memberikan bobot tongkol tanpa sekam tertinggi per petak, yaitu 6,55 kg per petak atau setara dengan 10,92 ton tongkol tanpa jagung per hektar, dan (3) Terdapat hubungan yang bermakna antara komponen pertumbuhan dan komponen hasil dengan bobot umbi tanpa sorgum per petak. indeks luas daun. Kompos secara mandiri mempengaruhi tinggi tanaman, jumlah daun, diameter batang, indeks luas daun, panjang tongkol, diameter tongkol dan berat tongkol tanpa tanam, (2) Dosis batuan fosfat 150 kg/ha dan kompos 10 ton /ha memberikan bobot tongkol tanpa gabah per petak tertinggi yaitu 6,55 kg per petak atau setara dengan 10,92 ton tongkol tanpa sekam per hektar, dan (3) Terdapat hubungan yang bermakna antara komponen tumbuh dan komponen hasil dengan bobot tongkol tanpa sekam per plot.

Kata Kunci: respon, pertumbuhan, hasil, fosfat batuan dan kompos.

Abstract

The research aims to determine; (1) The effect of the interaction between rock phosphate fertilizer and compost on the growth and yield of sweet corn Bonanza

How to cite:	Yuyu. W. (2022) Growth Response and Yield of Sweet Corn (Zea Mays Saccharata Sturt) Bonanza Variety Due To The Provision of Rock Phosphate and Compost, *Syntax Literate: Jurnal Ilmiah Indonesia, 7*(3).
E-ISSN:	2548-1398
Published by:	Ridwan Institute

variety, (2) The dose of rock phosphate fertilizer and compost which has a good effect on the growth and yield of sweet corn Bonanza variety, and (3) Growth relationship with the yield of sweet corn varieties Bonanza. The research was carried out in farmers' fields in Pamijahan Village, Plumbon District, Cirebon Regency, from July to September 2021. This study used an experimental approach using a factorial randomized block design consisting of two factors, namely rock phosphate with four levels and The two composts consisted of three levels (5 tons/ha, 10 tons/ha and 15 tons/ha) so that in each replication there were 12 treatment combinations and repeated three times. To determine the effect of spacing and seedling age treatment, analysis of variance through the F test was used, with further tests using Duncan's Multiple Spacing Test at a significance level of 5 percent. This research uses quadratic regression analysis with response surface model, and product moment correlation analysis. The results showed that: (1) Stone phosphate independently affected the length of the ear, the diameter of the ear, the weight of the cob without cob per plant, but had no significant effect on plant height, number of leaves, stem diameter and leaf area index. (2) The dose of rock phosphate 150 kg/ha and compost 10 tons/ha gave the highest weight of cobs without husks per plot, which was 6.55 kg per plot or equivalent to 10.92 tons of cobs without corns per hectare, and (3) There were There was a significant relationship between growth components and yield components and weight of the tuber without sorghum per plot. leaf area index. Compost independently affected plant height, number of leaves, stem diameter, leaf area index, length of the ear, diameter of the ear and weight of the cob without cropping, (2) The dose of rock phosphate 150 kg/ha and compost 10 tons/ha gave the weight of the cob without The highest grain per plot was 6.55 kg per plot or equivalent to 10.92 tons of cobs without husks per hectare, and (3) There was a significant relationship between growth components and yield components and weight of cobs without husks per plot.

Keywords*: response,growth, yield, rock phosphate and compost.*

Pendahuluan

Sweet corn (Zea mays saccharata Sturt) is a plant that has a fairly high commercial value, this is due to the sweet taste contained in the corn kernels. Sweet corn is an agricultural commodity that is very popular, especially by urban residents because of its delicious and sweet taste and contains lots of carbohydrates, little protein and fat. In addition, sweet corn has a significant role in meeting the nutritional needs of the community (Novira, F., Husnayetti, 2015).

Based on data from BPS and the Directorate General of Food Crops, the average productivity of sweet corn in Indonesia from 2011 - 2016 is relatively low, only reaching 5.81 tons/ha (Statistik, 2017). In the last five years, sweet corn productivity has increased slightly to 5.91 tons/ha (Statistik, 2017).

The market demand for sweet corn is not yet adequate. However, it is known that to meet domestic needs, Indonesia still imports sweet corn in frozen shelled form. In 2016, Indonesia imported 697,247 tons of frozen sweet corn and in 2018 it increased to 839,604 tons (https://horticulture. sariagri.id.). Not only frozen shells, Indonesia also imports processed sweet corn (canned), namely during the period 2014-2018, the average processed sweet corn import was 2,678 tons per year (https://sipindo.id/article). Thus, sweet corn has the potential to be developed in Indonesia.

Although productivity continues to increase, it is still below the potential yield of sweet corn which can reach 14-18 tons/ha. One of the reasons is that the application of fertilizer and the amount of nutrients available in the soil have not met the needs of plants (Musfal, 2008). Fertilizer is one of the most important production factors, lately the price of fertilizer has increased quite sharply. Besides being expensive, there is also a shortage of fertilizers everywhere. This affects the timing and dosage of fertilizers that are not appropriate, so that it can reduce soil fertility and crop production. The scarcity of fertilizers also led to farmer demonstrations which affected security.

P fertilization is one of the efforts to increase P in the soil. According to (I., 2000), nutrient P is one of the limiting factors for corn growth. Efforts to overcome the problem of P deficiency are carried out with P fertilization. Therefore, it is necessary to do research on the dose of phosphate fertilizer on the growth and yield of some sweet corn. Phosphate (P) is an essential nutrient for plants that plays a role in photosynthesis, respiration, energy transfer and storage, cell division and enlargement. Sources of P fertilizer that are commonly used in plantations are Natural Phosphate fertilizers (Batuan Phosphate) and TSP fertilizers.

Compost is organic fertilizer obtained from the weathering of plant materials or organic waste, such as straw, husks, leaves, grass, organic waste from factory processing, and organic waste produced by human (household) treatment. Composting can be defined as a biochemical process that involves microorganisms as intermediaries (agents) that break down organic matter into compost. In the composting process, the general treatment is to create a suitable microenvironment for the growth of microorganisms.

Based on the foregoing, to obtain clearer information, it is necessary to conduct further research on the Growth Response and Yield of Sweet Corn (Zea mays saccharata Sturt) Bonanza Varieties due to the Application of Rock Phosphate at Various Doses of Compost Fertilizer.

The aims of this study were to determine: 1) The effect of the interaction between rock phosphate fertilizer and compost on the growth and yield of sweet corn (Zea mays saccharata Sturt) Bonanza variety. 2) Which dose of rock phosphate fertilizer and compost has a good effect on the growth and yield of Bonanza sweet corn. 3) Relationship between growth and yield of Bonanza sweet corn.

