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Identification and Percentage of Disease Pathogen Attacks on Primary Palm Oil Crops (Elaeis Guineensis Jacq)

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Abstract
The aim of this research is to identify and determine the percentage of diseases caused by fungi in oil palm seedlings. The purposive sampling method and the objects observed were fungi that cause disease in oil palm seedlings microscopically at the Jambi Class 1 Agricultural Quarantine Laboratory. The results of the research found that Curvularia sp disease had a percentage of attacks in nursery one (f_1) of 25%, while the intensity of attacks in nursery one (f_1) was 5%, in nursery two (f_2) the percentage of attacks was 25% while the intensity of attacks in nursery two (f_2) 6%, and in the third nursery (f_3) the attack percentage was 10%, while the attack intensity in the third nursery (f_3) was 2%. The percentage of attacks by Pestalotiopsis sp in nursery one (f_1) is 20%, while the intensity of attacks in nursery one (f_1) is 4%, in nursery two (f_2) the percentage of attacks is 5%, while the intensity of attacks in nursery two (f_2) is 1%, and in nursery three (f_3) attack percentage was 20% while the attack intensity in the three (f_3) nursery was 4%. From this research, it was concluded that two diseases were found in oil palm seedlings, namely Curvularia sp leaf spot and Pestalotiopsis sp leaf spot.

Keywords: *Disease, Fungi, Oil Palm, Pathogen*

Introduction

The exact origin of the oil palm plant (Elaeis guineensis Jacq) cannot be known. However, there is a strong suspicion that this plant comes from two places, namely South America and Africa (Guinea). Species Elaeis melanococca Gaertn. or Elaeis guineensis comes from Africa (Guinea). The oil palm plant (Elaeis guineensis Jacq) is one of the most dominant types of plantation crops in Indonesia. Oil palm plantations play an important role in increasing the country's foreign exchange and also the existence of oil palm plantations creates jobs for the community. The oil palm plant is a plant that has very high economic value, and also oil palm is a good source of vegetable oil in the world, so the demand for this palm oil product is very large. The increasing demand for oil from palm oil has also played an important role in the Indonesian economy (Sitinjak, 2018).

According to estimates, approximately 90% of world oil production is used as food. Palm oil used as a food product comes from kernel oil which undergoes a fractionation, vaccination and hydrogenase process. The advantage of palm oil as a food ingredient is that it is a source of vitamin E, which is an anti-oxidant. Another advantage is that the linoleic acid content is low so that cooking oil made from palm fruit has stability (Nasution, 2014). In oil palm seedlings, this fungus is the cause of the main disease that attacks at the seedling stage which is often called leaf spot disease. Leaf spot disease caused by Curvularia sp. in oil palm nurseries it can reach 38%

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(Solehudin, Suswanto, Supriyanto 2012). Disease can cause the death of oil palm seedlings if the disease is not controlled.

High humidity in oil palm seedlings due to late transplanting from the pre-nursery to the main nursery will also worsen leaf spot disease (Susanto and Prasetyo, 2013). Leaf disease attacks in oil palm nurseries can cause stunted seedling growth. This attack is rarely fatal. If a serious attack occurs in the nursery which does not receive enough attention, the seeds may no longer be able to be used (Solehudin, Suswanto, Supriyanto 2012). Based on the problems above, the author is interested in conducting research on diseases in oil palm (Elaeis guineensis Jacq) nurseries by observing physically (macroscopically) and identifying fungi (microscopically).

Literature Review

Morphology of Oil Palm Plants

The classification of oil palm plants is Kingdom: Plantae, Infra Kingdom: Streptophyta, Sub Kingdom: Viridiplantaae, Division: Tracheophyta, Super Division: Embryophyta, Sub Division: Spermatophytina, Order: Arecales, Class: Magnoliopsida, Genus: Elaeis Jacq, Family: Arecaceae, Species: Elaeis guineensis Jacq (Pahan, 2021). In general, the oil palm root system is mostly located close to the soil surface, but in certain circumstances the roots can also explore deeper. The oil palm root system is a fibrous root system, consisting of primary, secondary, tertiary and quaternary roots. Primary roots generally have a diameter of 6-10 mm, emerge from the base of the stem and spread horizontally and penetrate into the soil at various angles. Primary roots branch to form secondary roots with a diameter of 2-4 mm. Secondary roots branch to form tertiary roots with a diameter of 0.7-1.2 mm and generally branch again to form quaternary roots (Pujokusumo, 2017).

