Introduction

The tea plant [*Camellia sinensis* (L.) O Kuntze] was grown for many centuries in China as a commercial crop. Tea drinking possibly spread to India from China around the 17th century and the Assam cultivar was discovered in the North-Eastern region of the undivided India in 1834 (Agnihotrudu, 1995). Today India occupies the foremost position in the world among all tea growing countries with respect to tea production, consumption and export. Tea industry is one of the most important organized sectors in the country and more than 70% of the country's population comes in contact with tea in India's economy and society both directly and indirectly. The tea bush like any other living plant is susceptible to attack by diseases more so as it has been subjected to various cultural treatments which are widely at variance with the natural conditions of growth. Practice of tea cultivation which necessitates the growing of parental crop in a pure stand extending over vast areas affords a happy hunting ground for pest and diseases of all kinds. Some of the existing soil conditions in the tea plantations predispose the plants to attacks by specific fungi causing some of the important diseases. One of the most common such diseases in Dooars and Terai region is the violet root rot caused by *Sphaerostilbe repens* B & Br. which is found to occur in all soils but is more common on stiff clay soil with water logging and poor aeration. The disease is practically unknown in hills. The pathogens attacks all tea plants from above one year upwards but the characteristic symptoms are produced on plants two year and above. When the bark of affected roots is peeled off, the wood surface is found to be covered with thick, irregular, white to orange and mauve to purplish-black, flattened strands, the rhizomorphs (Plate 1).

In nature unlike animals plants can not move and hence they can not side step or run away from attacking pathogen. They are bound to stand , wait and then face the attackers. In order to suit the above situations plants have evolved primarily localized type of defence or immune system, where each individual cell/tissue/ organism is required to defend itself without much help from distant plant parts. The pathogen is recognized and restricted by the few individual plant cells. An organism is recognized at the level of surface to surface interaction as either incompatible or compatible. Recognition or interaction as compatible depends on some kinds of molecular similarities between the host and pathogens (Chakraborty, 1988; Protsenko and Ladyzhenkaya, 1989; Chakraborty and Saha, 1994; Chakraborty et.al. 1995 and Chakraborty et.al.2002). Close serological similarity between host and pathogen is therefore one of the prerequisites for the successful establishment of the pathogen in the host.

This serological relationship between host and pathogen has been exploited for development of pathogen detection systems in the host using antisera raised against the pathogen. Such disease detection and diagnostic kits have the advantage over conventional methods by being specific and having the ability to detect even minute amounts in the tissue. Commercial diagnostic kits have been offered in recent years for the rapid diagnosis of several fungi in plant tissues and in soil and water (Werres and Steffens, 1994) Most common among these techniques are the imuunosorbent assays such as Enzyme Linked Immunosorbent Assays (ELISA) , Dot-blot, Western blot etc. ELISA is now routinely incorporated in various large scale disease indexing programmes particularly in perennial and vegetatively populated crops (Clark, 1981).

Timely detection of disease specially root diseases combined with proper management practices can lessen crop loss to a great extent. Among the current management practices for control of root diseases, the most environmental, friendly and effective one is the introduction of biocontrol agents in the soil , thus minimizing the use of fungicides. Among the available biocontrol agents *Trichoderma* sp has been tested in a large number of cases. Biomass production, their suitable formulations and delivery systems are the limiting factors for the commercialization of antagonists. Now a days a number of *Trichoderma* formulations such as Biofungus (Belgium), Bineb-T (Sween, U.K.) , Rootshield, Biotrek-T22G, Planterbox(USA), Rootpro, Trichodex, Trochoderma2000 (Israel), Trichopel, Trichodowels, Trichosean (Newzealand), Supersivit (Denmark) etc. are available in world market. In tea plantations the use of biocontrol agents assumes all the more important because of the restrictions of the use of fungicides.

Considering all the above , the present study was undertaken with the following objectives: (a) to screen various tea clones resistant to *S repens*; (b) to prepare mycelial and cell wall antigens from *S. repens* and raise polyclonal antiserum against the antigen preparations; (c) purification of antigen and antisera and analysis by immunoblotting; (d) to determine serological cross reactivity between tea roots and *S.repens* using ELISA and immunofluorescence (e) to detect the pathogen in soil and root tissues by ELISA and immunoenzymatic staining; (f) *In vitro* interaction studies of *S. repens* with *Trichoderma harzianum* and *T. viride* ; (g) To apply *T. harzianum* and *T. viride* in soil for biological control of violet root rot and (h) to determine the changes in the population of the root pathogen after *Trichoderma* infestation in soil by ELISA and immunoblotting.