

## Response Initial Vegetative Growth of Local Durian (*Durio zibethinus* Murr.) with The Addition of Organic Fertilizers

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### ABSTRACT

This research aims to observe the three cultivars of durian growth responds using organic fertilizer and to know the suitable type of organic fertilizer in the initial phase of vegetative growth on durian. The research was conducted in the Watulor, Waturejo village, district Ngantang, Malang with altitude 669 meters above sea level with rainfall 1588 mm/year. This research was conducted in February until June 2010. Research were using randomized block design with treatment three types of organic fertilizer 10 kg plant<sup>-1</sup> on three local durian cultivars. Treatments were consist of: P1K1 (Durian Jingga using goat manure fertilizer), P1K2 (Durian Arab using goat manure fertilizer), P1K3 (Durian Sepanjang Musim using goat manure), P2K1 (Durian Jingga using chicken manure), P2K2 (Durian Arab using chicken manure), P2K3 (Durian Sepanjang Musim using chicken manure), P3K1 (Durian Jingga using green manure), P3K2 (Durian Arab using green manure), and P3K3 (Durian Sepanjang Musim using green manure). There were 9 treatments and each treatment had 3 repetition. The results of this research showed that in the variable number of leaves, usage of chicken manure and green manure on the Durian Arab had the highest response compared to Durian Jingga and Durian Sepanjang Musim. While in the variable leaf area, Durian Jingga and Durian Arab using chicken and green manure fertilizer was having higher leaf area than Durian Sepanjang Musim. The soil analysis of using organic fertilizer on durian showed that the N content in soil was increased, P and K nutrient in the soil was decreased, while the average N content in leaf was decreased, P and K nutrient in the leaves was increased.

Keywords: Durian Jingga, Arab durian, Durian Sepanjang Musim, chicken manure, goat manure, green manure.

### INTRODUCTION

Durian (*Durio zibethinus* Murr.) is one of the featured fruit plant on tropical regions with high economic value and become one of the leading fruit in Indonesian horticulture (Syariefa, 2003). Indonesia has diverse durian varieties and each region has a supreme varieties. In the district Kasembon and Ngantang, Malang regency, there were varieties of local durian Ngantang which have specific characteristics, distinctive, and it can not found in other areas. The quality of durian is not inferior to the other local durians and durian imports. Therefore, to obtain a high quality product and able to compete in the local and international marketing, it needs an efforts to cultivate and develop these products intensively according to the habitat. In addition, the required handling of

the proper cultivation techniques, especially during the vegetative phase.

Organic Fertilizer is an alternative to support growth and development of plants. Organic fertilizer aims to loosen the soil and add nutrients in the soil so the plants can utilize these nutrients to grow and develop (Novizan, 2002). In the growth phase, durian needs fertilizer in small amounts and frequently added (Untung, 2001). It was not easy to determine the exact time and dosage of fertilization because its related to the level of soil fertility, plant age, soil form and natural environment (Nipin, 2002).

The hypothesis of this study were treatment chicken manure will produce durian plant growth faster than the goat manure and green manure. Type of Durian Arab had high response of plants growing component with organic fertilizer treatment

compared with Durian Jingga and Sepanjang Musim varieties.

## MATERIAL AND METHODS

The experiment was conducted in Watu lor, village Waturejo, Ngantang sub-district, Malang regency with altitude of 669 meters above sea level with rainfall of 1588 mm / year. The research was conducted between February until June 2010. Tools were used in this study, consist of: stationery, digital cameras, label, ruler, caliper, GPS, scales, analytical balance, soil moisture tester, hoe, trowel, stakes, sickle, and scissor. Materials were used in this study consist of durian cultivars Manalagi (as rootstock), durian cultivars Jingga, Arab and Sepanjang Musim (aged 5-7 months after grafting), goat manure, chicken manure, compost leaves, Furadan and pesticides.

