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Rubber Exploitation System and Its Influence on Tapping Panel Dryness Disease (Case Study: PT Perkebunan Nusantara XII Kebun Kotta Blater)

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ABSTRACT

Rubber (*Hevea brasiliensis* Muell Arg.) is one of the main commodities in the plantation sector in Indonesia, making demand for rubber increases every year. The higher the demand for natural rubber, the higher the level of rubber production. Rubber productivity can be maximized through the application of exploitation systems in the field. The exploitation system is a series of tapping systems that are applied throughout the production time of rubber plants (20-25 years) with the aim of obtaining high production yields, and are divided into 2, namely conventional exploitation and stimulants. The application of an excessive rubber exploitation system can cause Tapping Panel Dryness (KAS) disease which is characterized by not releasing latex or drying latex. This research was carried out on January 10 – February 12, 2022 at PT Perkebunan Nusantara XII Kebun Kotta Blater, Jember Regency which aims to determine the effect of the exploitation system on KAS. KAS is influenced by all stages in the exploitation system such as the use of stimulants, plant age, and tapping techniques. The intensity of KAS disease in old rubber TM in 1995 and 1996 was 1-2,20%, while in young rubber TM in 2013 it was 0%. The older the age of the rubber plant, the more susceptible it is to CAS disease as a result of tapping with high intensity (*over* exploitation), excessive stimulants, or tapping techniques that are not in accordance with the norm, causing wood injuries.

Keywords: Exploitation, KAS, rubber plant

Introduction

Rubber plant (*Hevea brasiliensis* Muell Arg.) is one of the main commodities of the plantation sector in Indonesia which in the last 5 years has been able to contribute 25% - 40% of foreign exchange to the total export of plantation products, with 84 % of its natural rubber production is exported in the form of raw rubber (Dewi et al., 2015). Rubber plantations in Indonesia have good prospects in terms of environmental suitability, land availability, number of workers, and availability of technology. This is in line with the world's demand for rubber which will continue to increase along with the tendency for synthetic rubber to be abandoned because it is considered environmentally unfriendly. The increasing demand for rubber every year will make rubber productivity also have to increase. Efforts to increase rubber production in the field can be done through the application of an exploitation system because high rubber productivity during an economic cycle is highly dependent on the implementation of the exploitation system and its panel management (Sayurandi & Tistama, 2020).

The exploitation system is a series of tapping systems that are applied throughout the production time of rubber plants (20-25 years) with the aim of obtaining high production yields according to the potential of plants or clones in a sustainable manner. The exploitation system consists of 2 types, namely conventional (regular tapping system without stimulants) and stimulants

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(combination tapping systems using stimulants). Stimulants can increase latex production in several ways, namely increasing membrane permeability, accelerating sucrose metabolism, and prolonging drainage time. latex, and modulates the activity of enzymes such as glutamine synthase and HGMS (Zhu & Zhang, 2009). The higher demand for production, can trigger workers in the field to over-exploit. The application of overexploitation systems on rubber plants can cause tapping panel dryness disease (KAS). The percentage of KAS will increase if tapping and stimulants are carried out with high intensity (Nugrahani et al., 2017).

Tapping Panel Dryness (KAS) or Brown Bast (BB) is an occurrence of rubber plant bark that do not produce or drain latex (Lubis, 2020). KAS is not caused by pathogens but in the form of physiological disturbances because plants experience fatigue due to an imbalance between exploited latex and regenerated latex. The visible symptoms of KAS include (1) the dry rubber content (K3) in latex decreases which is characterized by very dilute latex, (2) latex does not flow in some of the tapping grooves and within a few weeks the entire tapping groove does not release latex at all, (3) the dry bark on the tapping groove is brown, and (4) the dryness extends to other parts of the bark on the tree and the tree bark becomes cracked (Kristian, 2019). KAS attack itself is able to cause a decrease in productivity due to damage to the rubber skin to be tapped, as well as a factor causing stand loss because the plants are vulnerable to wind. Loss of natural rubber production due to CASH can reach 15 - 20%, while in productive crops, yield losses can reach 20% - 25% in almost all rubber plantation areas. This study aims to determine the effect of the application of the rubber plant exploitation system in the field on KAS disease.