Oil palm trunks cannot branch because they only have one growing point. Therefore, there is only one direction of growth (vertical or upward). This growing point will form leaves and stem segments which will increase the height of the stem. The height of oil palm plants can reach 25 m naturally. However, for cultivation purposes the plant height is only around 12 meters. If you look closely, the former leaf segments will form a regular growth pattern. The pattern formed is a spiral. There are 8 segments in total so it has a leaf formula of 1/8. The starting direction of the spiral can be from left to right or vice versa, depending on the traits it is born with (genetics). The direction of horizontal development of oil palm plants is limited to a diameter of around 90 cm. And oil palm plants have a commercial age limit of around 25 years (Nurhakim, 2014).

The composition of oil palm leaves is compound, even-finned and parallel-boned and forms a single midrib that reaches 7.5-9 m in length. On one mature oil palm tree there are 40-60 fronds. If pruning is not carried out at harvest, the number of leaves will reach more than 60. In a year, each tree will produce 20-30 leaves and then this decreases to 18-25 leaves as the plant gets older. The number of leaflets on each midrib ranges from 250-400. Young leaves that are still buds are pale yellow. The number of fronds, length of fronds, and number of leaflets depend on the age of the plant. In older plants, the number of midribs and leaflets is greater. Likewise, the fronds will be longer compared to young plants. In fertile soil, the leaves open quickly so that they are more effective in carrying out their function as a place for photosynthesis and as a means of respiration (Purwanto, 2016).

Oil palm is a monoecious plant (one house). This means that male and female flowers are found on the same tree. The male flower arrangement is separate from the female flower arrangement. However, sometimes male and female flowers are also found in one cluster (hermaphrodites). Generally, oil palm plants are cross-pollinated. Flowers emerge from the leaf axils and each leaf axil can only produce one inflorescence (compound flower). Some of the

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inflorescences usually fall off in the early phases of their development so that on individual plants it can be seen that some of the leaf axils do not produce inflorescences (Pahan, 2015).

The fruit (brondoloan) is collected in bunches. In one bunch there are around 1,600 pods. Young plants will produce 20-22 bunches per year. The number of fruit bunches on old plants is around 12-14 bunches per year. The weight of each bunch is around 25-35 kg. Based on shell thickness, oil palm is divided into three types, namely as follows.

1) Psifera is a type that does not form a shell and generally experiences fruit abortion. Psifera fertile can contain 40% oil.
2) Dura, which is a type that has a shell thickness of 2-8 mm with oil extraction of 16-18%. Generally used as a parent tree to produce commercial varieties.
3) Tenera is a hybrid of dura and psifera with a thin shell of 0.5-4.0 mm. Oil extraction is around 22-32% or more (depending on variety) (Pahan, 2021).

Conditions for Growing Oil Palm Plants

a. Length of Sunlight

The sunlight needed to produce carbohydrates also stimulates the formation of flowers and fruit. Therefore, the intensity, quality and duration of exposure greatly influence the process. The minimum amount of sunlight required for oil palms is 1,600 hours/year and the optimum is around 6-7 hours/day. Lack or excess of sunlight will have bad consequences for oil palm plants (Pujokusumo, 2017).

b. Temperature

The suitable oil palm plantation development area is around 15˚N-15˚South Latitude. A good oil palm planting height ranges from 0-500 meters above sea level. The optimum temperature for oil palm growth is around 29-30˚C. A good temperature variation should not be too high. The greater the temperature variation, the lower the results obtained. Cold temperatures can cause flower clusters to become evenly distributed throughout the year. In tropical areas, air temperature is closely related to height above sea level (asl). The optimal height is 200 meters above sea level, and it is recommended that it is no more than 400 meters above sea level, although in some areas such as North Sumatra, there are quite good oil palm plantations up to a height of above sea level (Purwanto, 2016).

