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GROWTH ANALYSIS OF SEEDS OIL PALM ON STAGE PRE NURSERY AND MAIN NURSERY AT PT. SOCFINDO

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ABSTRACT

Oil palm (Elaeis Guineensis Jagc.) is an oil palm plant belonging to the palm group which is an annual plant, oil palm is also a source of non-oil and gas foreign exchange for Indonesia. This research activity was carried out at PT. Socfindo Kebun seunagan, Nagan Raya, West Sumatra from 18 November 2021 to 16 December 2021. Research activities are specifically at learning and improving technical and managerial skills. The data obtained are primary data (direct) and secondary data (indirect). Primary data is data that the author directly observed during his internship at PT. Socfindo, in the form of plant height, stem diameter, and number of leaves. Direct observations to determine technical activities in the field and compared to standards, as well as direct discussions with workers and staff about oil palm nurseries. Secondary data obtained from daily reports, monthly reports and plant archives, secondary data includes climate, fertilization, organizational structure and matters related to labor. Observations on the vegetative growth of oil palm seedlings are expected to achieve appropriate growth. The purpose of this observation activity is to improve understanding, and technical skills, as well as to analyze oil palm nursery activities at the Pre-nursery and Main nursery stages at PT. Socfindo Seunagan Gardens.

INTRODUCTION

Oil palm (El aeis Guineensis Jagc.) is an annual oil palm plant that belongs to the palm family; it is also a source of non-oil and gas foreign exchange for Indonesia. Palm oil's major products are palm fruit bunches, which generate palm oil in the pulp (mesocarp), also known as Crude Palm Oil (CPO), and palm kernel oil, also known as Palm Kernel Oil (PKO) (De Petris, Boccardo, & Borgogno-Mondino, 2019; SARAGIH, Hanum, & Hanafiah, 2016).

The Indonesian government has decided to promote oil palm plantation lands due to the potential of palm oil in the global vegetable oil trade. In 2007, the area of oil palm plantations in Indonesia was 6.766.836 ha, with a production of 17,664,725 tons and a productivity of 2.6 tons ha-1. Moreover, it is expected to grow rapidly to 12.307.677 ha in 2017, with a palm oil production of 35.359.384 tons and a productivity of 2.9 tons ha-1 (*Oil palm plantation data*, 2006).

Seeding is the process of cultivating and maturing seeds so that they are ready to plant. A seedling process is required for most crops, including oil palm, because it is considerably more profitable than planting directly in the field. Seedling can be accomplished in one or two stages. Two-stage nurseries, including the Pre-nursery and the main nursery, are seen to be more appropriate (Afrillah, 2015; Laksono & Nugroho, 2020).

Palm oil has many carotenoids in it. Carotenoids are pigments that give foods a reddish hue. Furthermore, there is a key component, palmitic saturated fatty acid, which gives the oil a thick-semi-solid feel and leads it to solidify into solid fat in temperate regions. Palm oil

is a key ingredient in a variety of traditional West African recipes. Palm fruit was introduced from Africa to America from the 14th to the 17th centuries. It has spread to eastern North America. Palm oil is a significant source of vegetable oil for the country's economy. Oil palm agriculture is most commonly practiced in nations with tropical temperatures and high rainfall (minimum 1,600 mm per year). The palm oil industry's growth in tropical countries has been fueled by its high productivity potential. This is because, when compared to other crops, oil palm can provide the largest oil production per unit area. Furthermore, the palm oil harvests yields two types of oil: palm oil and palm kernel oil, both of which are in high demand on the global market (Gashgari, R., Alharbi, K., Mughrbil, K., Jan, A., & Glolam, 2018; Kusuma, 2015; Lubis & Agus Widanarko, 2011; Saeyang & Nissapa, 2021).

Oil palm farms can assist domestic companies based on palm oil commodity products from an economic standpoint (McCarthy, Gillespie, & Zen, 2012; Purnomo et al., 2020). In the food and non-food industries, palm oil and palm kernel oil are commonly utilized. Palm oil or palm kernel oil is also used to manufacture cooking oil in the food industry such as food fat, margarine, and other types of fat (cacao butter substitute). Fractionation, refining, and hydrogenation are the most common processes used to make these foods (Dian et al., 2017).

The purpose of this observation activity is to improve understanding, and technical skills, as well as to analyze oil palm nursery activities at the Pre-nursery and Main nursery stages at PT. Socfindo Kebun Seunagan.

