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# INFLUENCE DISEASE SPOTS LEAVES ON COFFEE PLANTS AND THEIR CONTROL

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**Abstract**
The disease spotting leaf is one disease in coffee plants caused by mold *Cercospora caffeicola*, also known as brown eyespot. Disease spotting leaf could attack part leaf coffee plant and the fruit (Harni et al., 2015) . The disease this can attack coffee plants during the seedling period until with plant ripens. If already severe, attack disease even could spread to coffee fruit. Symptom attack disease spotting leaf be marked with appearance spots colored yellow then changed Becomes spotting brown on leaves. The basic method in this writing is descriptive. The data used are the results of previous studies relating to the disease spotting leaf on coffee plants and their control. The result of this research is that fertilization balance is highly recommended for maintaining healthy plants to endure to attack disease. Besides that, spraying fungicide live (using Actinomycetes bacteria) and chemicals also help for push growth mold reason spotting leaves.

**Keywords:** Influence; Disease; Spot Leaves, Coffee Plants; Controlling.

## Introduction

Coffee ( *Coffea* sp.) is a commodity the plantation that holds a role urgent (Ardiani et al., 2018) in the Indonesian economy. Indonesia is the largest coffee-producing country in Southeast Asia and the largest third in the world after Brazil and Vietnam (Wahyudi et al., 2016) . However _ from aspect quality, still far left behind with other countries. one _ reason low coffee quality is exposed plant by agent biotic like pests and pathogens in the field (Muliani & Nildayanti, 2018; Suzuki et al., 2014) so that lower production and quality coffee beans produced (Sugiarti, 2019) . Coffee productivity and quality are affected by the disease (Hasan et al., 2022) like *Cercospora* and rust (Boa Sorte et al., 2019) . Different from leaf rust disease spotting leaf is one disease in coffee plants caused by mold *Cercospora caffeicola*, also known as brown eyespot. Disease spotting leaf could attack part leaf coffee plant and the fruit (Harni et al., 2015) . The disease this can attack coffee plants during the seedling period until with plant ripens. If already severe, attack disease even could spread to coffee fruit.

Symptom attack disease spotting leaf be marked with appearance spots colored yellow then changed Becomes spotting brown on leaves. As for the coffee cherries, attacks disease this be marked with emergence spots colored brown on the surface coffee fruit. Influential factors _ to deployment disease spotting leaf is humidity and rain because deployment disease this through water and wind (Sumantia, 2020) . Management efficient pest and disease is very important for diagnosis (Kranz, 1988) . This post aim for knowing the influence of disease spotting leaves on coffee plants and how its control.

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## Research Method

The basic method in this writing is descriptive. The data used are the results of previous studies relating to the disease spotting leaf on coffee plants and their control.

## Results and Discussion

Disease spotting leaf or brown eye spot-causing lesson necrotic round chocolate with center dark, surrounded by circles yellow. Affected leaves _ fall quickly and the branches dry up, causing a drop in productivity plant and lower quality fruit. The disease also causes hair loss intense and inhibiting leaves _ growth plant (Suhartono et al., 2013). Studies about coffee show that lost results secondary (38%) can be more tall than lost primary yield (26%) caused by pests and diseases leaves ( spots leaves of one of them ) (Cerda et al., 2017).

Disease control spotting leaf could be conducted with the use of technical culture method, control biological, and chemical. Controlling technical culture, among others give sufficient shade, fertilization _ balance, and reduction humidity coffee garden. Care patterns to coffee plants like trimming and cleaning weed can too resolve attack disease. Tree shade (partially big percentage associated shade) has _ effect positive directly on level severity and incidence disease leaves and quality soil (Durand-Bessart et al., 2020). Tree shader reported help manage the amount of coffee sickness like blight phoma, freckle eye chocolate caused by Cercospora _ coffeicola, and branches die back through modification microclimate (J. Avelino et al., 2020; Jacques Avelino et al., 2018; Schroth et al., 2000). Literature scientific about connection among header tree shade, coffee yield and profit show conflicting results _ (Cerdán et al., 2012).

However, some studies report enhancement significant results _ when shade removed (Campanha et al., 2004; DaMatta, 2004), whereas others did not find influence shade to results (Romero-Alvarado et al., 2002) or result maximum at level medium canopy Closing (Perfecto et al., 2005). In condition certain, tree shade support coffee plant , increase productivity (Soto-Pinto et al., 2000) with results biggest found below _ shade 35-65% (Perfecto et al., 2005; Staver et al., 2001) biological control could be conducted by infecting pathogens using bacteria or substance the antagonist. Actinomycetes isolate tested show ability in antagonize pathogen Cercospora coffeicola. Actinomycetes can hinder coffee plants from experiencing disease-spotting leaves and can increase coffee production (Farahdilla, 2018). Fertilization balanced is highly recommended for increased endurance plants. More K+ content lower and more Ca+2 content tall in coffee leaves for Step charging cherry give balance more nutrition _ big and improve endurance to leaf spots and rust Cercospora (Santos et al., 2008). The study previously show that spotting leaf Cercospora in deep coffee solution nutrition , level progression (AUIPC) and severity (AUSPC ) drop with increased K+ levels up to 4.79 mmol L-1 and an increase in levels of Ca+2 (Júnior et al., 2003), but variable increase with increase K+ level and decrease level N (Pozza et al., 2001).

