CHAPTER III

MATERIALS AND METHODS

Study areas

The capital city of Thailand, is known by the name Bangkok. The city was created in 1782 when King Rama I moved the capital from Thonburi across the Chao Phraya River, with the river serving as a natural line of defense against the ever-threatening Burmese invaders. Back then Bangkok was still only a small village, with canals instead of streets. Today it is a vibrant, thriving metropolis of over six million people approximately 10 percent of the total population of Thailand.

Elevated expressways, a belt highway, numerous pedestrian overpasses, flyovers for some of the busiest intersections, extensions of some of the major streets and computerized traffic signals have done much to take care of what is, at times, horrendous traffic. However, in spite of its modernization, Bangkok is still probably one of the most beautiful cities in the world.

There are many public parks, the green areas, in Bangkok. It is an ideal hideaway from the hustle and bustle of the big city. Shady trees and lovely lake offer pleasant atmosphere for all visitors, suitable for a weekend picnic. Early in the morning and in the evening, the public parks are alive when people come to the parks to exercise. Walking around, people will feel refreshing and energetic, seeing people happily jogging or practicing tai chi. If anyone wants to paddle around, the artificial lakes in the parks are the perfect setting.

For the sampling area of this study, three public parks in Bangkok, Suan Luang Rama IX, Queen Sirikit Park, and Lumpini Park, were selected to represent for the green areas of Bangkok that many people come to visit. For the ants, there are many habitats for them in the parks such as grass field, building, and standing trees. Ants can use the parks for the center of distribution to urban communities and make many problems to the parks and communities.

1. Suan Luang Rama IX

Suan Luang Rama IX Public Park (SUA) covers an area of 500 rais (200 acres) in the sub-suburban Nongbon district of the Southern Prakhanong district, near Samut Prakarn, southeast of Bangkok (Figure 3-1).

The concept of this park originated as one of the many social and public offerings to celebrate the 60th Birthday of His Majesty the King, in 1987. It is intended to be a lasting testimony of loyalty and respect by the Thai people for their revered Monarch. It also establishes the first comprehensive botanical garden in Thailand, providing a relaxing environment for social, sporting and cultural activities. The park includes six distinct areas, each having its own specific theme, and seven international miniature gardens creates in cooperation with experts from each country.

Figure 3-1: The map of Suan Luang Rama IX
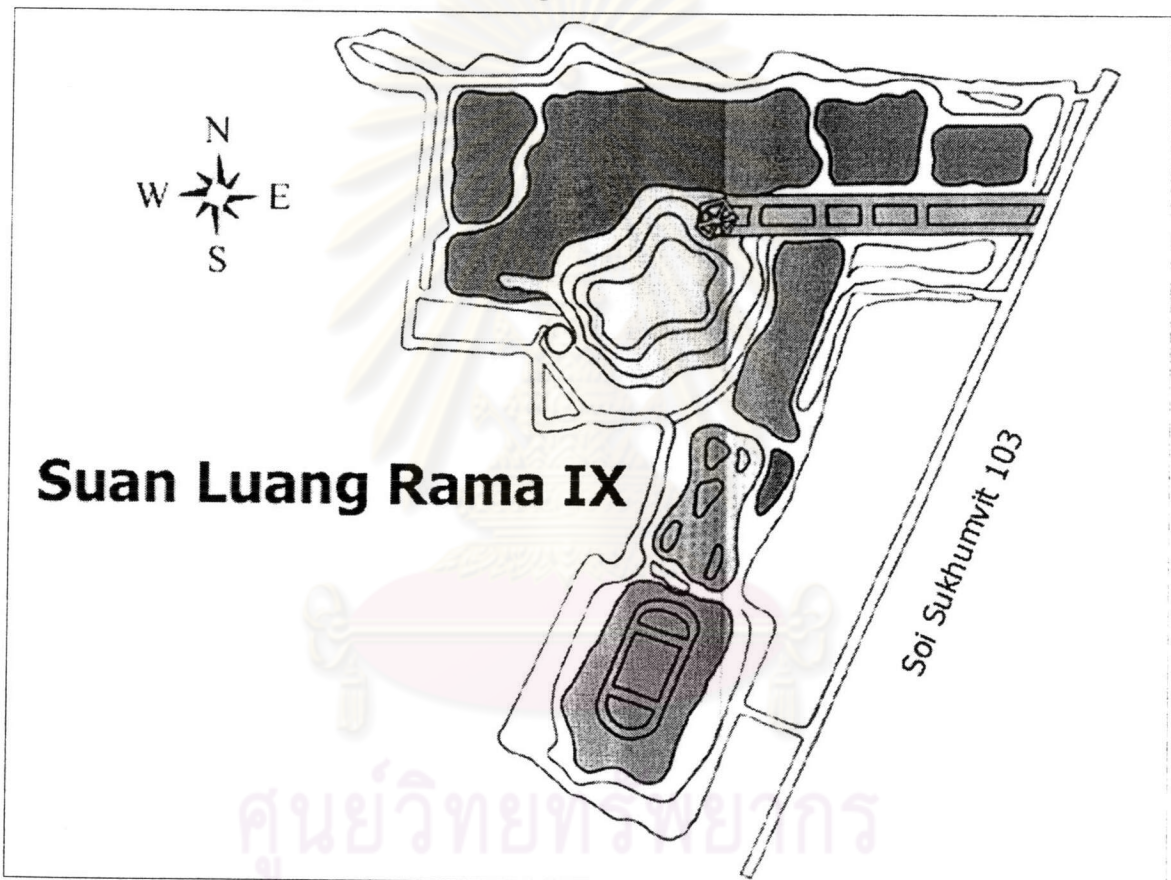
2. Queen Sirikit Park

