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ANALYSIS OF FRESH FRUIT BUNCH (FFB) YIELD LOSSES DUE TO BASE STEM ROT (BPB) DISEASE ATTACKS CAUSED BY GANODERMA BONINENSE IN PT. EVANS GROUP'S PANGKATAN PLANTATION

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Abstract

Oil palm (Elaeis guineensis Jacq.) is a tropical plantation crop with high economic value and is one of Indonesia's mainstay commodities. The purpose of this study was to determine the level of basal stem rot (Ganoderma boninense) infestation in oil palm plants at the Pangkatan Plantation of PT. Evans Group, the magnitude of the resulting fresh fruit bunch (FFB) yield losses, and the relationship between disease severity and the decrease in FFB yield. The research method used was a survey method with a quantitative descriptive approach. The results showed that the level of ganoderma infestation in Block A1 was relatively low at 8.7%, but had a significant impact on oil palm productivity. Trees attacked by ganoderma produced lower fresh fruit bunch (FFB) weights than healthy trees, thus indicating that plant health significantly affects production results.

Keywords: ***Oil Palm Plants, Fresh Fruit Bunches, Fresh Fruit Bunch Losses, Root Rot Disease, Ganoderma Boninense .***

INTRODUCTION

Oil palm (Elaeis guineensis Jacq.) is a tropical plantation crop that has high economic value and is one of Indonesia's mainstay commodities.(Themas et al., 2019)This plant produces crude palm oil (CPO), which is used for various purposes, such as food, cosmetics, and renewable energy (biodiesel). With high productivity and increasing global demand, palm oil plays a vital role in improving farmers' welfare and generating foreign exchange. Indonesia is even the world's largest producer and exporter of palm oil.(Syarovy et al., 2021)However, despite this enormous potential, oil palm plantations face various challenges that can reduce productivity. One major issue is basal stem rot (BPB), a disease caused by the fungus Ganoderma boninense. This disease attacks the basal stem and root tissue of the plant, disrupting nutrient and water absorption, and ultimately leading to plant death. Consequently, fresh fruit bunch (FFB) yields decline drastically, leading to significant economic losses. Besides disease, other common challenges include declining soil fertility, unsustainable land management, and fluctuating FFB prices at the farmer level.(Husni, 2021).

Fresh Fruit Bunches (FFB) are the primary product of oil palm plantations and serve as an indicator of plantation productivity. The quality and quantity of FFB are highly dependent on plant health and the availability of nutrients and water. However, FFB production can decline drastically if the plant is infected with disease, one of which is Basal Stem Rot (BPB), caused by the fungus Ganoderma boninense. This disease damages the basal stem tissue and root system, disrupting nutrient flow to the upper part of the plant. Consequently, flower and fruit formation are reduced, bunch weight decreases, and FFB quality is suboptimal.(Sophia, et al 2023)The main problem caused by BPB disease is a significant reduction in FFB yields even before the plants show severe symptoms. Plants that appear healthy on the surface may already have latent infections within the stems. If not promptly controlled, this disease can spread to other plants and cause mass mortality in a single plantation block. This condition not only reduces productivity but also increases maintenance and replanting costs, and disrupts the long-term sustainability of production in oil palm plantations.(Dina, el al 2024).

Ganoderma boninense is a pathogenic fungus that primarily causes basal stem rot (BPB) in oil palms. This fungus belongs to the class Basidiomycetes and is known as a soil-borne pathogen that attacks the basal stem and root tissue of plants.(Wawan et al., 2019)Infection begins when fungal hyphae enter healthy roots through contact with root debris or stumps of infected plants. Over time, Ganoderma boninense damages the woody tissue, disrupting water and nutrient transport, leading to yellowing of the leaves, broken fronds, stem rot, and eventual plant death. The disease is progressive and difficult to control because the fungus can persist in the soil and in dead plant tissue.(Adhwiyah Hasibuan Region, 2024)The main problem posed by Ganoderma boninense is its difficulty in controlling and the significant economic losses it causes. This pathogen can be transmitted through soil, root debris, and work equipment, making it easy to spread between plants within a single plantation block. Furthermore, current control methods, such as plantation sanitation, the use of antagonistic fungi, and chemical applications, can only slow the disease's progression, not eliminate it completely. As a result, the annual plant mortality rate continues to increase, fresh fruit bunch (FFB) productivity decreases, and replanting costs increase, making this disease one of the biggest challenges in the Indonesian oil palm plantation industry.(Panggabean, 2023). Based on the above background, the researcher will conduct a study entitled "Analysis of Fresh Fruit Bunch (FFB) Yield Losses Due to Basal Stem Rot (BPB) Disease Attacks Caused by Ganoderma boninense". The purpose of this study is to calculate the magnitude of FFB yield losses due to Ganoderma boninense infection and provide scientific information that can be used as a basis for making decisions on disease control and efforts to maintain sustainable oil palm plantation productivity.

RESEARCH METHODS

Place and Time of Research

This research will be conducted on PT Evans Group's oil palm plantations, where plants are infected with basal stem rot (BPB), a disease caused by Ganoderma boninense. The study will be conducted from November to January 2026.

Tools and materials

The tools used in this study included stationery, scales, a digital camera to document attack symptoms, and disease identification tools such as knives. The materials used included healthy oil palm plants and those infected with Ganoderma boninense, as well as data on fresh fruit bunch (FFB) production from the sample plants.