This research is expected to be a contribution of thought for developers of agricultural disciplines, especially agronomic studies of sweet corn plants. In addition, this research can be used as material for relevant agencies in the form of recommendations for government policy directions, especially for increasing sweet corn production, and can add insight to knowledge for researchers, especially about sweet corn farming.

Review of Literature

2.1 General Condition of Sweet Corn Plants Sweet

corn (*sweet corn*) is a secondary food commodity and belongs to the grass family

(Gramineae) genus Zea and species Zea mays Saccharata. Sweet corn has the characteristics of a clear endosperm, thin seed coat, low starch content, when ripe the seeds wrinkle. The main product of sweet corn is the fruit/cob, sweet corn seeds have a shape, color and endosperm content that varies depending on the type, sweet corn seeds consist of three main parts, namely*coat*, endosperm and embryo (Koswara, 2018).

seedSweet corn is believed to have originated from seed corn that had a mutation at the Su 1 . locus chromosome 4, (Su 1/Su 1 = corn kernels, su 1/su 1 = sweet corn). Sweet corn was grown in pre-Columbian times as a source of alcohol for ritual purposes. However, the use of sweet corn is neglected because sweet corn has wrinkled seeds, has lower starch content and has a shorter shelf life than corn kernels.

2.2 Conditions for Growing Sweet Corn

2.2.1 Climate

The area desired by most maize plants is a temperate to subtropical/wet tropical climate with ideal rainfall of around 85 - 200 mm/month on non-irrigated land. The growth of corn plants really needs sunlight during its growth period. The desired temperature for corn plants for the best growth is between 27^0C - 32^0C . Corn is a plant that requires a lot of water, especially during early growth, flowering and seed filling. In general, corn plants need 2 liters of water per plant per day during hot and windy conditions. Lack of water at 3 weeks after the cob hair comes out will reduce yields by up to 30%. Meanwhile, lack of water during flowering will reduce the number of seeds that are formed. Corn requires optimum humidity at the time of planting or at a time when the soil must be close to field capacity (Hanefeld, Josse, & Chiasson, 2005).

2.2.2 Soil

(Ekowati & Nasir, 2011) say that corn is a plant that does not require special soil requirements for cultivation. Corn is known as a plant that can grow in dry land, rice fields, and tides, as long as the necessary growing conditions are met. Types of soil that can be planted with corn include Andosol, latosol, and Grumosol. But the best for corn growth is Latosol. Soil acidity is between 5.6 - 7.5 with sufficient aeration and water availability and the optimum slope for maize is a maximum of 8%. Soil pH between 5.6 - 7.5. Good aeration and water availability, the slope of the soil is less than 8%. And the altitude is between 1000 - 1800 m above sea level with the optimum altitude between 50-600 m above sea level (Prabowo, 2009)

2.3 Sweet Corn Varieties

In an effort to increase sweet corn productivity, technological innovation of superior varieties plays an important role. The Food Crops Research Institute continues to strive to increase the genetic potential of varieties and prepare technology for actualizing the genetic potential of new superior varieties (VUB), especially its productivity and quality. Efforts to improve the genetic potential of maize varieties require not only management support and germplasm characteristics, but also suitable land characteristics for their development.

2.4 Rock Phosphate

rock is known as natural stone. In Indonesia, it is generally found in mountainous areas of coral, limestone or dolomite which is a cave deposit. Spread in Aceh, North Sumatra, West Sumatra, West Java, Central Java, East Java, Nusa Tenggara, and Papua. In general, natural phosphate deposits in Indonesia have total P2O5 levels that$_{Kasno}$vary$_{40}$ from low to moderate and there are some deposits that reach levels of up to$_{P2O5}$ and$_{\%}$ (Sutriadi & Setyorini, 2012). Of the more than 200 known phosphate minerals, the main mineral group of phosphates is the apatite form. Other elements found in phosphate rock such as Ca, Mg, Al, Fe, Si, Na, Mn, Cu, Zn, Mo, B, Cd, Hg, Cr, Pb, As, U, V, F, Cl.

2.5. The Role of Nutrient P for Corn Plants

Phosphorus is an important nutrient needed by plants to grow healthily. The amount required by plants is estimated to reach 2 mg atoms per liter of nutrients (Loveless, 2000). In contrast to nitrogen which is abundant and can be obtained through biochemical fixation, the availability of phosphorus in nature is quite limited. In soil, the amount is in the range of 400 - 1200 mg kg^{-1} Phosphorus absorbed by plants is in a bound form with other molecules in plants. Phosphorus bound to lipids forms phospholipids which are part of the plant plasma membrane (Campbell et al., 2000) Phosphorus is stored in seeds as phytin. soil. The presence of phosphorus in soil can be obtained through fertilization, animal manure, plant residues, industrial and domestic waste, in addition to natural phosphorus compounds both organic and inorganic which are already available in the soil (Krishnaveni & Meenakumari, 2010).

2.6.compost fertilizer

Composting is one way of manipulating the quality of organic inputs under controlled conditions so as to produce organic matter of a certain quality (Plaza, Brunetti, Senesi, & Polo, 2006). One thing that needs to be studied in composting is the role of cellulosic thermophilic microorganisms because these bodies are directly involved in the decomposition of organic inputs. A study conducted by Subba Rao (2002) showed that cellulosic thermophilic microorganisms succeeded in increasing the rate of composting of organic inputs. The importance of using organic fertilizers in a plant cultivation is very necessary because it can restore land productivity. According to (JS, D. Juanda, 2005), one of the efforts to control soil damage is to reduce the use of synthetic fertilizers and increase the use of organic fertilizers.

Metode Penelitian

3.1 Place and Time of Experiment

The experimental site is on agricultural land in Pamijahan Village, Plumbon District, Cirebon Regency, with an altitude of 40 m above sea level (asl). Based on the results of soil analysis, the pH value is 5-6.2 with clay-dust types (Appendix 1) and has an average annual rainfall of 1552 mm with a Q value of 87.76% including the type of medium climate or type D (Schmidt and Ferguson , 1951 in Gunarsih, 2012). The time of the experiment was carried out from November 2021 to January 2022.

3.2 Experimental Materials and Equipment +

The materials used in this experiment were sweet corn seeds of Bonanza variety (Description of sweet corn varieties can be seen in Appendix 4), municipal waste compost, nitrogen fertilizer (Urea), rock phosphate fertilizer (with 46% potassium dioxide content, 28% phosphate and 2% moisture content) and K fertilizer (KCl), Insecticides and Fungicides, bamboo stakes, plastic mines, meters, rapia ropes, jute sacks and plastic bags , as well as the research nameplate.

