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Utilization of Oil Mimba and Organic Fertilizer of Paitan Leaves Based on Microorganism for Improving Growth and Sweet Corn (Zea mays Var. Saccharata Sturt) Production

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Abstract: This research aims to know the effectiveness of organic fertilizer from paitan leaf (P) and organic pesticide from mimba oil (M) based on the addition of microorganisms (photosynthetic bacteria and Streptomyces) to improve the function of paitan as organic fertilizer and mimba oil as an organic pesticide. The use of pesticides and organic fertilizers was tested on sweet corn (Zea mays var. Saccharata Sturt). The research was conducted in Mojolangu Village, Lowokwaru District, Malang City. The study was conducted from June to August 2016. The design using factorial Randomized Block Design (RBD) consisted of 2 treatments: Organic Fertilizer from Paitan (P) and Organic Pesticide from Mimba Oil (M). P0: No paitan fertilizer, P1: Dose of fertilizer paitan 10 ton ha-1, P2: Dosage of 15-ton ha-1 fertilizer. M0: Without Mimba, M1: Dosage of Mimba Oil 2.5g/plant, M2: Dosage of mimba oil 5g/plant, M3: Dosage of oil of mimba 7.5g/plant. The results showed that observation of crops resulted in interaction on the weight of sweet corncob with skin, the weight of sweet corn without skin, sweet corn length, and production per hectare. Provision of 15 ton/ha of fertilizer with 5g of mimba oil/plant and 15 ton/ha of paitan/ha with mimba oil 7.5g/plant gives the best yield per hectare. Fertilizer paitan directly affect plant height, leaf number, leaf area, plant dry weight, the diameter of cob, fresh weight of the plant, and sweet corn sugar. Fertilizer paitan 10 ton/ha and fertilizer paitan 15 ton/ha give better influence than fertilizer paitan 0 ton/ha.

Keywords: *Paitan leaves, mimba oil, organic farming, sweet corn*

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I. PRELIMINARY

The world's demand for organic food has increased since the last few years [1], [2]. This is caused by the knowledge and awareness of the public about the importance of health. Organic farming provides healthier options for communities, but still lacks organic farming in the world including Indonesia [3], [4]. In Indonesia alone, there is only 0.14% organic farming compared to the number of existing farms [5]. Organic fertilizers and organic pesticides are known as one source of obstacles [6], [7]. Therefore, there is urgency to develop an effective yet affordable and feasible solution for organic farmers in Indonesia. Mimba (azadirachta indica) is known for its benefits to organic insecticides. Mimba is an endemic plant of Southeast Asia, in Indonesia often found almost everywhere [8], [9]. Some research results indicate that Mimba extract (leaf and seed) is one of the best elements to repel insect pests. [10] examined that the best mimba seed extracts to repel insects, apalgi when mixed with various microorganisms (lactobacillus, Streptomyces, photosynthetic bacteria), the pesticide product produced the higher the ability to expel and even kill the insects, besides the organic pesticides produced more durable and good aroma.

Soil organic matter is the main key of soil health both from physical, chemical and biological. Organic materials such as paitan plants (Tithonia diversifolla) are herbaceous plants of Asteraceae class. Paitan has the

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advantage that the decomposition time is faster than other plants and nutrients contained in the canopy. Growth with high parameters, fresh weight, dry weight, leaf area of sweet corn given paitan treatment significantly had higher growth than control plants. Utilization of fertilizer paitan will be better if coupled with the use of microorganisms will accelerate time decommission position.

This study aims to determine the effectiveness of organic fertilizer from leaves paitan (P) and organic pesticides from mimba oil (M) based on the addition of mixtures of microorganisms to increase the growth and production of sweet corn crops.

Hypothesis in this research are:

1. Giving dosage of paitan fertilizer (P) and mimba oil combined with different microorganisms (M) can produce different growth rates and yields and production of sweet corn crops.

2. The addition of dosage of paitan and mimba oil with combination of microorganisms can increase the growth and production of sweet corn.

