CHAPTER I

GENERAL INTRODUCTION AND REVIEW OF LITERATURE
1.1. INTRODUCTION

Avian community is an important component of forest ecosystem. Birds are playing a major role as pollinators, consumers, dispersers of plant seeds and predators of insects. Studies on bird community starting from MacArthur and MacArthur (1961) have attracted wide attention. Investigations on the bird communities of the Western Ghats to plan for biodiversity friendly development are gaining significance (Pramod, 1995). The focus of community ecology is the study of the grouping of species, their distribution and the interactions between them and the physical and biological factors of their environment (Wiens, 1989). According to Cody (1978) bird communities have direct relation with the structure of habitat and are indicators of environmental changes. Birds are one of the best indicators of environmental quality of any ecosystem (Ripley, 1978). Many other groups of animals such as butterflies (Brow, 1991 and Kremen, 1994), tiger beetle (Rodriguez et al., 1988), birds (Debinski and Brussard, 1994) and mammals (Mittermier, 1988) as well as plants (Cronk, 1988) have been used to assess the habitat quality.

Majority of the studies on bird community were focused on the understanding of the structure of a community based on the population (MacArthur and MacArthur, 1961; Cody, 1974 and Wiens, 1989). They attempted to explain the diversity, especially with respect to the forest structure or floristic diversity. The presence of a particular species in a type of forest was traditionally explained in terms of the availability of foraging substrates and vegetative layers. In recent years, the trend among community ecologists is to elucidate the function of a community focusing on habitat selection.

A number of environmental factors are known to influence the population of birds directly. Availability of food, detectability and capture, location of nesting sites, availability of nesting materials, presence of predators and competitors are the major factors influencing the foraging and breeding of birds and subsequently their
population. One of the key aspects in community structure is the food habits of a species which is critical in understanding the pattern and process of community organization (Wiens, 1989). Population studies have been traditionally used to monitor long term changes in avian population and to assess both habitat quality and the responses of birds to both natural and human caused environmental changes (Wiens, 1989).

1.2. REVIEW OF LITERATURE

1.2.1. Studies in other countries

Many relevant studies related to the present investigation have been conducted on forest bird species. The relationships between habitat structure and diversity in avian communities in Panama, Illionis, Texas and Bahamas were examined by Karr (1968) and Karr and Roth (1971). Karr (1976) reported seasonality, resource availability and community diversity in the tropical bird communities in Panama during the period 1968 and 1969. The community organization of an oak woodland avifauna was studied by Landres and MacMahon (1980). Wiens and Rotenberry (1981a) studied the relationship between the distribution of birds, abundance and habitat characteristics at a regional scale, using surveys conducted over three consecutive years in the shrub steppe of the northwestern Great Basin of North America. Greenberg (1981) who studied the abundance and seasonality of forest canopy birds on Barro Colorado Island, Panama reported that the canopy avifauna shares with many plant species with scrubby secondary growth and many common canopy species were also found frequently in more open areas. The rarest visitors to the canopy were primarily those from lower strata, the most common species were omnivores, and restricted insectivores were poorly represented when compared to the lower strata. Beedy (1981) examined the relationship of forest structure and vegetation diversity to bird community in the mixed conifer and red fir zones of the Central Sierra Nevada, California. Ambuel and Temple (1983) studied the avian biogeography and habitat selection in forests of
1.2.2. Studies in India

In India, community wide studies dealing with foraging guild, nest site selection and population are relatively very less. Most of the community studies in India are based on census data alone without relating to the other aspects. Among the three aspects, studies on foraging behaviour and nesting were largely limited to a single species or particular group of birds (Vijayan, 1975 and 1980; Khan, 1977 and 1978; Thiyagesan, 1991).

Khan (1980) gave a detailed account on the bird fauna of shola forest and plantation area in the Nilgiris. Gandhi (1986) compared the bird community structure of scrub forest with that of monoculture plantations and pointed out that the bird diversity was higher in the scrub forest than in monoculture plantation. Johnsingh et al. (1987) studied the edge effect on the bird fauna and the correlation of the abundance of insects and fruits with that of bird fauna in Wolf hill, a thorn forest in South India.

