CHAPTER 1

INTRODUCTION

Tropical rainforest is a reservoir of large numbers of potential microorganisms which can produce bioactive compounds that may find uses in medicine, industry, and agriculture (Strobel, 2002b). The golden triangle of Thailand (Northern Thailand, Laos and Burma) are one of the captivated area in the world which holding the fascinating plants and associated endophytes (Strobel, 2002a). The areas with their characteristics have the prospect of housing endophtyes with great biodiversity (Whalley, 2008). Indeed, foliar endophyte in tropical forests are thought to represent as much as an order of magnitude greater diversity than can be in the temperate zone (Dreyfuss and Chapela, 1994) and there is strong evidence that fungal endophytes are highly diverse on the scare of individual leaves and plants in the tropical forests (Fröhlich and Hyde, 2000; Arnold *et al*., 2000 and Gamboa and Bayman, 2001). Lodge *et al*. (1996) assumed that tropical endophytes may contribute substantively to fungal diversity. It is also remarkable that nearly 300,000 plant species exist on the earth, each individual plant is host to one or more endophytes but only a few of these plants have been completely studied relative to their endophytic biology (Strobel and Daisy, 2003). The diversity of fungal endophyte is at an exceedingly small scale as a single conifer needle may harbor several dozen species and highly host or tissue specific (Stone *et al*, 2004). If the total number of fungal species on earth approaches, the 1.5 million proposed by Hawksworth (1991), much more than 1 million species remain to be discovered. It is almost certain that a substantial proportion of these

undiscovered species will be what we considered here to be “endophytes” it follows that more accurate estimates of numbers of endophytic species will lead to more accurate estimates of global fungal species diversity (Stone *et al*., 2004). Endophytes are potential source of novel chemistry and biology, not only to helping and solve only human health, but also plant and animal health problems (Strobel, 2002a). Notably in agriculture, endophytic fungi can produced antibiotics such as cryptocandin, pestaloside, aromatic *β*-glucoside and pyrones (Lee *et al*., 1995, Strobel *et al*., 1996, Pulici *et al*., 1996 and Wicklow *et al*., 2005) which are useful to control plant diseases (Worapong *et al.*, 2001; Strobel and Daisy, 2003).

Thai dwarf fishtail palm or *Wallichia siamensis* Becc. which distributed in rainforest of northern Thailand, Nepal, Bhutan, northeastern India, Myanmar, Lao, Vietnam, and China (Henderson, 2007) is considered as native palm in these area. The palm is described as a small palm, densely clustered palm up to 4.5 m and widespread but never common (very rarely seen) (Gardner *et al*., 2002). The palm is also monocarpic (a plant that dies after flowering, although it may take several years to flower). It is assumed that native plants have grown along side the native insects, fungi, plant diseases, and other native organisms for thousands of years (Strobel, 2002b). Furthermore, native plants are also forming a long-time exclusive association with its endophytes which have produced a complex web of interrelationships, by which the native plant may depend upon numerous endophytes to survive and flourish, and a multitude of endophytes may, in turn, depend upon that native plant to survive (Strobel, 2003).

To date, information regarding on diversity of fungi associated with Thai dwarf fishtail palm remains unexplored prior to lacking of publications has been recorded.

The only information about fungi associated with Thai dwarf fishtail palm was reported by Techa (2002) studied diversity of saprophytic and endophytic fungi on Thai dwarf fishtail palm in Suthep-Pui National Park, Chiang Mai, Thailand. However, most of these data were from an unpublished thesis and thus potentially unreliable and also the study was only focus on taxonomy without any attempt to explore the potential of isolated fungi. Furthermore, the endophytic fungi resulted from the research were also dominated by unidentified fungi (Mycelia sterilia). Therefore, in order to explore the potential of endophytic fungi associated with Thai dwarf fishtail palm; this study isolated and characterized the endophytic fungi against several plant pathogenic fungi. In addition, this research also carried out identification of Mycelia sterilia fungi from endophytes by inducing their sporulation. As the identification usually involves microscopic examination of host tissue and often requires a high degree of taxonomic expertise. That is especially true for the isolates in pure culture that fail to produce spores or identifiable structures; determination of growth conditions that induce sporulation is very important (Stone *et al.*, 2004). In this research, it is hypothesizing that the opportunity to find new and interesting endophytic fungi from Thai dwarf fishtail palm which can produce valuable organic substances, is high potential due to its exclusivity association with the plant.

Objectives

1. To explore the biodiversity of the endophytic fungi associated with Thai dwarf fishtail palm.
2. To induce sporulation and fruiting bodies of Mycelial sterilia fungi which are commonly isolated endophytes.
3. To examine the potential of the endophytic fungi isolated from Thai dwarf fishtail palm in relation to control plant pathogenic fungi.