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Analysis of The Effectiveness of Controlling *Ganoderma boninense* Attacks Palm Oil (*Elaeis guineensis* Jacq) In Producing Plants At PT. Perkebunan Nusantara III Kebun Sei Putih

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ABSTRACT

Ganoderma is a type of disease that cannot be taken lightly because it can cause death to affected oil palm plants. Ganoderma infections can spread through spores and root contact. If there is inoculum in the soil, then spread through the soil is very difficult to avoid. This research aims to determine the effect of handling Ganoderma Boninense disease attacks on the decline in the population of oil palm plants (*Elaeis guineensis* jacq) in producing crops at PT. Perkebunan Nusantara III Sei Putih Garden. This research was carried out at PT. Perkebunan Nusantara III Sei Putih Garden. Study This done on month August year 2023. Study This use method Qualitative And Quantitative with count percent intensity attack ganoderma. In this study, a statistical test using SPSS two way ANOVA to see whether a comparison occurs significant changes in controlling ganoderma boninense attacks in PT. Nusantara Plantation III Sei Garden White. Results study This show that control Which done in PT. Perkebunan Nusantara III is running well, because it has been able to handle it spread disease ganoderma. With recognize symptom beginning, disaster attacks can be handled either through preventive measures or most No Can done isolation or dumping so disease Ganoderma boninense it doesn't spread to another location.

Keywords: *Ganoderma boninense, Nusantara III, Palm Oil, Qualitative, Sei Putih*

1. INTRODUCTION

Ganoderma boninense is classified as a soil-borne pathogenic fungus which infects the disease through roots and spreads the disease by producing basidiospores as a source of inoculum for stem rot infection (Lee et all, 2005). Control of *Ganoderma boninense* has so far not been successful in suppressing the development of the disease. Control using technical, mechanical and chemical culture often fails because *Ganoderma boninense* is a soil-borne pathogen with high saprophytic ability and a wide plant host range (Nildayanti, 2011).

The main factor that influences plant productivity in oil palm plantations is the use of quality seeds, as stated by Pahan (2006) that the real investment for commercial plantations is in the plant material (seeds/seedlings) that will be planted, because it is a source of profit for the company in the future.

Palm oil is Indonesia's mainstay commodity which is developing very rapidly. (Haikal et al., 2014).One type of disease What usually attacks oil palm plants is stem rot disease or commonly known by the abbreviation BPB. The disease is caused by *Ganoderma boninense* . This oil palm disease was initially discovered in Zaire Congo in 1935.At that time, BPB disease was considered unimportant because it was not very detrimental to oil palm farmers. This disease only attacks one percent of the plants on plantations, and that can be covered by the profits obtained from 99 percent of the palm oil harvest. (Ramli Muhammad, 2013).

Oil palm stem rot (BPB) caused by *Ganoderma boninense* is the most destructive disease in oil palm plantations in Indonesia and Malaysia.This pathogen not only attacks old plants, but also young ones. Currently, the rate of BPB disease infection is running faster, especially on soil with a sandy texture (Susanto 2013). It has been reported that in rejuvenation gardens, plant death due to stem rot reaches 60%. *G. boninense* is classified as a soil-borne pathogenic fungus which is infected by disease roots by producing basidiospores as an inoculum for infection of stem base rot (Nildayanti, 2011).

Ganoderma boninense can attack oil palms at the production and seedling stages. Typical symptoms before the formation of fungal fruiting Suppression of the development of stem rot disease is carried out using biological and vegetable agents through the process of antagonism mechanisms and testing of phytochemical compounds. bodies are characterized by rot at the base of the stem, causing dry rot in the inner tissues.

One of the effectiveness of *Trichoderma virens* in controlling *Ganoderma boninense* In Pre Nursery Palm Palm On Peat Medium Research Results of Mahmud et al (2020), In vitro *T virens* has a high inhibitory power against *G boninense*. Statistically, the results of observationshas no real effect on seed heightand root crown ratio but have a real effecton stem diameter so that the *Trichoderma virens* antagonist testwith *Ganoderma boninense* invitro has an inhibitory power of 73.5%but not yet when applied in the fieldable to increase seedling growth palm oil, research is neededcontinued by increasing the dose *Trichoderma virens*.

