EFFECT OF NUMBER OF SUCKER ON SAGO PALM (*Metroxylon* spp.) GROWTH AND DEVELOPMENT

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ABSTRACT

This experiment was carried out from February – July 2009 at PT. National Timber and Forest Product, Selat Panjang, Riau. This research made the plant in a group pursuant to sucker amount that is sucker 5-10 (A), 11-15 (B), 16-20 (C), and also as comparison use sucker amount more than 50. Completely Randomized block design with three replications were used in this experiment. Number of leaf, plant height, plant diameter, and number of sucker were observed. The objective of this experiment was want to know the effect of number of sucker surrounding the sago palm on its growth. All treatments were not significant different on sago palm growth. Plants growth at PT. National Timber and Forest Product company were pursued with average high 5.3 m and growth rate 0.72 m in every years. The plants growth pursued because it was doing sucker amount controlling since first planting

period and the three years ago the company are not give nutrient to the plants. In that condition sucker amount is not give result significant for the plants growth and development.

Keywords: sago palm, sucker, Selat Panjang

INTRODUCTION

Indonesia is tropical country, which has abundant of rain and sunshine. It caused plenty of plants and animals diversity. Unfortunately, up to now it is very difficult for Indonesia to be self sufficient country.

Sago palm is a potential commodity to be developed as not only for staple food, but also as raw material for agro industry, and as animal feed (Bintoro, 2008). Sago palm can produce 25-30 ton $ha^{-1}year^{-1}$. Sago palm yield is higher than rice, corn, or other crops. Besides of that, sago palm is also environmental friendly because the palm can absorb CO_2. So, it is known also pollutant cleaner (Novarianto, 2003) (Figure 1.).

According to Jong and Kuch (1995) sago palm can grow at marginal soil that other crops cannot grow. It yield is very high. Sago was considered as the most efficient plant in producing carbohydrate. Not listed in referenly Ishizaki (1998) mention in his concluding remark in the sixth international sago Symposium held in Pekanbaru, Riau, that among the crop and starch productivity, sago was the first rank of productivity of 25 ton/ha/year. Using this figure, Indonesia could produce 37.5 million ton / year. Its is a huge amount of carbohydrate production.

Naturally, sago palm has so many suckers. Its suckers potentially became competitor for each other, so it take time for sago palm grow. Naturally, sago palm can be harvested around 10 years after planting.

In order to stimulate its growth, sago palms sucker must be managed. The objective of this experiment want to know how far the effect of number of its sucker on sago palm growth.

METHODOLOGY

This experiment was carried out from February to August 2009 at PT. National Timber and Forest Product in Meranti District, Riau Province.

The treatment consist of number of sucker , i. e 5-10 (A); 11-15 (B); 16-20 (C) and more than 50 (D). All sago palm were grown at block K-26, J-27, and L-24 in division 2. Each treatment was consisted of 30 clusters. All sago palm were planted in 1996/ 1997. Completely Randomized block design with three replications were used in this experiment. Number of leaf (that full open leaf of sago), plant height (from soil surface to 20 cm below dry leaf), plant diameter, and number of sucker were observed.

RESULT AND DISCUSSIONS

Plant height

The effect of number of sucker on plant height was not significant different (Table 1.). All sago palm that used in this experiment were at rosette phase. At this phase the sago palm growth rate is very slow. Sago palm has two slow growth rate.

The first slow growth rate is at the sucker phase, and the second slow growth rate is at the end of its grow, especially when its flower is emerged (Novarianto, 2003). When its flower became fruit, the starch content became low. Sago palm growth can be seen at Figure 2.

The average stem height at PT. National Timber and Forest product based on February – July 20009 observation is about 5,3 m. Its growth rate about 0.06 m $month^{-1}$ or 0.72 m $year^{-1}$. Its possible that slow growth rate because of the Ca and Mg deficiency. In peat soil its Ca and Mg content is very low. According to Atmawidjaja (1992) and Novarianto (2003) sago palm can grow faster at marginal soil.

The stem height growth rate also was not significantly different when We grouping it into 2-4 m, 4-6 m, and > 6 m. Similar to the previous parameters, at B4 , the effects of all treatments were not significantly different.

