

Endophytic *Phomopsis* species: host range and implications for diversity estimates

T.S. Murali, T.S. Suryanarayanan, and R. Geeta

Abstract: Foliar endophyte assemblages of teak trees growing in dry deciduous and moist deciduous forests of Nilgiri Biosphere Reserve were compared. A species of *Phomopsis* dominated the endophyte assemblages of teak, irrespective of the location of the host trees. Internal transcribed spacer sequence analysis of 11 different *Phomopsis* isolates (ten from teak and one from *Cassia fistula*) showed that they fall into two groups, which are separated by a relatively long branch that is strongly supported. The results showed that this fungus is not host restricted and that it continues to survive as a saprotroph in teak leaf, possibly by exploiting senescent leaves as well as the litter. Although the endophyte assemblage of a teak tree growing about 500 km from the forests was also dominated by a *Phomopsis* sp., it separated into a different group based on internal transcribed spacer sequence analysis. Our results with an endophytic *Phomopsis* sp. reinforce the earlier conclusions reached by others for pathogenic *Phomopsis* sp., i.e., that this fungus is not host specific, and the species concept of *Phomopsis* needs to be redefined.

Key words: fungal endophytes, *Tectona grandis*, fungal diversity, *Phomopsis*, host restriction.

Résumé : Nous avons comparé des assemblages d'endophytes foliaires de tecks de forêts caduques sèches et humides de la Réserve Biosphère du Nilgiri. Une espèce de *Phomopsis* a dominé les assemblages d'endophytes de tecks quelle que soit la localisation des arbres hôtes. Une analyse des séquences d'espaceur interne transcrit de onze différents isolats de *Phomopsis* (dix d'arbres teck et un de *Cassia fistula*) a montré que ceux-ci se divisent en deux groupes qui sont séparés par une branche relativement longue qui est fortement soutenue. Les résultats démontrent que ce champignon n'est pas limité à un hôte et qu'il continue à survivre en tant que saprotrophe dans les feuilles de teck, vraisemblablement en exploitant les feuilles sénescentes de même que la litière. Bien que l'assemblage d'endophytes d'un teck poussant à 500 km des forêt fut également dominé par un *Phomopsis* sp., celui-ci s'est séparé en un groupe différent selon l'analyse de sa séquence d'espaceur interne transcrit. Nos résultats à propos du *Phomopsis* endophyte renforce les conclusions précédentes tirées par d'autres sur le *Phomopsis* pathogène selon lesquelles ce champignon ne serait pas spécifique à l'hôte et que le concept d'espèces pour *Phomopsis* a besoin d'être redéfini.

Mots clés : champignons endophyte, *Tectona grandis*, diversité fongique, *Phomopsis*, restriction à l'hôte.

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Introduction

Although the horizontally transmitted fungal endophytes of woody tropical angiosperms are an important component of fungal diversity (Hawksworth 2004) and feature among the groups of fungi to be explored to realize the estimated significance of fungal species (Hawksworth 2001; Arnold 2005; Suryanarayanan and Hawksworth 2005), there are limited studies on the ecology and host interactions of these

fungi (Arnold et al. 2000; Suryanarayanan et al. 2002, 2003; Van Bael et al. 2005). Here, we present the results of our study of foliar endophytes of teak, a tropical deciduous timber tree. Teak forests occur naturally in an area of about 23 million hectares in India, Laos, Myanmar, and Thailand. Teak is also grown in plantations in about 36 tropical countries over an area of 5.7 million hectares (FAO 2001). Although the pests and diseases of teak have been studied in detail (Anonymous 1995), to our knowledge there are no studies regarding fungal endophytes of teak. We characterized leaf endophytes of teaks in dry and moist deciduous forests of southern India, with particular attention to the molecular diversity of *Phomopsis* spp.

Materials and methods

Tectona grandis L. f. (Teak) (five individuals) growing in dry deciduous and moist deciduous forests of the Mudumalai Wildlife Sanctuary (Lat 11°32'N and 11°43'N, Long 76°22'E and 76°45'E) in the Nilgiri Biosphere Reserve (NBR) of southern India were studied for their endophyte association. Teak is a dominant member in both of these forests. The leaf samples were brought to the laboratory in sterile polythene

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