PREFACE

Agriculture has a significant role in the socio-economic fabric of India. About 80% of Indian population depends on agriculture. Along with the development in agricultural techniques the problem related to pest has also evolved through time.

Century old tea cultivation has been economic backbone to about 70% of population of northern part of West Bengal. Tea, the foliage crop, cultivated as long-term monoculture provides an ambience for greater colonization by arthropods with maturation of the bush. Starting from root, stem maintenance and pluckable leaves, flowers and seeds are infested by wide range of pest species. A guild of defoliators that belong to the lepidopteran family has been reported to attack the plant regularly and sporadically causing havoc crop loss, hence require effective management.

Most of the tea planters of NE region employ the conventional method i.e. the use of pesticide to mitigate the pest related problem. Indiscriminate use of pesticides has caused serious concerns such as insect resistance to pesticides, the resurgence of pests, outbreak of secondary pests, harmful effects on human health and the environment which may lead to biological magnification in higher tropic level as well as can affect the non-target organisms directly.

One alternative eco-friendly approach to chemical pesticide is the use of microbial insecticides that include bio-agents such as bacteria, viruses, fungi, protozoa, and nematodes. The organisms used in microbial insecticides should essentially be non-toxic and non-pathogenic to wildlife, humans and other beneficial/industrial organisms as these are not closely related to the target pest.

Attempts has been made to develop the microbial pesticide for major lepidopteran tea pests has been carried out by earlier workers including one of my supervisor Professor Ananda Mukhopadhyay, continuing the trend of developing the same for sporadic lepidopteran pests, both my supervisors prompted me to undertake the study as Ph.D. work.

My Ph.D. work involved isolation and characterization of different entomopathogenic bacteria from three sporadic lepidopteran pests viz. *Arctornis submarginata* (Hairy caterpillar), *Andraca bipunctata* (Bunch caterpillar) and *Orgyia postica* (Sungma caterpillar) collected from tea gardens of Darjeeling foothills, Terai and the Dooars adopting polyphasic approach followed by testing virulence of these newly isolated bacterial strains against target pests through bioassays. Finally most virulent strains were amplified for 16s rRNA sequence for further identification, sequence were deposited in Gene Bank and the strains were screened for three lepidopteran toxic *cry* genes.

Overall outcome of the present research work will hopefully be able to furnish detailed information on development of potential bacterial pesticides against lepidopteran tea pests in future. As the results of the present work suggests that the bacterial strains (*Bacillus*) studied have the potential to be developed as microbial biopesticides in future with parallel effects as *Btk*, which is already in use for controlling different lepidopteran tea pests by reducing chemical contamination of environment.

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