This research was a field experiment and methods in this study were using randomized block design, the treatment given were three kinds of organic fertilizer 10 kg plant<sup>-1</sup> in three cultivars of local durians. Treatments were consist of: P1K1 (Durian Jingga using goat manure), P1K2 (Durian Arab using goat manure), P1K3 (Durian Sepanjang Musim using goat manure), P2K1 (Durian Jingga using chicken manure), P2K2 (Durian Arab using chicken manure), P2K3 (Durian Sepanjang Musim using chicken manure), P3K1 (Durian Jingga using green manure), P3K2 (Durian Arab using green manure), and P3K3 (Durian Sepanjang Musim using green manure). There were 9 treatments and each treatment had 3 repetition, each replication consisted of 27 plants durian. The obtained data were tested using analysis of variance (F test) with a significance level of  $p = 0.05$  (F table 5%). If there are a significant differences, it will be continued by LSD test at level of 5%.

Plant growth observations were using non destructive with 27 sample plant with 2 week observations interval. Parameter of growth consist of: plant height, upper stem diameter, lower stem diameter, number of

leaves and leaf area. Analysis content of N, P, K on soil and analysis content of N, P, K on leaf (destructively) was performed before the treatment (0 week after treatment) and 12 weeks after treatment.

## RESULTS AND DISCUSSION

### Plant Growth of Durian

Results analysis of variance showed that treatment of organic fertilizer on durian were significantly affect to parameters number of leaves (Table 4) and leaf area (Table 5). However, plant height (Table 1), upper stem diameter (Table 2) and lower stem diameter (Table 6) were not significantly different at all observation periods in each treatment.

Stem is plant organ that functioning as the support of the growth of plants (Wiryanta, 2002). Based on the results of analysis of variance, the various type of organic fertilizer on the local durian were not significantly affect plant height (Table 4). Durian is including tree crops (annual), that take long infancy juvenile, therefore plant height was not significantly increase (Table 1).

Treatment various type of organic fertilizer on local durian were not significantly affect the growth of upper stem diameter (Table 2) and the lower stem diameter (Table 3) at all ages observations. That is because the growth of tree stem diameter tend to require longer periods of time, even though the treatment of organic fertilizer has been given for the growth process, but the increase in upper and lower stem diameter were not significantly different.

Balance of plant growth in the main stem growth is important to sustain the plant growth, so it expected there would be a balanced growth between upper stem and lower stem (rootstock), because if the upper stem on connection is bigger than lower stem, the result would be like 'foot stork' and if growth of upper stem are more dominant, so over time lower stem can not support, so that over time rootstock can not support the load on upper stem extension and the plant will be tumble-down.

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**Table 1.** Plant height (cm) using various type of organic fertilizers to the 3 types of local durian at various observation periods

Treatment	Improvement in plant height (cm) at observations weeks after treatment					
	2	4	6	8	10	12
Goat Manure + Jingga	1,09	1,26	1,34	1,25	1,23	1,09
Goat Manure + Arab	0,99	1,40	1,09	1,19	1,28	1,00
Goat Manure + S.Musim	0,93	1,06	1,25	1,06	1,16	0,93
Chicken Manure + Jingga	1,05	1,09	1,24	1,38	1,40	1,05
Chicken Manure + Arab	1,12	1,28	1,11	1,05	1,16	1,12
Chicken Manure + S.Musim	0,89	0,95	0,93	0,94	0,93	0,89
Green Manure + Jingga	1,09	1,39	1,41	1,21	1,29	1,10
Green Manure + Arab	1,15	1,45	1,51	1,56	1,20	1,15
Green Manure + S.Musim	0,92	1,09	1,06	1,16	1,07	0,92
LSD 5%	ns	ns	ns	ns	ns	ns

Remarks : ns = not significantly different.