c. Rainfall

The optimum rainfall required by oil palm plants is an average of 2,000-2,500 mm/year with even distribution throughout the year without prolonged dry months. Evenly distributed rainfall can reduce evaporation from the soil and oil palm plants. However, what is important is that there is no water deficit of 250 mm. If the soil is dry, it is difficult for plant roots to absorb minerals from the soil. Therefore, a prolonged dry season will reduce production. Regions in Indonesia that frequently experience drought are Lampung and West Java, while Kalimantan and several other locations almost once every 5-6 years (Fauzi, Widyastuti, Satyawibawa, 2014).

d. Type of soil

A good soil texture for growing oil palms is loamy, has enough nutrients and is well aerated. The land must not have standing water, not be rocky, and not have a solid layer. Oil palm can grow optimally in soil containing a pH between 5.0-5.5 (Nurhakim, 2014).

- Soil Chemical Properties

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Soil chemical properties include soil pH and nutrient content, chemical fertility levels such as main nutrient content (N, P, K), soil acidity (pH), cation exchange capacity. This is done by identifying the planting cycle of oil palm plantations that use Mucuna bracteata (Darlita, Joy, and Sudirja, 2017).

- Physical Properties of Soil

Good physical soil properties are more desirable for oil palm plants than chemical properties. Several things that determine the physical properties of soil are texture, structure, consistency, slope of the soil, permeability, thickness of the soil layer, and depth of the groundwater table. Ideally, oil palm plants require soil that is loose, fertile and has a deep solum without a hard layer, the texture contains 25-30% clay and dust, is flat and well-drained (Pujokusumo, 2017).

Oil Palm Plantation Nursery

There are several factors that influence the level of productivity of oil palm plants, including soil type and seed quality. Seeding is a process for growing and developing seeds or seeds into seedlings that are ready to be planted. Through this nursery stage, it is hoped that good and quality seeds will be produced. Good oil palm seeds are seeds that have optimal growth strength and performance and are able to withstand environmental stress conditions during transplanting. The system that is widely used in oil palm nurseries today is a two-stage nursery system. The two-stage nursery system consists of an initial nursery and a main nursery (Setiawati, 2017).

a. Early Nursery (Pre Nursery)

Initial nursery (pre nursery) for ± 3 months in small polybags (babybags). Pre-nursery is a nursery activity aimed at providing seedlings with optimal and controlled growing environmental conditions. Several activities are carried out in initial nurseries such as preparing and cultivating soil, planting sprouts, and maintaining initial nurseries. Maintenance activities consist of watering, controlling weeds, fertilizing, controlling pests and diseases, selecting seeds, moving and transporting seeds. In the initial nursery, shade is needed which is expected to be able to accommodate the intensity of sunlight (Setiawati, 2017).

b. Main Nursery (Main Nursery)

The main nursery is the second stage of a two-stage nursery system. In the main nursery, seedlings are maintained from 3 months to 12 months old. The success of the planting plan in the field and future production is determined by the implementation of the main nursery and the quality of the seeds it produces. Several activities in the main nursery include soil preparation and processing, providing water needs and watering installations, planting or watering, preparing planting media, planting seeds, maintenance (watering, weeding, mulching, fertilizing, pest and disease control, and seed selection) . The main nursery, namely seeds from the pre-nursery, are transferred into polybags measuring 40x50 cm or 40x60 cm with a thickness of 0.11 mm containing 15-30 kg of sifted topsoil. In the main seedling phase shade is no longer needed. Seedlings that have been transferred into large polybags are arranged at a distance of 90x90 cm or 70x70 cm (Setiawati, 2017).

c. Main Nursery Maintenance

Maintenance at the main nursery includes watering twice a day in the morning and evening. Water requirements are around 2 liters for each polybag. Weeding is done 2-3 times a month or adjusted to weed growth. It is recommended to fertilize palm oil in the main nursery

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using compound fertilizer, because it reduces transportation costs and lower fertilizer costs and applying several elements at once will be effective compared to applying single fertilizer. The composition of compound fertilizer (N:P:K:Mg) used in the ratio 12:12:17:2 is 230 grams/seed (Fauzi, 2004). In the main nursery phase, seeds cannot be planted directly in the field because the seeds are still too small so their growth is easily disturbed by pests and diseases. In addition, seedling growth is not uniform, especially for very young seedlings. Seeding can be done in the field or using large polybags (Kurniawan, 2016).