Stem diameter

The effect of number of sucker on plant diameter was significant different (Table 2.). Sago palm (Metroxylon spp.) is monocotyledon plant. Its stem has no cambium. This condition cause the stem diameter was not significant different (Andani, 2009). The stem diameter growth rate can be seen at Figure 3.

The average diameter growth rate about 0.16 cm $month^{-1}$ or 1.92 cm $year^{-1}$. Its grow rate is very slow, because no maintenance as long as 5 years.

Yamaguchi et al (1997) reported that sago palm grown on deep peat had shorter and fewer fronds with poorly developed canopies. The palm took 7-9 years to

form trunk, producing shorter and smaller trunks as compare to those grown on shallow peat. Ideal cluster of sago palm (Figure 4.).

Leaf

Leaf is the most important organ for sago plant because photosynthesis is carried out in this organ starch production is depend on leaf condition.

Although sago palm was about 12-13 years old but only has around 11 leaves. According to Notohadiprawiro and Louhenapessy (1992) sago palm that grow at peat soil will not so good because of the mineral deficiency. Less number of leaf cause the growth rate is slow. The effect of number of sucker was not significantly different on number of leaf (Figure 5.).

According to Dewi (2009) The result indicated that all foliar spray treatments did not affect on young sago palm growth. It is possible that the concentration of foliar spray is too low, application period which too long (once a month), weather condition, and environment condition around the plants affect young sago palm growth.

Beside of that, thinning, fertilizing, weeding was not to be done, causes only about 53 % number of sago plant still a life on 8000 ha areas planting (Wiraguna, 2009).

Maintenance

After selective harvesting, thinning, and gap replacement, maintenance such as weeding, fertilizer application and sucker control should be carried out 2 to 3 times a year. Agronomic practices like weeding, sucker thinning, fertilizer application, pest

and deseases controls are routine maintenance to be carried out. According to Amarillis (2009) on peat soil, weed dominated are *Nephrolephis bisserata* Schott. (76.82%), *Stenoclaena palustris* (Burm.) Bedd. (6.29%), and *Mikania micrantha* H. B. K. (9.61%) Borreria spp. (4.12%), *Melastoma malabatricum* Liin. (0.61%), and *Gleichenia linearis* Clarke (2.55%). Combination manual and chemical weeding were not significantly different compare with manual weeding only.

The types and application rates of fertilizer to be used should be calculated after frond and soil analysis. All waterlogged areas should be drained to provide a water table 10-50 cm below the soil surface. Fronds of unwanted suckers should be trimmed to just above the growing point.

Thinning purposes is decrease canopy density, allocation photosynthesis result to some sucker.

Number of sucker

Sucker in new bud which grow around the sago palm tree. New bud then became a new young plant. New young plant then is called as sucker. Every month will grow new sucker.

The effect of number of sucker was not significantly different on sucker growth. Number sucker growth around 4-10 month under stress condition the mortality at sucker > 50 was the biggest.

According to Atmawidjaja (1992) sago palm has short rhizome. It cause the palm potentially has much sucker. Sago palm which has much suckers will compete each others (Figure 6.).

In some natural sago stands, the density of palms is almost 600 cluster per hectare (Mifahorrahman et al, 1996), but in others there will be wide spaces without sago palms. Thinning and /or replacement should be carried out to bring the palm density to between 100 and 150 clusters per hectare, evenly spaced over the area. This can be done as follows:

1. overcrowded and unproductive old palms should be cut down
2. low yielding varieties of little or no commercial value should be remove
3. excess suckers should be removed from retained clusters so that each clusters so that each cluster will consist of 6 follower palms at different stages of growth (Figure 7).
4. gaps should be filled with high yielding varieties. For quicker growth, larger suckers weighing between 10 and 20 kg may be used. All other plants that are likely to compete with the sago palm should be removed.

