Number of Trunk Estimation in Sago Palm Plantation

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Abstract

Sago palm is the highest carbohydrate producer. The carbohydrate is taken from its trunk, so how many carbohydrate can be harvested depend on its trunk condition. The objective of this investigation was want to know the proper method for estimating the number of trunk in sago plantation. This investigation was carried out from February until July 2009 at sago plantation belonging to PT. National Timber and Forest Product in Meranti Distric, Riau, Indonesia. Four methods were used to estimate number of sago palm trunk. The methods were diagonal system (north–west corner, middle, south–east corner), diagonal system (north-east corner, middle, south-west corner), randomize six rows and six plots in a block. The result indicated that all methods were not significantly different to estimate the number of trunk of sago palm and 1,2 % of total area was enough to estimate sago palm trunk at sago palm plantation, especially in Meranti Distric.

Key words: Sago palm, estimation methods, trunk and sago plantation

INTRODUCTION

Indonesian people have known sago starch as staple food for long-long time ago. Haryanto and Pangloli (1992) stated that the people in Moluccas, Irian Jaya (Papua), Mentawai archipelago used sago starch as main food.

In Indonesia, sago palm (*Metroxylon* spp.) grow as natural forest. Sago palm can grow at swampy and marginal areas. However, sago palm will grow better at mineral soil and not permanent flood. Sago palm will grow slowly when, the palm in flood condition.

Sago palm can be used for many purpose, for example its leaf can be used for traditional roof and wall, and its bark can be used for esthetic floor. Sago waste can be used for seedling media and composit. Sago starch can be used for biofuel (ethanol), monosodium glutamate, sorbitol, polylactic acid for biodegradable plastic and livestock feed (Bintoro, 2008).

According to Henanto (1996) sago palm can be harvested about 11 trunks but it is not same at other palces in Indonesia. Estimation for sago palm trunk is necessary to be known, not only to know how many trunk can be harvested, but also phases growth of sago palm. So, we can predict how many sago palm trunk can be harvested every year.

The best sago palm performence are in divisions 1, 2, 3 and 4. The palm were planted around 1996-1999. At those divisions its plant spacing are 8 m x 8 m. According to Bintoro (1999) too near plant spacing decreated sago palm yield. At South Kalimantan, only 5 sago palm trunk/ha/year can be harvested, but in

serawak around 150 - 250 sago palm trunk can be harvested and every trunk contain 150 – 250 kg starch.

Sago palm maturity consisted of four phases i.e. Wela Stage (Figure 1), Maputih Stage (Figure 2), Maputih Masa Stage (Figure 3), and Siri Buah Stage (Figure 4).

MATERIALS AND METHODS

This investigation was carried out from February until July 2009. Area sago palm which is used in this investigation is division 4. The oldest sago palm in this area are around 12 – 13 years old. The plant spacing is 8 m x 8 m.

Four methods were used in this investigation. The methods were diagonal system (north-west corner, middle, south-east corner) sample was took third cluster from the border (Figure 5.a), diagonal system (nort-east corner, middle, south-west corner) sample was took third cluster from the border (Figure 5.b), random mixed six rows (each rows consisted of 16 clusters) (Figure 6), six plots in a block (Each plot consisted of 16 clusters. Three plots are in North side and the next three plots are in south side) (Figure 7). Number of sample were 96 cluster, it was about 1,2% of total polpulation.

Systematic random sampling was used in this investigation. Because, according to cochran (1991) systematic random sample is simple, easy, less risk and fast.

SAGO PALM CONDITION

PT. National Timber and Forest Product is laid at Tebing Tinggi Island, in Meranti Distric, Riau Province. It is in $0^{0}31' - 1^{0}08'$ North and $101^{0}43'$ 103^{0}

08' East. Based on administrative area, sago palm plantation belonging to PT. National Timber and Forest Product distributed to some villages i.e Tanjung Sari, Kayuara, Sungai Pulau, Kepau Baru, Tanjung Gadai, Teluk Buntal and Sungai Tohor.

Most of soil type at PT. National Timber and Forest Product is organosol soil and the rest is aluvial soil. Organosol soil has deep solum (>100 cm). Its texture is clay soil (lower part) and hemic (upper part). Soil pH is around 3,1 – 4,0. Organosol is around 19 820 hectars or 99,6% and alluvial is around 80 hectars or 0,4% (NTFP, 1997). Sago palm was planted first in 1996-1997. Weeds were controlled by manual and herbicide. Weed control only by herbicide was not effective because of acid water. The best treatment was combination between manual and herbicide (Amarillis, 2009).

RESULTS AND DISCUSSION

All sampling methods was not significanly different (Table 1). It means all methods can be used for estimation sago palm trunk at sago palm plantation, especially in Meranti District, Riau.