Queen Sirikit Park (SIR), covering an area about 200 rais (80 acres), is situated west of Chatuchak Park on Phahonyothin Road (Figure 3-2). The large area of this park is nicely planted with large amount of trees and flowers. The park is also designated as one of the country's ideal botanic gardens where local and foreign plants are conserved. During December, the park is decorated with various kinds of flowers and plantation. This park was constructed by the Queen Sirikit Park Foundation with cooperation from the

Ministry of Communication to celebrate Her Majesty the Queen 60th Birthday on August 12, 1992. Currently, this park has many attractive points such as lotus yard, botanic garden and Children's Discovery Museum. People come to visit approximately 2,000 - 5,000 persons on working day and 5,000 - 10,000 persons on holiday.

Figure 3-2: The map of Queen Sirikit Park
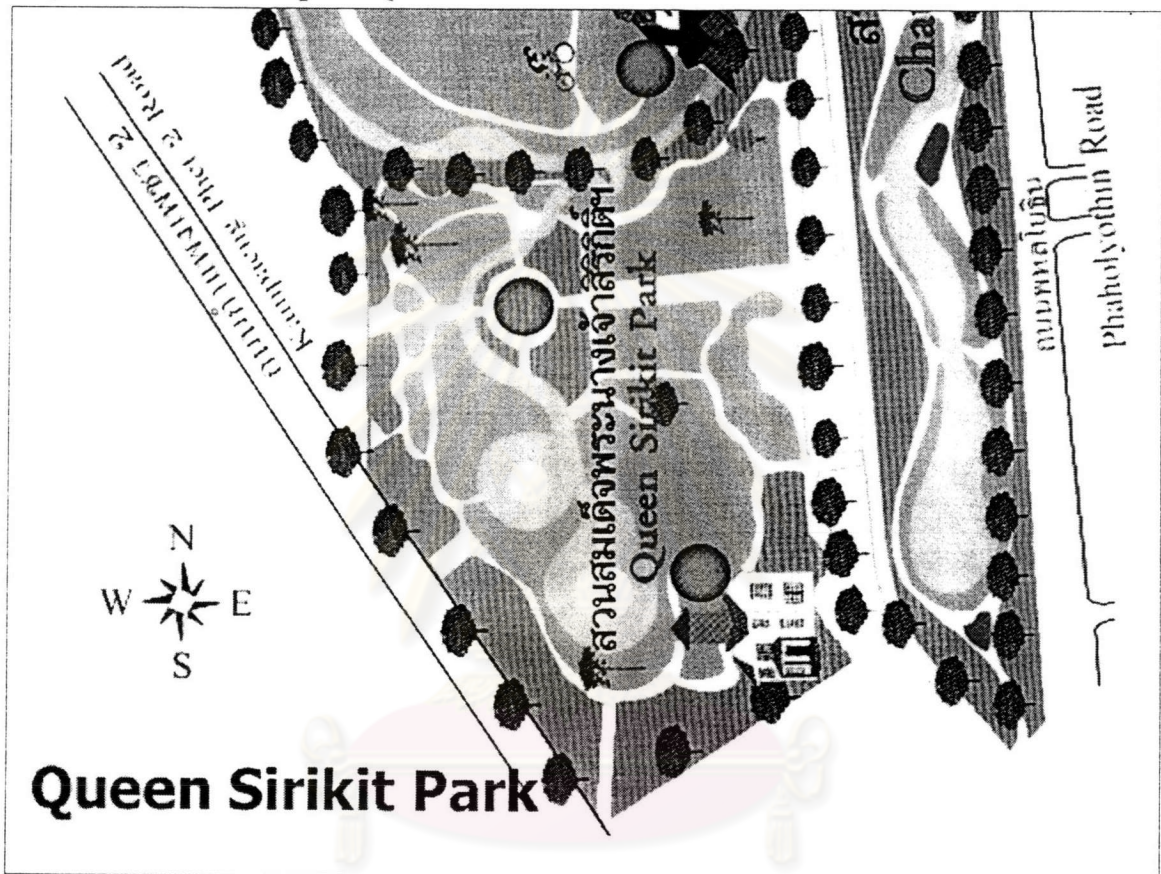
3. Lumpini Park