METHOD RESEARCH

From November 18, 2021 to December 16, 2021, this study activity was carried out in PT. Socfindo, Seunagan Nagan Raya Plantation, Aceh. This research effort employed a direct and indirect research strategy to collect primary and secondary data. Direct work experience in the sector is obtained by actively participating in the implementation of company activities, such as becoming a freelance daily employee (KHL). In addition to conducting observations and taking indirect approaches, data on plantations is collected in the form of daily, monthly, and annual reports, as well as various garden archives. Rainfall data must also be monitored for the vegetative growth of oil palms with enough water content. Primary data was obtained by making direct observations in the field of all activities carried out on the plantation. Activities that take place every day are written in a daily journal as a freelance daily employee (KHL). Field observation data is focused on nursery management, namely the pre-nursery and the main nursery. There are several observations that the authors collect as primary data, such as:

1. Observation of the amount of rainfall.

   This information is used to calculate the quantity of rain that falls each day in order to meet the daily water need per seedling, which is then adjusted for the time it takes to reach the average seedling capacity in each polybag.
2. Observation of plant vegetative growth, namely stem diameter, plant height, and number of leaves in the Pre-Nursery and the main nursery

   The information will be used to determine the vegetative growth of oil palm seedlings of various kinds. In the Pre Nursery, up to 20 seedlings were observed, and in the main nursery, up to 20 plants were observed. Each oil palm seed that was observed was given a number to distinguish which seeds were still being examined and which seeds would be jumbled up in the following week's observation.

Oil palm seedlings were measured for stem diameter, plant height, and number of leaves after 1 month of age in Pre Nursery, and after 3 months of seedlings in the main

nursery. The diameter of the stem was measured with a caliper around 1 cm from the soil surface at the stem's base, the value of the measurement with a caliper. From the base of the stem to the tip of the highest leaf, the plant's height was measured and straightened with a ruler. Only those leaf midribs, which have fully bloomed and are green in color, are tallied.

Data collected on plantations, such as daily, monthly, and annual reports, is used to generate secondary data. Garden maps, rainfall, land and crop conditions, plantation production and productivity, organizational structure, and other data are needed for general conditions and operations in plantations.

Meanwhile, secondary data such as the state of the nursery land, the condition of the seeds, the age of the plant seeds in each block of the nursery area, the results of the work, and other data or information are required for those connected to unique elements of nursery management.

RESULT AND DISCUSSION

Nursery conditions

Seedling can be accomplished in one or two stages. Oil palm sprouts are planted directly in huge polybags or in the main nursery in a one-stage nursery. The single stage nursery method, also known as single stage nursery, is a method of seeding that involves planting seeds directly in large polybags without first planting them in smaller polybags, with a large polybag size of 40 cm x 50 cm and a thickness of 0.2 mm in the field.

Sprouts are planted in the pre-nursery first, using small polybags and shade/beds. Then relocated to the main nursery using larger polybags when they are 2.5 - 3 months old. Pre Nursery for 2.5 months to 3 months and Main Nursery for 9 to 12 months is the seedling approach. Sprouts are planted in 14 cm x 23 cm baby bags with a thickness of 0.1 mm in the modified beds during the Pre Nursery period. Because of the long removal procedure and the high amount of oil palm seeds, PT.socfindo seunagan gardens are often ready for planting at 2.5 months. This is to avoid delays in planting.

The nursery system at PT Socfindo uses a Double stage system or a two-stage system, namely pre nursery and the main nursery system. The use of soil that is filled into polybags should use Top Soil, starting from the pre nursery and the main nursery, ensure that the soil is free from garbage and free from ganoderma fungus (no fruiting body)

A week or two before planting oil palm seedlings/sprouts, the polybags have been filled with soil. Then the polybags are arranged into beds with a bed width of 1.2 m, can be filled with 12 baby bags, the length of the beds is adjusted depending on the needs and the distance between the beds is 0.6 m, used for planting, fertilizing, selection, and control purposes.

In the main nursery, the 2.5 month old seedlings in the pre nursery are ready for planting, transferred to a larger polybag and then placed far apart with a distance of 90x90x90 cm, the purpose of providing distance is for planting, care, fertilization purposes. , selection, and control, as well as expanding midrib strands.

Seed maintenance includes watering, fertilizing, controlling pests and diseases. Watering is carried out every day for 6 hours a day, in the morning at 00.07-10.00 am and in the afternoon from 16.30-17.30, adjusted to the water needs of the nursery area, the required water capacity per day is 10mm per polybag, weeding Weeds are carried out in polybags and around polybags, weeding is done manually by spraying using a knapsack or by hand. Fertilization in the initial nursery was carried out at the age of 3 WAP and the main nursery at the age of 12 WAP, then the next fertilizer application was given at an interval of 1 week. The type of fertilizer used is NPK and Urea, by dissolving

it and then flushing it using gembor (in early nurseries). The type of fertilizer used in the main nursery is NPK and Urea, the application is spread in polybags.