Nephrolepis biserrata Schott. was dominance at sago palm plantation, the weed as tall as 2 m. Harjadi (1996) stated that sun light is very important in agriculture. Sago palm will grow well if the palm can absorb sunlight as much as possible. Becouse the weed were very tall, it inhibited sago palm. Becouse the weed complete, sago palm about nutrient, gas and sunlight. Becouse of this condition, sago palm height was not more than 6 m.

Water table at sago plantation should be around 30 – 50 cm (Figure 8). When the water table more than 50 cm or less than 30 cm, the sago palm grows was not optimal. Its root was very difficult to develop. This condition decreased sago palm ability to absorb nurient from the soil.

Soil pH was around 3.1 – 4.0. According to Soepardi (1983) when the soil pH less than 5.0, the micro nutrient will more available but macro nutrient like K, Mg, Ca will less available. This condition will inhibit sago growth. In order to overcome this condition some fertilizer must be given to sago palm. However, Dewi (2009) stated that same fertilizer treatment did not give any effect on sago palm growth. It caused the weeds was very dominant, the sucker was too much and unstable water table.

Rahman (2009) stated that 8 m x 8 m spacing treatment was the best one in Tebing Tinggi Island. However, sago palm at the age of 12 – 13 years old was reach at slow grow rate of sago palm (Bintoro, 2008). Minimal maintenance since the year of 2004 cauted the sago palm homogen. It is possible that this condition caused all methods for estimatary sago palm trunk almost the same effect.

CONCLUSION

All methods can be used for estimatery sago palm trunk and sample size should be 1,2 % of total area.

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ATTACHMENTS

Figure 1. Wela (destroy of thorn)

Figure 2. Maputih (mutih)

Figure 3. Nyorong (maputih masa)

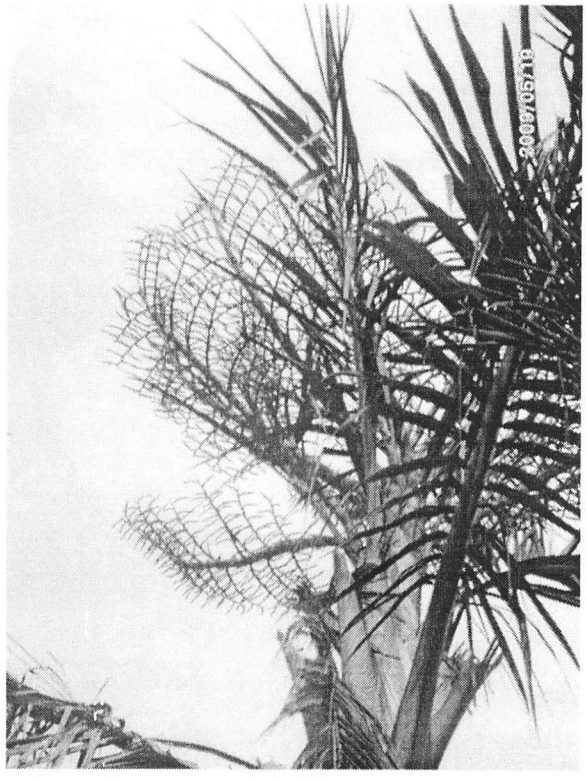


Figure 4. Flowering (siri buah)