Suan Lumpini or Lumpini Park (LUM) is one of the most important public parks in Bangkok. This was a huge open space once belonging to King Rama VI, who issued a royal command to turn the area into a public park. This park is located on Rama IV Road, between Ratchadamri and Witthayu (Wireless) roads, with entrance gates on all sides (Figure 3-3). In front of the park is the monument of King Rama VI, built in 1941.In the area 360 rais (144 acres) of the park, A large artificial lake in the center is surrounded by broad, well-tended lawns, wooded areas and walking paths. In the morning and in the evening, it's full of people exercising, more striking and graceful than the joggers are Chinese groups, making slow

movements to music. Presently, people come to visit approximately 20,000 persons in working day and 40,000 persons on holiday.

Figure 3-3: The map of Lumpini Park
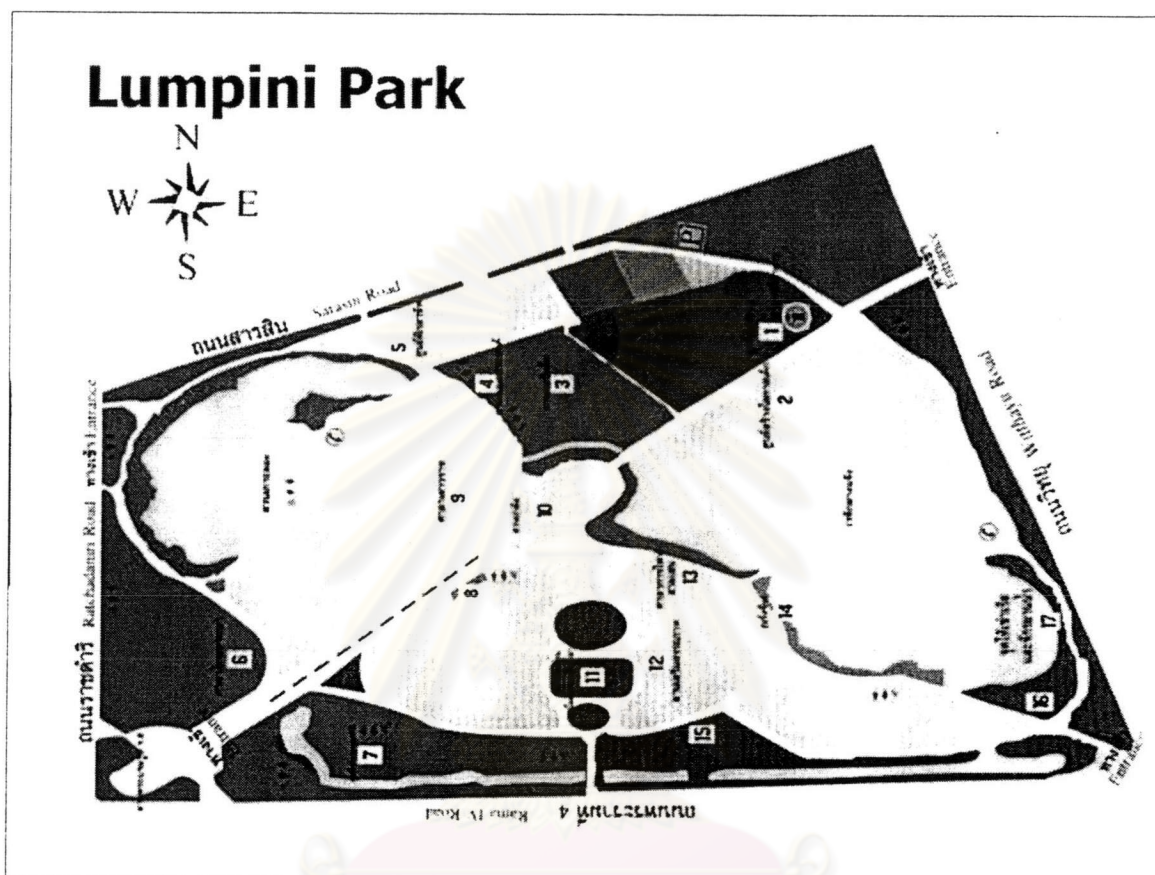
Environmental factor data collection