3.3 Experimental Design This

research was carried out with an experimental approach using a factorial randomized block design (RAK) consisting of two factors, namely the first factor was rock phosphate fertilizer with four levels and the second factor was three levels compost fertilizer, so that each replication there were 12 different treatment combinations. placed randomly and repeated 3 times, so there are 36 experimental units. The layout of the treatments is in Appendix 5. The treatments are as follows:

1. Rock Phosphate Fertilizer (P), consisting of four levels: p_0 = 0 kg rock phosphate/ha, p = 100 kg rock phosphate/ha, p_2 = 150 kg rock phosphate/ha, p_3 = 200 kg rock phosphate/ha
2. Compost fertilizer (K), consists of three levels: k_1 = 5 tons of compost/ha, k_2 = 10 tons of compost/ha, k_3 = 15 tons of compost/ ha

3.4 Implementation of the

Experiment This experiment was carried out in several stages of activity, including the following stages:

1. Land

   preparation Land preparation begins with clearing the land of weeds and plant residues then processing with a hoe at a depth of 20 cm. Processing is carried out until the soil becomes loose, flat and clean of weeds and roots. After the land was processed, 12 experimental plots were made for each group and repeated 3 times. Each experimental plot measuring 3 x 2 m with a distance between the experimental plots of 25 cm. The layout of the treatments in each experimental plot is shown in Appendix 3.

2. Planting

   Planting was carried out in a single system and 3 - 5 cm deep. The spacing used is 75 cm x 25 cm (Figure 1). Each hole planted two seeds of corn. The total plant population per plot was 32 plants. Determination of plant samples taken randomly by lottery method.

3. Embroidery

   Embroidery is replanting in planting holes where the plants do not grow and die. Crop embroidery was carried out at 1 MST.

4. Fertilization

   Inorganic fertilizers include Urea 300 kg/ha, and KCl 50 kg/ha (Martajaya et al., 2010), while Rock Phosphate fertilizers according to treatment (0, 100, 150 and 200 kg/ha), and compost according to treatment (5 tons/ha, 10 tons/ha and 15 tons/ha). Inorganic fertilizers are applied according to the recommendations. Urea fertilizer was given three times, namely part at 1 week after planting along with KCl, part at 3 weeks after planting, and part at 5 weeks after planting. Inorganic fertilizers are applied by means of planting. Meanwhile, compost and rock phosphate were given at the time of planting.

3.5 Observations

Response variables consist of supporting observations and main observations. Supporting observations are observations whose data are used to support the main observations, which include: environmental conditions (weather at the time of the experiment), rainfall during the experiment, weeds and pest and disease attacks, as well as flowering and harvesting ages.

3.6 Analysis of Observation Results

3.6.1 Hypothesis Testing 1

The purpose of this test was to determine the effect of rock phosphate fertilizer and compost on weed growth and yield of Bonanza sweet corn, then statistical analysis was carried out using the hypothesis, linear model Randomized Design (RAK) factorial pattern, analysis of variance and test of treatment mean difference (continued test).

3.6.2 Hypothesis Testing 2

To find out and test the optimum rock phosphate dose at various doses of compost or the optimum compost dose at various rock phosphate doses that give maximum samah rice yields, a quadratic regression analysis was carried out with a response surface model (Arikunto, 2019), where the yield of cob weight per plot is (Y), while the rock phosphate and compost rates are (X) with a quadratic regression equation (estimating model).

3.6.2 Hypothesis Testing 3

To determine the relationship between growth components and sweet corn yield components, the product moment correlation coefficient test was used.program tool *Statistical Package for Social Science* (SPSS).

Hasil dan Pembahasan

4.1 Supporting

Observations Supporting observations are observations whose data are used to provide an overview of the experimental site and support the main observations which include: soil analysis, rainfall and rice plant growth conditions during the experiment.

Based on the results of the analysis of soil samples before the experiment, which was obtained from the Laboratory of Soil, Plants, Fertilizer, Water, Agricultural Research and Development Agency, Integrated Testing Laboratory of the Research Institute for Vegetable Crops, the soil at the experimental site had a dusty clay texture, with a content of 26.00% sand, 36 dust. 0.00% and clay 38.00%. Soil texture is one of the soil properties that greatly determines the ability of the soil to support plant growth.

Soil texture has a role in determining the water system in the soil, namely in the form of infiltration speed, penetration and the ability to bind water by the soil. The pH value of H_2O is 6.2 (slightly sour), pH of KCl is 5.00 (sour). Soil pH greatly affects the availability of nutrients in the soil solution. Soil pH is the degree of soil acidity that can affect plant growth. During vegetative growth, plants are affected by soil pH. Most soils in Indonesia are acidic (5.5 to 6), or pH below 7. Soil reacting acid (low pH) is due to a lack of Calcium (CaO) and Magnesium (MgO).

C-organic content is 0.80% (very low), N-total 0.08% (very low) with a C/N value of 10 (low). The more organic matter content, the more water in the soil will increase. Organic matter in the soil can absorb water 2-4 times its weight which plays a role in water availability. P_2O_5 Bray 5.06 ppm (low) and P_2O_5 HCl (potential p) 36.90 mg/100 g (low), K Morgan Venema 39.0 ppm (moderate), K_2O 10.22 mg/100g (low).

Micro elements Fe 2.9 ppm (low), Zn 0.2 ppm (very low), Cu 0.4 ppm (very low), Mn 19.8 ppm (moderate), and Cl 0.4 ppm (very low). CEC 24.94 cmol(+)/kg (low) and base saturation 59.18% (medium). The results of soil analysis showed that the CEC of the experimental land was 21.49 cmol(+)/kg (low). Cation Exchange Capacity (CEC) is a chemical property that is closely related to soil fertility. Soil with a high CEC is able to absorb and provide nutrients better than soil with a low CEC. Base saturation from the analysis results showed 65% (high).

The results of observations of rainfall, the average daily humidity during the study were low because it had a value of < 200 mm per month, so that it affected plant growth. Kurnia (1997) states that lack of water during the vegetative and generative growth of plants will disrupt growth, so that it can reduce yields.

The average daily temperature in this study ranged from 26.9^0C - 27.8^0C. The temperature in this range is included in the optimum category because the optimum temperature for corn growth is between 25^0C - 33^0C (Yoshida, 1981). Air temperature will affect the growth and production of plants due to an imbalance of photosynthesis and respiration processes. The average daily humidity during the study ranged from 53.70% - 63.30%, while the optimum relative humidity range for maize was 50-90% (Rahmat Rukmana, 2001). Relative air humidity affects evapotranspiration. In the dry season with low humidity, the intensity of sunlight and high temperatures accelerate the rate of evapotranspiration. If the rate of evapotranspiration is not matched by the rate of translocation of water to the roots, the plant will experience drought. Humidity also affects the attack of pests and diseases.

Corn seeds began to grow 6 days after planting marked by the release of light green sprouts. The power to grow seeds in the field is 86.17%. According to Suhaeni (2011) that good seed quality is characterized by 86% growth power, no defects, can reveal the identity (nature) of the original parent, and free from pests and diseases. Seeds that did not grow were embroidered at the age of 7 DAP using corn plants which were planted at the same time as planting and planted separately in other fields around the experimental site.

