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**Associated Fungal Community in Infected Agarwood Tissues and Associated Soil of  
*Gyrinops walla***

**Vidurangi A.N.G.C.K.<sup>1</sup>, Manamgoda D.S.<sup>2</sup>, Subasinghe S.M.C.U.P.<sup>1\*</sup>, Fernando K.M.E.P.<sup>2</sup>**

<sup>1</sup>*Centre for Forestry and Environment, Department of Forestry and Environmental Science,  
University of Sri Jayewardenepura, Nugegoda, Sri Lanka*

<sup>2</sup>*Department of Botany, University of Sri Jayewardenepura, Nugegoda, Sri Lanka*

*\*upuls@sjp.ac.lk*

**Abstract**

*Gyrinops walla* Gaertn. is endemic to Sri Lanka and naturally populated in the forests and homegardens of lower elevations of the southwest region. It produces a highly valuable fragrant agarwood resin in stems and roots due to a self-defense mechanism, mainly to protect from fungal attacks, by activating secondary metabolic network. This study identified the fungal diversity in agarwood formed stem tissues and associated soils of *G. walla* trees by analysing genomic DNA of fungal isolates. Sampling of agarwood tissues and soil samples was made in *G. walla* growing in three different areas of the low country wet zone of Sri Lanka, vis. Neboda and Yagirala of Western Province and Rakwana of Sabaragamuwa Province. Solvent extraction was employed to extract the resin contents of agarwood samples. Surface sterilised tissues were subjected to grow, isolation and identification of fungal isolates. Soil samples were subjected to standard dilution series of plate count technique to isolate the fungi in soil samples. Morphological and molecular data were used to identify fungal isolates from infected tissues and soil samples. Phylogenetic trees were constructed to examine the relationships between the isolates sequence data and reference sequences in GenBank software. Results revealed that the agarwood resin contents of the tissue samples varied from 0.58±0.03% to 3.57±0.24%. Isolates from infected tissues of *G. walla* were identified as *Aspergillus aculeatus*, *A. flavus*, *A. niger*, *A. sojae*, *Botryosphaeria laricina*, *Colletotrichum gloeosporioides*, *Endomelanconiopsis endophytica*, *Fusarium falciforme*, *F. proliferatum*, *F. solani*, *Nodulisporium indicum* and *Trichoderma harzianum*. The number of fungal colony-forming units (cfug<sup>-1</sup>) were estimated in the soil as 2-5×10<sup>8</sup> g<sup>-1</sup> at the reproductive stage of the *G. walla* trees. Among them, *Ambifimbra verrucaris*, *A. flavus*, *A. niger*, *A. pseudonomius*, *A. terreus*, *F. falciforme*, *F. solani*, *Penicillium citrinum* and *P. reperi* were common according to the BLAST analysis. The results confirmed that the infected tissues and soil of *G. walla* in the natural environment harbors multiple fungal taxa that exist in a complex system leading to agarwood production in the tree stem.

**Keywords:** *Gyrinops walla*, Agarwood, Fungal community, Soil, PCR