

CHAPTER 1

INTRODUCTION

Cassia (Family Leguminosae, subfamily Caesalpinioideae, tribe Cassieae, subtribe Cassiinae) is one common but important legume genus in Thailand. The genus *Cassia* can be found all over the country and has members which many are well-known such as Golden shower (*Cassia fistula*, the national flower of Thailand), Pink shower, and Candle bush. Most *Cassia* are trees or shrubs, with a few herbs. Leaves are paripinnate compound and flower are mostly with red, pink or yellow colour. Pods are variable from cylindrical to flatten shapes. According to Flora of Thailand (Larsen *et al.*, 1984), there are 22 *Cassia* species recorded in Thailand. These Thai species have a wide range of morphological characteristics, from trees high up to 15 meters e.g. Golden shower (*C. fistula*), to 2-3 meters tall shrubs e.g. Candle bush (*C. alata*), or as small as weed-like herbs e.g. Makarm-din (*C. leschenaultiana*).

Many *Cassia* species have been commercially used as good timber wood and as ornamental plants. Moreover, they have also been utilised as traditionally herbal medicines to treat tropical disease, for instance, an infectious eye, ringworm or any skin diseases. Pods and branches of Golden shower (*C. fistula*) can be used as laxative agent to treat flatulence and constipation. Nowadays, anti-dandruff shampoos and hair conditioners composed of candle bush extract can be purchased commonly in a lay market.

Taxonomic relationship between *Cassia* and other genera in the subtribe Cassiinae have been discussed for a long time. Several taxonomists classified these plants to different systems based on various morphological characters. In 1981, Irwin

and Barneby first classified the subtribe into three genera (*Cassia*, *Senna* and *Chamaecrista*). However, three years later (in 1984), Larsen *et al.* suggested in the Flora of Thailand that all 22 Thai species from the 3 genera should be in only one genus, *Cassia*. After that, many more botanists have argued about this long-time taxonomic problem. The Flora Malesiana (Larsen and Hou, 1996), for example, moved 10 *Cassia* species to the genus *Senna* and another four *Cassia* species to the genus *Chamaecrista*. These confusing and problematic arguments rely heavily on a variability of those morphological characteristics. Phenotypic characters of plants can be varied by time and environment and the effect of convergent evolution could lead to great misunderstanding in their evolutionary relationship, particularly from pollination syndrome commonly found in many angiosperms (Lewis *et al.*, 2000).

To clarify the taxonomic problem of *Cassia* and other genera in the subtribe Cassiinae, molecular phylogenetic methods were introduced in this M.Sc. thesis research. The tRNA^{Leu} (*trnL*) intron from chloroplast genome and the ITS regions from nuclear genome had been used as target genes for PCR and nucleotide sequencing. The DNA sequence data was then used as molecular characters for phylogenetic analyses to reveal an evolutionary relationships among members of the subtribe Cassiinae. Moreover, the phylogenetic relationship revealed from molecular data were also compared to morphological characters of these plants.

Aim of the thesis

This thesis aims to introduce molecular biology methods, using Polymerase Chain Reaction (PCR) and DNA sequencing analyses, to study molecular genetic relationship of *Cassia* species found in Thailand and solve the long-time taxonomic problems of the subtribe Cassiinae.