CHAPTER 1

INTRODUCTION

Cercosporoid fungi is one of the major agent causing diseases on plants and crop losing throughout the world. Cercosporoid fungi are commonly associated with leaf spots, but can also cause necrotic lesions on flowers, fruits, bracts, seeds and pedicels of numerous hosts in most climatic regions (Agrios, 1997). Crop losses from fungal diseases pose a serious threat to global food security. In addition, certain groups of fungi produce mycotoxins infected crops. Furthermore, other than important pathogens of major agricultural crops such as cereals, vegetables, ornamentals, forest trees, grasses, etc., cercosporoid fungi are also known to be hyperparasitic to other plant pathogenic fungi (Shin and Kim, 2001), and are employed as biocontrol agents of alien weeds (Morris and Crous, 1994). Study of cercosporoid fungi in Thailand is still needed due to lacking of the sufficient data of the mycoflora. In Thailand, 117 species of *Cercospora* and allied genera were hitherto known (Sontirat *et al.*, 1980; Giatgong, 1980; Petcharat and Kanjanamaneesathian, 1989). Taxonomy has its objectives as the description, naming, identification, classification and determination of relationships of organisms. Taxonomy is a broad field of science, providing and accumulating information from research in the field, the laboratory, the garden, the herbarium, the library, and from other fields of science such as geography, geology, chemistry, genetics, ecology and statistics. Taxonomy is the foundation upon which biology is built. The biochemist has to know the names and characteristics of the species from which he extracts wonder drugs, the molecular scientist has to know the

species which he engineers genetically into super crops-the taxonomist will identify and provide the names. The field ecologist has to know the different species by name in order to carry out his surveys. Without a knowledge of taxonomy, no environmental impact assessments could be achieved. No scientific reporting in any of the biological fields, whether biochemistry, genetics, agriculture, etc., is possible without correct taxonomic identification and naming. The taxonomist stands in the first ranks to preserve the diversity of life on our planet. Correct identification of insect pests, diseases, weeds and beneficial species is a critical requirement for implementing management plans for quarantine and plant health. The genetic and phenotypic diversity of fungal pathogens needs to be systematically cataloged. Because approximately 10,000 fungal species are considered as plant pathogenic (Agrios, 1997; Farr *et al.*, 1989), accurate identification of new isolates is a challenge, even to experts. Considering that the number of fungal species identified to date (72,000 to 100,000) only represent a small fraction of the estimated 1.5 million species in the fungal kingdom (Hawksworth, 1991; Hawksworth, 2001; Hawksworth and Rossman, 1997), the actual number of plant pathogenic fungi is likely to be much higher than 10,000. The observation that fungal species easily recognized using phylogenetics are not necessarily morphologically distinguishable (O' Donnell *et al.*, 1980) further supports the existence of many more fungal pathogens in nature. This problem underscores the importance of systematically cataloging and sharing taxonomic and phylogenetic information concerning fungal pathogens. Study of taxonomy of pathogenic fungi on plants and assessment of its biodiversity and distribution on different host plants and in different regions as well, will be very important for any application such as management of pest control and quarantine.

Taxonomy study will give us some important information regarding species name and its morphological characters, symptoms of the fungi on the host surface, and distribution in the different host plants. While plant disease attacks the crops and some plants that economically important for human lives, the first question arising in our minds is what kind of disease it is? How dangerous the disease attacking the crops? Taxonomic data will greatly help us uncover and describe fungal pathogen diversity in nature (Geiser, 2004; Taylor *et al,*. 2000). Taxonomy and biodiversity study will answer the question correctly and reveal its effect and all the important characters of the disease including symptoms on the host, morphology and physiological characters and the species advantages and disadvantages in the environment. Taxonomy and biodiversity information are the urgent databases for pest treatment as the next steps in the management of pest control. Successful disease management strategies require accurate and rapid identification of the causalagents. Study of distribution of plant pathogenic fungi has a similar importance role in either the management of pest control or quarantine. After identifying the plant disease correctly and carefully, we will know where the disease coming from by the information from distribution study. In the quarantine, database of distribution of plant pathogen is the major information to protect domestic plant crops from new disease introduction causing by human activities such as traveling. Refer to the previously information above, we choose taxonomy, biodiversity and mycoflora of *Cercospora* and allied genera as a major subject of this research. The study will cover identification, description, classification and distribution of *Cercospora* and allied genera which the finding in the research, identification and distribution of the host plants, and assessment of *Cercospora* and allied genera biodiversity in Northern

Thailand. Description of the species is completed by both of drawing and photograph pictures for making the description clear and informative.

Objectives

1. Survey and assess of biodiversity of *Cercospora* and allied genera in Northern Thailand.
2. Survey and assess of distribution host specificity of *Cercospora* and allied genera in Northern Thailand.
3. Survey of distribution of *Cercospora* and allied genera in Northern Thailand.