Weeds began to appear on the experimental field at 7 days after planting which began with the growth of grass weeds. Along with the development of time, weeds growing in the experimental area were found to have 3 groups of weeds, namely grass weeds, tekian weeds, and broadleaf weeds.of grasses such as: grinting grass (*Cynodon dactylon*), lulangan (*Eluisina indica*); puzzle groups such as: grass nut (*Cyperus* *rotundus)* and broad-leaved weeds such as: purslane (*Portulaca sp*), spinach (*Amaranthus sp*), kale (*Ipomea aquantica*).

According to Murrinie (2010), grass weeds will grow and develop quickly if they get enough light and water, so that these weeds have higher competitiveness than other weeds. To control the weeds that grow, weeding was done at the age of 15 DAP and 30 DAP by manual method, which was pulled directly and assisted by using a chord.

Plant-disturbing organisms identified during the experiment were in the form of plant pests and diseases. Pests that attacked corn plants during the experiment were as follows:

1. Grasshoppers and crickets, these pests eat sprouts that have just grown so that the corn plants are cut off their growing points. The level of attack of this pest is relatively small.
2. Leaf caterpillar (*Prodenia litura*). Leaf caterpillars attack the leaf buds and usually 1 month old corn plants are attacked by leaf caterpillars. The leaves of corn plants which when they are large become damaged, the intensity of the attack is high. Symptoms of damage can be seen on the leaves. The caterpillars that have just emerged from the eggs live in groups, eat the surface of the leaves, then disperse to find food in other clumps.
3. Caterpillar span (*Cryodeixischalcites*). This pest attacks all parts of the plant, especially the leaves so that they become damaged and irregular. The intensity of this pest attack in the experimental field is relatively small.
4. Stem Borer (*Menagromyza sojae*). The way to attack this pest is that the larvae eat leaf tissue and seed chips, in 2-3 days they go to the stem through the stalk and then pierce the pith. Pupae are formed inside the stem, the larval hole can cause twigs to break, the plant to wither, dry out and die. The intensity of this pest attack in the experimental field is relatively small.
5. Green Ladybug (*Nezara viridula*) or ladybug is the main important leaf-sucking pest that is polypag (eating several types of plant families). This pest is important because it produces toxins, causing plants to wither. The intensity of this pest attack in the experimental field is relatively moderate.

Pests that attack sweet corn plants are classified as moderate, with low attack power (15%). Pest control is carried out with an integrated pest control system. Mechanical control is done by taking caterpillars or larvae directly that are attacking sweet corn plants. Control with insecticides can be done if the population exceeds the control threshold with damage > 25%. Therefore, the control of pests that attack sweet corn is only done mechanically by collecting caterpillars or larvae.

Based on the data above, according to the researcher's opinion, the pests that attack plants are still relatively low, so that the control of these pests is simply done by mechanical means, namely by taking caterpillars or larvae directly that are attacking sweet corn plants.

Efforts to control various types of plant pests that are carried out by farmers in general are by applying insecticides without paying attention to the negative impacts caused (Naveed et al. 2009). Insecticides with active ingredients deltamethrin and chlorpyrifos are known to be effective for controlling maize pests and can maintain yields of 61.6% for deltamethrin and 45.3% for chlorpyrifos (Tengkano et al., 2007). However, the use of these two insecticides has not been able to overcome the population and the level of attack caused.

Sanitation or cleaning is an important factor in cultivating sweet corn plants. Because many insect pests can survive on plant debris (Untung, 2003). According to Sembel (2012), weed removal is not only important for healthy plant growth but also necessary to keep weeds from becoming a place for insects to live to lay eggs or obtain food sources or just as temporary shelter.

Diseases that attack corn plants that can be identified based on visible attack symptoms are:

1. Dwarf Disease. Symptoms of this disease are seen in young leaves showing indentations (curly) and rough, wrinkled with dark green color and abnormal growth.
2. Rhizoctonia rot. Symptoms of this disease are root and stem rot, the plant wilts and eventually dies.

Rizobacteria isolates were able to act as agents of inducing systemic resistance in maize to wilt disease and at the plant growth promoter (*Plant Growth Promoting Rhizobacteria/*PGPR).isolates CgBd disease development, growth and plant yields better than TLKC isolates. The best way to apply isolate is through soaking corn sprouts in rhizobacterial suspension. These two rhizobacteria isolates can be used as an environmentally friendly alternative to wilt disease control in corn plants.

Corn plants in the experimental field began to appear male flowers at the age of 48 DAP, and simultaneously flowering in each experimental plot occurred at the age of 55 DAP, and the age of female flowers began to appear at the age of 57 DAP and simultaneously at the age of 65 DAP for harvesting carried out at the age of 75 days. after planting.

Crop harvest time is strongly influenced by environmental factors, especially day length and temperature, in the highlands sweet corn is harvested at a longer age. Sweet corn is usually consumed when it is still fresh and young, because it will affect the sugar content of the seeds, if sweet corn is harvested at the wrong time it will affect the sugar content of the seeds. Surtinah (2008) reported that the harvest age of 70 days after planting showed the highest sugar content of sweet corn seeds, namely 15.78% for the Sweet Boy variety.

4.2 Main Observations

4.2.1 Plant Height The

At the age of 4, 5 and 6 weeks after planting independently rock phosphate fertilizer had no significant effect on plant height. The application of various doses of rock phosphate fertilizer did not significantly affect plant height. This is because phosphate fertilizers dissolve slowly so that the application of phosphate fertilizers has no significant effect on plant height. The use of phosphate rock as phosphate fertilizer directly is less effective because of the low solubility of phosphate rock (Noor, 2003). Phosphate aid can provide phosphate in the soil in the long term, due to the *slow release*. The results of research conducted by Husnain et al. (2013) rock phosphate is able to supply P in corn plants up to 6 times the growing season.

At the age of 4 weeks after planting independently, compost fertilizer had no significant effect on plant height. At the age of 5 weeks after planting independently significantly affected the number of leaves per plant.compost$_1$ and $k_2$were not significantly different for plant height, but both were significantly different with the use of 15 tons/ha (k_3). This is because the compost given is able to provide the nutrients needed by plants, so that corn plants grow optimally.

At the age of 6 weeks after planting independently, compost fertilizer had a significant effect on plant height. The compost treatment of 5 tons/ha (k_1) was significantly different from the compost dose of 15 tons/ha (k_3), but not significantly different from the compost treatment at 10 tons/ha (k_2). It is suspected that the application of compost to the soil can increase the nutrients in the soil that can be utilized by corn plants for growth. The addition of organic matter in the soil can be done by giving organic fertilizers such as compost. The advantage of adding organic fertilizers to the soil lies not only in its nutrient content but also has other roles, namely improving the state of the structure, aeration, soil water holding capacity, influencing or regulating soil temperature conditions and providing a substance resulting from overhaul that can help plant growth. (Purnomo et al., 2009).