2. MATERIAL AND METHODS

2.1 Place and time

This research was carried out at PT. Perkebunan Nusantara III, Sei Putih Garden, Galang District, Deli Serdang Regency , for 3 months, namely from June 2023 to August 2023 with coordinates N: 98 ^{0} 22'45.88" E: 02 ^{0} 34'43.32" height 28 meters above sea level.

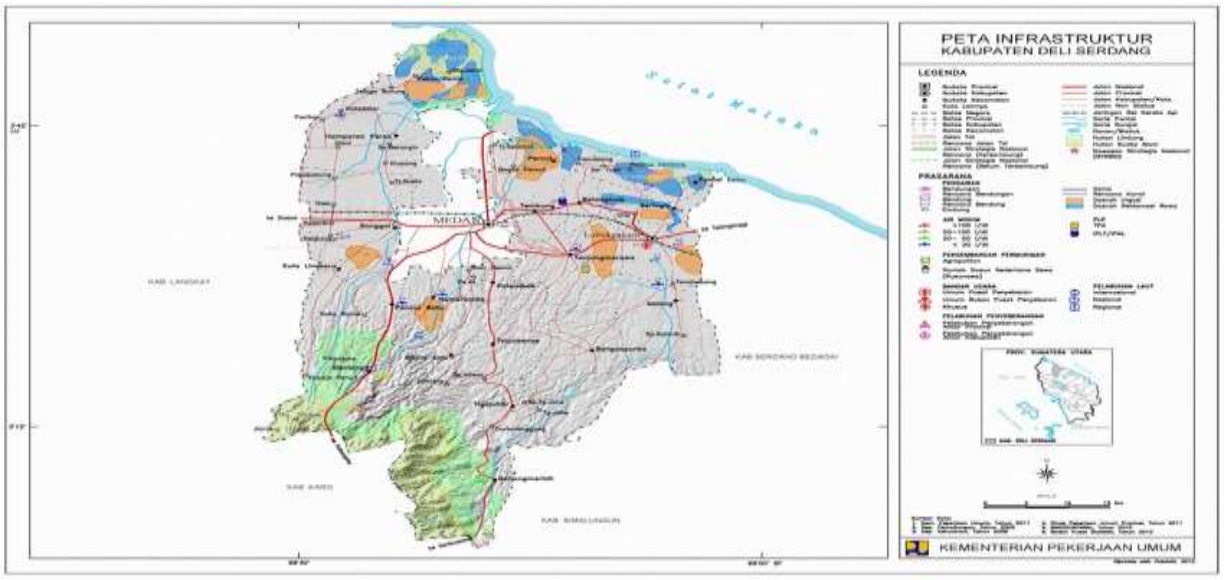

Figure 1. Administrative Map Deli Serdang Regency, Galang District

2.2 Design Study

This research uses quantitative methods by taking inventory data of oil palm trees attacked by *Ganoderma boninense* before processing and after processing. The data taken is data for 2022-2023. Then the percentage of attack intensity is calculated. After that the data was processed using the *one way ANOVA statistical test* .

The research was carried out on the level of stem base rot attacks in different blocks and was calculated using the formula:

$$IS = \text{Number of Infested Trees / Number of Census Trees} \times 100\%$$

Note:
IS: Attack intensity

The attack level criteria are as follows:

- Light attack = 0-25%
- Medium attack = >25-50%
- Severe attack = >50-90%
- Very heavy attack = >90-100%. (DL Umbrella 2019)

2.3 Stages Study

1. Taking Data Which needed

a. Quantity data Ganoderma boinense attack in Sei Putih garden for 2 years latest (2022-2023)
b. Data on affected plants attack ganoderma Boinense before and after handling in the white sei garden year latest (2022-2023)
c. Decline population plants / density per hectare (SPH)

2. Calculation insensitivity Ganoderma attack

Data Processing Techniques

Data analysis using method Two Way Anova test or 2 Way Anova is a test for compare differences in group means have been divided into two variables free with SPSS.