How to Control Diseases in Oil Palm Seedlings

a. Cuts on Leaves. Cutting the leaves of oil palm seedlings is done to prevent leaf spots from spreading (Ferina and Beni, 2019).

b. Plant Isolated. Leaf spot disease which has attacked many oil palm seedlings will be isolated so that it cannot spread, so that plants that are still healthy can avoid leaf spot disease (Ferina and Beni, 2019).

c. Using fungicide. Control of leaf spot disease is carried out by spraying the fungicide Score 250 EC with a concentration of 0.1-0.2% (1-2 cc/liter of water). Spraying is carried out in the morning or evening at intervals of once every 2 weeks and if the intensity of the attack is high, then spraying can be carried out at intervals of once a week (Ferina and Beni, 2019).

The Influence of Climate on Disease Attacks

The impact of climate change can directly or indirectly influence the growth dynamics of Plant Pest Organisms (OPT). The increase in extreme climate events characterized by flood and drought phenomena, changes in rainfall patterns which have an impact on shifts in seasons and cropping patterns, temperature fluctuations and increasing air humidity are able to stimulate the growth and development of pests, thus having a negative impact on Indonesian agriculture. The influence of extreme climatic events often stimulates outbreaks of several major plant pests and diseases (Ditjenbun, 2007).

Climate change due to global warming plays a role in triggering the existence of pests in nature. Fluctuations in temperature and air humidity can stimulate the growth and development of pests. These changes can affect pest status in the field. The issue of the emergence of Curvularia sp and Pestalotiopsis sp on oil palm seedlings is an example of a pest that is developing due to the role of global climate change. And in the rainy season, disease attacks caused by fungi are more dominant (Diyasti and Aceu, 2021).

Method

This research was conducted in Pematang Pauh Village, Tungkal Ulu District, West Tanjung Jabung Regency, Jambi Province, as well as the Jambi Class 1 Agricultural Quarantine Laboratory from October-December 2022. The materials used in this research were samples of Tenera type oil palm seeds in the main nursery (Main nursery) who are infected with disease, alcohol, chlorox, distilled water, filter paper and wet newspapers. Meanwhile, the tools used in this research were a knife or scissors, plastic, stationery, camera, Petri disk, airstream, tweezers, fungus identification book and light microscope. The method used for sampling was a purposive sampling method at the main nursery which was divided into nursery location 1, nursery location 2, and nursery location 3.

In this study, sampling was carried out in 1 village with three nursery locations (f_1, f_2, and f_3). The total population at each nursery location is 130 seedlings. So the sample used was 15% of 130 plants, namely 20 plants. Determination of sample plants is done by randomly drawing 20 lottery numbers. Before taking plant samples, all plants (130 seeds) were numbered and then 20

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numbers were removed from the 130 numbers provided. Then the drawn number is used as the sample plant number. Next, the sample plants were observed visually (observing the percentage and intensity of disease pathogen attacks). Observations continued microscopically in the Jambi class 1 Agricultural Quarantine laboratory.

Results and Discussion

Field Observation Results

a. Symptoms Percentage of Disease Attacks

The results of the percentage of disease pathogen attacks on the main nurseries of oil palm plants in Peamatang Pauh Village, Tungkal Ulu District, West Tanjung Jabung Regency are in Table 1 below.

Table 1. Types and Symptoms of Disease Pathogen Attacks and the Percentage of Seedlings Attacked by Disease

No.	Types and Symptoms of Disease	Amount and Percentage Seedlings Attacked by Disease		
		f_1	f_2	f_3
1.	Leaf Spot (Curvularia sp.) There are oval and concave spots when viewed from the upper leaf surface. The color of the spot is dark brown surrounded by yellow, which can be seen in Figure 1.  Figure 1. Symptoms of attack by the pathogen Curvularia sp	5 Plant 25% 	5 Plant 25%	2 Plant 10%
2.	Leaf Spot (Pestalotiopsis sp.) Spots that are irregular in shape. Elongated brownish red spots. Almost half of the leaflets dry out and are grey-white, as can be	4 Plant 20%	1 Plant 5%	4 Plant 20%

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seen in Figure 2.