II. RESEARCH METHODS

The design used in this study is a factorial randomized block design (RAK) consisting of two factors, namely the provision of mimba oil and fertilizer paitan. The treatments are as follows:

Factor dose of paitan fertilizer (P) consists of 3 levels, namely:

P0: Without fertilizer paitan

P1: The dose of fertilizer paitan 10 tons/ha

P2: The dose of fertilizer paitan 15 tons/ha

While the dose of oil factor mimba (M) consists of 4 levels, namely:

M0: Without the mimba oil

M1: Dosage of oil of mimba 2.5 g/plant

M2: Dosage of oil of mimba 5 g/plant

M3: Dosage of oil of mimba 7.5 g/plant

The experiment was conducted with 12 treatment combinations repeated 3 times, so there were 36 plot experiments.

1. P0M0 = control (without paitan and oil mimba)

2. P0M1 = fertilizer paitan 0 ton/ha + mimba oil 2.5 g/plant

3. P0M2 = fertilizer paitan 0 ton/ha + mimba oil 5 g/plant

4. P0M3 = fertilizer paitan 0 ton/ha + mimba oil 7.5 g/plant

5. P1M0 = paitan fertilizer 10 ton/ha + mimba oil 0 g/plant

6. P1M1 = fertilizer paitan 10 tons/ha + oil mimba 2.5 g/plant

7. P1M2 = fertilizer paitan 10 tons/ha + mimba oil 5 g/plant

8. P1M3 = fertilizer paitan 10 tons/ha + mimba oil 7.5 g/plant

9. P2M0 = fertilizer paitan 15 ton/ha + mimba oil 0 g/plant

10. P2M1 = fertilizer paitan 15 ton/ha + oil mimba 2.5 g/plant

11. P2M2 = fertilizer paitan 15 ton/ha + mimba oil 5 g/plant

12. P2M3 = fertilizer paitan 15 ton/ha + mimba oil 7.5 g/plant

A. Implementation of Research

Soil analysis is done by taking soil samples of 500 g on the land to be used as research sites. Soil sampling method is to take 100 g samples randomly on each corner of the land as a whole and the middle of the field. Soil sampling was done 2 times ie initial soil sample (before planting) and final soil sample (after research). Soil analysis includes pH, N-total, P, K, C-organic by analyzing soil samples from experimental plots conducted at the BALITKABI Malang Laboratory. Implementation

The cultivation of the land is done with a plow of cows as much as 1 times to obtain soil structure that loose so it can support the growth and development of plant roots. Planting is done on soil moisture. Planting is done by inserting sweet corn seed into the planting hole. Spacing used is 75 x 25 cm. Planting hole with depth of ś 3 cm. Each planting hole is filled with 1 sweet corn seed and given the mimba oil in accordance with the treatment, then planting hole covered with fine soil.

The fermented paitan fertilizer is given 2 weeks before planting, thus it is expected that the paitan fertilizer has been completely decomposed. The mimba oil pesticide is given when the plant is 2 weeks old. Application of paitan fertilizer using dose 0 ton/ha, 10 ton/ha, 15 ton/ha and mimba oil of 0 g/plant, 2.5 g/plant, 5 g/plant, 7.5 g/plant. The control of insect pests of the pest is done by spraying pesticide of mimba oil obtained from RAPID (Lab Biology) of Universitas Widyagama Malang, while paitan fertilizer is obtained from wild paitan plant around agricultural land.

B. Observation

Observations on the growth and yield of sweet corn were done nondestructively and destructively by taking two plants each treatment and starting at age 14, 28, 42, 56 HST and harvesting observations made at age 70 HST. The parameters observed were growth and plant yield parameters, including: plant height (cm), number of leaves,

leaf area, dry weight of plant (g/plant), weight of cob tar (g/plant), weightless cobs (g/plant), Sugar content was measured using brix refractometer, cob diameter (cm), length of tuna (cm), fresh weight of plant (g/plant) and production (ton/ha).

III. RESULTS AND DISCUSSION

A. *Observation of Growth*

The result of variance analysis showed that the treatment of paitan and mimba oil did not show any significant interaction to plant height at all age of observation. to plant height only at all ages of observation. The height of sweet corn plant from the treatment of paitan fertilizer and the mimba oil is presented in Table 1.