Sprout varieties

PT.socfindo issued 3 types of superior varieties, namely:

1. DxP UNGGUL SOCFINDO LaMe

   The main advantage of DxP LaMe is that it is more tolerant of environmental stresses so that it is able to produce a large number of bunches per tree (25-33 bunches per year at the age of 3-5 years). Slow growth in height (40-50cm/year) makes the cycle of this variety longer (up to 30 years). Some DxP LaMes also have resistance to *Fusarium disease.*

2. DxP UNGGUL SOCFINDO Yangambi

   The dominant characteristic of this variety is being able to produce a high early harvest (quick starter). With a large number of bunches and heavy. This variety is very suitable for planting in areas with an even distribution of rainfall throughout the year with good drainage.

3. DxP UNGGUL SOCFINDO MT Gano

   The DxP Socfindo MT Gano variety as a new variety released in 2013 was proven to be tolerant of Ganoderma disease with high production capacity. Due to its tolerant nature, Ganoderma makes tree density can be maintained so that the productive life becomes longer than ordinary varieties. Or often called "Sustainable Oil Palm Planting Material".

Vegetative Growth

While the authors conducted research at PT. Socfindo Seunagan Garden, observations during the pre-nursery period were carried out from the age of 1 month (4 MST), and observations at the main nursery period were carried out from 3 months (12 MST). Observing the diversity of seeds by means of vegetative measurements is a simple way to determine the quality of the seeds planted. Vegetative growth observed from November 18, 2021 to December 16, 2021, can be seen in the following table.

Table 1. Vegetative growth

Vegetative growth	MST	Pre-nursery	MST
Plant height (cm)	4	12.5	12
	6	16.2	14
	8	18.4	16
Number of leaves	4	2	12
	6	3	14
	8	4	16
Rod diameter(mm)	4	4.25	12
	6	5.6	14
	8	7.8	16

Vegetative plant growth is the most frequently observed measure of plant growth, both as an indicator of growth and as a variable used to measure environmental influences. Plants are said to be good if the growth of plant height is good and neither stunted nor too fast. Plant height shows the vegetative growth of a plant. Plant growth measurements were carried out starting from stem diameter, number of leaves, and plant

height. Performed three times with an interval of 2 weeks once per 20 plants. Observations made were then analyzed using regression analysis.

The results of observations can be seen in table 1 above that plant height, stem diameter, and number of leaves increase every week from the beginning of the observation, this shows that the amount of nutrient and water needs at each planting is very sufficient, of course accompanied by regular fertilizer application every one week. Once, the increase in stem diameter, plant height, and number of leaves did not only occur in the pre-nursery but also in the main nursery. According to Autixier et al. (2014), water sources in tidal lands aside from rainwater are also from surrounding rivers, water sources both from rain and river flows that enter the garden area must be managed as well as possible during the rainy season and dry season, of course so that the level of Water in the garden can be maintained so that the needs of plants for water are fulfilled and not excess.

The ideal rainfall for oil palm growth is 2000-2500 mm/year because the effective water requirement for oil palm is 1300-1500 mm/year (Ferwerda, 1977). Conditions of high rainfall affect the formation and development of female flowers into fruit that fail to form. On the other hand, low rainfall results in a lack of water supply in the long term. Maryani, Anis Tatik.("The effect of water supply volume on the growth of oil palm seedlings in the main nursery (Fauzi, Widyastuti, Satyawibawa, & Paeru, 2012).

It can be seen in table 2 that the average rainfall at PT.socfindo in the last 2 months can meet the needs of oil palm seeds in each polybag, where each polybag requires a water capacity of 10 mm per day, watering is done by checking the water capacity provided. by rainfall, then adjust the watering time using sprinkles in the seedling area.

Table 2. Daily rainfall data at PT. Socfindo Kebun Subagan

TANGGAL	DATA CURAH HUJAN DI BULAN	
	NOVEMBER	DESEMBER
1	8	57
2	20	0
3	0	0
4	21	0
5	102	0
6	11	0
7	96	0
8	21	0
9	0	0
10	0	0
11	0	10
12	0	28
13	0	3
14	16	0
15	44	13
16	6	19
17	0	19
18	0	20
19	17	85
20	0	81
21	27	0
22	0	0
23	20	0
24	0	0
25	0	0
26	0	0
27	17	0
28	4	0
29	27	0
30	0	1
31		0
TOTAL (mm)	457	276
HARI HUJAN	16	10

In general, it can be seen that the seedling height, stem diameter, and number of leaves of the Socfindo variety dominated by a few percent and had higher growth rates than ordinary seedlings in general, at the age of 12 WAP the socfin variety was superior (22.1 cm) and which is generally (20.0 cm). Socfindo variety has a higher number of leaves than the general variety. This is an advantage for the Socfindo variety because at

the age of 2.5 months, Socfindo's DxP variety seeds already have 3-4 leaves and can be directly transferred to the next planting stage, namely the main nursery.

CONCLUSION

The results of the analysis of vegetative growth data showed that planting and maintaining plants in the pre-nursery and main nursery according to procedures had a significant effect on the growth of oil palm seedlings. This is indicated by the very good seedling growth data compared to the general growth data at the same seedling age.

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