Control by chemical could use Mancozeb fungicide (made from active Manganese 16%, Zinc 2%, and 62% ethylenebisdithio carbamate/manganese ethylenebisdithio carbamat plus nonzinc) like Dhitane and Delsene (Anonymous, 2018). As well as fungicides made from active copper (Copper sandoz, Cupravit) (Anonymous, 2020).

## Conclusion

Disease spotting coffee leaf caused by fungus *Cercospora coffeicola* enough Becomes attention because attack could through leaf nor fruit. Although no disease main, however attacks heavy disease this could lower coffee productivity and quality. As for controlling disease spotting leaf could be conducted through subtraction humidity garden like trimming and setting shade. Besides that, fertilization balance is highly recommended for maintaining healthy plants to endure

to attack disease. Besides that, spraying fungicide live (using Actinomycetes bacteria) and chemicals also help for push growth mold reason spotting leaves.

## References

Anonymous. (2018, January). *Group and Working Method of Mancozeb Fungicide Active Ingredients* . Mitalom. https://mitalom.com/pestisida/3170/mengenal-golongan-material-aktif-mankozeb-cara-kerja-dan-benefit-fungicida-mancozeb/

Anonymous. (2020, April). *LEAF BLOCK DISEASE Cercospora Caffeicola B. et Cke COFFEE PLANT* . Planters and Foresters. https://www.planterandforester.com/2020/04/ Diseasebercak-daun-cercospora.html

Ardiani, F., Wirianata, H., & Hastuti, PB (2018). The Effect of Giving Mycorrhizae and Organic Materials on the Growth of Coffee Seeds (Coffea sp.). *AGROISTA: Journal of Agrotechnology* , *02* (2), 162–177.

Avelino, J., Vílchez, S., Segura-Escobar, MB, Brenes-Loaiza, MA, Virginio Filho, E. de M., & Casanoves, F. (2020). Shade tree Chloroleucon eurycyclum promotes coffee leaf rust by reducing uredospore wash-off by rain. *Crop Protection* , *129* , 105038. https://doi.org/10.1016/J.CROPRO.2019.105038

Avelino, Jacques, Allinne, C., Cerda, R., Willocquet, L., & Savary, S. (2018). Multiple-Disease System in Coffee: From Crop Loss Assessment to Sustainable Management. *Annual Review of Phytopathology* , *56* , 611–635. https://doi.org/10.1146/ANNUREV-PHYTO-080417-050117

Boa Sorte, LX, Ferraz, CT, Fambrini, F., Goulart, RDR, & Saito, JH (2019). Coffee Leaf Disease Recognition Based on Deep Learning and Texture Attributes. *Procedia Computer Science* , *159* , 135–144. https://doi.org/10.1016/J.PROCS.2019.09.168

Campanha, MM, Santos, RHS, De Freitas, GB, Martinez, HEP, Garcia, SLR, & Finger, FL (2004). Growth and yield of coffee plants in agroforestry and monoculture systems in Minas Gerais, Brazil. *Agroforestry Systems* , *63* (1), 75–82. https://doi.org/10.1023/B:AGFO.0000049435.22512.2D

Cerda, R., Avelino, J., Gary, C., Tixier, P., Lechevallier, E., & Allinne, C. (2017). Primary and Secondary Yield Losses Caused by Pests and Diseases: Assessment and Modeling in Coffee. *Plos One* , *12* (1), e0169133. https://doi.org/10.1371/JOURNAL.PONE.0169133

Cerdán, CR, Rebolledo, MC, Soto, G., Rapidel, B., & Sinclair, FL (2012). Local knowledge of impacts of tree cover on ecosystem services in smallholder coffee production systems. *Agricultural Systems* , *110* , 119–130. https://doi.org/10.1016/j.agsy.2012.03.014

DaMatta, FM (2004). Ecophysiological constraints on the production of shaded and unshaded coffee: a review. *Field Crops Research* , *86* (2–3), 99–114. https://doi.org/10.1016/J.FCR.2003.09.001

Durand-Bessart, C., Tixier, P., Quinteros, A., Andreotti, F., Rapidel, B., Tauvel, C., & Allinne, C. (2020). Analysis of interactions amongst shade trees, coffee foliar diseases and coffee yield in multistrata agroforestry systems. *Crop Protection* , *133* , 105137. https://doi.org/10.1016/J.CROPRO.2020.105137

Farahdilla, D. (2018). *POTENTIAL ANTAGONISM OF ACTINOMYCETES FROM COFFEE PLANTS rhizosphere (Coffea sp.) AGAINST PATHOGEN Cercospora coffeicola CAUSES OF LEAF PATCH IN COFFEE PLANTS* . Brawijaya University.

