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Oil Palm Fruit Bunch Yield Fluctuation between Dry and Rainy Season in Dry and Wetland

Fluktuasi Hasil Tandan Buah Segar Kelapa Sawit antara Musim Kering dan Musim Hujan di Lahan Kering dan Lahan Basah

D.P. Priadi[1*], **N. Abuchatam**[1], and **J. Simangunsong**[2]
[1]Staf Jurusan Budidaya Pertanian Universitas Sriwijaya, [2]Mahasiswa Jurusan Budidaya Fakultas Pertanian Universitas Sriwijaya, Indralaya, Ogan Ilir 30662
[*]Corresponding author: priadidp@yahoo.co.id

ABSTRAK

Tujuan penelitian ini adalah mengetahui fluktuasi hasil tandan buah segar kelapa sawit antara musim kering dan musim hujan di lahan kering dan lahan basah. Penelitian dilakukan di tanah Entisol pada PTPN VII kebun Betung Krawo dan tanah Ultisol PTP Hindoli yang keduanya terletak di kecamatan Sungai Lilin, kabupaten Musi Banyuasin. Data hasil tandan buah segar yang digunakan dalam penelitian ini adalah data tahun 2007−2010. Data curah hujan tahun 2007−2010 menunjukkan tak ada bulan kering ekstrim pada musim kemarau. Hasil penelitian menunjukkan bahwa hasil tandan buah segar pada lahan kering lebih tinggi dari pada lahan basah, baik pada musim kering maupun pada musim hujan. Hasil tandan buah segar berfluktuasi antara musim hujan dan musim kemarau, baik di lahan kering maupun di lahan basah. Hasil di musim hujan tidak secara konsisten lebih tinggi dari hasil di musim kemarau. Disimpulkan bahwa hasil tandan buah segar kelapa sawit tidak saja dipengaruhi ketersediaan air tanah dan jumlah curah hujan, tetapi juga dipengaruhi factor lain internal dan eksternal tanaman.

Kata kunci: fluktuasi hasil, lahan basah, lahan kering

ABSTRACT

The objective of this research was to study how much yield difference of fresh fruit bunch of oil palm between dry and rainy season, and whether the yield difference much in dry land compare with wetland. The research was conducted in Entisol of PTPN VII Betung, and in Ultisol of PTP Hindoli, both in Sungai Lilin Regency. Yield data used in this study was data of year 2007−2010. Rainfall data during 2007−2010 showed no absolute dry month during dry seasons. The result of the study indicated that yield in dry land higher than in wetland either in dry season or in rainy season. Yield fluctuated between dry and rainy season either in dry land or in wetland. But, yield in rainy season did not consistently higher than in dry season. It was concluded that oil palm yield was influenced not only by soil water supply and rainfall quantity, but also internal and many other external factors.

Key words: dry land, wetland, yield fluctuation

INTRODUCTION

Yield fluctuation of fresh fruit bunches (FFB) in oil palm causes problems for oil palm processing plant. Sometimes fruit bunch supply is not enough such that the processing plant is partly idle. But, sometimes fruit bunches are oversupply such that the processing plant can not process the fruit bunches properly. So, it is necessary to stabilize the FFB yield of oil palm. In order to be able to stabilize FFB yield of oil palm, we need to recognize the yield fluctuation pattern in different soils and seasons, and consider what causes the yield fluctuation. Corley (1977) indicated that interaction between external and internal factors influenced the seasonal yield fluctuation. Several developmental processes such as frond emission rate, inflorescence stages, pollination efficiency perhaps influence fruit bunch yield in oil palm. Recently, more and more oil palm is grown in wet land. Then, we hypothesize that FFB yield fluctuation between dry and wet season differ between dry and wet land.

MATERIAL AND METHOD

Treatments in this research were soil condition and season. Soil condition was dry land and wet land. Season was dry season and rainy season. The research was conducted in two locations in Sungai Lilin Regency, namely Betung Krawo Estate of PTP VII and Sungai Tungkal Estate of PT Hindoli. Soil of Betung Krawo is Entisol, while soil of Sungai Tungkal Estate is Ultisol. Two blocks, one dry land and one wet land, were used in the two locations. Two blocks selected in Betung Krawo Estate were Block 252 and Block 333. Two blocks selected in Sungai Tungkal Estate were Block H12 and Block H13.

Observations of yield and plant morphology in the two locations were done in two season, those were dry season and rainy season. Variables observed in this research were FFB yield, plant height, length of leaf sheath, length of foliolage, and stem girth.

RESULTS

FFB yield data were shown in Table 1. Data shown in Table 1 were averaged from each block within six months. The highest FFB yield in wet land in this research was 29.9 ton/ha.