4.2.2 Number of Leaves per Plant

At the age of 4, 5 and 6 weeks after planting independently rock phosphate fertilizer did not significantly affect the number of leaves per plant. The application of various doses of rock phosphate fertilizer did not significantly affect the number of leaves per plant. This is presumably because the availability and absorption of nutrients are not too different by plants and the metabolic processes that occur so that rock phosphate administration has no significant effect on the number of leaves parameters. In addition to the *slow release* or slow soluble rock phosphate, direct phosphate fertilizers are less effective because of the low solubility of rock phosphate, so that giving various doses of rock phosphate does not affect the number of leaves per plant.

At the age of 4 weeks after planting independently, compost fertilizer had no significant effect on the number of leaves per plant. This is presumably because the compost decomposition process in the soil is still ongoing so that there are not enough nutrients available and well absorbed by plants and insufficient water due to low rainfall will further slow down the decomposition process which requires sufficient water. The growth factors of each plant were still in sufficient quantities for life, especially during the vegetative phase, so that the plants showed an increase in the number of leaves that were relatively the same. The dose of compost did not increase the number of corn leaves where the results obtained from the application of compost at all doses gave almost the same range.

4.2.3 Stem Diameter The

At 4, 5 and 6 weeks after planting independently, rock phosphate fertilizer had no significant effect on stem diameter. The application of various doses of rock phosphate fertilizer did not have a significant effect on stem diameter. This is presumably because the stem diameter is more influenced by genetic factors from the sweet corn plant which causes the stem diameter to be almost the same.

At the age of 4 weeks after planting, compost independently significantly affected stem diameter. The dose treatment of compost 15 tons/ha gave the highest stem diameter and was significantly different from the compost treatment at 10 tons/ha, but not significantly different from the compost treatment at 5 tons/ha.

At the age of 5 weeks after planting the compost independently had a significant effect on stem diameter. The compost fertilizer dose treatment of 5 tons/ha gave the highest stem diameter and was significantly different from the compost treatment at 10 tons/ha, but not significantly different from the compost treatment at 15 tons/ha, but the compost treatment at 10 tons/ha was not significantly different. This is because the compost material given can improve the physical properties of the soil to become loose so that the roots of corn plants are easier to develop and absorb nutrients.

At the age of 6 weeks after planting the compost independently had a significant effect on stem diameter. The treatment with 5 tons/ha of compost gave the highest stem diameter and was significantly different from that of 15 tons/ha of compost, but not significantly different from that of 10 tons/ha of compost. This is because compost with organic C content, as well as N, P, and K is quite helpful in the vegetative growth process of plants as well as stem diameter. Supported by the research results of Widowati et al. (2005), compost in the form of chicken manure always gives the best plant response to plant growth and yield.

4.2.4 Leaf Area Index The

The administration of various doses of rock phosphate did not significantly affect the leaf area index. This is presumably because the leaf area index is more influenced by genetic factors from the sweet corn plant which causes the leaf area index to be relatively the same.

The compost fertilizer independently had a significant effect on the leaf area index. The doses of compost fertilizer at 5 tons/ha and 10 tons/ha gave the highest leaf area index and significantly different from compost treatment at 15 tons/ha. This is because the application of organic matter/compost fertilizer is able to improve soil structure by increasing soil organic matter content and can maintain soil water content so that nutrient absorption becomes more optimal and as a supplier of nutrients that are very useful for increasing plant vegetative growth, such as leaf area index. Compost is able to support plant physiological processes such as photosynthesis so that the utilization of nutrients is more efficient.

4.2.5 Cob Length The

Rock phosphate fertilizer independently significantly affected the length of the ear. Treatment of rock phosphate fertilizer doses of 100 kg/ha and 150 kg/ha (p_1 and p_2) gave the highest cob lengths of 18.99 cm and 19.03 cm and significantly different from rock phosphate treatments of 0 kg/ha and 200 kg/ha. ha (p_0 and p_3). The existence of this real effect is thought to be caused by factors in the treatment of rock phosphate fertilizer so that it affects soil fertility and genetic characteristics of corn plants. According to Lakitan (2011), explaining that the formation of fruit and the number of fruit formed by plants is determined by the flowering process of plants which is influenced by factors contained in plants such as hormones and genetics, as well as external factors such as temperature, climate, water, light. sun and nutrients.

Research results Parhusip, et al. (2020) showed that the combination treatment of Urea fertilization 200 kg/ha, KCl 150 kg/ha and Natural Phosphate 700 kg/ha could produce the highest ear diameter and length of the ear and was significantly different from other treatments. The results of research by Betty et al. (2017) showed that phosphate fertilizer treatments of 100 kg/ha and 150 kg/ha could increase the length and diameter of the cobs. The addition of compost independently significantly affected the length of the sweet corn cobs. The compost fertilizer treatment of 10 tons/ha (k2)gave the highest cob length and was significantly different from the compost treatment at 5 tons/ha and 15 tons/ha (k1 and k3).

4.2.6 Cob Diameter The

Rock phosphate fertilizer independently significantly affected the diameter of the ear. Treatment doses of rock phosphate fertilizer 100 kg/ha and 150 kg/ha (p_1 and p_2) gave the highest ear diameters of 3.96 cm and 3.86 cm and significantly different from rock phosphate treatment of 0 kg/ha and 200 kg/ha. ha (p_0 and p_3). This is thought to be caused by factors in the treatment of rock phosphate fertilizers that affect soil fertility and genetic characteristics of corn plants. According to Lakitan (2011), explaining that the formation of fruit and the number of fruit formed by plants is determined by the flowering process of plants which is influenced by factors contained in plants such as hormones and genetics, as well as external factors such as temperature, climate, water, light. sun and nutrients.

The addition of compost independently significantly affected the diameter of the sweet corn cobs. The compost fertilizer treatment of 10 tons/ha (k2)gave the highest cob diameter, which was 3.85 cm and significantly different from the compost treatment at 5 tons/ha and 15 tons/ha (k1 and k3).

4.2.7 Weight of cob without husks per plant

The results of the analysis of variance showed that there was no interaction effect between rock phosphate fertilizer and compost on the weight of the cob without grain per plant can be seen in table.

Table 14
Effect of Rock Phosphate and Compost on Cob Weight without Kelobot per Plant

Treatment	Cob weight (g)
1. Effect of Rock phosphate	
p_0 (0 kg rock phosphate/ha)	149.49 a
p_1 (100 kg) rock phosphate/ha)	227.47 c
p_2 (150 kg rock phosphate/ha)	237.16 c
p_3 (200 kg rock phosphate/ha)	172.32 b
2. Effect of Compost	
k_1 (5 tons compost/ha)	187.61 a
k_2 (10 tons of compost/ha)	213.83 b
k_3 (15 tons of compost/ha)	188.39 a

Remarks: The mean number followed by the same letter shows no significant difference based on Duncan's Multiple Spacing Test at 5% significance level.