CONCLUSION

1. The effect of number of sucker was not significant on sago palm growth, especially at mature sago palm
2. Sago palm with plenty of sucker without proper maintenance with grow slowly

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ATTACHMENT

Table 1. Sago Palm Growth Rate

Treatment	Stem Growth (months)			
	B1	B2	B3	B4
(Number of sucker)	.....m.....			
A (5-10)	0.06	0.11	0.17	0.25
B (11-15)	0.06	0.12	0.17	0.24
C (16-20)	0.05	0.09	0.16	0.24
D (> 50)			0.16	0.2

Note : B1 = Δ 2 months – 1 month observation

B2 = Δ 3 months - 1 month observation

B3 = Δ 4 months - 1 month observation

B4 = Δ 5 months - 1 month observation

Table 2. Stem Diameter of Sago Palm Growth Rate

Treatment	Stem Growth (months)			
	B1	B2	B3	B4
(Number of sucker)			.....m.....	
A (5-10)	-0.83	-0.73	-1.27	-1.07
B (11-15)	-0.67	-0.03	-0.50	-0.37
C (16-20)	-0.75	0.21	-0.70	-0.73
D (> 50)			-0.50	-0.50

Note : B1 = Δ 2 months - 1 month observation

B2 = Δ 3 months - 1 month observation

B3 = Δ 4 months - 1 month observation

B4 = Δ 5 months - 1 month observation

BPPT

KEMAPUAN SERAPAN CO_2

Tanaman	Panen rata2/tahun	Rata hari efektif/siklus	Lama penyinaran	Laju fotosintesa CO_2 / dm^2 / h	Luas daun/ha	CO_2 yg terserap ton/ha/tahun
Sagu	1	365	12jam	22 mg	3juta	289
Jagung*	2.5	45	12jam	80 mg	2juta	216
Padi*	2.5	45	12jam	30 mg	2juta	81
Ubi kayu*	1	180	12jam	39 mg	2juta	168
Tebu*	1	180	12jam	52 mg	2juta	225
Ubi jalar*	2	80	12jam	23 mg	3juta	88