Harni, R., Samsudin, Amaria, W., Indriati, G., Soesanthy, F., Khaerati, Taufiq, E., Hasibuan, AM, & Hapsari, AD (2015). *Technology for Controlling Pests and Diseases of Coffee Plants* . IAARD Press.

Hasan, RI, Yusuf, SM, Mohd Rahim, MS, & Alzubaidi, L. (2022). Automated masks generation for coffee and apple leaf infected with single or multiple diseases-based color analysis approaches. *Informatics in Medicine Unlocked* , *28* , 100837. https://doi.org/10.1016/J.IMU.2021.100837

Júnior, DG, Pozza, EA, Pozza, AAA, Souza, PE, Carvalho, JG, & Balieiro, AC (2003). Incidência e severidade da cercosporiose do cafeeiro em função do suprimento de potássio e calcio em solução nutritiva. *Phytopathologia Brasileira* , *28* (3), 286–291. https://doi.org/10.1590/S0100-41582003000300010

Kranz, J. (1988). Measuring Plant Diseases. *Experimental Techniques in Plant Disease Epidemiology* , 35–50. https://doi.org/10.1007/978-3-642-95534-1_4

Muliani, S., & Nildayanti. (2018). Inventory of Pests and Diseases in Organic Coffee Planting. *Agroplantae2* , *7* (2), 14–19.

Perfecto, I., Vandermeer, J., Mas, A., & Pinto, LS (2005). Biodiversity, yield, and shade coffee certification. *Ecological Economics* , *54* (4), 435–446. https://doi.org/10.1016/J.ECOLECON.2004.10.009

Pozza, AAA, Martinez, HEP, Caixeta, SL, Cardoso, AA, Zambolim, L., & Pozza, EA (2001). Influence of the mineral nutrition on intensity of brown-eye spot in young coffee plants. *Pesquisa Agropecuaria Brasileira* , *36* (1), 53–60. https://doi.org/10.1590/S0100-204X2001000100007

Romero-Alvarado, Y., Soto-Pinto, L., García-Barrios, L., & Barrera-Gaytán, JF (2002). Coffee yields and soil nutrients under the shades of Inga sp. vs. multiple species in Chiapas, Mexico. *Agroforestry Systems* , *54* (3), 215–224. https://doi.org/10.1023/A:1016013730154

Santos, FDS, De Souza, PE, Pozza, EA, Miranda, JC, Carvalho, EA, Fernandes, LHM, & Pozza, AAA (2008). Adubação orgânica, nutrição e progresso de cercosporiose e ferrugem-do-cafeeiro. *Pesquisa Agropecuaria Brasileira* , *43* (7), 783–791. https://doi.org/10.1590/S0100-204X2008000700001

Schroth, G., Krauss, U., Gasparotto, L., Duarte Aguilar, JA, & Vohland, K. (2000). Pests and diseases in agroforestry systems of the humid tropics. *Agroforestry Systems , 50* (3), 199–241. https://doi.org/10.1023/A:1006468103914

Soto-Pinto, L., Perfecto, I., Castillo-Hernandez, J., & Caballero-Nieto, J. (2000). Shade effect on coffee production at the northern Tzeltal zone of the state of Chiapas, Mexico. *Agriculture, Ecosystems & Environment* , *80* (1–2), 61–69. https://doi.org/10.1016/S0167-8809(00)00134-1

Staver, C., Guharay, F., Monterroso, D., & Muschler, RG (2001). Designing pest-suppressive multistrata perennial crop systems: shade-grown coffee in Central America. *Agroforestry Systems* , *53* (2), 151–170. https://doi.org/10.1023/A:1013372403359

Sugiarti, L. (2019). Identification of Pests and Diseases in Coffee Plants in the Experimental Garden of the Faculty of Agriculture, Winaya Mukti University. *Agro Wiralodra* , *2* (1), 16–22. https://doi.org/10.31943/agrowiralodra.v2i1.27

Suhartono, D., Aditya, W., Lestari, M., & Yasin, M. (2013). Expert System in Detecting Coffee

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Plant Diseases. *International Journal of Electrical Energy , 1* (3). https://doi.org/10.12720/ijoee.1.3.156-162

Sumantia, K. (2020, July). *Introduction and Control of Coffee Plant Diseases* . Buleleng Regency Agriculture Office. https://distan.bulelengkab.go.id/information/detail/article/pengenalan-dan-control-disease-tanaman-kopi-66

Suzuki, N., Rivero, RM, Shulaev, V., Blumwald, E., & Mittler, R. (2014). Abiotic and biotic stress combinations. *New Phytologist , 203* (1), 32–43. https://doi.org/10.1111/NPH.12797

Wahyudi, T., Pujianto, & Misnawi. (2016). *Coffee: history, botany, production processes, processing, downstream products, and partnership systems* . UGM Press.