TABLE 1
THE HEIGHT OF SWEET CORN PLANT FROM THE TREATMENT OF PAITAN FERTILIZER AND OIL OF MIMBA

Treatment	Plant height (cm) of plants at various ages of observation (day)			
	14	28	42	56
Paitan Paitan 0 ton/ha (P0)	5,36 a	15,64 a	28,68 a	169,58 a
Paitan 10 ton/ha (P1)	6,68 b	20,15 b	41,97 b	196,30 b
Paitan 15 ton/ha (P2)	6,80 b	21,38 c	48,73 c	202,53 b
BNT 5%	0,38	1,04	3,49	11,71
Mimba				
Mimba 0 g/plant (M0)	5,99	18,61	38,31	189,51
Mimba 2.5 g/plant (M1)	6,23	18,84	39,43	188,42
Mimba 5 g/plant (M2)	6,35	19,36	40,79	189,42
Mimba 7.5 g/plant (M3)	6,56	19,42	40,63	190,53
BNT 5%	tn	tn	tn	tn
KK (%)	7,15	6,44	10,34	7,30

Remarks: values followed by the same letter at each age of observation (day) and treatment (Paitan or Mimba oil) were not significantly different by BNT test of 5% level; tn: not real; hst: day after planting.

Table 1 shows that the 15 ton/ha fertilizer treatment has the highest plant height value compared to other fertilizer treatments at all ages of observation.

B. *Leaf Amount*

The result of the analysis of the variation of the number of leaves of sweet corn plant showed no interaction between the treatment of paitan fertilizer and the mimba oil treatment. Treatment of fertilizer paitan give effect to the number of leaves at 28, 42 and 56 day observation age. The mimba oil treatment did not affect the number of sweet corn leaves at all ages of observation. The number of sweet corn leaves from the treatment of paitan and the mimba oil is presented in Table 2.

Based on Table 2, it can be seen that at the age of 28 hst observation of the highest leaf number value in the treatment of fertilizer paitan 15 tons/ha with a value of 6.28. Treatment of 15 ton/ha of fertilizer on observation was significantly different with the treatment of 10 tons/ha of fertilizer. Treatment of paitan fertilizer as much as 0 ton/ha gave the lowest effect when compared with other paitan fertilizer treatment. The value of leaves amount of fertilizer treatment paitan 15 ton/ha at 42, 56 hst respectively for 9,17 and 12,23. Treatment of paitan fertilizer of 0 ton/ha gives the lowest value when compared to other treatments.

C. *Leaf Area*

From the analysis of variation of plant leaves sweet corn variety showed no interaction between the treatment of paitan fertilizer with oil treatment of mimba. The treatment of paitan fertilizers gave a significant effect on the area of sweet corn plant leaves at all ages of observation. The mimba oil treatment did not have a significant effect on the area of sweet corn leaves at all ages of observation. The area of sweet corn leaves from the treatment of paitan fertilizer and the oil treatment of mimba is presented in Table 3.

TABLE 2
NUMBER OF SWEET CORN LEAVES FROM THE TREATMENT OF PAITAN AND MIMBA OIL

Treatment	Number of sweet corn leaves from the treatment			
	14	28	42	56
Paitan				
Paitan 0 ton/ha (P0)	3,50	5,57 a	8,63 a	11,57 a
Paitan 10 ton/ha (P1)	3,68	5,97 b	9,00 b	12,03 b
Paitan 15 ton/ha (P2)	3,65	6,28 c	9,17 b	12,23 b
BNT 5%	tn	0,28	0,26	0,25
Mimba				
Mimba 0 g/plant (M0)	3,60	5,96	9,04	12,09
Mimba 2.5 g/ plant (M1)	3,64	5,87	8,80	11,80
Mimba 5 g/plant (M2)	3,58	6,04	8,98	11,91
Mimba 7.5 g/plant (M3)	3,62	5,89	8,91	11,98
BNT 5%	tn	tn	tn	tn
KK (%)	8,34	5,52	3,46	2,45

Remarks: values followed by the same letter at each age of observation and treatment (paitan or palm oil) were not significantly different by BNT test of 5% level; tn: not real; hst: day after planting.