Figure 2. Symptoms of attack by the pathogen Pestalotiopsis sp

Note: f_1, f_2, and f_3 sampling location

Based on Table 1, the types of disease found in all the nurseries observed were leaf spot (Curvularia sp.) and leaf spot (Pestalotiopsis sp.). Symptoms of leaf spot (Curvularia sp.) are the presence of oval and concave-shaped spots when viewed from the upper leaf surface. The color of the spots is dark brown surrounded by yellow. Meanwhile, the symptoms of leaf spot (Pestalotiopsis sp.) are irregularly shaped spots. Elongated brownish red spots. Almost half of the leaves dry out and turn grayish white. In nursery one (f_1) there were 5 plants with leaf spot disease (Curvularia sp.) (25%) and 4 plants with leaf spot disease (Pestalotiopsis sp.) (20%). In nursery two (f_2) there were 5 plants with leaf spot disease (Curvularia sp.) (25%) and 1 plant had leaf spot disease (Pestalotiopsis sp.) (5%). In nursery three (f_3) there were 2 plants with leaf spot disease (Curvularia sp.) (10%) and 4 plants with leaf spot disease (Pestalotiopsis sp.) (20%).

b. Intensity of Disease Attacks

The results of the intensity of disease attacks in the main oil palm nursery in Peamatang Pauh Village, Tungkal Ulu District, West Tanjung Jabung Regency are in table 2 below.

Table 2. Types and Intensity of Seedlings Attacked by Disease

No.	The type of disease	Intensity of Disease Attacks		
		f_1	f_2	f_3
1.	(*Curvularia sp.*)	5%	6%	2%
2.	(*Pestalotiopsis sp.*)	4%	1%	4%
3.	(*Fusarium sp.*)	0%	0%	0%

Note: f_1, f_2, and f_3 sampling location

Based on Table 2, the results of the intensity of leaf spot disease attacks (Curvularia sp.) in nursery one (f_1) are (5%), in nursery two (f_2) namely (6%), and in nursery three (f_3) namely (2%). Meanwhile, the results of the intensity of leaf spot disease attacks (Pestalotiopsis sp.) in nursery one (f_1) were (4%), in nursery two (f_2) namely (1%), and in nursery three (f_3) namely (4%).

Observation Results in the Laboratory

a. Observation of Mold Growth in the Moist Chamber

The results of observations on petridish plates of fungal growth in the samples, to see fungal growth can be seen in table 3.

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Table 3. Observation of fungal morphology in moist chamber media

Observation Days to-	Disease	Sampel			Description of Fungal Growth
		f_1	f_2	f_3	
7	Leaf Spot 	2 *petridish*	2 *petridish*	3 *petridish*	The fungal mycelia are visible in the moist chamber, but are very fine and white in color.
14	Leaf Spot 	4 *petridish*	4 *petridish*	6 *petridish*	The fungal mycelia are visible in the moist chamber, but are very fine and white in color.

Note: f_1, f_2, and f_3 sampling location

Based on Table 3, the growth of fungal diseases on leaves in the moist chamber media on day 7 experienced growth in sample location one (f_1) by 2 petridishes, in sample location two (f_2) by 2 petridishes, and in sample location three (f_3) by as much 3 petridishes. Meanwhile, on the 14th day, the growth of disease fungi on the leaves in the moist chamber media increased. In sample location one (f_1) there are 4 petridishes, in sample location two (f_2) there are 4 petridishes, and in sample location three (f_3) there are 6 petridishes.

b. Types of Fungi Identified Microscopically

The types of pathogens identified microscopically are the fungal pathogens Curvularia sp., Pestalotiopsis sp., Fusarium sp.

1. Curvularia sp.

Results of microscopic observations of the fungus Curvularia sp. which can have characteristics in the form of insulated hyphae, single or more conidia found at the tip of the hyphae, 3 septates, the second part of the conidia cell is larger and darker in color than the other parts of the cell, the conidiophores are dark brown, unbranched and septate. Microscopically, the Curvularia sp pathogen can be seen in figure 3.