**Table 2.** Upper stem diameter (cm) using various type of organic fertilizers to the 3 types of local durian at various observation periods

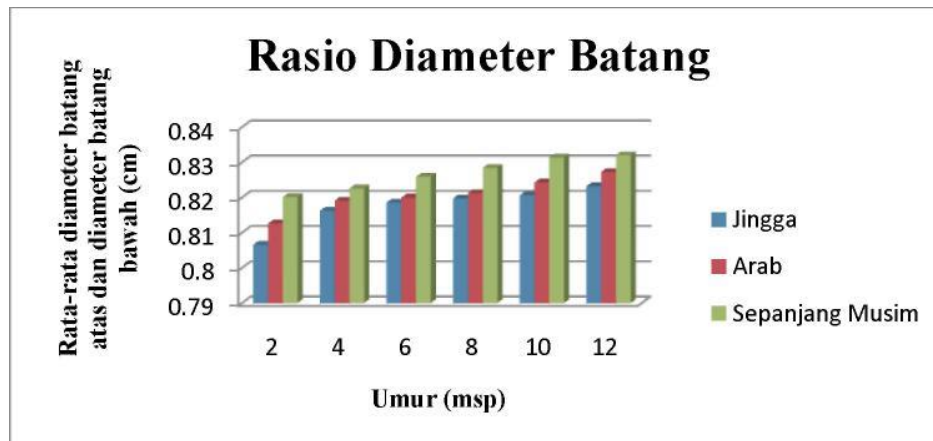
Treatment	Improvement in stem diameter on above part (cm) at observations weeks after treatment					
	2	4	6	8	10	12
Goat Manure + Jingga	0,71	0,71	0,72	0,71	0,71	0,71
Goat Manure + Arab	0,71	0,71	0,71	0,71	0,71	0,71
Goat Manure + S.Musim	0,71	0,71	0,71	0,71	0,71	0,71
Chicken Manure + Jingga	0,71	0,72	0,72	0,72	0,72	0,72
Chicken Manure + Arab	0,71	0,72	0,72	0,72	0,71	0,71
Chicken Manure + S.Musim	0,71	0,71	0,71	0,71	0,71	0,71
Green Manure + Jingga	0,71	0,71	0,71	0,71	0,71	0,71
Green Manure + Arab	0,71	0,72	0,71	0,71	0,71	0,71
Green Manure + S.Musim	0,71	0,71	0,71	0,71	0,71	0,71
LSD 5%	ns	ns	ns	ns	ns	ns

Remarks: ns = not significantly different.

**Table 3.** Lower stem diameter (cm) using various type of organic fertilizers to the 3 types of local durian at various observation period

Treatment	Lower stem diameter (cm) at observations weeks after treatment					
	2	4	6	8	10	12
Goat Manure + Jingga	0,72	0,72	0,72	0,71	0,72	0,71
Goat Manure + Arab	0,72	0,72	0,72	0,72	0,72	0,72
Goat Manure + S.Musim	0,71	0,71	0,72	0,71	0,72	0,72
Chicken Manure + Jingga	0,72	0,72	0,72	0,72	0,72	0,72
Chicken Manure + Arab	0,72	0,72	0,72	0,72	0,72	0,71
Chicken Manure + S.Musim	0,71	0,71	0,71	0,71	0,71	0,71
Green Manure + Jingga	0,71	0,71	0,72	0,72	0,72	0,71
Green Manure + Arab	0,71	0,72	0,72	0,72	0,72	0,72
Green Manure + S.Musim	0,71	0,71	0,71	0,71	0,71	0,71
LSD 5%	ns	ns	ns	ns	ns	ns

Remarks: ns = not significantly different.



**Figure 1.** Graph the average diameter ratio of scions and rootstocks. Descriptions: Compatible (1: 1), Walking stork (> 1), Elephantiasis (<1)

**Table 4.** Number of leaves (leaf) using various type of organic fertilizers to the 3 types of local durian at various observation periods.