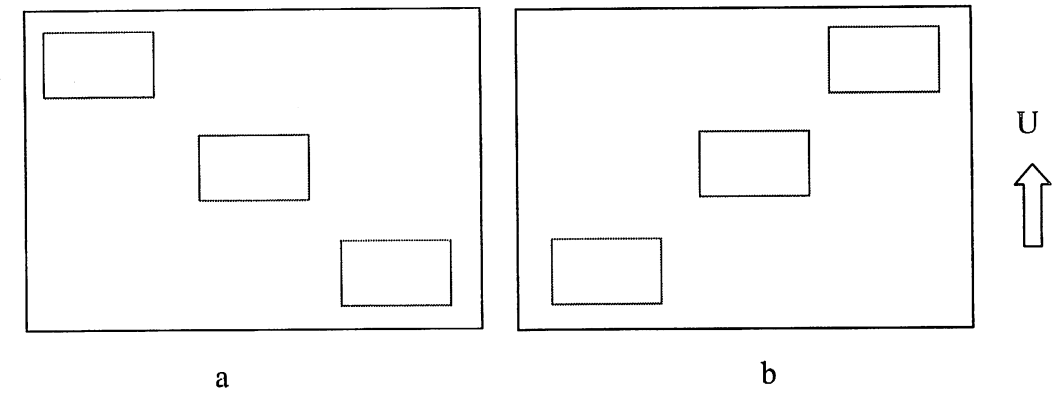


Figure 5. Diagonal Methods

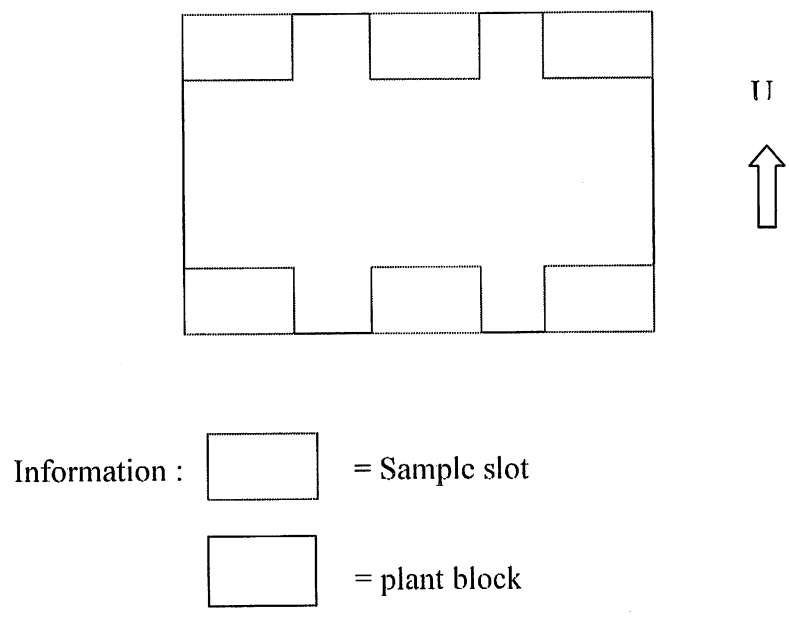
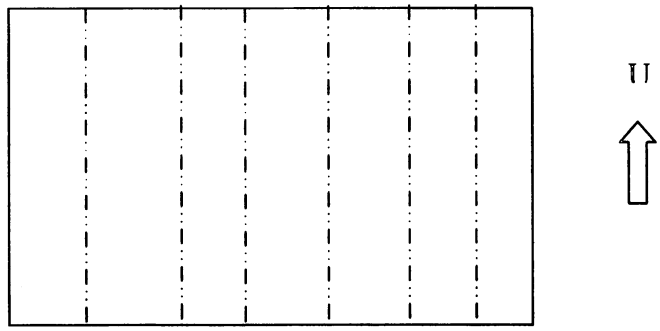


Figure 6. Six Sample Slots



Information : = plant block

= clump line

Figure 7. Row Random

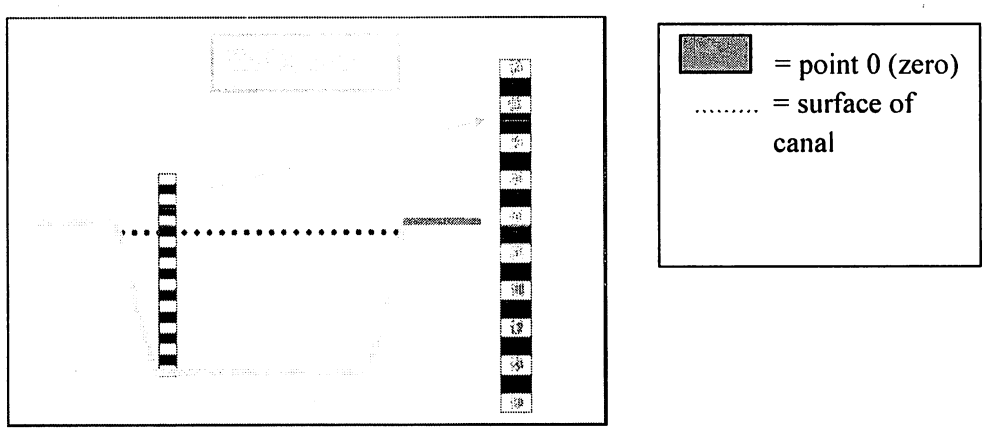


Figure 8. Canal Water Level in Sago Plantation

Table 1. Test Result of Pull Method Sample with Variable Height Plant

No.	Pull Method Sample	Tall Criteria (m)						T-test Value
		0 - 2	2 - 4	4 - 6	> 6	BD	NY	
		.... plants average every ha (%)...						
1.	Six sample slot	15.64	11.47	16.67	5.19	0.00	3.14	0.36^{tn}
2.	Row random	13.59	16.67	16.67	7.31	2.12	1.03	0.61^{tn}
3.	Diagonal strech of northeast goes to south-west	4.17	3.14	10.45	6.28	1.03	2.12	1.21^{tn}
4.	Diagonal stretch of northwest goes to south-east	7.31	6.28	8.33	3.14	1.03	0.00	1.28^{tn}

Information : BD = Buang Duri (destroy of thorn)
NY = Nyorong
tn = Pull method samples do not different reality to population, t test level 5%