Diversity of birds and plants in Mudumalai Wildlife Sanctuary were reported by Manoharan (1988). Daniels (1989) studied the birds of Uttara Kannada district and explained the factors that influenced the local bird assemblage and diversity. Balasubramanian (1989) investigated on the plant-bird interactions with specific reference to frugivorous birds in Point Calimere Wildlife Sanctuary. The ecology of terrestrial birds and seasonal abundance of land birds in Keoladeo National Park have been reported by Ali and Vijayan (1986), Vijayan (1990) and Sundaramoorthy (1991). Behaviour of southern Spotted Owlet (*Athene brama*), and Jungle Crow (*Corvus macrorhynchos*) and food plants of Roseringed Parakeet (*Psittacula krameri*) at Point Calimere were reported by Balasubramanian (1990, 1993). The patterns of bird species diversity within three vegetation types at Mundanthurai were investigated by Johnsingh and Joshua (1994). Balasubramanian (1996) examined the interactions between fruit eating birds and bird dispersed plants in the tropical dry
evergreen forest in the Point Calimere. Kannan and James (1997) studied the breeding biology of the Great Pied Hornbill (*Buceros bicornis*) in the Anamalai Hills. Gupta (1997) reported the status and distribution of raptors in Mudumalai Wildlife Sanctuary, Tamil Nadu. The avifauna of the Anamalai hills was studied by Kannan (1998) and reported 218 species of birds, of these 12 species were endemic to Western Ghats. Gokula (1998) analysed the structure of bird communities in the dry deciduous and thorn forests in Mudumalai Wildlife Sanctuary and described in detail the structural and functional aspects of the community. Yoganand and Davidar (2000) studied the habitat preferences of 30 species of forest birds in Baratang Island, Andaman and analysed the habitat preferences. Raman (2001) studied the communities of birds in different altitudes and the impact of fragmentation and plantations on rainforest birds in the Western Ghats.

### 1.2.3. Studies in Kerala

Studies on birds of Kerala were commenced by Hume (1876 and 1878) with his first and second list of birds of Travancore hills and after that several studies have been conducted on forest birds in the Western Ghats part of Kerala. Kinloch (1921) reported the avifauna of the Nelliampathy Hills. Ali and Whistler (1935a, 1935b, 1935c, 1936a, 1936b, 1936c, 1937a and 1937b) made an extensive bird survey in the Western Ghats a part of Kerala, later this was published in the form of a book (Ali, 1953). Ingli (1953) reported the birds of Cochin backwaters and Vembanad Lake. Neelakantan and Pillai (1962) carried out a survey of birds at Cochin and Ernakulam. The seasonal variations of the non-migratory birds were reported by Neelakantan (1976). Sugathan (1981) identified the habitats of Ceylon Frogmouth (*Batrachostomus moniliger*).

Most of the studies were mainly concerned with the listing of bird species in specific sites or in the protected areas of Kerala, namely, Peechi-Vazhani Wildlife Sanctuary by Anon. (1991), Chinnar Wildlife Sanctuary by Nameer and George

Detailed ecological studies on individual species and community studies have been started in the mid seventies by Zacharias (1979) who studied the detailed ecology and biology of certain species of Indian babblers in the Malabar region. Khan (1980) carried out comparative studies on the avifauna of the sholas and the neighbouring plantations in the Nilgiris. Yahya (1980) studied the ecology and biology of barbets (*Megalaima viridis* and *Megalaima rubricapilla*) at Periyar Tiger Reserve. Zacharias and Gaston (1983) reported the breeding seasons of birds at Calicut. Vijayan (1984) examined the comparative biology of Drongos. Zacharias and Mathew (1988) studied the ecology of Babblers, *Turdoides* sp. Satheesan (1990) described the ecology and behaviour of Pariah Kite (*Milvus migrans*) as a problem bird at some Indian aerodromes. Vijayan (1990 and 1992) made a detailed investigation on the feeding and breeding biology of the Malabar Wood shrike (*Virgatus sylvicola*) at Thekkady. Jayson (1994) carried out the ecological and behavioural studies on the forest birds of Silent Valley National Park. Santharam (1995) has described the ecology of sympatric woodpecker at Peechi-Vazhani Wildlife Sanctuary. Maheswaran (2001) reported the effect of habitat alteration on the birds of the Western Ghats. However, no systematic studies have been conducted on the avifauna of Parambikulam Wildlife Sanctuary, and hence the present study was carried out with the following objectives.
Objectives

- To assess the habitat use by the avifauna in different habitats of the Parambikulam Wildlife Sanctuary

- To study the floral and avifaunal composition of three major different habitats, the moist deciduous forest, the evergreen forest and the teak plantation of Parambikulam Wildlife Sanctuary.