



**UNIVERSITI PUTRA MALAYSIA**

**EFFECT OF DIFFERENT MEDIA ON GROWTH AND PHYSIOLOGICAL  
TRAITS OF OIL PALM SEEDLINGS IN HYPLUG TRAY AND POLYBAG**

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**EFFECT OF DIFFERENT MEDIA ON GROWTH AND PHYSIOLOGICAL TRAITS  
OF OIL PALM SEEDLINGS IN HYPLUG TRAY AND POLYBAG**

**By**

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## ABSTRACT

Good planting medium is essential for enhancement of excellent drainage, aeration and root establishment of oil palm seedlings in nursery. Combination of agricultural by-product such as coco peat with bio-organic fertilizer can be used to improve soil structures of planting medium. Hyplug tray was introduced with unique basic features to overcome the flooding and environmental problem in order to maintain the growth performance of oil palm seedlings at pre-nursery stage. The objectives this study are to identify the best combination of planting medium for oil palm seedlings growth in pre-nursery stage, to compare the effectiveness of using Hyplug tray and polybag growth container and, to evaluate growth and physiological characteristics performance of FELCRA D×P planting materials. This study was conducted at FELCRA Tebing Tinggi, Segamat, Johor using a split-split plot design with 4 replications. Two types of growth containers, namely Hyplug tray and polybag assign as a main plot. Four planting media were used as a sub-plot, M1 (top soil) as a control, M2 (topsoil + coco peat, 1:1 ratio), M3 (topsoil + 50g FELCRA Bio-Organic NRich) and M4 (topsoil + coco peat, 1:1 ratio + 50g FELCRA Bio-Organic NRich) and the sub-sub plot was four different FELCRA D×P crosses. Data on vegetative growth traits such as plant height, fronds length, number of fronds, fresh and dry weight of seedlings was measured. Leaf area, root length, chlorophyll content and nutrients concentrations was analysed using a root scanner, LI-3100 leaf area meter, SPAD 502 chlorophyll meter and autoanalyzer, respectively. From this study, it was observed that the treatments applied were significantly effects on growth and physiological traits of oil palm seedlings at pre-nursery stage.

## ABSTRAK

Medium tanaman yang baik adalah penting untuk menggalakkan saliran, pengudaraan dan pertumbuhan akar anak benih sawit yang sangat baik di tapak semaian. Kombinasi sisa pertanian seperti habuk kelapa dengan baja bio-organik diperlukan untuk memperbaiki struktur tanah medium tanaman. Hyplug telah diperkenalkan dengan ciri-ciri asas yang unik untuk mengatasi takungan dan pencemaran alam untuk mengekalkan prestasi pertumbuhan anak benih kelapa sawit pada peringkat pra-nurseri. Objektif kajian ini adalah untuk mengenal pasti kombinasi terbaik media tanaman untuk pertumbuhan anak benih kelapa sawit di peringkat pra-nurseri, untuk membandingkan keberkesanan penggunaan bekas Hyplug dan polibeg, dan untuk menilai pertumbuhan dan ciri-ciri fisiologi bahan tanaman FELCRA D × P. Kajian ini telah dijalankan di FELCRA Tebing Tinggi, Segamat, Johor dengan menggunakan reka bentuk pecahan-pecahan plot dengan 4 replikasi. Dua jenis bekas tanaman iaitu bekas Hyplug dan polibeg ditetapkan sebagai plot utama. Empat medium tanaman adalah sebagai plot kecil, M1 (tanah atas) sebagai kawalan, M2 (tanah atas + habuk kelapa, nisbah 1: 1), M3 (tanah atas + 50g FELCRA Bio-Organik NRich) dan M4 (tanah atas + habuk kelapa, nisbah 1: 1 + 50g FELCRA Bio-Organik NRich) dan sub-sub plot adalah empat kacukan berbeza bahan tanaman FELCRA D × P. Data mengenai ciri-ciri pertumbuhan vegetatif seperti ketinggian tumbuhan, panjang pelepah, jumlah pelepah, berat basah dan kering telah diukur. Luas daun, panjang akar, kandungan klorofil dan kandungan nutrient, di analisis menggunakan pengimbas akar, LI-3100 meter luas daun dan 502 SPAD meter klorofil dan autoanalyzer. Dari kajian ini, rawatan yang digunakan telah memberi kesan kepada pertumbuhan dan ciri-ciri fisiologi benih kelapa sawit pada peringkat pra-nurseri.

## CERTIFICATION

This project paper entitled “EFFECT OF DIFFERENT MEDIA ON GROWTH AND PHYSIOLOGICAL TRAITS OF OIL PALM SEEDLINGS IN HYPLUG TRAY AND POLYBAG” is prepared by Nurul Hashikin Bt Mohamad and submitted to the Faculty of Agriculture in fulfillment of the requirement of PRT 4999 (Final Year Project) for the award of the degree of Bachelor of Agricultural Science.

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## CHAPTER 1

### INTRODUCTION

Oil palm plantation is the biggest plantation crop in Malaysia which has been the prime crop choice under the diversification program since 1917 through conversion of rubber plantation . As a major player in the oil and fats world market, oil palm has generated income for Malaysian government economies through exports revenues and taxes implementation (Wibowo, 2008).

Malaysia currently accounts for 39 % of world palm oil production and 44% of total world exports and contributed of 12% and 27% of the world total production and exports of oils and fats respectively. According to Bursa Malaysia, total world exports of Malaysian palm oil until the end of 2010 was 2,064,247 million tonnes. It was increased from the previous year, 2009 which is 1,892,099 million tonnes (Haslinda, 2008).

Meanwhile, total export of oil palm products, consisting of palm oil, palm kernel oil, palm kernel cake, oleochemicals, biodiesel and finished products increased by 2.9% or 0.64 million tonnes to 22.40 million tonnes in 2009 from 21.76 million tonnes recorded in 2008. This increase has further induced the expansion of oil palm plantations in Malaysia. Thus, more lands have been converted into oil palm plantation as a result of the increases in oil palm hectarage (Law et al., 2012).

Due to the increasing of world demand, the total area planted with oil palm was 5,499,012 hectares, 59.9% or 2,096,856 hectares being in Peninsular Malaysia, 29.4% or 1,027,329 hectares in Sabah and 10.7% or 374,828 hectares in Sarawak. The last decade had seen rapid expansion in the cultivated area in Sabah and Sarawak; while planting in Peninsular Malaysia had slowed down because of diminishing availability of new land for the crop (Teoh, 2002).

Table 1: The total area (ha) of Oil Palm Plantation in Malaysia

Year	Area (ha)	% change
1960	54, 838	0.0
1965	96, 945	77.4
1970	261, 199	169.4
1975	641,791	145.7
1980	1, 023, 306	59.4
1985	1, 482, 399	44.9
1990	2, 094, 028	41.3
1995	2, 540, 087	21.3
2002	3, 376, 664	32.9
2005	4, 051, 374	20.0
2010	4, 853, 766	19.8
2011	5, 000, 109	3.0

Source : MPOB, Malaysian Palm Oil Statistics (2011)

Being one of the biggest producers and exporters of palm oil and also its products, it is important to ensure oil palm seedlings grow well in nursery by using a good planting medium and superior D×P planting materials to obtain sustainable yield production.

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