PREFACE

I started my research work in 2017 which has been documented in this thesis entitled **"Study of resistance and underlying mechanisms against common insecticides in *Culex quinquefasciatus* Say, from different districts of northern part of West Bengal, India"** under the supervision of Dr. Dhiraj Saha, Department of Zoology, University of North Bengal, Darjeeling, West Bengal, India.

Vector-borne diseases especially those transmitted by mosquitoes are a serious threat to humans. Abundance of mosquito vectors throughout the tropical and subtropical regions of the world has resulted in the proliferation of dreaded mosquito-borne diseases *i.e.*, dengue, chikungunya, malaria, lymphatic filariasis, Japanese Encephalitis, zika, West Nile fever and many other in these regions. Annual infection rate of the diseases are quite high along with the mortality caused mainly by dengue and malaria. Apart from high mortality rate, morbidity and disability associated with diseases like lymphatic filariasis can also not be neglected.

Mosquito-borne diseases are usually spread in developing countries with poor sanitation and lack of proper infrastructures. The cost associated with disease treatment and long term morbidity associated with lymphatic filariasis, negatively impacts upon the socio-economic status of an individual. Moreover, only few treatment facilities are available for combating the mosquito-borne diseases. As such, efforts for efficient management of disease mainly include the control of mosquito vectors responsible for transmission of disease-causing pathogens.

Vector control strategies rely on the application of chemical insecticides targeted against the mosquito larvae and adults throughout the world. However, the continuous and unrestrained exploitation of chemical insecticides against the mosquito vectors has led to the development of insecticide resistance. Insecticide resistance in *Culex quinquefasciatus* – a vector of lymphatic filariasis is reported from different regions worldwide. This resistance against insecticides in *Cx. quinquefasciatus* is an important issue of concern as lymphatic filariasis is endemic in 72 countries in the world with highest infection rate in India.

In West Bengal, lymphatic filariasis is endemic in 12 districts and apart from few medications available, vector control through the use of insecticides continues to be a preferred choice of disease elimination. Endemicity of various mosquito-borne diseases with high prevalence of the mosquito vectors in northern region of West Bengal has created pressure on excessive use of insecticides against the mosquito vectors. Moreover, survey of different mosquito vectors and study of resistance status against commonly used insecticides is the need of the hour.

Therefore, this study incorporates the survey of *Cx. quinquefasciatus* – a vector of lymphatic filariasis in northern districts of West Bengal. It further highlights the assessment of resistance status of the vectors against commonly used insecticides along with the probable mechanisms of resistance development. This study provides information upon which future strategies of efficient vector control may be based upon in northern region of West Bengal.