1. **INTRODUCTION**

Lymphatic filariasis is caused by nematodes belonging to the family Onchocercidae (Leiper) 1911 of superfamily Filariodea (Chabaud and Anderson, 1959). *Wuchereria bancrofti* (Cobbold) 1877, *Brugia malayi* (Brug) 1927 and *Brugia timori* Partono et al., 1977 are the three species known to cause human filariasis. The adults of these species dwell in lymphatic system and microfilaria produced by them circulate in the peripheral blood and are subsequently ingested and transmitted by vector mosquitoes. Lymphatic filariasis is an important public health problem in the tropical and subtropical regions of Asia, Africa and America. In South-east Asia it has been estimated that over 904 million people are at risk of this disease. India is one of the three countries in the world where the incidence of filariasis is numerically greatest. Over 30% of the world population at risk of this infection live in India (WHO, 1984). Filariasis is widespread in India and occurs in all the states except Punjab (early traces), Himachal Pradesh, Jammu Kashmir and Rajasthan, all of which lie in the north western part of the country. The infection is of very long standing since elephantiasis has been reported in India from very early times by famous Hindu Physicians like Susruta and Madhavakara. There are 22 million microfilaria carriers and a further 16 million people have symptoms and signs of filariasis (Sharma, 1983). Only *W. bancrofti* and *B. malayi* are prevalent in India (Hawking, 1973). While nocturnally periodic and
Diurnally subperiodic forms are found in the former, only periodic form has been reported in the latter. Bancroftian filariasis is the predominant type accounting for about 98% of total filariasis cases and is widely distributed. In general, infection is more intense in urban areas than in rural areas. Malayan filariasis, on the other hand is more prevalent in rural areas and limited to a few pockets of Kerala, Assam, Orissa, Madhya Pradesh and West Bengal where over 3 million people are at risk. The single largest endemic tract of malayan filariasis caused by periodic B. malayi lies in the central part of Kerala with an area of about 1,800 sq.kms. extending from Chavara (Quilon district) in the South to Chowghat (Trichur district) in the north and also in Cannanore (Hawking, 1973; Rao, et al., 1978). Kerala is one of the most intensely infected states of India and the extent of the problem in this area could be understood from the disease being referred to as "Shertallai leg" (Rajagopalan, et al., 1989). Studies on filariasis in this area including control dates back to the earlier part of this century.

Mansonina mosquitoes are the important vectors of malayan filariasis in India and other South East Asian Countries (Brug and de Rook, 1930, Carter, 1950). The Mansonoides is predominantly Oriental although prevalent from New Guinea and Japan in the East to Africa in the West. Six species of this subgenus occur in Oriental region and they are natural vectors of the two types of malayan filariasis, periodic and subperiodic (Chiang and Cheong, 1985). In India only
Four species of mansonioides mosquitoes viz., Mansonia annulifera (Theobald) 1901, M. uniformis (Theobald) 1901, M. indiana Edwards, 1930 and M. longipalpis (van der Wulp), 1892 have been reported to be prevalent (Barraud, 1934) and the former three species were incriminated as natural vectors of periodic B. malayi in Shertallai part of Kerala (Iyengar, 1928). The larvae of Mansonia was first described by Goeldi (1905) and was then known by the name Taeniorhynchus. The unique feature of Mansonioides is that the adults lay their eggs on the undersurface of floating leaves of aquatic weeds and the larvae and pupae attach themselves to the roots of these plants (Barraud, 1934; Wharton, 1962). They obtain oxygen from the roots and thus their survival is solely dependent upon aquatic vegetation. Work on Mansonioides in India was initiated by Iyengar in 1938 concentrating more on vector incrimination, egg laying behaviour, growth of Pistia and certain chemical characteristics of pond water. He recommended that physical removal of Pistia, the most preferred host plant as the feasible solution to control Mansonioides. Later, several authors contributed on several other aspects of Mansonioides mosquitoes through pilot studies in restricted areas (Burton, 1959; Joseph, et al., 1963; Chandrasekharan, et al., 1976). However, a comprehensive document on the biology, ecology and dynamics of vector mosquitoes is still lacking.

Conventional approaches in the control of vectors which depend
mainly on the use of insecticides would not be effective in controlling Mansonioides mosquitoes due to their unique breeding habit involving aquatic weeds. Moreover, use of insecticides in the control of vectors is being discouraged due to well known reasons of high cost, environmental hazard and development of resistance by the vectors. When compared to vectors of bancroftian filariasis, research on the bionomics and control of vectors of malayan filariasis is scanty (Yap, 1985). Hence, there is a need to design and develop an appropriate strategy to control Mansonioides vectors. Unlike the vectors of bancroftian filariasis, the extent of breeding of Mansonioides is determined by the availability of host plants, the prevalence and distribution of which varies in different geographical regions. Hence, it can be aptly stated that malayan filariasis is a localized problem. This necessitates a thorough understanding of the bionomics of these vector species, particularly the immatures and the prevalence of host plants which in turn is expected to help in developing the appropriate approaches for the control of Mansonioides. Therefore, detailed studies were carried out on various aspects of immatures of Mansonioides and their host plants in Shertallai taluk, Kerala with the following objectives:

1. To identify the different types of breeding habitats and to delineate their relative role in vector breeding

2. To enlist various natural host plants and to study their prevalence and their selection by Mansonioides mosquitoes for oviposition and larval attachment
3. To screen locally prevalent aquatic plants for their role in supporting vector breeding

4. To examine various abiotic characteristics and biotic components in breeding habitats

5. To study the population dynamics of immatures in pond habitat

6. To understand the behaviour of immatures

7. To assess the efficacy of selected Insect Growth Regulators (IGRs), slow release formulations of insecticides and bio-control agents in controlling the immatures through field trials.

The text is presented chapterwise supported by relevant tables and figures. Results were subjected to appropriate statistical analyses wherever necessary. For each aspect of the study within a chapter, a brief introduction referring to the specific objective is given which is followed by material and methods, and, results and discussion. With a view of maintaining coherence in the presentation and to enable continuity and clarity in reading, subtitling of material and methods, and, results and discussion has not been made.