CHAPTER I

INTRODUCTION

The fungal pathogens have been the cause of heavy losses of plants and plant produce, and since long, chemicals have been the only answers to these losses. Due to recognition of residual problem of chemical pesticides; in most of the advanced countries, there is a ban on the use of certain chemicals. And people are preferring the biological methods for the control of plant diseases.

Biological control of plant pathogens accomplished through host plant resistance and cultural practises has been working for decades and continues to be predominant disease control accomplished through introduction or encouragement to micro-organisms antagonistic to plant pathogens has been slow to develop. Extensive efforts were made in the 1920s and 1930s to introduce antibiotic producing micro-organisms into soil for root disease control, but the experiments were so unsuccessful that research on this method of biological control virtually ceased for about three decades.

The art and science of plant disease control must continue to move in the direction of biological control of plant pathogens including use of introduced antagonists. Chemical controls are necessary with many diseases at presents but are undesirable and even inadequate as long term solution to crop health. The receent

holocaust of Bhopal Tragedy is fresh in our memory. Inspite of all these multinationals are still dumping these dangerous chemicals in the developing countries for crop protection. During the past several years, some notable success of disease control achieved through introduction of micro-organisms in the laboratory, glass house and fields. It is now widely recognised that biological control of plant pathogen is a distinct possibility for the future and can be successfully exploited in modern agriculture especially with the framework of integrated work in pest management system.

Biological control has regarded as biological interference with epidemics. And it includes principles such as cross protection, hyperparasitism, lysis of bacteriophages, predators and animals antagonistic to pathogens, bacterial diseases at or around host surface, complexes associated with nematodes and interference in virus disease.

Thus, hyperparasitism is one of the principles of biological control.

A number of fungi are active parasites on other fungi. Relationship between two species of plants or animals in which one benefits at the expense of other usually without killing is known as parasitism. An organism that parasitizes another and such a relationship is known as hyperparasitism. It is a attack

of a secondary parasite on a primary parasite.

Fungi occurring on other fungi are commonly termed 'mycoparasite'. Cooke (1977) considered the term mycoparasite inappropriate as it could be used for a fungus on any organism and not only on other fungi. The term 'hyperparasite' was employed interchangeably with 'mycoparasite' by Boosalis (1964) and has been adopted by several mycologists (e.g. Deighton, 1969; Deighton and Pirozynski 1972); but it was considered unacceptable by Cooke (1977) in strictly impling only a species parasite on an already parasitic organisms. Cooke (1977) speaks of fungi 'antagonistic' towards other fungi but this can not be commended (Cole and Kendrick, 1981) for general usage as many fungi reported from other fungi may not form actively antagonistic relationships at all (Cole and Kendrick, 1981). Mycophilic used by Rudakov (1978), may be unacceptable term, according to Cole and Kendrick (1981) where the association is obligate, but the precise physiological relationship is unclear. 'Fungicolous' has sometimes been used to refer to fungi macromycetes (e.g. Tubaki, 1955; Nicot, 1967) but also more widely to embrace a very wide range of fungus to fungus relationships (e.g. Gilman and Tiffany, vide Cole and Kendrick, 1981). 'Fungicolous' has been used as a general term by Barnett (1963); Barnett and Binder (1973) for cases where a definite nutritional relationships has not been

demonstrated.

Mycoparasitism is a potential biocontrol mechanism of fungal diseases of plants. Certain fungi and bacteria are parasitic on plant pathogens. There are also fungi which are actively parasite on other fungi and such hyperparasitism (mycoparasitism) occurs with several soil fungi as well as other ones.

Plants have evolved a variety of mechanism by which to sacrifice a few cells so the whole plant can survive. It is a very effective mechanism for a defense (by Kiraly). The pathogen may be attacked by hyperparasites at the point of innoculum production or at the infection court and it may not be able to induce disease.

The hyperparasitic fungi so far recorded belong to all the groups from Phycomycetes to Deteuromycetes, but almost all the Phycomycetes, Ascomycetes and Deteuromycetes very rarely to Basidiomycetes. Fungal hosts belong to all these groups. Hyperparasitism is wide spread in fungi particularly in certain orders such as hypocreals and chytridiales (Devay, 1956) and it is very common on members of uredinales and erysiphales.

Fungi enter into a number of mutalistic relationships with other fungi. Some are facultative (e.g. Rhizctonia solani) while others are obligate (e.g. Eudarluca australis) hyperparasites and some others can be antagonistic or hyperparasitic although different

strains are perhaps involved. Hyperparasitic and phytoparasitic fungi show similarities in host parasitic interaction. Parasitism is just one form of symbiosis which involves heterotrophic organisms. Among the true mycoparasites there are those which obtain nutrients i.e. necrotrophic hyperparasites atleast by those which quickly kill the invaded host cells, where as fungi which attack the shoots of plants tend to be parasitized by biotrophic fungi.

Hyperparasites of fungi were first described in the 1800s by mycologists with interest in plant diseases. Most reports of hyperparasites suggest that they might be useful for biological control but hyperparasites are rarely used in pest management programmes. Hypperparasites have provided biological control of plant disease in experimental plots.

With these views, the primary taxonomical study of hyperparasites was undertaken and presented here in.