Treatment	Number of leaves (leaf) at observations weeks after treatment					
	2	4	6	8	10	12
Kotoran Kambing + Jingga	1,45	1,36ab	1,48	1,22ab	1,34	1,31abc
Goat Manure + Arab	1,41	1,23ab	1,37	1,30ab	1,25	1,42bc
Goat Manure + S.Musim	1,19	1,11a	1,09	1,09a	0,90	1,15ab
Chicken Manure + Jingga	1,59	1,19ab	1,47	1,29ab	1,07	1,40bc
Chicken Manure + Arab	1,60	1,48b	1,41	1,54b	1,37	1,52c
Chicken Manure + S.Musim	1,22	1,15a	1,03	0,96a	0,95	1,08a
Green Manure + Jingga	1,43	1,33ab	1,30	1,13a	1,21	1,44c
Green Manure + Arab	1,86	1,86c	1,41	1,48ab	1,45	1,57c
Green Manure + S.Musim	1,35	1,27ab	1,40	1,11a	1,07	1,38bc
LSD 5%	ns	0,32	ns	0,34	ns	0,29

Remarks : Numbers followed by the same letter at the same age on the column showed no significant different based on LSD test at level 5%.

Meanwhile, if the growth of upper stem is less than the rootstock, it will produce a 'trunk elephantiasis' extension and looks disproportionate, so the plant will be easy to collapse when exposed to high winds or overloaded by durian fruit. Therefore, the upper and lower stem extension has to be balanced. The ratio of upper and lower stem diameter of three cultivars durian due to treatment various of organic fertilizers was presented in Figure 1. It showed that the growth ratio of upper stem and lower stem on durian tend to have a stem elephantiasis (<1), the upper stem accreting stem diameter faster than the lower stem, because it is still in the initial vegetative phase, the stem growth expected can

balance between the upper and lower stem diameter.

Leaves is a plant organ that essential for plant growth for photosynthesis system (Sitompul and Guritno (1995). Therefore, plant growth is determined by the photosynthetic activity, which is photosynthate as result of photosynthesis are translocated to the plant organs for the plant growth. On the parameter number of leaves, increasing number of leaves shown at 4, 8 and 12 weeks after treatment (Table 4), because the formation of durian leaves from the buds until unfolded takes time between 3 weeks until 1 month.

The formation of leaves organ is affected by nutrients absorption of the plants. The availability of nutrients inside the

**Table 5.** Leaf area (cm<sup>2</sup>) using various type of organic fertilizers to the 3 types of local durian at various observation periods

Treatment	Leaf Area (cm) at observations weeks after treatment					
	2	4	6	8	10	12
Goat Manure + Jingga	7,94	6,54 b	6,94bc	6,99bc	6,28cd	5,94bc
Goat Manure + Arab	6,92	6,52 b	5,40abc	5,78bc	5,52bcd	5,98bc
Goat Manure + S.Musim	6,72	3,99 a	4,54ab	4,7 lab	3,03a	3,87ab
Chicken Manure + Jingga	9,75	5,68 ab	7,34c	5,98bc	5,64cd	6,79c
Chicken Manure + Arab	8,38	7,08 b	7,65c	6,32bc	6,61d	6,33c
Chicken Manure + S.Musim	5,50	3,75 a	3,26a	3,03a	3,16ab	3,42a
Green Manure + Jingga	7,55	6,54 b	5,79abc	6,39bc	4,85abc	6,07bc
Green Manure + Arab	8,97	11,19 c	7,27c	7,47c	6,3 led	6,46c
Green Manure + S.Musim	7,45	4,98 ab	6,29bc	4,76ab	4,04abc	4,60abc
LSD 5%	ns	2,33	2,72	2.46	2,44	2,20

Remarks: Numbers followed by the same letter at the same age on the column showed no significant different based on LSD test at level 5%.

soil, availability of water in the soil, absorption roots, alkaline soil and absorption plant itself are playing important roles in nutrients absorption (Sutejo, 1999). Photosynthetic rate of plants is determined by leaf area. The larger leaf area, the optimal leaves to absorb sunlight, which is used for photosynthesis (Sitompul and Guritno, 1995). Results of analysis of variance showed that treatment of various organic fertilizer on durian had significant effect on the increase in leaf area at observation periods of 4, 6, 8 and 10 week after treatment. When vegetative phase, result of photosynthesis is highly used for leaf growth. Sitompul and Guritno (1995), stated the rate of leaf photosynthesis of young and old leaves increased rapidly, in line with the age of the plant until the flowering period (generative phase) and then decreases on further developments.