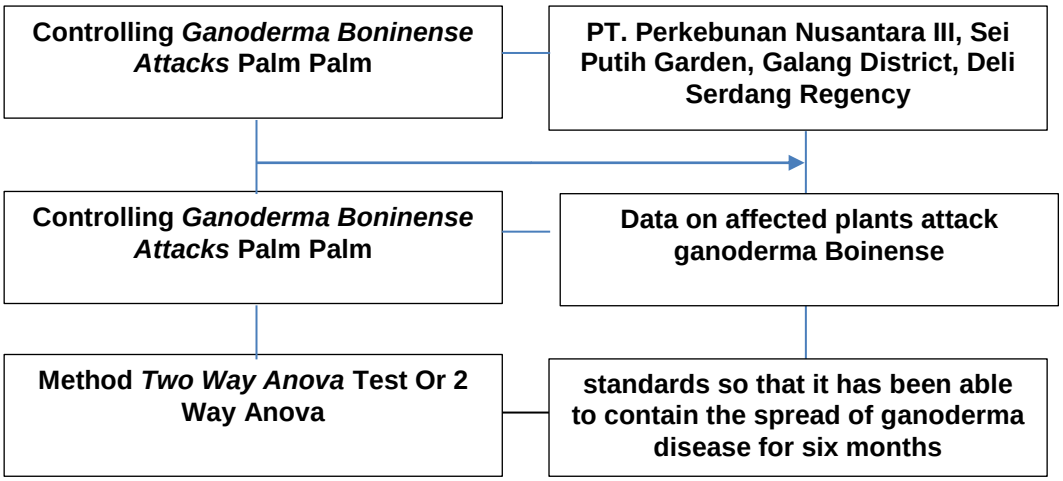

Figure 2. Flow Diagram *Ganoderma boinense*

3. RESULT AND DISCUSSION

After conducting research regarding the analysis of the effectiveness of controlling attacks by palm oil *ganoderma boninense (Elaeis guineensis* jacq) on mature plants at PT Perkebunan Nusantara III Kebun Sei Putih, the following results were obtained:

Table 1. Data Census Attack Disease Ganoderma Semester II Year 2022

Garden	Year Plant	Generation	Block	Wide(Ha)	Disease Ganoderma	
					Sick	Sick
Sei Putih	2000	I	G.15	0.65	3	67
			G.16B	6.45	18	724
			G.17B	5.4	23	565
			H.15A	0.15	7	17
			P.16	14.35	17	1,860
			H.17B	10.3	13	1,157
			I.16B	13.35	19	1,657
			I.17B	11.1	21	1,254
			I.18	2.8	10	314
			J. 15B	1.1	1	140
			J. 16A	11.6	27	1,444
			J. 17B	13.2	21	1,606
			J. 18B	12.7	15	1,324
			K.15B	3.25	4	389
			K.16B	9.2	14	1,101
			K.17A	10.1	26	1,204
			K. 18B	10.9	11	835
			L.15B	2.9	3	317
			L.16B	6.85	14	742
			L.17B	7.5	23	793

The results of Table 1 show that there is no difference between the second semester of 2022 and the first semester of 2023 with the number of blocks observed being 20 blocks in Afdeling III. Each block has a different area, with a different number of trees. The total number of trees is 17,790, with a total of 290 sick trees and a total of 17,500 healthy trees. This happens because the level of attack on plant life has a big influence. This is because in young plants, the roots have not yet fully met each other from plant to plantother.

Meanwhile, in old plants the roots have grown long so there is a very large potential for spread through the roots to nearby plants. So the incidence and severity of root rot disease attacks will increase as the age of the oil palm plant increases. This is in accordance with the statement by Nildayanti (2011), Control of *Ganoderma boninense* which is still carried out using chemicals in the form of

fungicides causes residue, resistance to pathogenic fungi, pollution of the biotic and abiotic environment and is not successful in overcoming the spread of stem rot disease.