TABLE 3
THE AREA OF SWEET CORN LEAVES FROM THE TREATMENT OF PAITAN AND OIL MIMBA

Treatment	The area of sweet corn leaves from the treatment			
	14	28	42	56
Paitan				
Paitan 0 ton/ha (P0)	39,05 a	252,58 a	1113,50 a	2232,67 a
Paitan 10 ton/ha (P1)	51,37 b	434,55 b	1749,54 b	2804,78 b
Paitan 15 ton/ha (P2)	52,93 b	508,82 b	2096,05 c	3080,69 b
BNT 5%	8,40	87,21	239,29	305,74
Mimba				
Mimba 0 g/plant (M0)	49,24	380,79	1635,06	2665,58
Mimba 2.5 g/ plant (M1)	47,43	352,49	1703,25	2683,22
Mimba 5 g/plant (M2)	50,53	400,55	1599,69	2657,91
Mimba 7.5 g/plant (M3)	43,93	460,78	1674,12	2817.50
BNT 5%	tn	tn	tn	tn
KK (%)	20,76	25,84	17,10	13,34

Remarks: values followed by the same letter at each age of observation and treatment (paitan or palm oil) were not significantly different by BNT test of 5% level; tn: not real; hst: day after planting.

D. Dry Weight Plant

Pursuant to result of analysis of variation of dry weight of sweet corn plant showed no interaction between treatment of paitan fertilizer and oil treatment of mimba. The treatment of paitan fertilizer gave a significant effect on dry weight parameter of sweet corn plant at all age of observation. The mimba oil treatment did not give any significant effect to dry weight parameter of sweet corn plant at all age of observation. The value of dry weight of sweet corn plant is presented in Table 4.

Table 4 shows the dry weight of plants at ages 14, 28 and 56 hst having the highest value on the 15 ton/ha fertilizer treatment, but not significantly different from the treatment of 10 ton/ha of fertilizer. With the lowest dry weight value on the fertilizer treatment paitan 0 ton/ha. At the age of 42 hst observation, the highest dry weight of the crops from the 15 ton/ha fertilizer treatment was 29.98. While the lowest dry weight value of the treatment of fertilizer paitan 0 ton/ha of 14.83.

TABLE 4
DRY WEIGHT OF SWEET CORN PLANT FROM THE TREATMENT OF PAITAN FERTILIZER AND OIL OF MIMBA

Treatment	Dry weight of sweet corn plant from the treatment			
	14	28	42	56
Paitan				
Paitan 0 ton/ha (P0)	0,36 a	1,78 a	14,83 a	58,00 a
Paitan 10 ton/ha (P1)	0,45 b	3,25 b	24,48 b	88,10 b
Paitan 15 ton/ha (P2)	0,49 b	3,92 b	29,98 c	94,12 b
BNT 5%	0,08	0,75	4,80	10,40
Mimba				
Mimba 0 g/plant (M0)	0,42	2,79	21,74	79,44
Mimba 2.5 g/ plant (M1)	0,47	2,56	24,66	80,22
Mimba 5 g/plant (M2)	0,44	3,07	22,62	78,36
Mimba 7.5 g/plant (M3)	0,41	3,51	23,37	82,28
BNT 5%	tn	tn	tn	tn
KK (%)	20,56	29,76	24,54	15,34

Remarks: values followed by the same letter at each age of observation and treatment (paitan or palm oil) were not significantly different by BNT test of 5% level; tn: not real; hst: day after planting.

E. Observation of Production Heavy cobs weigh sweet corn

Based on the result of the analysis of the variation of the weight of corn cobs weighted maize indicated the interaction between the treatment of paitan fertilizer and the oil treatment of mimba. The value of the weight of the sweet corned cobs is presented in Table 5.

