ROOT DISEASES IN *HEVEA BRASILIENSIS*: CHALLENGES, STRATEGIES AND PATHWAYS TO SUSTAINABLE RUBBER CULTIVATION

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Global rubber cultivation is facing significant challenges due to root diseases that affect *Hevea brasiliensis*, commonly known as the rubber tree. Despite the negative impact of root diseases on tree health and latex yield, they often receive less attention than above-ground pests and diseases. Fungal pathogens such as *Rigidoporus lignosus*, *Ganoderma pseudoferreum* and *Phellinus noxius* are major contributors to root diseases in rubber trees, causing white root rot, red root disease and brown root disease respectively. Managing these diseases is a difficult task due to the lack of disease-resistant plant varieties, the ability of pathogens to remain in the soil for long periods, environmental factors and limited effectiveness of control methods. To tackle these challenges, it is suggested to adopt integrated disease management strategies that combine cultural, biological and chemical approaches. Cultural practices such as optimal site selection and sanitation, biological control using beneficial microorganisms and botanical control utilizing plant extracts offer sustainable alternatives to chemical fungicides. Although chemical control is commonly used, it should be integrated with other methods to minimize environmental impact and reduce the risk of resistance development. Moreover, the adoption of integrated approaches, early disease detection and resistant cultivars are essential for long-term disease management and sustainable rubber cultivation. Policymakers play a crucial role in promoting sustainable practices through funding support, extension services and regulations that incentivize environmentally friendly approaches. Collaboration among stakeholders is crucial for knowledge exchange, innovation and collective action towards a resilient rubber industry. Urgent action and collaboration are imperative to effectively manage root diseases, safeguard livelihoods and ensure sustainability of rubber cultivation.

Keywords: Disease management, *Hevea brasiliensis*, Integrated approaches, Root diseases, Sustainable rubber cultivation

INTRODUCTION

Hevea brasiliensis Muell. Arg., commonly known as the rubber tree, holds immense economic significance as the primary source of natural rubber, a crucial commodity in various industries worldwide. However, the sustainable cultivation of rubber faces significant challenges, particularly from root diseases that threaten tree health and latex yield. Despite severity of these diseases, they often receive insufficient

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