CHAPTER 1

INTRODUCTION & SCOPE OF THE STUDY
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The science of ethnozoology, a sub-field of anthropology is concerned with how human beings perceive, manage, classify and use animal species (Costa Neto 1999). It also focuses on the ways in which animals influence the people they interact with and utilized animals for food, clothing, work, worship, and companionship. Zooarchaeology and archaeozoology, which primarily focus on the identification and interpretation of animal-remains, from an archaeological context, are disciplines included in ethnozoology. The medicinal use of animals and animal-derived products called zootherapy is an important component of ethnozoology.

According to the zootherapeutic universality hypothesis (Marques 1994), all human civilizations with a structured medical system will utilize animals as medicines. Animal based medicines have always played a significant role in the healing practices, magic rituals and religions of indigenous and western societies all over the world (Nadkarni 1954, Angeletti et al 1992, Rosner 1992, Solavan et al 2004). Although the phenomenon of zootherapy is widespread, it has only recently aroused the interest of researchers. Some are focusing on its cultural aspects while others are studying the pharmacological effects (Costa Neto 1999) of the substances involved. Of the 252 essential chemicals, which have been selected by the World Health Organization (WHO), 11.1% come from plants and 8.7% from animals (Marques 1997).
India is gifted with immense wealth of faunal and floral diversity. There are about 45,000 species of plants and 81,000 species of animals (MoEF 1994). The tribals who depend on plants and animals for their day-to-day life and health-problems are the real custodians of the knowledge of medicinally important plants and animals. Most of the knowledge accumulated by the tribals on medicinal plants and animals are unknown to the scientific community. Most of the biodiversity, associated with tribals have either disappeared or are on the verge of extinction (Vedavathy 2002). Therefore, the immediate concern of the scientific community is to document the indigenous knowledge related to therapeutic use of plant and animal-species and to device strategies to preserve and tap this rich knowledge in a more sustainable way for the benefit of mankind. Though there have been many studies on ethnobotany (MoEF 1994, Bhandary et al 1995, Rao Rama and Hendry 1996, Samvatsar and Diwanji 2000, Katewa et al 2001, Singh et al 2002, Harsha et al 2003), ethnozoological studies are limited (Lalramnghinglova 1999, Rajan et al 2002, Patil 2003, Ranjith Singh et al 2003). Even though there are 37 tribal communities in Tamil Nadu, South India, a survey of the published literature revealed no comprehensive report of ethnozoology of Tamil Nadu except that of Nilgiri District carried out by Rajan et al 2002. As such, in the present investigation, an attempt has been made to study the ethnozoology of Tamil Nadu and form the first objective of this investigation.
Ethnozoological studies conducted among the South Indian tribes revealed that six out of nine tribes surveyed (the 'Kanikkaran', 'Paniyan', 'Palliyan', 'Sholaga', 'Irular' and 'Kota') have been using the termite *Odontotermes formosanus* Shiraki for the treatment of asthma. The 'Kanikkaran' and 'Palliyan' tribes have also been using the termite *O. formosanus* Shiraki as food to enhance lactation in women. Other ethnographic studies also revealed that termites formed an important part of the diet and folk medicine of tribes around the world (Bodenheimer 1951). There are about 16 times as many insect species as there are plant species. Yet very few researchers have concentrated on the medically useful properties of insects. Most researches with insects revolve around getting rid of them or fighting against the disease they spread. Termites have not been studied/exploited in a large way mainly because of the difficulty in harvesting large numbers and extracting them from the soil debris. Hence, three commonly available subterranean termites (*Microtermes obesi* Holmgren, *Macrotermes estherae* (Desneux), and *O. formosanus* Shiraki) were selected for further studies.