TABLE 5
HEAVY COBS WEIGHING SWEET CORN FROM THE TREATMENT OF PAITAN AND MIMBA OIL

Perlakuan	Heavy cobs weighing sweet corn (g)			
	Mimba 0 g/plant (M0)	Mimba 2.5 g/plant (M1)	Mimba 5 g/plant (M2)	Mimba 7.5g/plant (M3)
Paitan 0 ton/ha (P0)	221,00 a	228,73 a	235,83 a	241,97a
Paitan 10 ton/ha (P1)	243,87 a	279,40 b	299,47 bc	294,93 b
Paitan 15 ton/ha (P2)	312,03 c	310,43 c	339,57 c	346,50 c
BNT 5%		19,47		
KK (%)		4,11		

Remarks: values followed by the same letter at each age of observation and treatment (paitan or palm oil) were not significantly different by BNT test of 5% level; tn: not real; hst: day after planting.

From Table 5 can be seen the effect of treatment of paitan to oil treatment of mimba. Treatment of 0 tons/ha fertilizer gave the highest weighted earning value in the oil treatment of 7.5 g/plant and the lowest value in the oil treatment of 0 g/plant.

The influence of the mimba oil treatment on the treatment of paitan to the weight of the cob swatted sweet corn. At the treatment of mimba oil 0 g/cob weight plant weighs the lowest on the treatment of fertilizer paitan 0 tons/ha. Change of dose of fertilizer paitan 0 ton/ha to 10 ton/ha and 15 ton/ha give weight value of cob weighted increase. These results are similar to the treatment of mimba oil 2.5 g/plant, 5 g/plant and 7.5 g/plant.

F. Sugar level

Based on the analysis of the variation of sweet corn sugar showed no interaction between the treatment of paitan fertilizer and the mimba oil treatment. Treatment of paitan give influence to sweet corn sugar. The value of sweet corn sugar content is presented in Table 6.

TABLE 6
LEVELS OF SWEET CORN SUGAR FROM THE TREATMENT OF PAITAN AND MIMBA OIL

Treatment	Sugar level (Brix)
Paitan	
Paitan 0 ton/ha (P0)	12,73 a
Paitan 10 ton/ha (P1)	13,54 b
Paitan 15 ton/ha (P2)	13,96 b
BNT 5%	0,44
Mimba	
Mimba 0 g/plant (M0)	13,38
Mimba 2.5 g/plant (M1)	13,61
Mimba 5 g/plant (M2)	13,28
Mimba 7.5 g/plant (M3)	13,38
BNT 5%	tn
KK (%)	3,86

Remarks: values followed by the same letter at each age of observation and treatment (paitan or palm oil) were not significantly different by BNT test of 5% level; tn: not real; hst: day after planting.

Table 6 shows the fertilizer treatment of 15 ton/ha has the highest plant weight value, but it was not significantly different with the treatment of 10 tons/ha of fertilizer. Treatment of 0 tons/ha of fertilizer has the lowest plant weight value compared to other fertilizer treatments. As for the treatment of oil mimba did not give a real effect on sweet corn sugar content.

G. Yields

Based on the results of the analysis of the variety of crops per ha of sweet corn indicates the interaction between the treatment of paitan and the mimba oil treatment. The yield per hectare is calculated from the weight of the sweet corned swishstick per plot converted to hectares. The treatment of fertilizer paitan gives a very real effect to the harvest. While the oil treatment of mimba gives a real effect on the sweet corn harvest. The value of the crop per hectare ha ha is shown in Table 7

TABLE 7
UNCULTIVATED COB YIELDS OF SWEET CORN FROM THE TREATMENT OF PAITAN AND OIL MIMBA

	Uncultivated cob yields of sweet corn (ton/ha)			
Treatment	Mimba 0 g/plant (M0)	Mimba 2.5 g/plant (M1)	Mimba 5 g/plant (M2)	Mimba 7.5 g/plant (M3)
Paitan 0 ton/ha (P0)	10,40 a	10,76 a	11,10 a	11,39 ab
Paitan 10 ton/ha (P1)	11,48 a	13,15 b	14,09 b	13,88 b
Paitan 15 ton/ha (P2)	14,68 c	14,61 c	15,98 c	16,31 c
BNT 5%	0,92			
KK (%)	4,11			

Remarks: values followed by the same letter at each age of observation and treatment (paitan or palm oil) were not significantly different by BNT test of 5% level; tn: not real; hst: day after planting.

