

## INTRODUCTION

### 1.1 General introduction

Tropical forests contain more than half of the Earth's terrestrial species and Malaysia is identified as one of the biodiversity hotspots because it contains a rich flora and fauna species. This tropical region also hold a high number of endemic species which is species that only can be found in specific area (Myer *et al.*, 2000). Habitat loss and degradation of forest habitat due to developments are rapidly occurring in this region and this drive to biodiversity loss.

The expansion of agriculture is the greatest current threat to biodiversity (Foley *et al.*, 2005). Palm oil has high global demand because it has been used in many products for example in food production, cosmetics and biofuel. China and India contribute the largest consumer of palm oil in the world and this cause expending of large area for oil palm plantations. Malaysia and Indonesia is a leader in palm oil production. Both together produce more than 80% of all palm oil in the world. Unfortunately, these countries are listed as biodiversity hotspots where many endemic species are threatened by the high rates of deforestation due to the expansion of oil palm plantations.

The loss of large forested areas for agricultural activities may reduce the population of many animal species. Conversion of natural ecosystems to agricultural landscapes has had a severe negative impact on global biodiversity with losses of species (Turner *et al.*, 2011). Retaining natural habitat fragments within the agricultural landscapes could improve the species richness and species composition for the certain group of animals (Koh & Wilcove, 2008). However there is little information on the

efficiency of forest fragments and adjacent forests for maintaining or improving species richness within the plantations.

The response of animals towards the habitat alteration and fragmentation may vary between different parts of a habitat. The habitat specialist and behaviourally less flexible species may be more affected by habitat fragmentation than habitat generalists and behaviourally more flexible species. Species with restricted mobility such as small mammals may be constrained by habitat changes than species such as birds and large mammals. Thomas *et al.* (2001) reported that the habitat quality of forest fragments is likely to influence the species richness. The species richness in agricultural areas will increase with proximity to the natural habitat (Dolia *et al.*, 2008; Livingston *et al.*, 2013). This is due to “spillover” of individuals from adjacent natural habitat (Lucey & Hill, 2012) and as well as the presence of edge species (De Vries *et al.*, 1997).

Forest edges are transition zones between adjacent habitats and they are a type of ecotone. Forest edges have distinctive microclimates, and they are generally rich in microhabitats (Murcia, 1995). Habitat edges have long been considered to have important effects on the abundance and diversity of certain kinds of plants and animals. The edges can have both positive and negative impacts on wildlife (Alvarez *et al.*, 1988; Harris, 1988). Some species may increase in abundance as the relative amount of edge habitat increases because edges often result in greater vegetative complexity and allow access to more habitat types.

This study is focusing on response of small mammal species to the habitat alteration especially the oil palm plantation. Understanding how biodiversity responds to habitat change caused by human activities is clearly important for conservation efforts in the region. Small mammals are thought to play important roles in the ecosystem (McConkey, 2005) they act as seed dispersal and help in pollination process,

pest controller, and important prey items especially for larger animals. Rapid conversion of the natural habitat to oil palm plantation may effect the population and composition of small mammal species. Common species may be able to survive in alternated habitat in contrast with the specialist species.

There has been many studies in Peninsular Malaysia focusing on small mammal species in forested area but very few in other habitat such as oil palm plantation. This study intends to document the effect of species richness and species composition of small mammals to different characteristic of habitat. The information of species richness and composition of small mammal species in the natural habitat and in altered habitat in this study may be useful for management planning. It is hoped that this study will be able to fill the knowledge on the responses of small mammals to altered habitats by linking knowledge to action orientated strategies in conservation biology.

## **1.2 Research objectives**

This study focus on small mammal (volant and non-volant) community structure and the effect of oil palm plantations on small mammal diversity. Generally this study intends to uncover community structure pattern of small mammals inhabiting oil palm plantation and its neighbouring forest with these specific objectives;

- To compare small mammal community composition and species richness between oil palm plantation and adjacent forest habitats.
- To study the effect of forest edge distance on species composition of small mammals.
- To investigate the effect of different oil palm age stages on small mammals assemblages.