Table 2. Calculation of Percentage of Attack Intensity in 2022 Semester II

Block	Percentage IntensityAttack Ganoderma	Intensity Attack
G.15	3/70 x 100 = 4.28 %	Attack Light
G.16B	18/ 742 x 100 = 2.42%	Attack Light
G.17B	23/588 x 100 = 3.91 %	Attack Light
H.15A	7/24 x 100 = 29.16 %	Attack Currently
P.16	17/1872 x 100 = 0.90 %	Attack Light
H.17B	13/1170 x 100 = 1.11 %	Attack Light
I.16B	19/1676 x 100 = 1.13%	Attack Light
I.17B	21/1275 x 100 = 1.64%	Attack Light
I.18	10/324 x 100 = 3.08%	Attack Light
J. 15B	1/141 x 100 = 0.70%	Attack Light
J. 16A	27/1471 x 100 = 1.83%	Attack Light
J. 17B	21/1627 x 100 = 1.29%	Attack Light
J. 18B	15/1339 x 100 = 1.12%	Attack Light
K.15B	4/393 x 100 = 1.01%	Attack Light
K.16B	14/1115 x 100 = 1.25%	Attack Light
K.17A	26/1230 x 100 = 2.11%	Attack Light
K. 18B	11/846 x 100 = 1.30%	Attack Light
L.15B	3/320 x 100 = 0.93%	Attack Light
L.16B	14/756 x 100 = 1.05%	Attack Light
L.17B	23/816 x 100 = 2.81%	Attack Light

Based on the research data obtained, it can be seen that in the first semester of 2023, there were 19 oil palm plants affected by light attacks by *ganoderma boninense* and 1 oil palm plant affected by moderate attacks. The data obtained shows that there is no difference between 2022 and 2023, this is due to the presence of stem rot disease caused by infection with the fungus Ganoderma sp. This disease is a dangerous disease in oil palm plantations because it reduces productivity and causes plants to die. This is in accordance with the opinion of Yuniasih, B (2018), Based on the severity of the attack, young plants showed a lower percentage of attacks than old plants. This is because the spread of stem rot disease occurs due to contact between the roots of healthy plants and diseased plants.

Table 3. Calculation of Percentage of Attack Intensity in 2023 Semester I

Block	Percentage IntensityAttack Ganoderma	Intensity Attack
G.15	3/70 x 100 = 4.28 %	Attack Light
G.16B	18/ 742 x 100 = 2.42%	Attack Light
G.17B	23/588 x 100 = 3.91 %	Attack Light
H.15A	7/24 x 100 = 29.16 %	Attack Currently
P.16	17/1872 x 100 = 0.90 %	Attack Light
H.17B	13/1170 x 100 = 1.11 %	Attack Light
I.16B	19/1676 x 100 = 1.13%	Attack Light
I.17B	21/1275 x 100 = 1.64%	Attack Light
I.18	10/324 x 100 = 3.08%	Attack Light
J. 15B	1/141 x 100 = 0.70%	Attack Light
J. 16A	27/1471 x 100 = 1.83%	Attack Light
J. 17B	21/1627 x 100 = 1.29%	Attack Light
J. 18B	15/1339 x 100 = 1.12%	Attack Light
K.15B	4/393 x 100 = 1.01%	Attack Light
K.16B	14/1115 x 100 = 1.25%	Attack Light
K.17A	26/1230 x 100 = 2.11%	Attack Light
K. 18B	11/846 x 100 = 1.30%	Attack Light
L.15B	3/320 x 100 = 0.93%	Attack Light
L.16B	14/756 x 100 = 1.05%	Attack Light
L.17B	23/816 x 100 = 2.81%	Attack Light

Based on results data research obtained, it can be seen that in the year 2023 semester I, there are 19 plants coconut affected palms attack light *Ganoderma boninense* and 1 plant coconut palm caught attack currently. The data which is obtained shows No there is difference between 2022-2023 This is due to the most typical symptoms of stem base rot is decay occurs base of the stem and followed tree collapse and existence basidiocarp as a sign of disease (Susanto 2011; Susanto *et al.* 2013). When Ganoderma detected in palm oil, ca 50% of the internal tissue has rotted (Susanto *et al.* 2013). Zakaria *et al.* (2015) reported that on the garden rejuvenation, resulting plant death stem base rot can reach 60 %. Even in several plantations in Indonesia, this disease has causes the death of oil palms up to 80% or more of the population Palm oil.

4. CONCLUSION

Based on the results of this research, it can be concluded that the control carried out at PT. Perkebunan Nusantara III has complied with applicable standards so that it has been able to contain the spread of ganoderma disease for six months.To maximize control of ganoderma attacks, biological and mechanical control can be carried out. Future researchers are advised to research further into the factors that can cause ganoderma attacks.

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