Figure.1. Amount of CO2 can absorb by Sago palm and other crop

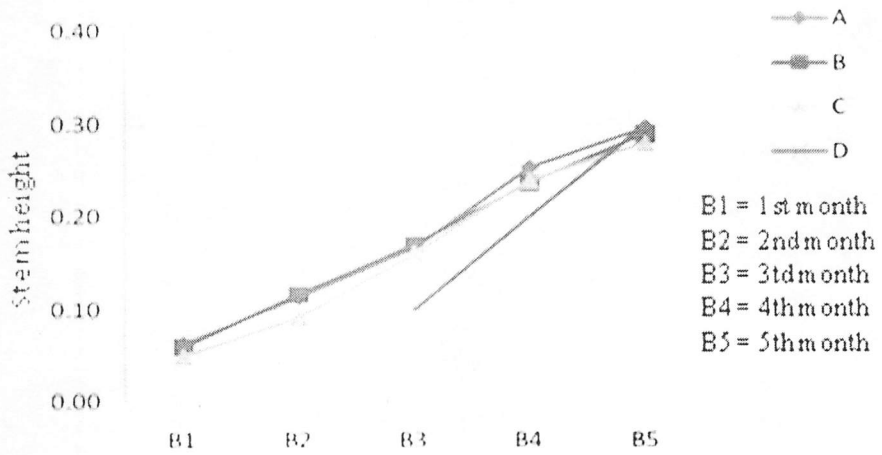

Figure 1. Stem Growth Rate

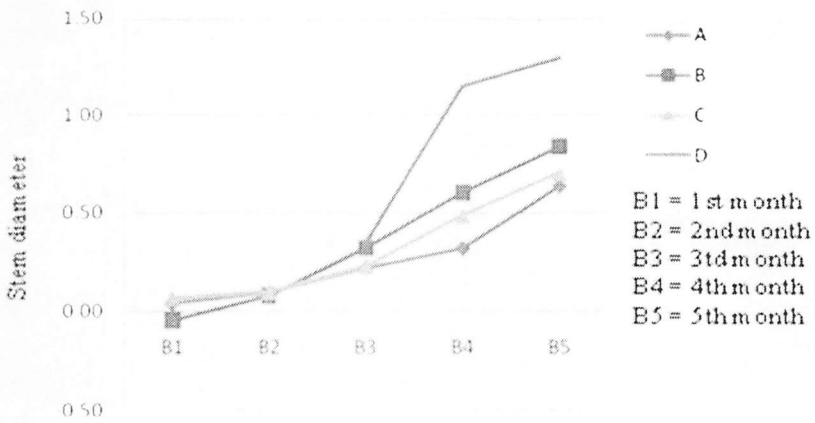

Figure 2. Stem diameter growth rate

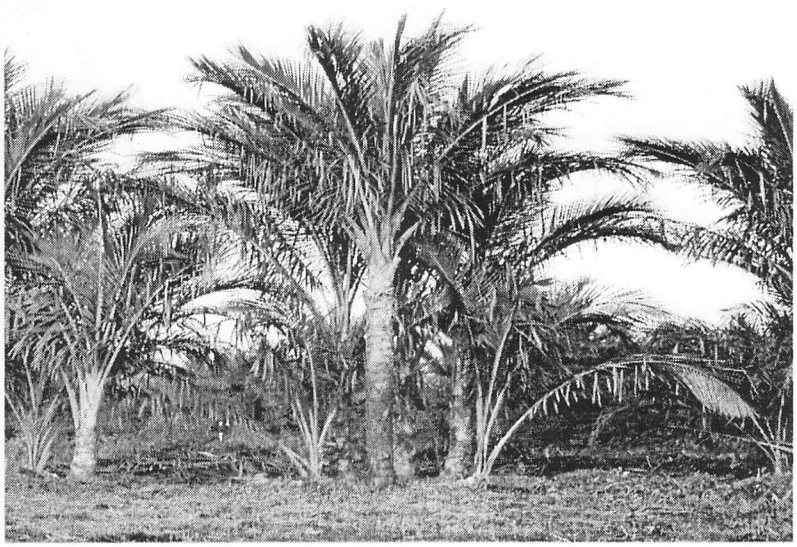

Figure 3. Suitable Sago Clump with some Sucker

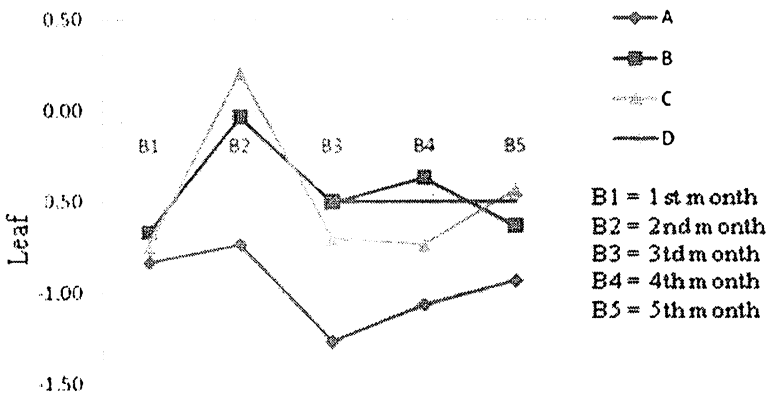

Figure 4. Leaf growth rate

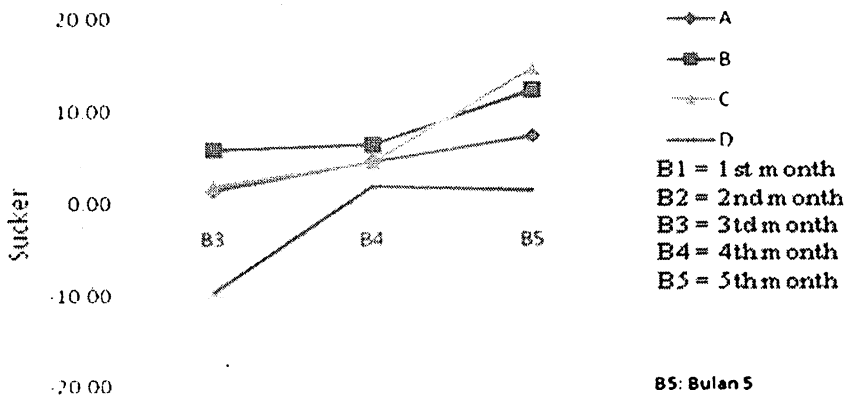

Figure 5. Number of Sucker

Figure 6. Before and After Thinning