From Table 7 can be seen the effect of treatment of paitan on the oil treatment of mimba on the harvest per sweet corn ha. The 0 ton/ha panning treatment gave the highest yield value on the oil treatment of mimba 7.5 g/plant and the lowest in the oil treatment of neighboring 0 g/plant. The 10 ton/ha panning treatments gave the highest yield value on the treatment of mimba oil 5 g/plant and the lowest on the oil treatment of 0 g/plant. While for treatment of paitan 15 ton/ha give highest value of crop at treatment of 7.5 g/plant and lowest at oil treatment of mimba 2.5 g/plant. The influence of the mimba oil treatment on the treatment of paitan on sweet corn yield.

The treatment of mimba oil 0 g/plant gives the highest value on the treatment of 15 ton/ha and the lowest on the treatment of 0 ton/ha. Treatment of mimba oil 2.5 g/plant gives the highest value at the treatment of 15 tons/ha and the lowest on the treatment of pairs 0 tons/ha. The treatment of mimba oil 5 g/plant gives the highest value at 15 tons/ha and the lowest treatment at 0 ton/ha. Treatment of mimba oil 7.5 g/plant gives the highest value at the treatment of 15 tons/ha and the lowest on the treatment of pairs 0 tons/ha.

IV. DISCUSSION

A. *Interaction of Paitan and Moroccan Fertilizer to Sweet Corn*

The treatment of paitan fertilizers and oil treatment gave a real interaction with the weight of cobs weighing, the weight of cobs without weight, the length of the cob and the harvest per hectare. Provision of 15 ton/ha of paitan fertilizer with the treatment of mimba oil 5-7.5 g/plant gives the highest weight of cob weighs than without paitan and oil treatment. Treatment of 15 ton/ha paitan fertilizer is able to add nutrients P which plays an important role in the formation of flowers, fruits and seeds of sweet corn. The mimba oil treatment of 5-7.5 g/plant can help the sweet corn plants form the root of its function to assist the absorption of nutrients.

Giving paitan and mimba oil can increase the yield of sweet corn crop. This is because paitan fertilizer can give additional nutrient supply to corn plant, especially nutrient P. This is in accordance with [11] statement potentially in the provision of P, where paitan able to provide P in a fast time that reaches 92% in phase early plant growth. Mimba oil also plays an important role in improving the ability of roots in the absorption of nutrients in the soil. Mimba oil mimba is able to absorb water and nutrients especially P to the soil micro pore.

The process of forming a sweet corncob is strongly influenced by the availability of nutrients P on the soil. This is because the nutrients of P play an important role in the generative growth of a plant. This is in accordance with the statement [12] the availability of sufficient nutrients at the time of growth causes the metabolism of plants will be more active so that the process of cell division will be better which ultimately encourages the increase in fruit weight. Therefore, the provision of 15 tons/ha of paitan fertilizer and 5 g/plant of mimba can influence the sweet corn cob yield, because it is able to provide optimal supply of nutrients. The availability of optimal nutrients will maximize the growth of sweet corn crops. Paitan fertilizer is one source of soil organic matter that is important for soil fertility. Organic matter is able to increase the population and activity of beneficial microorganisms for plants such as rhizobium and mimba oil. Input of organic matter affects the infections of mimba oil in the root of maize and the amount of spores of mimba oil in root areas. Alusia, 2014 states that the more soil organic matter the more optimal the plant growth will be. So that the application of paitan fertilizer is very suitable if it is taken with the provision of mimba oil to increase the growth and yield of sweet corn crops. Input of organic matter from paitan can also provide a source of energy for mimba oil so that it can improve soil aeration and can eventually increase the amount of spores of mimba oil in root areas. The use of paitan fertilizer gives a better effect than mimba oil when viewed from the sweet corn harvest. Paitan fertilizer provides improved sweet corn yields higher than mimba oil. This is because paitan fertilizer is one of the suppliers of macro and micro nutrients for good plants. So that sweet corn plants are able to give the best crop, due to the fulfillment of nutrient needs of the plant.