FFB yield in rainy season tend to be higher than in dry season in Hindoli dry land (Ultisol). But, yield in dry season in wetland of PTP VII (Entisol) was higher than in rainy season, except in 2007−2008. FFB yield fluctuation in wetland of Hindoli was similar to dryland of PTP VII, namely yield in rainy season could be lower or higher than in dry season. Average of 4 year FFB yield indicated that yield in Hindoli dry land (Ultisol) was lower than in Hindoli wetland. However, average of 4 year FFB yield in PTP VII soil wetland (Entisol) was lower than in PTPVII dry land.

Table 2 indicated that amount of rainfall in rainy season was consistently higher than in dry season. Rainfall data showed that the two locations did not have extreme dry season. The two locations had almost similar pattern of rainfall.

Plant height, stem girth, and sheath length of dry land were greater than of wet land of PTP VII. Middle leaflet length of wet land was similar with dry land of PTP VII. On the other hand, stem girth of dry land was lower than wet land of Hindoli. Middle leaflet length of wet land was lower than we land of Hindoli. In general, data in Table 3 indicated that growth in dry land was better than in wet land in the two locations.

DISCUSSION

FFB yield fluctuated between years, between dry and rainy season, and between dry and wetland. Yield data showed no certain pattern of yield fluctuation across years, seasons, and soil types.. Soil in Hindoli does not contain pyrite. On the other hand, soil in PTP VII contains pyrite. The pyrite perhaps causes lower yield in rainy season in wetland of PTP VII. During rainy season, the pyrite was dissolved, and the low pH pyrite solution level up to the root zone.

Henson and Dolmat (2004a) found different FFB yield fluctuation pattern in two locations of peat soils of Malaysia. They suggested that planting date and bunch number influenced the yield fluctuation. Apparently, each location has particular climate and soil characteristic that cause particular yield fluctuation pattern.

Table 1. FFB yield of dry and wet land of PTP VII and PT Hindoli in dry season (April─September) and rainy season (October─March)

Year	PTP VII				Hindoli			
	Wetland		Dryland		Wetland		Dryland	
	Dry season	Rainy season	Dry season	Rainy season	Dry season	Rainy season	Dry season	Rainy season
	---------------------------- kg/ha -------------------------------							
07-08	3316	7337	5609	10471	9114	13358	11594	17229
08-09	5470	3630	6412	5219	10003	9874	10883	10062
09-10	8085	4381	11272	8387	14547	15356	12102	12265
10-11	6220	5173	8746	7992	15252	11774	9497	10506
Mean	5773	5130	8010	8017	12229	12590	11019	12515

Table 2. Amount of rainfall in dry and rainy season in PTP VII and Hindoli estates

YEAR	PTP VII		Hindoli	
	Dry season	Rainy season	Dry season	Rainy season
	---------------------------------- mm --------------------------------------			
05-06	1230	2208	1186	1417
06-07	850	1268	674	1117
07-08	937	1537	1302	1731
08-09	957	1454	823	1696
09-10	486	1266	728	1881

Rainfall data showed that the two locations did not have extreme dry season. No extreme dry season perhaps caused no large difference FFB yield between dry and rainy season. As expected, rainfall amount in rainy season was higher than in dry season. Turner (1977) found that in severe dry climate the rainfall variation influenced the yield fluctuation, but in less severe dry climate rainfall variation did not dominantly influence yield variation.

Data in Table 3 indicate that growth in dry land is better than in wet land. Wetland of PTPN VII has pyrite. Pyrite in soil can suppressed growth of oil palm (Sutarta et al., 2008). Supposedly, soil water all over the year in wet land is more available than in dry land. Then, besides soil water, other factors cause lower plant growth in dry land. Apparently, better plant growth in dry land did not stabilize the fruit bunch yield across the seasons.

Interestingly, Henson and Dolmat (2004b) pointed out that pollination efficiency which was influenced by rainfall was apparently an important factor that causes yield variation. Perhaps, in order to stabilize FFB yield across the season, pollination efficiency should be maintained. Siregar et al. (2010) found that temperature fluctuation influenced yield in North Sumatera plantation.

Internally, seasonal fluctuation of carbohydrate reserve composition and leaf nutrient status of oil palm were observed. Legros et al. (2010) found that monosaccharide concentration in the stem was high, and sucrose and starch concentration were low at the end of the dry period. Glucose concentration was low at the end of the rainy season. The carbohydrate reserve fluctuation correlates with FFB yield. Fairhurst et al. (2010)

observed fluctuation of leaf nutrient status and FFB yield over years.

Floral initiation in oil palm is 33-34 months before anthesis (Turner and Gillbanks, 1974). Certainly, climate fluctuation, soil nutrient fluctuation, rainfall fluctuation during floral and fruit development influence FFB yield, either directly or indirectly.

CONCLUSION

FFB yield in wet land can be higher than in dry land, although the plant growth in dry land was less than in dry land. FFB yield fluctuated irregularly across the season, either in wet land or in dry land, and did not match to season rainfall quantity. In conclusion, the FFB fluctuation was influenced by not only soil water availability, but also other climate factors and internal factor such as pollination efficiency. Research should be done to find out which factors are dominant in determining FFB yield.

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