The secondary data of air temperature, relative humidity, and rainfall of Bangkok were supported by Meteorological Department. In this study, the data from 3 monitoring stations such as Bangkok metropolis, Bangkok port (Klong Toei), and Don Muang airport were used.

Ant data collection

1. Duration of sampling

Ant samplings were repeated 6 times covering one year during March 2003 to February 2004.

2. Sampling methods

Three different habitat types; open grass field, building and standing tree areas were represented as study sites. In different habitat types, the different collecting methods were used.

In the open grass fields, ant samples were collected by pitfall traps. The traps consisted of plastic containers, 10-cm deep and 7-cm diameter with about 3 cm of soap solution in the bottom. Each trap was embedded into the ground so that the rim was exactly at ground level. At each grass field site, 25 traps were set up in a grid pattern at 5-m intervals in 20 m x 20 m square plot. The traps were left for two days then all specimens were removed and cleaned before preserved in 90% ethyl alcohol.

To collect ants in the building areas, honey baits were used. Forty-five cotton pieces (4 x 4 cm) with honey were placed on the ground separated from each other by 4 m around the building. Then after 30 minutes, ants were collected on the cotton pieces to preserve in 90% ethyl alcohol.

Time unit method was used for sampling ants in the standing-tree areas. Collecting was made within 60 minutes to get as many species as possible by visual/manual search on the ground surface, under stones of wood bark, and around the base of tree trunks in 400-m^2 plot. Used tools were forceps, sifter, plastic pan, and vial with 90% ethyl alcohol.

Ant identification

After pinning, the ant specimens were identified up to the genus and species level according to the keys by Identification Guide to the Ant Genera of the World (Bolton, 1994) and checked with the collections in the Ant Museum of Thailand at Kasetsart University. The samples, which could not be identified to species, were list as sp.1, sp.2 and so on.

Data manipulation

1. Occurrence: This value is ratio of number finding the species in total times of sampling

$$\text{Occurrence} = \frac{\text{no. finding of species x X 100}}{\text{total times of sampling}}$$

2. Similarity Index or Sorensen Index: This value is based on species presence only (Spellerg, 1991). The degree of similarity in species composition between each pair of samples within a site is analyzed using Sorensen's Index which represents the proportion of total species in a sample pair which is present in both samples (Kreb, 1985).

$$C \quad = \quad \frac{2W \times 100}{A + B}$$

Where   C   =   Similarity Index

            W   =   ant species occurring in both areas

            A   =   number of ant species in area A

            B   =   number of ant species in area B

3. Species Diversity Index: This value is based on the species and abundance of species in a habitat or community. The diversity within a community was identified using Shannon-Wiener Index as the following formula (Wilson, 2000).

$$H' \quad = \quad -\sum p_i \ln p_i$$

Where   H'   =   Shannon-Wiener Diversity Index

            p_i =   the proportion of individuals in the ith species

            ln   =   log base $_n$

4. Evenness Index: The calculation of equitability or evenness index was also determined of the form: (Ludwig and Reynold, 1988)

$$J \quad = \quad \frac{H'}{H' \max}$$

Where   J   =   Equitability or Evenness Index

            H'   =   Shannon-Wiener Diversity Index

   H' max   =   ln s

Statistical methods

1. Description Statistics

Description statistics as Mean, Maximum, Minimum and Standard Error of Estimated are presented in form of graph and table.

2. Statistical analysis

Statistical analysis can contribute to this research through SPSS for Windows. Spearman correlation is used to analyze relationship between environmental factors (temperature, relative humidity, and rainfall) and ant distribution.