CHAPTER 1

INTRODUCTION

Microsorum punctatum (L.) Copel. is a common species, having a widespread distribution in various forest types of temperate and tropical parts of the Old World, extending from the Pacific Islands to Northeast Australia, Malaysia, Southeast Asia, Southern China, the Indian subcontinent extending to Madagascar and Tropical Africa, whereas the highest species diversity occurs in East Asia (Bosman, 1991; Roux, 2005). *M. punctatum* (L.) Copel. and its related species are terrestrial, lithophyte or epiphyte in evergreen forests, mostly in deep shade. These species can be found from mangrove or sandy beach forest at sea level up to high elevation of Montane forest. At present, *Microsorum* includes about 50 species. Many of them are widely cultivated either as house or garden plants.

Microsorum punctatum and its related species have a great variation in frond forms, sizes, and venation patterns and were treated differently by different authors. For example, *M. musifolium* Copel. and *M. glossophyllum* Copel. were treated as synonyms of *M. punctatum* while they were recognized as distinct species by some workers (Bosman, 1991). Nooteboom (1998) noted that *M. glossophyllum* is a form differing in blackish narrow rhizome scales, but this character is variable and intermediates occur with the more brownish and wider scale. *M. musifolium* is a form with wider fronds and more connecting veins and is connected with *M. punctatum* by many intermediates. Moreover, *Polypodium punctatum* ssp. *subirideum* H. Christ and *P. punctatum* ssp. *subdrynariaceum* H. Christ were first proposed in 1906 and were transferred into *M. subirideum* by Copeland, who proposed name *M. punctatum*, in 1947 and were treated as synonym of *M. punctatum* by some worker (Bosman, 1991; Bosman et al., 1998; Nooteboom, 1997). *Polypodium polycarpon* Cav. was considered as a basionym of *M. polycarpon* Tardieu., this species have rather different morphological character of frond-form from *M. punctatum*. It was also considered as a synonym of *M. punctatum* by some pteridologists. Because these variations do not match with previous recognized taxa, Nooteboom placed these collective taxa as a species complex and suggested that they are worth investigating (personal communication, 9 September 2005).

These examples show that *M. punctatum* and related species are not clearly circumscribed and delimited. Moreover, these taxa, especially cultivated plants, exhibit variations in frond forms (e.g. irregularly lobed). Some of these forms have been described as cultivars, i.e. *M. punctatum* (L.) Copel. cv. *serratum*. These variants are not included in previous recognized systematic treatments. It can be seen that the members of this species complex have a history of circumscriptional uncertainty, suggesting the need for further taxonomic evaluation.

Aim of the thesis

1. To investigate morphological, anatomical and molecular variation of *Microsorum punctatum* (L.) Copel. and its related taxa. With these objectives in mind, both cluster analysis (CA) and discriminant analysis (DA) were performed based on both qualitative and quantitative characters (i.e. 56 characters) examined from 707 herbarium specimens.

2. To infer phylogenetic relationship of *Microsorum punctatum* (L.) Copel. and its related taxa based on morphological data.

3. To determine the taxonomic status of taxa in the *Microsorum punctatum* (L.) Copel. complex.