Results of analysis of variance showed that treatment of various organic fertilizer on durian had significant effect on the increase in leaf area at observation periods of 4, 6, 8, 10 and 12 week after treatment (Table 5). This was presumably because when the leaves had very influential factor on subsequent plant growth, as evidenced in the Arab durian, leaves appeared faster and it tend to have more number of leaves and leaf area to be higher compared to the other cultivars. Durian Sepanjang Musim produced the lowest leaf area, if the leaves area were low,

the capacity to do photosynthesis activity will also low. Therefore, leaf area significantly affect the rate of photosynthesis in plants. While leaf area on Arab and Durian Jingga were high, the solar radiation absorbed by the leaves also higher, so the process of photosynthesis could be optimum. Guritno Sitompul (1995), stated that the higher leaf area will be able to capture sunlight and CO<sub>2</sub> diffusion more effective to accelerate the rate of photosynthesis. Photosynthate then translocated to plant organs such as roots, stems and leaves. Thus, the total leaf area of plants were affected by the number of leaves and photosynthate production.

#### Macro Nutrients Availability in The Soil

In the soil analysis showed that there has been a change in the content of N, P and K in the soil after treatment of various organic fertilizers could increased N soil. This happened because nitrogen holding capacity of the soil due to the activity of soil microorganisms (Sutejo, 1999). There were significant differences in soil analysis before and after treatment in the treatment of goat manure, chicken manure and green manure. Soil analysis before treatment showed the nitrogen content in the soil 0.14%, while after treatment 0.18% - 0.20%. This was indicated that plants absorb nutrients that has been provided to support the growth of durian. Phosphorus element in the root layer is not mobile and easily washed by water.

**Table 6.** Soil analysis of Nitrogen (N) before and after treatment various type of organic fertilizers

Treatment	Before Treatment N (%)	After Treatment N (%)	Nutrient Levels N %		
			Low	Medium	High
P1K1	0,14	0,19	0,1-0,2	0,21-0,5	0,51-0,75
P1K2	0,14	0,19	0,1-0,2	0,21-0,5	0,51-0,75
P1K3	0,14	0,18	0,1-0,2	0,21-0,5	0,51-0,75
P2K1	0,14	0,20	0,1-0,2	0,21-0,5	0,51-0,75
P2K2	0,14	0,20	0,1-0,2	0,21-0,5	0,51-0,75
P2K3	0,14	0,19	0,1-0,2	0,21-0,5	0,51-0,75
P3K1	0,14	0,19	0,1-0,2	0,21-0,5	0,51-0,75
P3K2	0,14	0,18	0,1-0,2	0,21-0,5	0,51-0,75
P3K3	0,14	0,18	0,1-0,2	0,21-0,5	0,51-0,75

Remarks: P1 (Goat manure), P2 (Chicken Manure), P3 (Green Manure), K1 (Durian Jingga), K2 (Durian Arab), K3 (Durian Sepanjang Musim).

**Table 7.** Soil analysis of Phosphorus (P) content before and after treatment various type of organic fertilizers

Treatment	Before Treatment P (ppm)	After Treatment P (ppm)	Nutrient Levels P (ppm)		
			Low	Medium	High
P1K1	59,54	29,00	10-20	21-40	41-60
P1K2	59,54	27,50	10-20	21-40	41-60
P1K3	59,54	32,00	10-20	21-40	41-60
P2K1	59,54	37,50	10-20	21-40	41-60
P2K2	59,54	35,60	10-20	21-40	41-60
P2K3	59,54	33,50	10-20	21-40	41-60
P3K1	59,54	30,90	10-20	21-40	41-60
P3K2	59,54	30,00	10-20	21-40	41-60
P3K3	59,54	30,80	10-20	21-40	41-60

Remarks: P1 (Goat manure), P2 (Chicken Manure), P3 (Green Manure), K1 (Durian Jingga), K2 (Durian Arab), K3 (Durian Sepanjang Musim).

