

# MORPHOLOGICAL, PATHOLOGICAL AND MOLECULAR CHARACTERIZATION OF *PHYTOPHTHORA* SPP. ASSOCIATED WITH ABNORMAL LEAF FALL DISEASE OF RUBBER TREE

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Abnormal leaf fall (ALF) disease caused by *Phytophthora* spp. is considered to be the most destructive disease of rubber in India. Phenotypic and molecular methods were used for characterizing 30 *Phytophthora* isolates obtained from different geographical locations in Kerala over a period of three years. Phenotypic parameters such as colony morphology, virulence, sporangial characteristics and metalaxyl fungicide sensitivity were studied. *Phytophthora* colony morphology revealed eight different types of mycelial growth patterns. There was substantial variation in the sporangial morphology of the isolates. The isolates were sensitive to metalaxyl fungicide. Among the RRII 400 series clones assessed, clone RRII 414 was found to be tolerant and RRII 429 susceptible. Amplification and sequencing of the internal transcribed spacer (ITS) regions of the *Phytophthora* isolates confirmed the pathogen as *P. meadii*. The isolates of *P. meadii* were clustered together in the phylogenetic tree, regardless of their geographic origins.

**Keywords:** ITS sequencing, Metalaxyl, Morphology, Oomycetes, Phylogeny

## INTRODUCTION

*Hevea brasiliensis* (Willd. ex A.Juss.) Muell. Arg., also known as Para rubber is the main commercial source of natural rubber. Latex extracted from rubber trees is useful in the manufacture of a variety of products such as adhesives, containers, footwear, gloves, medical devices and tyres. Abnormal leaf fall (ALF) disease caused by *Phytophthora* spp. is the most destructive, annually recurring disease of rubber trees in India causing a loss of 38 to 56 per cent in latex yield (Jacob *et al.*, 2006). ALF is caused by different species of *Phytophthora* including

*P. meadii*, *P. botryosa*, *P. capsici*, *P. citrophthora* and *P. nicotianae* (Sdoodee, 2004). ALF disease caused by *Phytophthora* spp. is prevalent in India, Sri Lanka, Thailand, Malaysia, Myanmar and Cambodia. In India, ALF disease is mainly caused by *P. meadii* and is prominent in the traditional rubber-growing regions of Kerala and Tamil Nadu.

Diseases caused by *P. meadii* are favoured by tropical climate with prolonged wet conditions. *Phytophthora* diseases in rubber become severe during the southwest monsoon season in the months of June to October. Initially, the individual leaflets of