Material and Methods

The research was conducted on January 10 – February 12, 2022, at PT Perkebunan Nusantara XII Kebun Kotta Blater, Jember, Jawa Timur. Data collection was taken using two types of data, namely primary data and secondary data. Primary data were obtained through observation (systematic observation, recording and shooting of phenomena investigated and taking part in activities at PT Perkebunan Nusantara XII Kebun Kotta Blater), interviews with field workers (garden foreman, and tappers). While secondary data was obtained through literature studies, either from the main office of PT Perkebunan Nusantara XII Kebun Kotta Blater for the past three months, or from books, journals, and previous research that has been verified. The presentation of the data is based on the data obtained at PT Perkebunan Nusantara XII Kebun Kotta Blater, then analyzed by presenting the data in narrative form as well as tables or graphs on the results.

Results and Discussion

The results showed that the exploitation of rubber by PT. Perkebunan Nusantara XII Kebun Kotta Blater is a combination exploitation system (conventional + stimulant).

Table 1. Monitoring Data on Exploitation System (Rubber Tapping) at PT Perkebunan Nusantara XII Kebun Kotta Blater November 2021 - January 2022

Tahun Tanam	Populasi	Klon	November (2021)		Desember (2021)		Januari (2022)	
			Sistem Sadap	Stimulan	Sistem Sadap	Stimulan	Sistem Sadap	Stimulan
1995	19.168	BPM 24	½ DC d2	GAS 10 (3,33%)	½ DC d2	GAS 15 (2,50%)	½ DC d2	GAS 15 (2,50%)
1996	4.607		½ DC d2	GAS 15 (2,50%)	½ DC d2	GAS 15 (2,50%)	CCRC	-
2013	16.410		½ SKB d3	GAS 30 (1,25%)	½ SKB d3	GAS 30 (1,25%)	½ SKB d3	GAS 30 (1,25%)

Double Cutting or a combination of SKB and SKA in 1 tree (DC), Tapping every 2 days (d2), Tapping 3 Once a Day (d3), Grove Application System (GAS), Down Ward Tapping (SKB), Up Ward Tapping (SKA), Cacah Rucah (CCRC)

On mature rubber producing plants (TM) in 1995 and 1996 in November - December were applied tapping system ½ DC d2, which means combining the tapping system ½ SKB on B1-2 with ¼ SKA on panel H0-2 (up), and the tapping is done every 2 days, while in the old TM 1996 in January 2022, the tapping system was chopped trash or dead tapping, which is applied to plants aged over 22 years, and during this period exploitation is carried out as much as possible (Table 1.). For young TMs in 2013 the tapping system applied was ½ SKB d3, which means using a downward tapping system with a half-spiral slice length, with tapping every 3 days (Table 1.) Stimulants were carried out using Amcotrel 10 PA (active ingredients: 10% etefon) which was applied by the GAS method, a dose of 1 ml/tree/application. Stimulants in old TM in 1995 and 1996 used the GAS 10 system (1 month 3×) or GAS 15 (1 month 2×), with a concentration of 2.50% (1:3 diluent) - 3.33% (1:2 diluent), while for young TM in 2013 the application of stimulants used the GAS 30 system (1 month 1×) with a concentration of 1.25% (1:7 diluent) - 2.50 % (Table 1.).

