INTRODUCTION

Tea [*Camellia sinensis* (L). O. Kuntze] is one of the most economically important plantation crops of India, being cultivated in both the Northern and Sourthern belts of the country. Darjeeling produces the world's finest quality tea, in the steep hill slopes of the Eastern Himalayas upto an elevation of 3000m. At the Himalayan base lies the tea districts of Terai and Dooars. Tea is also grown in the slopes of Nilgiris and Annamalai hills of Peninsular India. Being a perennial, the tea plant possibly interacts with, and samples more environmental problems than do most other plants. A number of fungal pathogens cause foliar diseases of tea which effect the economic importance because damages to the leaves reduces the quality and quantity of tea production. Blister blight caused by *Exobasidium vexans* Massee is considered to be one of the most destructive foliar diseases of tea resulting in enormous crop losses to the Tea industry. The fungus infects mainly the tender leaves and stems. The pathogen is a biotroph and there are no known alternate hosts. The life cycle is completed on tea itself. The disease initially starts with a pale yellow spot and gradually enlarges into circular lesion (Chandra Mouli, 1983; Agnihothrudu, 1995). As the disease progresses inside the leaf tissue, the upper surface of the developing lesion depresses into a shallow cavity, while on the lower side it correspondingly becomes convex and this forms the blister (Plate-1).

Weather conditons have profound influence on the development of the pathogen and disease incidence. A relative humidity higher than 80% is essential for basidiospore formation, ejection and germination. An optimum temperature of 22°C to 25°C and continuous leaf wetness of 11hr is optimum for infection. A thin film of water is more favourable for germination and hence when dew is formed in the evening the spores germinate to bring about infection. Therefore, the epidemic of the disease is very common in humid, foggy regions (Baby and Premkumar, 2000). Investigations have shown that the Ultraviolet-B(UV-B:290-320nm) component of solar radiation helps in the formation of blister postules (Gunasekera *et. al.* 1997). However, cuticle thickness and the angle of leaf and twig were found to be important factors for the resistance of tea clones to blister blight (Martosupono and Sliharta, 1980). Attempts have been made by number of workers to control blister blight disease in field conditions (Venkata Ram and Chandra Mouli, 1983, Chandra Mouli and Premkumar, 1996).

The use of immunological assays of microbial disease of plants for both detection and diagnosis is rapidly increasing in the field of phytopathology (Hansen and Wick, 1993), It has long been known that most plant pathogens possess as part of their structures, specific antigenic determinants or recognition factors in the form of proteins, glycoproteins, complex carbohydrate polymers or other complex molecules (Devay and Adler, 1976; Chakraborty, 1988). Recognition of the diagnostic potential of such determinants for both experimental and applied investigation in plant pathology has resulted in a bewildering array of techniques which are collectively reffered to as immunoassays (Werres and Steffens, 1994). Immunoassays originally developed for the identification of viral diseases are now finding equal application in the detection of bacterial and fungal diseases (Mohan, 1988; Lyons and White, 1992; Linfield, 1993; Chakraborty and Saha, 1994; Chakraborty *et. al.*, 1995; Wakeham and White, 1996). Though significant advances have been made in the development of rapid, sensitive assays for fungi in recent years, commercially available techniques are limited to a few pathogens and diseases. Serological techniques can be used to detect fungi present in low amounts in and on plant tissue and therefore, in many cases the pathogen can be detected at an earlier stage of disease development than was previously possible.

Since such immunological studies on blister blight disease of tea caused by *Exobasidium vexans* are lacking, and considering the importance of such studies, this study has been undertaken. The main objective of this study are as follows :

(a) To study the occurrence of blister blight disease in tea gardens of hills and plains and their correlation with weather conditions.

(b) To screen Darjeeling, Tocklai and UPASI varieties of tea plants for resistance to *Exobasidium vexans*.

(c) To extract antigens from basidiospores of *E. vexans*, healthy and naturally blister infected and artificially inoculated (with *E. vexans*) tea leaves, non host species and non-pathogen (*Fusarium graminearum*).

(d) To raise polyspecific and polyclonal antibody for *E.vexans*, polyclonal antisera for healthy tea leaves as well as for non pathogen and to purify IgG for serological assays.

(e) To detect serological cross reactivity between *E. vexans* and tea varieties following agar gel double diffusion and enzyme linked immunosorbent assay.

(f) To optimize ELISA sensitivity for polyspecific and polyclonal antibody raised against *E. vexans*.

(g) To detect the infection in tea leaves of different varieties by ELISA, dot blot and western blot analysis.

(h) To determine the cellular location of crossreactive antigens in loosened cells, tea leaf tissues and basidiospores by using immunofluorescence technique.

(i) To compare the field application of biocides and systemic fungicide for the management of blister blight of tea and immunological responses.

Before going into details of the present work, a brief review in conformity with this study has been presented in the following pages.