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Figure 3. Pathogen Curvularia sp.

According to Semangun (2007), pathogenic fungi can enter plant parts through wounds, natural holes, or by directly penetrating the surface of intact plant parts. If pathogens cannot penetrate these layers, they enter through wounds. Life cycle of Curvularia sp. Mainly spread by its conidium, either by wind or by splashing rainwater and water, and also by insects.

2. Pestalotiopsis sp.

The results of microscopic observations showed that the conidium of Pestalotiopsis sp. It is shaped, has 4 compartments and has 3 apical setae (hairs) (Figure 3). This is in accordance with the statement of Sumardiyono and Triharso (1985) in Semangun (2008) which stated that the conidium of the fungus Pestalotiopsis sp. Coil-shaped, 4-parted, has 3 apical setae (hairs). The pathogen Pestalotiopsis sp can be seen microscopically in figure 4.

Figure 4. Pathogen Pestalotiopsis sp.

According to Semangun (1991), fungal spores are spread by being carried by the wind, and over short distances they can be carried by water and insects. Fungal spores Pestalotiopsis sp. can only infect if there are injured plant parts on the leaves. Disease caused by the fungus Pestalotiopsis sp. Found more in plants that grow less well. Excess nitrogen and excessive use of manure make plants more susceptible to disease.

3. Fusarium sp.

Results of microscopic observations of the fungus Fusarium sp. has 2 types of conidia, namely, macroconidia and microconidia. Macroconidia are elongated and curved with a tapered tip and have 3-6 cells. There are also microconidia that do not have a partition, but some have two partitions, are straight elliptical or slightly curved (Figure 3). This is in accordance with the

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opinion of Ganjar (1999) who states that microconidia generally do not have partitions but some have bisections, are found in very large numbers, are ovoid-elliptical to cylindrical, straight or slightly bent. Microscopically, the Fusarium sp pathogen can be seen in figure 5.

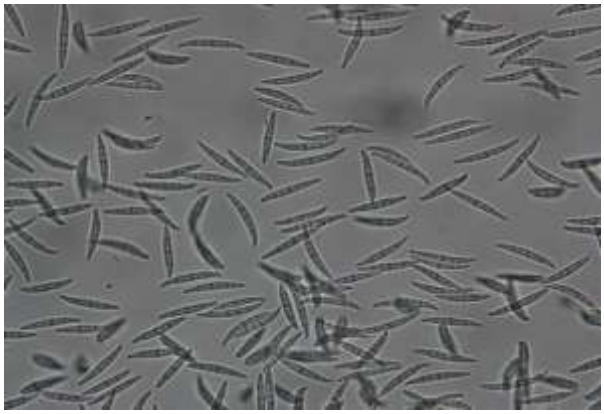

Figure 5. Pathogen Fusarium sp.

According to Semangun (1991), the spread of spores is caused by splashing rainwater. Water splashes on the Fusarium sp fungus. Which infects plant parts in higher areas. Fungi form many conidia on tissues exposed to water splashes that carry fungal pathogens, especially if the air is very humid. The growth of fungal pathogens will accelerate.

In general, the symptoms of yellow streak disease caused by the Fusarium sp fungus are that on young plants the leaves appear brownish yellow on one leaf and then spread to the next leaf and then to the leaves below. The plant then completely dries up and dies within 2 months after the first symptoms appear.

Results of Interviews with Farmers Regarding Oil Palm Seedling Care

Based on the results of direct interviews in the field, they can be summarized in Table 4.

Table 4, Data from interviews with farmers

No.	Questionnaire	Farmer f_1	Farmer f_2	Farmer f_3
1.	Name	Dodi	Gunadi	Edi
2.	Age (Years)	30	42	45
3.	Last education	Senior High School	Senior High School	Senior High School
4.	Disease Control	By cutting the leaves	By cutting the leaves	By cutting the leaves
5.	Weed Control	Manually	Manually	Manually
5.	Fertilizing and Watering	-NPK fertilizer (5-6 g/seed) is applied once a month -Watering is done twice a day in (dry months) and no watering is done in (wet months)	-NPK fertilizer (5-6 g/seed) is applied once a month -Watering is done twice a day in (dry months) and no watering is done in (wet months)	-NPK fertilizer (5-6 g/seed) is applied once a month -Watering is done twice a day in (dry months) and no watering is done in (wet months)

Source: interviews with farmers at f_1, f_2, and f_3 nursery locations

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From the results of observations of the conditions of the oil palm nursery locations f_1, f_2, and f_3 can be seen in table 5.