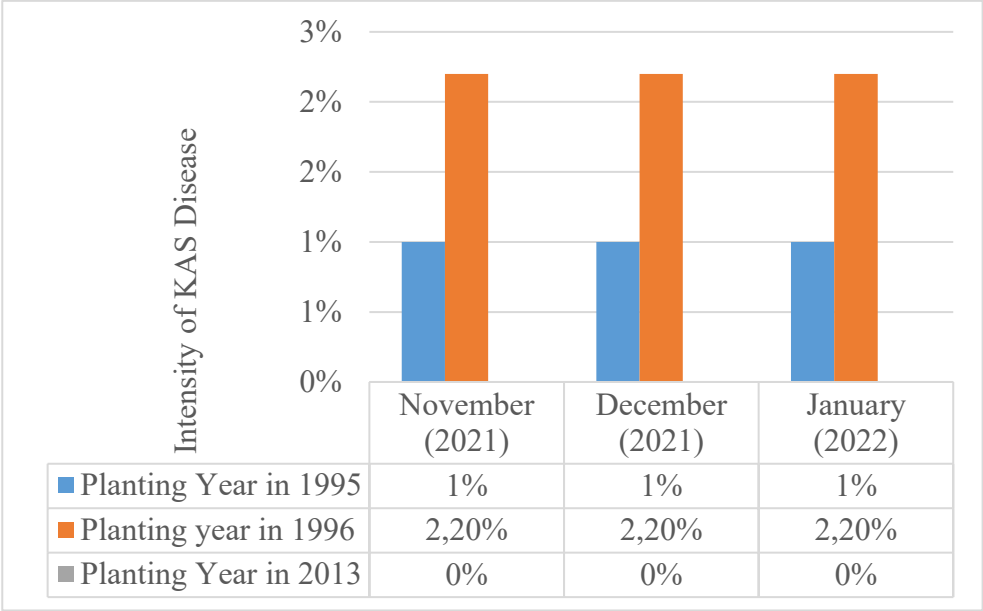

Figure 1. Intensity of KAS Disease (November 2021 - January 2022)

The intensity of KAS disease in old rubber TM in 1995 and 1996 was 1%-2.2%, while in young rubber TM in 2013 there were no rubber plants affected by KAS (Figure 1.). KAS is caused because plants are tapped with high intensity (over exploitation) or excessive stimulants, and older plants are often reported to experience higher CASH due to interactions with higher levels of exploitation (Sumarmadji, 2005). Stimulant active ingredients are able to produce ethylene gas which can stabilize the osmotic pressure of latex and lutoid (basic fraction of latex containing cations) so that it can delay the occurrence of coagulation. If the lutoid is broken, these cations will react with the negatively charged rubber particles causing coagulation. Ethylene gas produced from Amcotrel can also reduce the activity of the oxidase enzyme and increase the turgor pressure and phosphorus content of latex, so that the stimulant is able to delay latex vessel blockage and prolong the latex flow period (Syamsiyah et al., 2020). The ideal concentration of ethepon used as a stimulant in productive TM is 2-2.5%, while for old TM the concentration is 5-7.5% (Siregar & Suhendry, 2013). The use of stimulants can increase production 40% higher than normal tapping production, but this increase will decrease until the 4th or 5th tapping after application, and can still be used if the decrease in dry rubber content (KKK) is < 3%. And if the number of trees attacked by KAS (partial or total) > 8% of a population, the use of stimulants must be stopped immediately (PT. Perkebunan Nusantara XII, 2013).

KAS disease is not only caused by the age of the plant, or by the provision of stimulants, it can also be caused by the ability of the tapper to conduct wiretapping. Usually, in the old TM most of the workers when doing the tapping no longer attach importance to the tapping norms so that the quality of the tapping tree decreases. This is indicated by the number of wood wounds on the tree which will affect the duration of skin regeneration. Wood wounds can cause KAS on the bottom panel because they damage and break the latex vessels so that latex flow is disrupted, and KAS can be found in both virgin skin (B0-1 and B0-2) and recovered skin (B1-1 and B1-2) even in panel H0 (Andriyanto & Tistama, 2014). Control efforts that can be done include resting rubber trees that are attacked by KAS until the trees are able to excrete latex again. Furthermore, do not do the tapping too often and it is recommended to reduce the use of excessive stimula.