Rock phosphate fertilizer independently had a significant effect on the weight of the cob without husks per plant. Treatment doses of rock phosphate fertilizer 100 kg/ha and 150 kg/ha (p_1 and p_2) gave the highest plant weights of cobs without rhizome, namely 227.47 g and 237.16 g and significantly different from rock phosphate treatment 0 kg/ha and 200 kg/ha (p_0 and p_3). This is thought to be caused by factors in the treatment of rock phosphate fertilizers that affect soil fertility and genetic characteristics of corn plants. According to Lakitan (2011), explaining that the formation of fruit and the number of fruit formed by plants is determined by the flowering process of plants which is influenced by factors contained in plants such as hormones and genetics, as well as external factors such as temperature, climate, water, light. sun and nutrients.

The addition of rock phosphate fertilizer had a significant effect on the weight of the cobs without husks. The increasing application of rock phosphate fertilizer can increase the weight of the cobs without husks only up to 150 kg/ha, but after increasing the dose of rock phosphate fertilizer to 200 kg/ha, the weight of the cobs without husks decreases again. Fertilization with too high a dose reduces the process of movement of the food cycle which can suppress the growth of the number of leaves and root development.

The addition of compost independently significantly affected the weight of the cobs without sweet corn husks. The compost fertilizer treatment of 10 tons/ha (k_2) gave the highest weight of unhulled cobs per plant, which was 213.83 g and significantly different from the compost treatment of 5 tons/ha and 15 tons/ha (k_1 and k3). This is becauseapplying compost to the soil makes the soil more friable and increases the aeration of the clay, so that root respiration and nutrient intake are actively increased.

4.2.8 Weight of cobs without husks per plot The

results of the analysis of variance showed that there was an interaction effect between rock phosphate fertilizer and compost on the weight of cobs without husks per plot, as shown in table.

Table 15. Interaction Effect of Rock Phosphate Fertilizer and Compost on Cob Weight without Grass per Plot

Rock Phosphate (kg/ha)	Compost Fertilizer (tonnes/ha)		
	k_1 (5 tons/ha)	k_2 (10 tons/ha)	k_3 (15 tons/ha)
p_0 (0 kg/ha)	3.82 a A	3.62 a A	4.04 a A
p_1 (100 kg/ha	5.75 b B	4, 55 a A	5.00 b A
p_2 (150 kg/ha)	5.47 b A	6.55 b B	5.70 b A
p_3 (200 kg/ha)	5.33 b B	5.17 a B	4, 03 a A

Information: The average number accompanied by the same lowercase letter in the row, or the same capital letter in the column, shows no significant difference based on Duncan's Multiple Spacing Test at a significant level of 5%

Rock phosphate fertilizer and compost fertilizer have an effect interaction with the weight of the barrel l without grain per plot. The rock phosphate treatment of 0 kg/ha, (p_0), indicated that the compost dose was not significantly different from the weight of the cob without husks per plot. The rock phosphate treatment of 100 kg/ha (p_1), showed that the compost dose of 5 tons/ha gave the highest weightless cobs per plot and significantly different with compost doses of 10 tons/ha and 15 tons/ha. Then at a dose of rock phosphate of 150 kg/ha (p2), it showed that the compost treatment of 10 tons/ha gave the highest weight of cobs without husks and was significantly different from other treatments. In the rock phosphate treatment of 200 kg/ha (p_3), it showed that the compost treatment of 5 tons/ha and 10 tons/ha was not significantly different, but both were significantly different from the compost treatment of 15 tons/ha.

The highest weight of unhulled cobs per plot was achieved at the combination of p_2k_2 (rock phosphate 150 kg/ha and compost 10 tons/ha), which was 6.55 kg per plot or equivalent to 10.92 tons of cobs without husks per hectare. This indicates that the rock phosphate and compost fertilizer treatment is the optimal combination of treatments that can provide good cob weight without grain per plot.

To determine the relationship between rock phosphate and cob weight without husks per plot at various doses of compost, quadratic regression analysis was used. The relationship between rock phosphate and cob weight without husks per plot in the compost treatment of 5 tons/ha (k_1), with the regression equation = 4,850 + 0,068 X -

0,001 X^2 (R^2 = 0,469). From the regression equation, the optimum rock phosphate was 34 kg/ha, with a maximum weight of 6.01 kg of stump without husks per plot. In the compost treatment 10 tons/ha (k_2), with the regression equation = 4.025 + 0.071 X - 0.0004 X^2 (R^2 = 0.595). From the regression equation, it was obtained that the optimum rock phosphate was 88.75 kg/ha, with a maximum weight of 7.18 kg of stump without husks per plot.compost treatment was 15 tons/ha (k_3), with the regression equation = 3.974 + 0.092 X - 0.0007 X^2 (R^2 = 0.517). From the regression equation, it was obtained that the optimum rock phosphate was 65.71 kg/ha, with a maximum weight of 7.00 kg of stump without husks per plot. For more details, it can be seen in Figure 2 and Table 16.

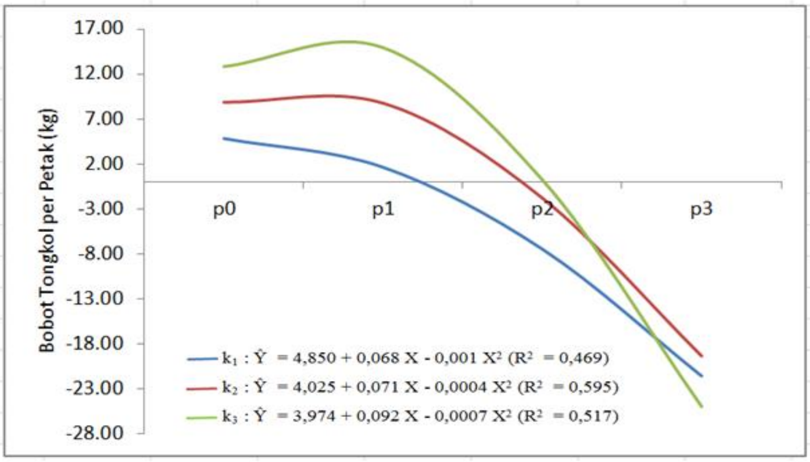
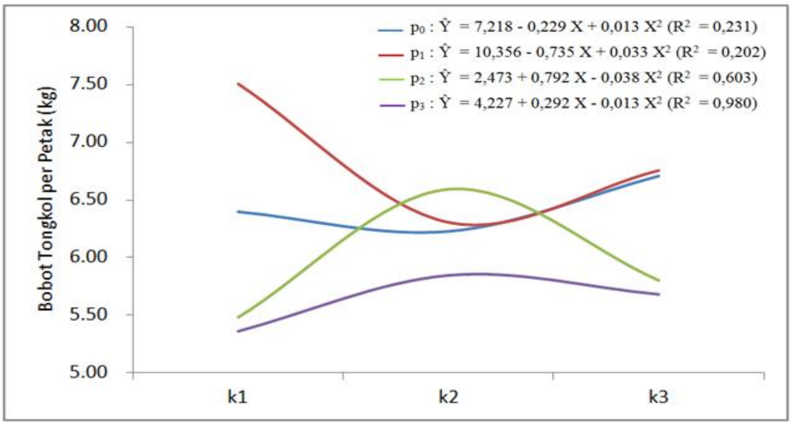