As mentioned earlier, the present survey conducted among the South Indian tribes revealed that, most of the tribes have been using the termite *O. formosanus* Shiraki to treat asthma (Solavan et al., 2004), a disease likely to be associated with the microbes *Streptococcus pneumoniae*. 
*Haemophius influenza* and other viruses. Apart from this, bacterial-antigen may produce an allergic response. Asthma in children and middle-aged people is mainly due to this (Das 1988). They used to roast the alate forms (winged stage) of termites in an earthen pot and consume as such in the evening for 3 consecutive days as a remedy for asthma. Termites are also reported to have antibacterial properties. Two novel antimicrobial peptides namely termicin and spinigerin, have been isolated from the fungus-growing termite *Pseudacanthotermes spiniger* (Lamberty et al. 2001, Da Silva et al 2003). There are many other reports on the pharmacological importance of arthropods (Pemberton 1999, Salem 1981, Haffejee and Moosa 1985, Ladas et al 1995, Zielonka et al 1987). Therefore, antimicrobial potentialities of the common termites of the South India viz. *M. obesi* Holmgren, *M. estherae* (Desneux), and *O. formosanus* Shiraki, and their respective mounds form the second objective of the study.

Ethnozoological studies conducted among the South Indian tribes also revealed that the 'Kanikkaran' and 'Palliyan' tribes have been using the subterranean termite *O. formosanus* Shiraki as food to enhance lactation in women (Solavan et al 2004). The use of termite as human food in the South and North Eastern parts of India was reported earlier (Maxwell-Lefroy 1909, Gope and Prasad 1983, Rajan 1987). The consumption of termite by human beings has been known long before. The hunter-gatherer people of Africa have, in fact, long been used termite to supplement their
diets (Bodenheimer 1951). Recently the South African and French researchers have reported that the ape-man *Australopithecus robustus*, who lived more than a million years ago, had a taste for termite (Backwell and d'Errico 2001). Also, the chimpanzees are reported to “fish” for termites by using grass stalk (Suzuki 1966, McGrew 1992, Whiten et al 1999). Above all, the termite formed an important part of human diet in many parts of Africa (Smeathman 1781, Ene 1963, Chavunduka, 1975, Phelps et al 1975, Oliveira et al 1976, Karp and Karp 1977, Silow 1983, Wilson 1990, Fasoranti, and Ajiboye 1993, Mbata 1995), Latin America (Wallace 1853, Smole 1976, Redford and Dorea 1984, Dufour 1987, Ribeiro and Kenhiri 1989), Asia (Forbes 1813, Maxwell-Lefroy 1909, Ghosh 1924, Gope and Prasad 1983, Rajan 1987, Somnasang et al 1986) and Australia (Oliver 1991). Several large vertebrate animals like the ant-eaters, echidna, pangolins, spiny ant-eaters, aardvarks, and ardwolves eat almost exclusively termites and ants (Kreher et al 1971). No other group of insects has such a wide variety of specialist mammalian and vertebrate predators. Even plants are also reported to eat termites. The termite *Hospitalitermes bicolor* seems to be the main diet of the pitcher plant *Nepenthes albomarginata* (Merbach et al 2002). As such, the third major objective of the study is focused on the effect of the termite *Odontotermes formosanus* Shiraki on the growth and reproduction in the Swiss albino mouse *Mus musculus*.
Interestingly, the present investigation revealed the antimicrobial potentialities of the termite *O. formosanus* Shiraki, thus confirming the tribal remedies. Whittaker and Feeny (1971) had opined that the classification of toxic compounds by their role was difficult since the role was often combined. As such, the compounds found within these organisms may have other properties like antiviral, antitoxicity, and antigenotoxicity. Also the antigenotoxic effects of other dietary agents like vegetables (carrot, spinach and cabbage), spices (cinnamon, pepper, cumin, clove and cardamom), tea and coffee (Abraham et al 1998), tomato, garlic, and turmeric (Mohan et al 2004) naringin (Nar), a flavonone, found in grapefruit (Alvarez-Gonzalez et al 2001) were known. Bearing this in mind, an attempt has also been made to study the antitoxic and antigenotoxic effects of the termite *O. formosanus* Shiraki on the Swiss albino mouse, *M. musculus* form the fourth and fifth major objectives of the study.