Question and objectives
Malaria continues to be a major public health problem in most countries of tropical world and its control is becoming increasingly difficult. It has been estimated that there may be 300-500 million clinical cases each year and 1.4 – 2.6 million deaths caused by malaria, with countries in tropical Africa accounting for more than 90% of these (Anonymous, 1995). In India, although malaria was reduced in many parts of the country after the implementation of Nation Malaria Eradication Program for nearly four decades, malaria continues to persist in hilly and forested areas of the country (Sharma, 1984; Kondrashin and Rashid, 1987; Anonymous, 1987). Over 2.5 million malaria cases are reported annually, of which 35-40% is caused by Plasmodium falciparum (Sharma, 1996). During 1996, total number of death in India due to malaria was greater than 1000 (Shiv Lal et al., 1998).

Experience has shown that there are considerable variations in malaria epidemiology within the country and there is no single control tool or approach appropriate to all diverse situations. The success of vector control would depend upon a thorough understanding of the malaria problem, vector and their biology and of vector control options and their selective use.

Studies on various aspects of bionomics of different anopheline vectors have been extensively carried out in the past on the important anophelines of India (Rao, 1984). Vector incrimination is the most important step in planning and implementing vector control. One important criterion to incriminate a species as a vector is its ability to develop the plasmodium to the sporozoite stage. However, information on the susceptibility to infection with different Plasmodium species is scanty. Such information would not only be helpful in identifying potential vectors, defining the vector status of the anophelines that are suspected as vectors.
based on field studies but also in determination of vector competence of known vectors and their relative importance in areas where multiple vectors are involved in transmission.

In India, malaria in erstwhile Koraput district in Orissa is difficult to manage. All four human malaria parasites are present in this area (Jambulingam et al., 1989), with *P. falciparum* being the most prevalent, constituting 93.0% of the total malaria cases (Gunasekaran, 1991). A total of 25 anopheline species have been recorded in this area (Gunasekaran et al., 1989; VCRC Annual report, 1989 & 1990). Nine of these viz., *An. fluviatilis*, *An. culicifacies*, *An. jeyporiensis*, *An. varuna*, *An. subpictus*, *An. splendidus*, *An. tessellatus*, *An. theobaldi* and *An. pallidus* were the abundant. During a study, *An. fluviatilis* has been incriminated as the major vector of malaria in this area. Natural infections have also been detected in *An. culicifacies* and *An. annularis* (Gunasekaran et al., 1989; Parida et al., 1991).

Other species like *An. varuna* and *An. jeyporiensis* were either incriminated as vectors in the area during pre-DDT era or reported as vectors elsewhere in India or other countries. Therefore, their vector potential remains uncertain or suspected. Further, marked differences have been reported in the natural infection rate and vectorial capacity of *An. fluviatilis* from different physiographic zones of erstwhile Koraput district (Parida et al., 1991).

Studies are, therefore, necessary to compare concurrently the vector competence of local mosquito species, which are abundant in the study area for sympatric parasite strains. Such information may help to explain the seasonal and spatial variations in malaria transmission reported in Malkangiri and Jeypore zones (Parida et al., 1991; Jambulingam et al., 1991). Earlier studies were reported in India by Strickland et al., 1933, Russel and Mohan. 1939a, Roy, 1943, Knowles and Basu, 1943, Siddons, 1944, Mohan, 1955, Choudhury et al., 1963.
Das et al., 1979 and Nanda et al., 1987). These studies, however, did not include local genotypes.

A laboratory study was therefore, undertaken during the period from November 90 to December 95. Overall, the objective was,

- To determine the susceptibility of the abundant anopheline species in erstwhile Koraput District to the three sympatric species of human plasmodia, *P. falciparum*, *P. vivax* and *P. malariae*.

The other specific issues regarding vector competence addressed during the study using *P. falciparum* and *An. fluviatilis* as the parasite-host model were,

- The degree of variation within the vector species of two geographic zones (Malkangiri and Jeypore) in relation to susceptibility to *P. falciparum*.
- The effect of gametocyte count, asexual parasitaemia and sex ratios of gametocytes in the human host on infectivity to mosquitoes.
- The relationship between age of gametocyte carriers (human host) and the age of mosquitoes on infectivity of *P. falciparum* to *An. fluviatilis* and
- Influence of temperature on infectivity and sprogony of *P. falciparum* in *An. fluviatilis*. 