Table 16. Weight of Cobs without Grass per Plot Maximum Dose of Rock Phosphate at Various Compost Doses

No.	Compost	Optimum Value Rock Phosphate (kg/ha)	Weight of Cob without hulls (kg)
1	5 tons/ha	34.00	6.01
2	10 tons/ha	88.75	7.18
3	15 tons/ha	65.71	7.00

To determine the relationship between compost and cob weight without husks per plot at various doses of rock phosphate fertilizer, quadratic regression analysis was used. The relationship between compost and cob weight without husks per plot in rock phosphate treatment 0 kg/ha (p_0), with the regression equation = 7.218 - 0.229 X + 0.013 X^2 (R^2 = 0.231). From the regression equation, the optimum compost dose was 8.81 tons/ha, with a maximum weight of 6.21 kg of cobs without husks per plot. In rock phosphate treatment 100 kg/ha (p_1), with the regression equation = 10.356 - 0.735 X + 0.033 X^2 (R^2 = 0.202). From the regression equation, the optimum compost dose was 11.14 tons/ha, with a maximum weight of 6.26 kg of cobs without husks per plot. In rock phosphate treatment 150 kg/ha (p_2), with the regression equation = 2.473 + 0.792 X - 0.038 X^2 (R^2 = 0.603). From the regression equation, it was obtained that the optimum compost dose was 10.42 tons/ha, with a maximum weight of 6.60 kg of cobs without husks per plot. In rock phosphate treatment 200 kg/ha (p_3), with the regression equation = 4.227 + 0.292 X - 0.013 X^2 (R^2 = 0.980). From the regression equation, the optimum compost dose was 11.23 tons/ha, with a maximum weight of 5.87 kg of cobs without husks per plot.



17. Weight of Cobs without Grass per Plot Maximum Compost Dosage at Various Doses of Rock Phosphate

No.	Rock Phosphate	Optimum Value of Compost (tonnes/ha)	Weight of Cob without weight (kg)
1.	0 kg/ha	8.81	6.21
2.	100 kg/ha	11.14	6.26
3.	150 kg/ha	10.42	6.60
4.	200 kg/ha	11.23	5.87

Based on the results of the study, it was known that the highest weight of cobs without husks per plot was achieved in the combination treatment of p_2k_2 (rock phosphate 150 kg/ha and compost 10 tons/ha), which is 6.55 kg per plot or equivalent to 10.92 tons of cob without cobs per hectare. This indicates that the rock phosphate and compost fertilizer treatment is the optimal combination of treatments that can provide good cob weight without grain per plot.

4.3 Relationship of Growth Components, Yield Components and Weight of Cob without Clumps per plot

To determine the relationship between growth components, yield components and weights of cobs without corns per plot, statistical test of *product moment*. The relationship between growth components and yield components with weight of cob without husks per plot can be seen in Table 18.

Table 18
Relationship between Growth Components and Yield Components with Weight of Cobs without Grafts per Plot

Variable X	Variable Y	r	r^2	Sig (2-tailed)	Significant-kansi
Plant Height (X_1)	Weight of Cob without Clump per Plot (Y)	0.345	0.119	0.039	Real
Number of Leaves (X_2)	Weight of Cob without Clump per Plot (Y)	0.581	0.338	0.000	Real
Stem Diameter (X_3)	Weight of Cob without(Y)	0.565	0.319	0.000	Real
Leaf Area Index (X_4)	Weight of Cob without Grasshoppers per Plot (Y)	0.372 0.138	0.025	Real	Length of
Cob (X_5)	Weight of Cob without Grass per Plot (Y)	0.534	0.285	0.001	Real
Diameter of Cob (X_6)	Weight of cobs without cobs per plot (Y)	0.521	0.271	0.001	Real

Information: r = correlation coefficient r^{of} determination

= *coefficient*2as follows:

1. Based on the description above, the researcher concluded that plant height was positively related to the weight of the cob without husks per plot. This is becausethe higher the plant, the greater the photosynthate yield which is distributed to the cob weight organs without cob per plot, so that the cob weight is greater.
2. The relationship between the number of leaves per plant at the end of the observation (6 weeks after planting) and the weight of the cob without corns per plot was significantly different, with a correlation coefficient of 0.581. This means that the relationship between the number of leaves per plant at the age of 6 weeks after planting and the weight of the cob without cob per plot is 0.581, belonging to the medium closeness level. The value of the coefficient of determination (r^2) was 0.338, meaning that the number of leaves per plant contributed to the weight of the cob without cob per plot of 0.338 (33.80%), and the remaining 66.20% was influenced by other factors not included in the model. From the results of the significance test, it was obtained that the Sig value, 2-tailed 0.000 was smaller than 0.05, meaning that the relationship between the number of leaves per plant and the weight of the cob without cob was significantly different.
3. The relationship between the diameter of the stem at the end of the observation (6 weeks after planting) and the weight of the cob without husks per plot was significantly different, with a correlation coefficient of 0.565. This means that the relationship between the diameter of the stem at the age of 6 weeks after planting and

the weight of the cob without cob per plot is 0.565, belonging to the moderate level of closeness. The coefficient of determination (r^2) was 0.319, meaning that the diameter of the stem contributed to the weight of the cob without husks per plot of 0.319 (31.90%), and the remaining 68.10% was influenced by other factors not included in the model. From the results of the significance test, it was obtained that the Sig value, 2-tailed 0.000 was smaller than 0.05, meaning that the relationship between the diameter of the stem and the weight of the cob without the cob was significantly different.

4. The relationship between leaf area index and cob weight without cob per plot was significantly different, with a correlation coefficient of 0.372. This means that the relationship between leaf area index and cob weight without cob per plot is 0.372, belonging to a low level of closeness. The value of the coefficient of determination (r^2) was 0.138, meaning that the leaf area index contributed to the weight of the cob without cobs per plot of 0.138 (13.80%), and the remaining 86.20% was influenced by other factors not included in the model. From the results of the significance test, it was obtained that the Sig value, 2-tailed 0.000 was smaller than 0.05, meaning that the relationship between leaf area index and cob weight without plot was significantly different.
5. The relationship between the length of the cob and the weight of the cob without husks per plot was significantly different, with a correlation coefficient of 0.534. This means that the relationship between the length of the cob and the weight of the cob without the cob per plot is 0.534, belonging to the moderate level of closeness. The coefficient of determination (r^2) was 0.285, meaning that the length of the cob contributed to the weight of the cob without husks per plot of 0.285 (28.50%), and the remaining 71.50% was influenced by other factors not included in the model. From the results of the significance test, it was obtained that the Sig value, 2-tailed 0.001 was smaller than 0.05, meaning that the relationship between leaf cob length and cob weight without cob plots was significantly different.