B. *Influence of Pohon Fertilizer Treatment to Sweet Corn*

From the research, it was found that the paitan fertilizer treatment had significant effect on plant height, leaf number, leaf area, dry weight of plant, cob diameter, sugar content of sweet corn plant. Treatment of 15 ton/ha of paitan fertilizer gives a big influence on the growth and yield of crops when compared with plants without the treatment of paitan fertilizer. The results of Hutomo et al. 2015 shows that the average yield per hectare of maize given fertilizer paitan dose 15 tons/ha provides the greatest value compared with other doses.

Fertilizer paitan of 15 tons/ha can provide additional supply of nutrients for the process of vegetative growth of sweet corn crops. The number of leaves of sweet corn plant at age 28, 42, 56 hst gave a real different effect. The highest number of sweetcorn leaves on the treatment of 15 tons/ha of fertilizer. Increasing the number of leaves caused by leaf formation is influenced by the absorption and availability of nutrients, especially macro nutrients. Nitrogen element plays a role in the formation of leaves [13]. This proves that paitan fertilizer can provide additional supply of nutrients for sweet corn plants.

Element N and P is the most important element for growth, so if the existence of the element is less then the growth of plants will not be maximized. According to [13] on vegetative growth the process of photosynthesis takes place with high capacity. As a result, the nutrient requirement is getting bigger especially the N element so that when the shortage will cause the plant to grow dwarf,

flowering is inhibited, and the root growth is limited so the production is low, while the requirement of P element increases up to 45% when the hair starts to appear. P deficiency causes the panicles to be late, the filling of the cobs disturbed, the slow grinding of seeds and the small seeds.

C. *The Influence of Mimba Oil Treatment to Sweet Corn*

From the research conducted obtained the results of oil treatment mimba effect on the weight of cobs berkelob weigh, cob weight without kelobot, length of cob and yield per hectare sweet corn. Sweet corn crops treated with mimba oil treatment of 5-7.5 g/plant gives the value of observation parameters of sweet corn harvest is greater than the oil treatment plant neither 0 g/plant. Mimba oil supply of 5-7.5 g/plant gives a real effect on sweet corn crop yield. This is because the sweet maize cinnamon mimba plant can increase the absorption of nutrients in bound form which previously was not absorbed by the plant.

Mimba oil has a significant effect on the weight of cobs of sweet corn, wherein the provision of mimba oil 5 and 7.5 g/plant is the treatment that gives the highest cob weight value. Treatment of mimba oil 5 and 7.5 g/plant gives the value of weight of cobs berkelob and or higher without weight if compared with oil treatment of neighbor 0 g/plant. This is supported by the statement of [14] of the mimba oil pesticide treatment giving the best influence to the growth and production of corn crops in marginal dry land.

Mimba oil gives no significant effect on all growth parameters. Although mimba oil inoculation may increase yield but not affect growth parameters. In the parameters of plant height, the number of leaves, leaf area, and dry weight of plants showed no influence from mimba oil. This is presumably because the activity of mimba oil is hampered by land factors.

V. CONCLUSION

1. On observation of crop yields interaction on the weight of cob weights, weightless cobs, length of cobs, and cob yields without weight per hectare. Fertilizer paitan 15 ton/ha with neem oil 5 g/plant and fertilizer paitan 15 ton/ha with 7.5 g oil mimba gram/plant gives cob yield without best weight per hectare.

2. The treatment of paitan fertilizer gives a significant effect on plant height, leaf number, leaf area, dry weight of plant, diameter of cob, fresh weight of plant, and sweet corn sugar content. Fertilizer paitan 10 ton/ha and fertilizer paitan 15 ton/ha give better influence than fertilizer paitan 0 ton/ha.

3. Treatment of neem oil gives a real effect on the diameter of cobs of sweet corn crops. Provision of neem oil 2.5 g/plant, 5 g/plant and 7.5 g/plant gives the diameter of cob better than the oil of 0 g/plant.

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