**Table 8.** Soil analysis of Potassium (K) content before and after treatment various type of organic fertilizers

Treatment	Before Treatment K (me/100g)	After Treatment K (me/100 g)	Nutrient Levels K (me/100g)		
			Low	Medium	High
P1K1	1,29	0,99	0,1-0,3	0,31-0,6	0,61-1,0
P1K2	1,29	0,93	0,1-0,3	0,31-0,6	0,61-1,0
P1K3	1,29	1,04	0,1-0,3	0,31-0,6	0,61-1,0
P2K1	1,29	1,60	0,1-0,3	0,31-0,6	0,61-1,0
P2K2	1,29	1,50	0,1-0,3	0,31-0,6	0,61-1,0
P2K3	1,29	1,64	0,1-0,3	0,31-0,6	0,61-1,0
P3K1	1,29	0,91	0,1-0,3	0,31-0,6	0,61-1,0
P3K2	1,29	1,00	0,1-0,3	0,31-0,6	0,61-1,0
P3K3	1,29	0,98	0,1-0,3	0,31-0,6	0,61-1,0

Descriptions: P1 (Goat manure), P2 (Chicken Manure), P3 (Green Manure), K1 (Durian Jingga), K2 (Durian Arab), K3 (Durian Sepanjang Musim).

Most of the land has capacity to absorb and bind phosphorus, except on sandy soils (Novizan, 2002).

On Table 7 showed a significant change in the phosphorus (P) content

because the availability form of phosphorus can be absorbed by plants. The analysis soil before treatment of organic fertilizer, content phosphorus in soil was higher 59.54 (ppm) than after treatment with amount of

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phosphorus 27.00 (ppm)-37.50 (ppm). The effect of organic matter on the phosphorus availability can be directly through the mineralization process or indirectly by release of P fixation at warm temperatures. Availability of phosphorus will increase due to the reform process of organic materials, while the availability of phosphorus decrease in low-temperature area (Novizan, 2002). Based on analysis data on Table 7, the phosphorus content in the soil is still enough. However, the addition of phosphorus fertilizer highly recommended to increase the reserves of phosphorus in the soil (Sutejo, 1999).

Analysis content of potassium (K) in the soil after treatment were in medium level. Potassium is absorbed by plants in the form of  $K^+$  ions. In the soil, these ions are very dynamic, easily leached in sandy soils, and soils with low pH has low availability of potassium (Novizan, 2002). In this research, Potassium (K) showed an increase and decrease after treatment various types of organic fertilizers. Based on soil analysis before and after treatment (Table 8), the reduction of potassium content in the soil of 4.03% - 43.33%. This is presumably because the form of potassium in the soil was not available, so the nutrients can not be absorbed by plants. The loss of supplies potassium could be reduced because

potassium taken by plants, potassium leaching by rainwater and soil erosion. Novizan (2002), stated that the plants absorb more potassium and nitrogen more than other nutrients

#### Nutrient (N, P, K) Absorbption on Leaves

Observation element N, P and K in the leaves was done by taking leaf samples of each treatment. The results of leaf analysis before and after the treatment were significantly changes in the content of N, P and K on leaves. Content of nitrogen (N) on leaves was relatively stable on the amount of N content 1.97% in the leaves (Table 9), This happened because nitrogen absorption by durian was well supported by organic fertilizers and sufficient soil water could make soil moisture high enough, so plants could absorb nitrogen optimally. The higher nitrogen content on leaf, photosynthesis would work better because it helps to multiply the number of chlorophyll, that used for photosynthesis (Sitompul and Guritno (1995). Based on Table 9, the content of nitrogen after treatment using organic fertilizers was in medium level for plant growth. Leaf analysis before and after treatment showed an increase in content of phosphorus (P) which is quite high at 58.82% - 78.37% (Table 10).