   Stem diameter was significantly correlated with seed weight per plot,meaning that plants with large stem diameters would produce higher yields. This happens because the corn stalk has a book where the leaves grow. The larger the diameter of the stem, the more likely it is to increase the leaf area which functions as a place for photosynthesis to take place. Increasing the diameter of the stem has the opportunity to produce fertile leaves.
6. The relationship between the diameter of the cobs and the weight of the cobs without husks per plot was significantly different, with a correlation coefficient of 0.521. This means that the relationship between the diameter of the cob and the weight of the cob without the cob per plot is 0.521, belonging to the moderate level of closeness. The coefficient of determination (r^2) was 0.271, meaning that the diameter of the cob contributed to the weight of the cob without husks per plot of 0.271 (27.10%), and the remaining 72.90% was influenced by other factors not included in the model. From the results of the significance test, it was obtained that the Sig value, 2-tailed 0.001

was smaller than 0.05, meaning that the relationship between leaf cob diameter and cob weight without cob plots was significantly different.

Conclusion

Based on the results of the research and discussion described above, the following conclusions can be drawn: 1) There is an interaction effect between rock phosphate and compost treatment on the weight of the cob without husks per plot. Rock phosphate independently had an effect on the length of the ear, diameter of the ear, weight of the ear without husks per plant, but had no significant effect on plant height, number of leaves, stem diameter and leaf area index. Compost independently affected plant height, number of leaves, stem diameter, leaf area index, ear length, ear diameter and cob weight without cob per plant. 2) The dose of rock phosphate 150 kg/ha and compost 10 tons/ha gave the highest weight of cob without husks per plot, which was 6.55 kg per plot or equivalent to 10.92 tons of cobs without corns per hectare. 3) There was a significant relationship between the growth component and yield component and the weight of the stumps without tubers per plot. Plant height, number of leaves, leaf area index, stem diameter, ear length and ear diameter had a significant positive relationship to the weight of the cob without cob per plot.

BIBLIOGRAFI

Arikunto, Suharsimi. (2019). *Prosedur Penelitian Suatu Pendekatan Praktik*. Rineka Cipta. Google Scholar

Campbell, John Y., Allen, Franklin, Barberis, Nick, Bekaert, Geert, Chan, Lewis, Cochrane, John, Feldman, David, Goetzmann, Will, Lettau, Martin, Ludvigson, Sydney, Mankiw, Greg, Shiller, Robert, Shleifer, Andrei, Veronesi, Pietro, Viceira, Luis, & Vuolteenaho, Tuomo. (2000). *Nber Working Paper Series Asset Pricing At The Millennium*. Retrieved From Http://Www.Nber.Org/Papers/W7589.

Ekowati, Diah, & Nasir, Mochamad. (2011). Pertumbuhan Tanaman Jagung (Zea Mays L.) Varietas Bisi-2 Pada Pasir Reject Dan Pasir Asli Di Pantai Trisik Kulonprogo. *Jurnal Manusia Dan Lingkungan*, *18*(3), 220–231. Google Scholar

Hanefeld, Markolf, Josse, Robert G., & Chiasson, Jean Louis. (2005). A-Glucosidase Inhibitors For Patients With Type 2 Diabetes: Response To Van De Laar Et Al. *Diabetes Care*, *28*(7), 1840. Google Scholar

I., Winks. (2000). *Phosphorus And Beef Production In Northern Australia. Responses To Phosphorus By Ruminants A Review. Trop. Grassid*. Google Scholar

Js, D. Juanda, And Sodiq Jauhari. (2005). "Peluang Efisiensi Penggunaan Dan Biaya Pupuk Pada Lahan Sawah Hasil Analisa Tanah (Kasus Di Kecamatan Kesugihan Kabupaten Cilacap)." *Jurnal Litbang Provinsi Jawa Tengah*, *3*(1), 80–89. Google Scholar

Koswara, Indra Yudha. (2018). Perlindungan Tenaga Kesehatan Dalam Regulasi Perspektif Bidang Kesehatan Dihubungkan Dengan Undang-Undang Nomor 36 Tentang Kesehatan Dan Sistem Jaminan Sosial. *Jurnal Hukum Positum*, *3*(1), 1–18. Google Scholar

Krishnaveni, Dr. R., & Meenakumari, J. (2010). Usage Of Ict For Information Administration In Higher Education Institutions – A Study. *International Journal Of Environmental Science And Development*, *1*(3), 282–286. Https://Doi.Org/10.7763/Ijesd.2010.V1.55 Google Scholar

Musfal. (2008). Efektivitas Cendawan Mikoriza Arbuskula (Cma) Terhadap Pemberian Pupuk Spesifik Lokasi Tanaman Jagung Pada Tanah Inceptisol. Sekolah Pascasarjana. *Universitas Sumatera Utara Medan*, 1–44. Google Scholar

Novira, F., Husnayetti, Dan S. Yoseva. (2015). Pemberian Pupuk Limbah Cair Biogas Dan Urea, Tsp, Kcl Terhadap Pertumbuhan Dan Produksi Tanaman Jagung Manis (Zea Mays Saccharata Sturt). *Jom Faperta*, *2*(1), 1–18. Google Scholar

Plaza, César, Brunetti, Gennaro, Senesi, Nicola, & Polo, Alfredo. (2006). Molecular And Quantitative Analysis Of Metal Ion Binding To Humic Acids From Sewage Sludge And Sludge-Amended Soils By Fluorescence Spectroscopy. *Environmental Science*

And Technology, *40*(3), 917–923. Https://Doi.Org/10.1021/Es051687w. Google Scholar

Prabowo, Agung. (2009). Aliran-Aliran Filsafat Dalam Matematika. *Jurnal Ilmiah Matematika Dan Pendidikan Matematika*, *1*(2), 25–45. Google Scholar

Statistik, Badan Pusat. (2017). *Statistik Ekspor Impor Komoditas Pertanian 2010 -2016. Jurnal Statistik Ekspor Impor Komoditas Pertanian. Google Scholar*

Sutriadi, Mas Teddy, & Setyorini, Diah. (2012). Response Of Peanut Due To Application Of Dolomite Plus. *Journal Of Tropical Soils*, *17*(2), 143. Https://Doi.Org/10.5400/Jts.2012.V17i2.143-150. Google Scholar

Yoshida, Shouichi. (1981). *Fundamentals Of Rice Crop Science. Int. Rice Res. Inst.,*. Google Scholar