

## CHAPTER III

### STUDY AREAS

The study sites were located in the Huai Khayeng sub-district, Thong Pha Phum district, Kanchanaburi province, in western Thailand. Three areas were selected based on differences in land usage types: (i) a natural habitat represented by a mixed deciduous forest, (ii) a largely monoculture-based forestry plantation, represented by a teak plantation, and (iii) an agrochemically intensive farm represented by an evergreen durian orchard (Fig. 3.1).

#### 3.1 Mixed deciduous forest

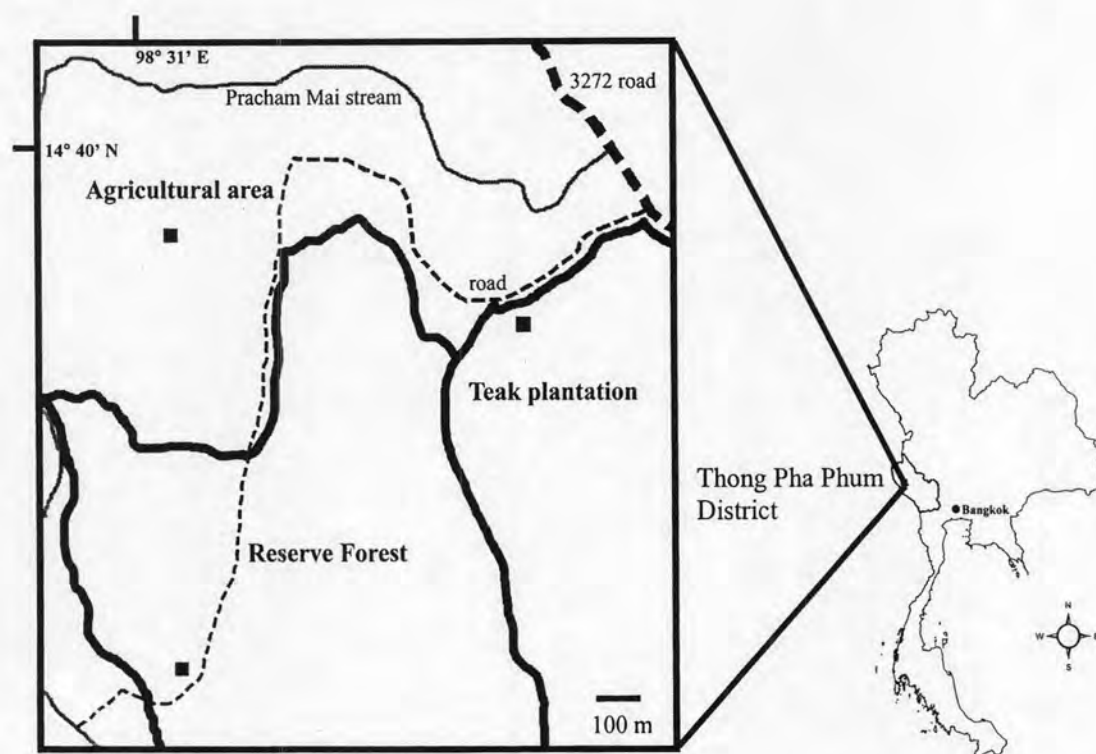
The mixed deciduous forest (Figure 3.2 A) was located in the Golden Jubilee reserve forest, which covers a total area of 5,637.12 hectare. The Golden Jubilee reserve forest is divided into the northern part (1,880.16 hectare) and the southern part (3,756.96 hectare), and the study site was situated in the northern area. The Golden Jubilee reserve forest consists of a dry evergreen forest, a mixed deciduous forest, and a dry dipterocarp forest (Bourmas, 2005). The mixed deciduous forest consists of dominant plant species, such as *Xylia xylocarpa* (Roxb.) Taub., *Lagerstroemia duperreana* Pierre ex Gagnep., *Sisyrolepis muricata* (Pierre) Leenh., *Careya sphaerica* Roxb., *Croton roxburghii* N. P. Balakr., and *Oroxylum indicum* (L.) Kurz. The canopy of mixed deciduous forest was approximately 80% in wet season and 20% in dry season.

#### 3.2 Teak plantation

A 20-25 years old teak (*Tectona grandis*) plantation (Figure 3.2 B) is located in the Huai Khayeng Reserve Forest Restoration Project, where the teak trees were planted at  $6 \times 6 \text{ m}^2$  intervals, and rattan palm (*Calameae* sp.) trees had been planted between the teak rows in an eight hectare area since 2006. The canopy of teak plantation was approximately 60% in wet season and 10% in dry season. Local cattle browsing and grazing on small bamboo and seedlings were occasionally found in this area.

### 3.3 Durian orchard

The durian orchard (Figure 3.2 C) covers an area of 20.8 hectares with the durian trees planted orderly at  $5 \times 5 \text{ m}^2$  interval and managed, therefore, the canopy cover was approximately 50% without leaf shedding throughout the year. Agrochemicals, such as pyrethroid, organophosphate, and carbamate insecticides (cypermethrin, chlorpyrifos and methomyl, respectively) including herbicide (glyphosate), and mixed fertilizers of nitrogen, phosphorus and potassium, were applied all year round. Durian trees usually received intensive input of insecticides in January to protect their flowers from pests. In February and March, the insecticides were also used for protecting the fruits. The fertilizers were used to nourish the trees while some small fruits were removed. Market size durians were harvested actually from May to June. In rainy season, some fungicides were used to protect the trees from fungi. In September, the trees were pruned and the herbicide, glyphosate, was used.



**Figure 3.1** The study site map in Huai Khayeng sub-district, Thong Pha Phum district, Kanchanaburi province of Thailand, depicting the three studied sites sampled in 2007 - 2008: 1. Reserve forest (a mixed deciduous forest), 2. Teak plantation, and 3. Agricultural area (an agrochemically intensive durian orchard).



A. Mixed deciduous forest



B. Teak plantation



C. Durian orchard

**Figure 3.2** The study sites A. mixed deciduous forest, B. teak plantation, and C. durian orchard in Huai Khayeng sub-district, Thong Pha Phum district, Kanchanaburi province