Dissertation Title	*Pestalotiopsis:* Phylogeny and DNA Barcoding
Author	Sajeewa Maharachchikumbura
Degree	Doctor of Philosophy (Biosciences)
Advisor	Assoc. Prof. Dr. Kevin David Hyde
Co-Advisor	Assist. Prof. Dr. Ekachai Chukeatirote

ABSTRACT

The genus *Pestalotiopsis* has received much attention in recent years, not only because of its role as a plant pathogen, but also as a commonly isolated endophyte which has been shown to produce a wide range of chemically novel diverse metabolites. *Pestalotiopsis* consists of around 230 species, most of which were named according to their host associations. However, Phylogenetic analyses in combination with morphology and review of literatures have shown that the genus needs revision, and many of the traditional species may be spurious. This calls for critical re-examination of the genus, using both phenotypic studies and phylogenetic analyses of sequence data based on ex-type and ex-epitype cultures.

In this study, we have studied the genus *Pestalotiopsis* and tested the use of various genes to resolve species boundaries. The 10 gene regions (ACT, β-tubulin, CAL, GPDH, GS, ITS, LSU, RPB 1, SSU and TEF1) were utilized to resolve cryptic *Pestalotiopsis* species, ITS, β–tubulin and TEF1 proved to be the better markers. The other gene regions were less successful in PCR amplification and/or resolving species.

Out of tested locus, as a single gene TEF1 gave the highest species resolution/ PCR success and combination of ITS, β-tubulin and TEF1 gave the best resolution.

Furthermore, we examined large number of *Pestalotiopsis* strains, which were isolated from various hosts and geographic origins. Phylogenetic relationships between these strains and other genera in the family *Amphisphaeriaceae* were resolved based on LSU sequence data. The phylogeny shows that *Pestalotiopsis* is a distinct clade in *Amphisphaeriaceae* and should be split in three groups; besides *Pestalotiopsis,* the two new genera *Neopestalotiopsis* and *Pseudopestalotiopsis* are proposed. Phenotypic analyses of conidial characters coupled with phylogenetic analyses of sequence data were used to clarify species boundaries in the three genera. Species of *Pestalotiopsis* were assigned to 19 sections, 40 new species were described, one species was epitypified and two ex-types were re-examined. *Neopestalotiopsis protearum* assign as the generic type of the newly proposed *Neopestalotiopsis.* In addition we described 19 new species, two species were epitypified, two ex-type were re-examine and six section names were introduced to the *Neopestalotiopsis*. *Pseudopestalotiopsis theae* placed as the generic type of *Pseudopestalotiopsis*; besides two new species were introduced and one species was epitypified.

Keywords: *Neopestalotiopsis*/ new species/ *Pestalotiopsis*/ phylogeny/ *Pseudopestalotiopsis*