



Botryosphaeriaceae associated with *Tectona grandis* (teak) in Northern Thailand

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Abstract

Tectona grandis (teak) is one of the most important economic timbers worldwide. Limited studies exist on the potential pathogens of these trees. Fungi in the Botryosphaeriaceae are cosmopolitan opportunistic pathogens, endophytes and saprobes of numerous hosts. Both symptomatic and asymptomatic branch and stem sections, as well as leaves were collected from *T. grandis* in plantations and forests in four provinces of northern Thailand with the aim of identifying species of Botryosphaeriaceae associated with these trees. Morphology and multi-locus phylogenies (ITS, TEF1- α , β -tubulin) were used to identify the Botryosphaeriaceae species. Six species from four different genera were found on *T. grandis* in Northern Thailand. These included *Dothiorella tectonae* sp. nov., *Lasiodiplodia brasiliense*, *L. pseudotheobromae*, *L. theobromae*, *Pseudofusicoccum adansoniae* and *Sphaeropsis eucalypticola*. *Dothiorella tectonae* is introduced here as a novel species and compared with other species in the genus. *Dothiorella tectonae*, *L. brasiliense*, *L. pseudotheobromae*, *L. theobromae*, *P. adansoniae* and *S. eucalypticola* are first reports for *T. grandis* in Thailand. Variations in morphology between descriptions of previously described species and that obtained in this study are described to facilitate future identification of species.

Key words: *Dothiorella*, *Lasiodiplodia*, *Pseudofusicoccum*, *Sphaeropsis*, multi-gene phylogenetics, taxonomy

Introduction

Tectona grandis (teak) is one of the most economically valuable tropical hardwood trees globally. Natural teak forests occur in only four countries in the world including Burma, India, Lao People's Democratic Republic and Thailand (Kollert and Cherubini 2012; Thulasidas 2014). India, Lao PDR and Thailand have bans on logging of native teak forests and the export of native teak, and therefore rely on plantations for teak production (Kollert and Cherubini 2012). In 2010, teak plantations in Thailand were reported to cover an area of ~128 000 ha (Kollert and Cherubini 2012). Large areas in northern Thailand are planted with teak plantations and covered by natural teak forests (Graudal *et al.* 1999). In Chiang Rai Province, the area under productive teak plantations is ~3 321 ha with the income from teak and teak timber products reported as ~120 725 USD (80 USD/m³/year) (Elmagboul *et al.* undated). Teak has been an important trading commodity in Thailand for over 700 years (Areeya 1992). The timber has a wide range of uses including flooring, decking, framing, bargeboards, carvings, and furniture. It is also used for shipbuilding due to its resistance to sun, heat, cold, rain and seawater (Rondon *et al.* 1998).

Various fungal pathogens are reported to affect teak, including *Armillaria mellea* and *Phellinus noxius* causing root rot (Mohd Farid *et al.* 2005, Owusu 2011), *Erythricium salmonicolor* causing pink disease (stem cankers and girdling) (Akrof *et al.* 2014) and *Olivea tectonae* causing leaf rust (Daly *et al.* 2006, Pérez *et al.* 2008, Cabral *et al.* 2010). Numerous endophytic fungi have been reported from teak leaves in Thailand. These include species of *Alternaria*, *Colletotrichum*, *Daldinia eschscholtzii*, *Fusarium*, *Nigrospora*, *Penicillium*, *Phomopsis*, and *Schizophyllum commune* and members of the Xylariaceae (Mekkamol *et al.* 1997, Mekkamol 1998, Chareprasert *et al.* 2006). Several