Conclusion

The rubber exploitation system implemented by PT. Perkebunan Nusantara XII Kebun Kotta Blater is a combined exploitation system, with the entire rubber area planted with clones of BPM 24. The tapping system used for old rubber TM (1995 & 1996) is ½ DC (double cutting) d2 or cacah rucah, while for young TMs in 2013 using the ½ SKB d3system. Stimulants using Amcotrel were applied using the method of GAS 10 (1 month 3×), GAS 15 (1 month 2×), GAS 30 (1 month 1×) with a concentration of 1.25% - 3.33%. Intensity of KAS disease in old rubber TM in 1995 and 1996 was 1-2,20%, while in young rubber TM in 2013 it was 0%. This is influenced by the use of stimulants, plant age, and tapping techniques. The older the rubber plant, the more susceptible it is to KAS disease as a result of tapping with high intensity (over exploitation), excessive stimulants, or tapping techniques that are not in accordance with the norm, causing wood injuries that will damage and break the latex vessels so that latex flow is disrupted.

Conclusion

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References

Andriyanto, M., and Tistama, R. (2014). Perkembangan dan Upaya Pengendalian Kering Alur Sadap (KAS) pada Tanaman Karet (*Hevea brasiliensis*). *Warta Perkaretan*, 33(22), 89-102.

Dewi P. H., Widodo, S., Hartono, S., and Hadi, D. (2015). Analisis Permintaan Karet Alam Indonesia di Pasar Internasional. *AGRARIS: Journal of Agribusiness and Rural Development Research,* 1(2), 136–148.

Kristian, Y. (2019). *Pengendalian Kering Alur Sadap (KAS) Pada Tanaman Karet (Hevea brasiliensis)*. Jakarta: Pusat Penyuluhan Tanaman Kementerian Pertanian.

Lubis, A. F. (2020). *Kajian Aktivitas Fisiologis Tanaman Karet (Hevea brasiliensis Muell. Arg.) Klon Metabolisme Tinggi dan Rendah Pada Kejadian Kering Alur Sadap*. Disertasi, Medan: Universitas Sumatera Utara, 2020.

Nugrahani, M. O., Rouf, A., Aji, Y. B. S., Widyasari, T., and Rinojati, N. D. (2017). Kombinasi Sistem Sadap Frekuensi Rendah dan Penggunaan Stimulan untuk Optimasi Produksi dan Penurunan Biaya Penyadapan Di Panel BO. *Jurnal Penelitian Karet*, 35(1), 59-70.

PT Perkebunan Nusantara XII. (2013). *Pedoman Pengelolaan Budidaya Tanaman Karet*. Surabaya: PT Perkebunan Nusantara XII.

Sayurandi., and Tistama, R. (2020). Evaluasi Kinerja Klon Karet Unggul dengan Penerapan Sistem Sadap Intensitas Rendah. *Warta Perkaretan*, 39(2), 15–26.

Siregar, T. H. S., and Suhendry, I. (2013). *Budidaya dan Teknologi Karet*. Jakarta: Penebar Swadaya.

Sumarmadji. (2005). Optimasi Produktivitas Klon Karet melalui Berbagai Sistem Eksplotasi. *Prosiding Lokakarya Nasional Pemuliaan Tanaman Karet*, 123-140.

Syamsiyah, C., Suherman, S., Rosniawaty, F., and Oktavia. (2020). Respons Produksi Tanaman Karet Klon BPM 24 terhadap Jenis dan Konsentrasi Stimulan Etilen Organik Kulit Pisang. *Jurnal Kultivasi*, 9(2), 135-1141.

Zhu, J., and Zhang, Z. (2009). Ethylene Stimulation of Latex Productiom in *Hevea brasiliensis*. *Plant Signaling & behaviour,* 4(11), 1072-1074.