

Development of Management Strategy for Black Sooty Mold Fungus on Coconut Leaf After Whitefly Damage

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Abstract

Coconut (*Cocos nucifera* L), an important plantation crop in Sri Lanka, faces productivity problems due to various biotic factors, with whitefly damage posing a significant threat as it promotes the growth of black sooty mold. The mold culture on the leaf surface reduced photosynthesis and thus reduced yield. Therefore, it is necessary to control the formation of mold after the whitefly has settled on the fronds. This study addresses the limitations of chemical pesticides and explores eco-friendly alternatives to mitigate the impact of black sooty mold fungus in field conditions. Fungicide agents and plant extracts were compared, and antifungal compounds from plant materials such as clove leaf, turmeric leaf, garlic, pandan leaf, *Senna alata*, Jasmine leaf and holy basil were identified. Black mold was isolated, cultured, and confirmed in the laboratory. Two nano formulations were created based on preliminary observations: one with 5% jasmine and 1% geraniol, and the other utilizing 5% clove oil. Laboratory experiments applied these formulations at 10% concentrations in Potato Dextrose Agar (PDA) media to culture black sooty mold fungus, comparing the results with a control as a completely randomized design with 6 replicates. Results indicated no mold growth on plates treated with both formulations, while control plates exhibited mold growth after two days. Continuous observation revealed inhibition of mold growth for up to two months with formulation two, whereas formulation one exhibited mold initiation after three weeks. Further experiments conducted with both the formulations were incorporated with whitefly toxic compounds were treated to the infested palm through trunk injection. Treated palms exhibited delayed reduction in mold growth on new fronds, with no reduction observed on existing molds. Continuous monitoring and repeated application through further research are essential for conclusive results.

Keywords: *Antifungal compounds, Black sooty mold fungus, Coconut, Whitefly damage*

Book of Abstracts, 1st Undergraduate Research Colloquium
Department of Biosystems Technology, South Eastern University of Sri Lanka
e-ISBN: 978-955-627-023-5