Preface
Concomitant with the development of ecosystems various vectors and diseases have been established through time and space. In this regard mosquitoes occupy the important place as the largest group of insects of public health importance in the world. Besides causing colossal blood loss, they are capable of transmitting many diseases such as malaria, filariasis, yellow fever, dengue and encephalitis, resulting in morbidity and mortality. This is especially true for tropical countries. Man has been engaged in controlling the mosquito vectors using all his knowledge and resources. Though he was successful earlier, the vectors and vector borne diseases have returned with more vigour in many countries. So it has become very important to concentrate on local vectors.

Japanese encephalitis (JE) is an arboviral disease vectored mainly by Culicine mosquitoes. In India JE has emerged as a public health problem in many states mainly due to green revolution. As the major vectors of JE are rice field breeders, agricultural development has played a major role for its prevalence. Considering the above facts, two JE vectors were surveyed and investigated for their ecology, insecticide susceptibility and isozyme profiles by the author.

Cx. vishnui and Cx. fuscocephala are mainly rice field breeders. They can also breed in swamps, tanks, rainwater collections and ground pools, along with other species such as Cx. tritaeniorhynchus and Anophelines. Cx. vishnui has been considered as an important vector of Japanese encephalitis (JE) in many parts of India including the places of the present investigation in Karnataka state. Cx. fuscocephala has also been
incriminated as an important vector responsible for the transmission of JE in Karnataka. In addition, this species has been a vector of JE in Thailand, Malaysia and Taiwan as well.

OBJECTIVES:

Vector control has been the most important means to contain mosquito borne diseases. For this, chemicals belonging to organochloride, organophosphate and carbamate groups are widely used even today especially in developing countries. Of late, synthetic pyrethroids are employed in some foci. An array of target species have already shown resistance to many of these insecticides due to the indiscriminate application. More and more species are added to the list every year. According to the WHO (1986) and Mehrotra (1992), about 50 species of Anophelines, 44 species of Culicines and 43 species of other arthropods of public health and veterinary importance have become resistant to one or more insecticides. So it has become very important to monitor various vector species in every endemic area for their insecticide susceptibility status. It is with this aim the author has taken up bioassay studies and resistance test on the two vector species. In order to find out differential sensitivity and the impact of agricultural development, if any, two populations were investigated (Chapter-I).

Studies on the genetic and behavioural differences of various strains/species are also very important to get an insight into the impact of various ecological pressures. In case the genetic diversity is due to insecticide selection pressure, it will reflect in the isozyme pattern as well. It is with this idea, enzymes such as esterase-A and B (EST-A and B),
alkaline phophatase (APH), acidphophatase (ACPH), aldehyde oxidase (ALDOX), malate dehydrogenase (MDH) and glucose-6-phosphate dehydrogenase (G-6-PD), were investigated by polyacrylamide gel electrophoresis. Increased activity of enzymes such as esterase-A and B, acidphosphatase and aldehyde oxidase, if any, would help to make correlation between insecticide tolerant and susceptible populations and also between species. It was with this aim the electrophoretic investigation was undertaken (Chapter-II).

Concurrent study of population dynamics of target population is important to assess the possibility of epidemic outbreak. Routine and continuous sampling of any stage may depict the relative fluctuation of the population. The aim of the present sampling was to analyse a few of the physico-chemical factors existing in the breeding sources of Mandya and Mysore in relation to the immature density of *Cx. vishnui* and *Cx. fuscocephala*. In addition, observation of oviposition rhythm, pupation rate and sex ratio add further information on the two vectors (Chapter - III).