Table 5, Condition of oil palm nurseries in 3 locations

No.	Location	Age and Land Condition
1.	f_1  Figure 6. Location 1	The age of the seedlings at location 1 (f_1) is 8 months old and the average number of leaves is 10 leaves.
2.	f_2  Figure 7. Location 2	The age of the seedlings at location 2 (f_2) is 10 months old and the average number of leaves is 14 leaves.
3.	f_3  Figure 8. Location 3	The age of the seedlings at location 3 (f_3) was 8 months old and the average number of leaves was 10 leaves.

Discussion

The types of disease found at the locations observed were leaf spot (Curvularia sp.) and leaf spot (Pestalotiopsis sp.). The percentage of disease pathogen attack in nursery one (f_1) was 5 plants with leaf spot disease (Curvularia sp.) (25%) and 4 plants with leaf spot disease (Pestalotiopsis sp.) (20%). In nursery two (f_2) there were 5 plants with leaf spot disease

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(Curvularia sp.) (25%) and 1 plant had leaf spot disease (Pestalotiopsis sp.) (5%). In nursery three (f_3) there were 2 plants with leaf spot disease (Curvularia sp.) (10%) and 4 plants with leaf spot disease (Pestalotiopsis sp.) (20%).

The intensity of attack by leaf spot disease (Curvularia sp.) in nursery one (f_1) is (5%), in nursery two (f_2) is (6%), and in nursery three (f_3) is (2%). Meanwhile, the results of the intensity of leaf spot disease attacks (Pestalotiopsis sp.) in nursery one (f_1) were (4%), in nursery two (f_2) namely (1%), and in nursery three (f_3) namely (4%).

The growth of disease pathogenic fungi from leaf spot samples of oil palm seedlings in moist chamber media on day 7 experienced growth in seedling sample one (f_1) by 2 petridishes, seeding sample two (f_2) by 2 petridishes, and seeding sample three (f_3) by 2 petridishes. 3 petridishes. Meanwhile, on the 14th day, the growth of disease pathogenic fungi in the moist chamber media increased. Nursery sample one (f_1) has 4 petridishes, nursery sample two (f_2) has 4 petridishes, and nursery sample three (f_3) has 6 petridishes. The types of pathogens identified microscopically are the fungal pathogens Curvularia sp., Pestalotiopsis sp., Fusarium sp. Pathogenic attacks from these 3 types of disease are found in the three nursery locations f_1, f_2, and f_3.

In the rainy season, the intensity of leaf spot disease caused by the pathogens Curvularia sp and Pestalotiopsis sp is more dominant. High rainfall and windy conditions will make it easier for Curvularia sp and Pestalotiopsis sp spores to spread from one plant to another (Priwiratama, 2012).

According to Sutarman (2017) cleanliness from weeds is very important to prevent the spread of leaf diseases in oil palm seedlings. This is because weeds can act as alternative hosts for Curvularia sp and Pestalotiopsis sp. The two pathogens that cause leaf disease on oil palm seedlings are air borne pathogens (pathogens that are transmitted through the air) so you have to be careful when it rains and strong gusts of wind will move the spores from their source to the oil palm seedlings.

The intensity of the attack by this disease pathogen at the three nursery locations f_1, f_2, and f_3 was categorized as very light because the farmers carried out good maintenance. Where in August it is declared a dry month, farmers water regularly, namely twice a day, and in September it is declared a wet month, farmers do not water, then oil palm seedlings are given NPK fertilizer at a dose of 5-6 g/seed and fertilization is carried out once a month. Meanwhile, weed control is done manually. So because the oil palm seedlings in the 3 nursery locations f_1, f_2, and f_3 are well cared for, the intensity of the attack by the pathogens Curvularia sp and Pestalotiopsis sp is in the very light category.

