CHAPTER VI

GENERAL CONCLUSION
The present investigation reveals that the determination of the phylloplane mycoflora of a particular host is affected by several internal and external factors. Some fungi, viz. *Curvularia lunata*, *Trichoderma harzianum*, and *I. longibrachiatum* were found to be constantly present on the host *Cajanus cajan*, whereas *Aspergillus fumigatus*, *Curvularia lunata*, *Epicoccum nigrum*, and *Trichoderma harzianum* on the host *Glycine max*., indicating the tendency of selectiveness and preference for their respective hosts. *Aspergillus niger* and *A. flavus* showed their presence, even under stress, possibly owing to their saprophytic and thermophilic nature. *Trichoderma harzianum*, *I. longibrachiatum*, and *Epicoccum nigrum* exhibited their occurrence with high frequency and abundance on their hosts, perhaps, due to the availability of suitable nutritional facilities.

Highly nutritive carbohydrate sources, namely-glucose, fructose, and sucrose supported good growth of the target fungi like *Trichoderma harzianum*, *I. longibrachiatum*, and *Epicoccum nigrum* which showed high frequency and abundance on their hosts, presumably, because of their availability in the
form of exudates from the leaf surfaces. However, *Epicoccum nigrum* exhibited low frequency of occurrence and abundance on the host *Glycine max*. The nutritional studies also revealed that glucose and fructose failed to support its growth even moderately. Maltose and mannose were detected in the extracts and exudates of *Cajanus cajan* leaves, which compounds also proved to be the good sources for the growth of *Epicoccum nigrum* in *vitro* studies.

*Trichoderma harzianum* was recorded to be a common and constant species occurring on both the hosts, which may be attributed to having feeble power of selectivity for the nutrients. It showed good to moderate growth in all the sugars and amino acid sources employed in the laboratory studies. The best growth of this fungus was exhibited in glutamic acid which was also detected in the extracts and exudates of leaves of both the hosts. The other species *T. longibrachiatum* showed its constant presence on *Cajanus cajan* but not on *Glycine max*. The absence on the latter may be attributed to some unknown inhibitory factors operating on the host surface.

*Epicoccum nigrum* was not as constantly associated with *Cajanus cajan* as it was with on *Glycine max*. Such a selective tendency may be due the to availability or non-availability of specific nutrients, as it were detected. Moreover, the presence of certain inhibitory substances in the leaf extracts and exudates of *Cajanus cajan*, as evidenced by the
spore germination tests also, is not ruled out. But interestingly enough, this fungus (E. nigrum) has been reported to be with higher frequency than the other fungi whenever it occurs on Cajanus cajan, which may be possibly due to their higher ecological amplitude and antagonistic potential ovability, by virtue of which it draws upon nutrition unhindered, thus simultaneously inhibiting other phylloplane fungi to compete. Epicoccum nigrum emerged as a highly antagonistic species presently in the laboratory experiments amongst all other tested fungi including Emericella quadrilineata which ranked second best regarding this aspect.

Certain species occurred on one host only, showing absence on the other host for reasons unknown. The minimum number of fungi were recorded during the month of January 88 from the host of Glycine max, and during the month of February-March 87 from the host of Cajanus cajan. Such situation may be attributed to unfavourable environmental conditions, viz. extreme cold and no precipitation during January 1988. During February the conditions were slightly better excepting the rainfall, while and in March the temperature reached beyond 34°C, which might have worked as limiting factors.

Several pathogenic fungi viz. Macrophomina phaseolina, Phyllosticta glycinea, and Alternaria longissima are known to incite disease to both the hosts, and are found to be constant, frequent, and abundant species on these hosts in the present investigation; but their pathogenic ability remained
undetected in the present studies. This may be presumably due to the inter-specific competition among the phylloplane fungi because of which their pathogenic activity did not succeed. Such a failure may also be due to the non-availability of nutrients on the host surface, adverse environmental conditions, and/or presence of certain inhibitory substances secreted by the antagonists. The present investigation revealed that Glycine max. leaf extract was highly effective against the spore germination of Phyllosticta glycinea. Another pathogen, Macrophomina phaseolina showed feeble germination in the extracts and exudates of hosts may be due to the presence of certain inhibitory substances. M. phaseolina was found to be highly antagonised by Trichoderma harzianum and T. longibrachiatum which were constantly present on both the hosts, thus suggesting a means through which the biological control of this pathogenic fungus could be brought about. Alternaria longissima spore germination was also found to be adversely affected by the exudates of Cajanus cajan, possibly due to the presence of inhibitory substances secreted by the host, viz. Phenylalanine, Cystine, and Phenols etc. In the nutritional studies also Phenylalanine and Cystine were found to be unfavorable for the growth of Alternaria longissima. Such findings indicate the inherent potentialities of the antagonists which can serve as effective instruments of biological control against the pathogens. They are also suggestive of the widespread influence of micro-organisms other than the pathogens on the incidence of plant disease control.
Man does not know the total roster of microorganisms even in a single tiny lump of soil or a piece of leaf surface, let alone their complex interactions with each other and with their physical and chemical environment. Moreover, living things present an incredibly more complex situation than do the physical and chemical laws that control them. Thus the present investigation reveals that host itself appears to create favourable conditions for trapping of fungal species and also destroy them. They also appear to be selective to choose their micro-organismal phylloplane composition according to their needs having gone through various stages of interactions occurring between hosts and pathogens (stages of Host and pathogen); host and fungal antagonists, fungal antagonists and other pathogens, environment and micro-organisms, and the environment and availability of nutrients, etc.

It can be easily realized that man has greatly decreased his options of survival by polluting his environment, particularly by use of chemical substances harmful not only to himself but to his crops and animals. This realization has made him, of late, to turn to natural control by restoring a biological balance. Quick methods to attain control over crop diseases and pests have resulted in an environmental catastrophe, which may be eventually reduced, if not completely got over, by employing biological methods of control which may be slow but sure to be achieved.