**Table 9.** Leaf analysis of nitrogen (N) content before and after treatment various type of organic fertilizers

Treatment	Before Treatment N (%)	After Treatment N (%)	Nutrient Levels N %	
			Low	Medium
P1K1	1,90	2,04	1,66	1,97
P1K2	2,05	2,02	1,66	1,97
P1K3	1,97	1,81	1,66	1,97
P2K1	1,90	1,92	1,66	1,97
P2K2	2,05	2,19	1,66	1,97
P2K3	1,97	1,88	1,66	1,97
P3K1	1,90	1,97	1,66	1,97
P3K2	2,05	2,11	1,66	1,97
P3K3	1,97	1,83	1,66	1,97

Descriptions: P1 (Goat manure), P2 (Chicken Manure), P3 (Green Manure), K1 (Durian Jingga), K2 (Durian Arab), K3 (Durian Sepanjang Musim).

**Table 10.** Leaf analysis of Phosphorus (P) content before and after treatment various type of organic fertilizers

Treatment	Before Treatment P (%)	After Treatment P (%)	Nutrient Levels P %	
			Low	Medium
P1K1	0,07	0,26	0,05	0,26
P1K2	0,08	0,25	0,05	0,26
P1K3	0,07	0,20	0,05	0,26
P2K1	0,07	0,31	0,05	0,26
P2K2	0,08	0,25	0,05	0,26
P2K3	0,07	0,23	0,05	0,26
P3K1	0,07	0,37	0,05	0,26
P3K2	0,08	0,26	0,05	0,26
P3K3	0,07	0,22	0,05	0,26

Remarks: P1 (Goat manure), P2 (Chicken Manure), P3 (Green Manure), K1 (Durian Jingga), K2 (Durian Arab), K3 (Durian Sepanjang Musim).

**Table 11.** Leaf analysis of Potassium (K) content before and after treatment various type of organic fertilizers

Treatment	Before Treatment (K %)	After Treatment (K %)	Nutrient Levels K %	
			Low	Medium
P1K1	0,71	0,97	0,67	0,95
P1K2	0,83	0,95	0,67	0,95
P1K3	0,98	0,86	0,67	0,95
P2K1	0,71	1,00	0,67	0,95
P2K2	0,83	0,99	0,67	0,95
P2K3	0,98	0,88	0,67	0,95
P3K1	0,71	1,00	0,67	0,95
P3K2	0,83	1,03	0,67	0,95
P3K3	0,98	0,89	0,67	0,95

Remarks: P1 (Goat manure), P2 (Chicken Manure), P3 (Green Manure), K1 (Durian Jingga), K2 (Durian Arab), K3 (Durian Sepanjang Musim).

According Sutejo (1995), the availability of P depends on the rate of mineralization and immobilization of organic matter, while the important factors that affect the rate of mineralization and immobilization is the quality and quantity of organic matter. Thus, the addition of organic fertilizers in the soil could causes phosphorus content in the plant becomes higher. Phosphorus absorbed by plant to help the energy transport and used for establishing the roots system, so the plant can absorb nutrients in the soil optimally (Novizan, 2002). After treatment various type of organic fertilizer, the phosphorus content in the leaves was in medium level for plant growth (Table 10).

Analysis of Potassium (K) in the leaf before and after treatment type of organic fertilizer were increased in Jingga and Durian Arab cultivars (Table 11). While after treatment analysis potassium on leaf content decrease of 0.95%, hence durian was not optimal in absorbing potassium or the

potassium availability in the soil can not support the needs of potassium in the plants. Potassium is macro nutrients, it needed for plant growth processes and maintain plant system to defense from drought and disease (Novizan, 2002). Based on Table 11, potassium content in the leaves was in medium level of nutrients for plant growth. The absorption of nutrients by plants is influenced by: the availability of water, capacity absorption of the roots, soil alkaline (pH of the soil), and ability of plant absorption (Sutejo, 1999).

## CONCLUSION

There was a significant response in each cultivars of durian due to the treatment of various organic fertilizers indicated by the parameters number of leaves and leaf area. Treatment chicken and green manure on the Durian Arab had higher number of leaves than Durian Jingga and Sepanjang Musim.



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Addition organic fertilizers on durian, according to soil analysis showed that the nitrogen content in the soil was increase, phosphorus and potassium content were decreased. Therefore, addition organic matters are needed to sustain the plant growth of durian. Nitrogen, phosphorus, and potassium (NPK) content in the leaves was in medium level of nutrients for plant growth.

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