From the results of interviews conducted with farmers, control of Curvularia sp and Pestalotiopsis sp pathogen attacks was carried out by cutting the leaves of oil palm seedlings that were experiencing pathogen attacks. In this way, attacks by the pathogens Curvularia sp and Pestalotiopsis sp can be prevented from spreading to other oil palm seedlings. Weed control at the f_1, f_2, and f_3 nursery locations is carried out manually. Fertilization of oil palm seedlings at the f_1, f_2, and f_3 nursery locations is carried out once a month. The fertilizer used is NPK fertilizer at a dose of 5-6 g/seed. Watering in August (dry month) is done twice a day and in September (wet month) oil palm seedlings are not watered if it rains. Maintenance of oil palm seedlings includes disease control, fertilizing and watering. As a result of good maintenance of oil palm seedlings, disease pathogen attacks are very light.

The standards that farmers must carry out regarding attacks or intensity of disease attacks on oil palm seedlings are as follows:

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a. Spacing the seeds to 90 cm x 90 cm

b. Temporarily reduce the volume of water sprayed

c. Manual watering using gembor is more recommended, and should be directed to the soil surface in polybags, not the leaves

d. Isolate and trim diseased leaves from seedlings with mild-moderate symptoms

e. Next, sprayed with the fungicide thibenzol, captan or thiram at a concentration of 0.1-0.2% every 10-14 days

f. Destroy heavily infested seedlings

Conclusions

Based on the research results, it can be concluded that 2 (two) diseases were found in oil palm seedlings in Pematang Pauh Village, Tungkal Ulu District, West Tanjung Jabung Regency, namely Curvularia sp leaf spot and Pestalotiopsis sp leaf spot.

Curvularia sp disease, the percentage of attacks in nursery one (f_1) is 25%, while the intensity of attacks in nursery one (f_1) is 5%, in nursery two (f_2) the percentage of attacks is 25%, while the intensity of attacks in nursery two (f_2) is 6%, and in nurseries three (f_3) attack percentage is 10% while the attack intensity in three (f_3) nurseries is 2%.

Pestalotiopsis sp disease, the percentage of attacks in nursery one (f_1) is 20%, while the intensity of attacks in nursery one (f_1) is 4%, in nursery two (f_2) the percentage of attacks is 5%, while the intensity of attacks in nursery two (f_2) is 1%, and in nursery three (f_3) attack percentage is 20% while the attack intensity in three (f_3) nurseries is 4%.

References

Sitinjak, R. R. 2018. Respon Pertumbuhan Bibit Kelapa Sawit (*Elaeis quineensis* Jacq). Di Pre Nursery Setelah Pemberian Ekstrak Bawang Merah (*Allium Cepa l*) Dengan Waktu Perendaman Yang Berbeda. Agroprimatech, 2(1), 1-9.

Nasution, H.H. 2014. Pertumbuhan Bibit Kelapa Sawit (*Elaeis quineensis* Jacq) Pada Berbagai Perbandingan Media Tanam Sludge Dan Tandan Kosong Kelapa Sawit (TKKS) Di Pre Nursery. USU. Medan.

Solehudin D, Suswanto I, Supriyanto. 2012. Status Penyakit Bercak Coklat Pada Pembibitan Kelapa Sawit di Kabupaten Sanggau. J Perkebunan Lahan Tropika. 2 (1) : 1-6.

Susanto A, Prasetyo A. 2013. Respon *Culvularia lunata* Penyebab Penyakit Bercak Daun Kelapa Sawit Terhadap Berbagai Fungisida. Pusat Penelitian Kelapa Sawit. Medan.

Semangun, H. 2008. Penyakit-Penyakit Tanaman Perkebunan di Indonesia (Edisi Kedua). Gajah Mada University Press, Yogyakarta.

Priwiratama, H. 2012. Efikasi Fungisida Nordox 86WG Terhadap Penyakit Bercak Daun *Culvularia* di pembibitan Kelapa Sawit.

Sutarman. 2017. Dasar-dasar Ilmu Penyakit Tanaman. Sidoarjo: Umsida Press.