Research methods

The research method used was a survey with a quantitative descriptive approach. Data collection was conducted through direct field observations of oil palm plants exhibiting BPB symptoms and healthy plants as a comparison. Data collected included the level of disease infestation, the physical condition of the plants, and the FFB yield per tree. The observations were then analyzed to determine the extent of yield losses due to the disease.

Research Implementation

1. The stages of research implementation include:
2. initial survey to determine the location and population of plants to be observed,
3. identification of healthy plants and those infected with BPB based on visual symptoms,
4. measurement and recording of FFB yields from each plant category, as well as
5. Additional data collection, such as plant age and environmental conditions, was conducted. All observation data was then summarized and processed for analysis.

Observation Parameters

Observation parameters in this study included the level of BPB disease attack (percentage of affected plants) and the yield of fresh fruit bunches (FFB) per tree during a single harvest period. This data was used to compare productivity between healthy and diseased plants.

Data analysis

The data obtained were analyzed descriptively and quantitatively by calculating the average FFB yield of healthy and diseased plants. The difference in yield between the two was used to determine the percentage of losses due to Ganoderma boninense infection. The data analysis was presented in tables and graphs to facilitate interpretation and draw conclusions regarding the impact of BPB disease on oil palm production.

RESULTS AND DISCUSSION

BPB Disease Attack Rate

Based on the results of the research on the level of BPB disease attacks in block A1 of PT. Evans Group Pangkatan, the results obtained are presented in Table 1.

Table 1. Results of the level of BPB disease attacks in block A1 of PT. Evans Group Pangkatan

Observation Block	Sample Area	Number of Samples	Attack Rate Percentage (%)
A1	10 Ha	10	8.7

Based on observations in Block A1 with a sample area of 10 ha and a sample size of 10 trees, the percentage of ganoderma infestation was 8.7%. This value indicates that the intensity of ganoderma infestation in Block A1 is relatively low, but still requires attention because this disease is progressive and can reduce plant productivity if not controlled. Although only a small number of trees are infected, the presence of ganoderma has the potential to spread the disease to healthy plants around it, so ongoing management and monitoring efforts are needed to maintain plant health and productivity in Block A1.

Figure 1. Plants infected with Ganoderma Sp.

Fresh Fruit Bunch (FFB) Yield

Based on the research results of Fresh Fruit Bunch (FFB) yields in block A1 of PT. Evans Group Pangkatan, the results obtained are presented in table 2.

Table 2. Fresh Fruit Bunch (FFB) Yield in Block A1 of PT. Evans Group Pangkatan

Sample Subject	Weight of Tree FFB Affected by Ganoderma	Weight of Healthy Fresh Fruit Bunches
P1	11	19
P2	17	26
P3	6	25
P4	17	21
P5	8	22
P6	10	19
P7	12	22
P8	13	20
P9	18	21
P10	14	23

Based on research data from 10 sample trees, it was observed that the weight of fresh fruit bunches (FFB) on healthy oil palm trees was consistently higher than on trees infected with ganoderma. The weight of FFB on ganoderma-infected trees ranged from 6–18 kg, while that of healthy trees ranged from 19–26 kg. This difference indicates that ganoderma attacks negatively impact plant productivity, as the disease disrupts the root system and nutrient absorption, thus suboptimal growth and fruit formation. Therefore, plant health significantly impacts the weight of FFB produced, with healthy trees producing heavier FFB than ganoderma-infected trees.

Discussion

Observations in Block A1 showed a ganoderma infestation rate of 8.7%, indicating that the disease intensity is still relatively low, but should not be ignored. Ganoderma is a chronic and progressive soil-borne disease, so even though the infestation rate is low, the potential for it to spread to surrounding healthy plants remains high. This indicates that the presence of infected plants can act as a source of inoculum within the block, especially if proper sanitation and plantation management are not implemented. Therefore, regular monitoring and early control measures are crucial to prevent future increases in infestation rates.

Figure 2. Results of fresh fruit bunch rice

The research also showed a clear difference between the weight of fresh fruit bunches (FFB) from healthy oil palm trees and those infected with ganoderma. Healthy trees produced higher weights of FFB than infected trees, indicating that plant health is directly proportional to productivity. The decrease in FFB weight in ganoderma-infected plants occurred due to impaired physiological function, particularly in the root system, which plays a role in water and nutrient absorption. As a result, photosynthesis and fruit formation were not optimal. In addition to directly reducing productivity, Ganoderma infestation also impacts the long-term sustainability of plantation production. Infected plants generally exhibit symptoms of gradually decreasing vigor, such as stunted growth and unstable fresh fruit bunch (FFB) production. If control measures are not taken, diseased plants can potentially die, increasing economic losses and reducing productivity per hectare. This confirms that even though the infestation level is still low, its impact on production is already clearly observable. Several factors suspected of influencing the level of ganoderma infestation and the difference in fresh fruit bunch weight between healthy and infected trees include soil conditions, plantation sanitation, plant age, and maintenance management. Soil with high humidity and poor drainage can support the development of ganoderma pathogens. Furthermore, untreated infected plant debris can become a source of disease spread. Unbalanced fertilization also plays a role in reducing plant resistance to disease. Therefore, implementing good plantation management, including improved drainage, land sanitation, and balanced fertilization, is essential to suppress ganoderma growth and increase fresh fruit bunch productivity.

CONCLUSION

The ganoderma infestation rate in Block A1 is relatively low at 8.7%, but it has had a significant impact on oil palm productivity. Ganoderma-infested trees produced lower fresh fruit bunch (FFB) weights than healthy trees, indicating that plant health significantly impacts production.

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