



CHAPTER 3

STUDY SITE AND STUDY SPECIES

3.1 Study sites

The field study took place in the sacred building of Suthiwatwararam Temple, Samut Sakhon Province and nearby areas. Some parts of the study were conducted at Si-Ha Islands, Phatthalung Province and at Chulalongkorn University. The study was carried out during the year 2000 and 2001.

3.1.1 The sacred building of Suthiwatwararam Temple

The sacred building of Suthiwatwararam Temple is the breeding site of White-nest Swiftlets (Figure 3.1). It is located at approximately 100 m from the mouth of Tha Chin River ($13^{\circ}31'41''N$, $100^{\circ}16'12''E$). There are 3 temples nearby namely Wat Ling Chon, Wat Lang San Prasit, and Wat Bang Ya Phraek at approximately 0.7, 1.5, and 1.7 Km away to the north, west and south of the sacred building (Figure 3.2), but these temples are not colonized by swiftlets.



Figure 3.1. The sacred building of Suthiwatwararam Temple, Samut Sakhon Province.

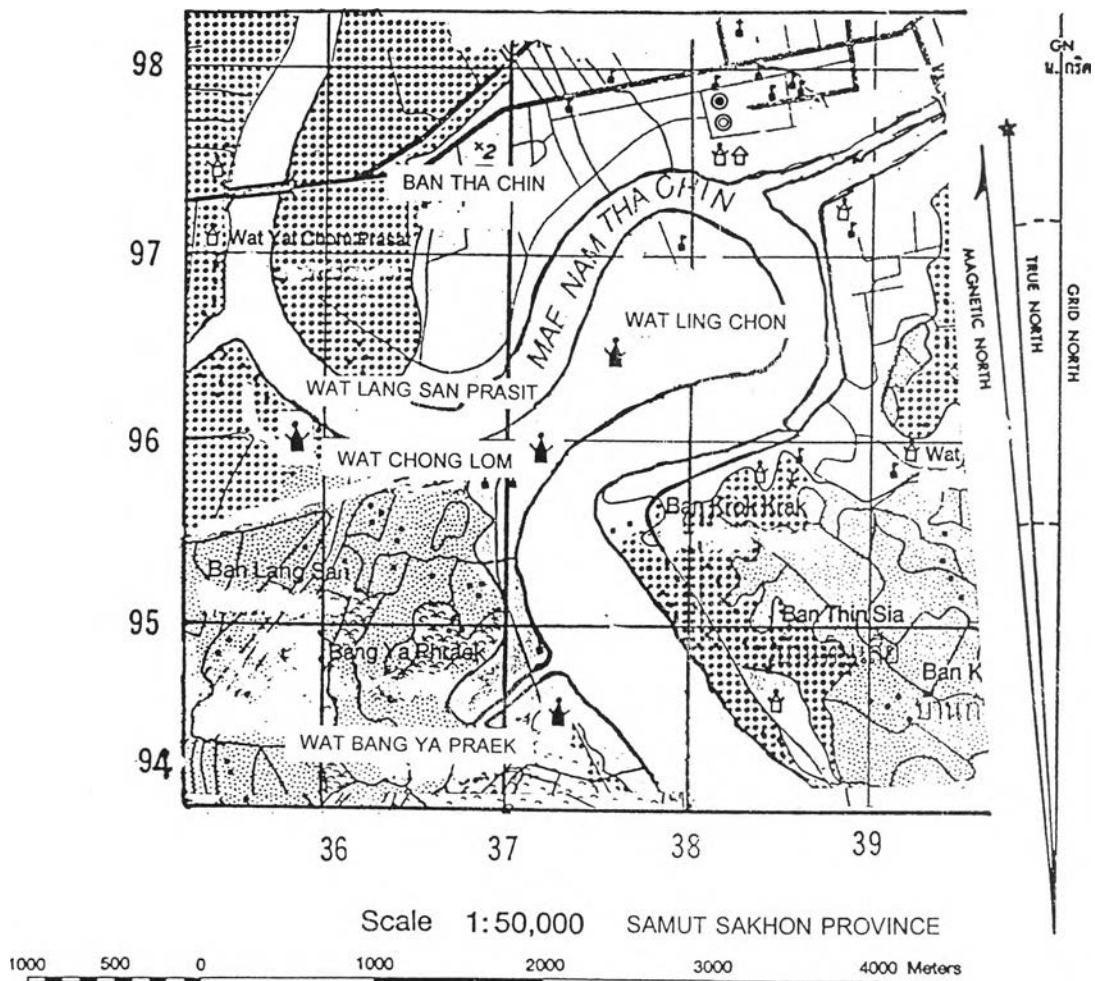


Figure 3.2. Location of the sacred building of Suthiwatwararam Temple (or Wat Chong Lom) and its surrounding area. The map was adapted from the topographic map with the scale of 1 : 50,000, provided by the Royal Thai Survey Department.

The main entrance of the sacred building faces toward the east. It is a rectangular building containing the altar of the golden coffin of the late abbot. The altar is located at the end of the nave section against the back wall. The building has a saddle-shaped roof where nesting or roosting sites of around 1,000 breeding pairs are inside. The remaining birds live in the hall of which four sidewalls were made by bricks and covered with lime-based plaster. The walls are slightly high (~7 m) which allow more ventilation. The walls were constructed on each side of 10 pillars. The altar section was partitioned from the nave section by the sculptural wall hanging from the ceiling. This sculptural wall, $3.0 \times 3.0 \times 0.2 \text{ m}^3$ in length, width and thickness, respectively, was

made by cement and was decorated with moulding and stucco motifs of Thai-style, which is called "Thep-pa-nom and Sa-rai". These uneven surfaces provide many sites with "supporters" for nests. The irregular shapes of supporters differ from those in caves, which are mostly U-shape forms.

Estimated area of sculpture wall is 9 m^2 and most of nests were found here. The rest of the nests are located at the four sidewalls and at the edges between pillars and walls. Therefore nest-sites in the building could be classified into 4 site types depending on types of surface (i.e. smooth sites at the smooth and flat wall or uneven surface sites at the sculpture wall) and dimensions that nests can attach to the wall (i.e. one or two dimensions). Four nest-site types were 1) sites at smooth and flat wall with no supporters, nests attached at one dimension surface, sm1; 2) sites at smooth and flat wall with no supporters, nests attached at two dimensions surface, sm2 ; 3) sites at sculpture wall with no supporters, nests attached at one dimension surface ,sc1 and 4) sites at sculpture wall with supporters, nests attached at two dimension surface, scs2. Total areas of the four nest-site types were estimated as 138,18,1 and 8 m^2 , respectively. All site types are shown in Figure 3.3 and 3.4.

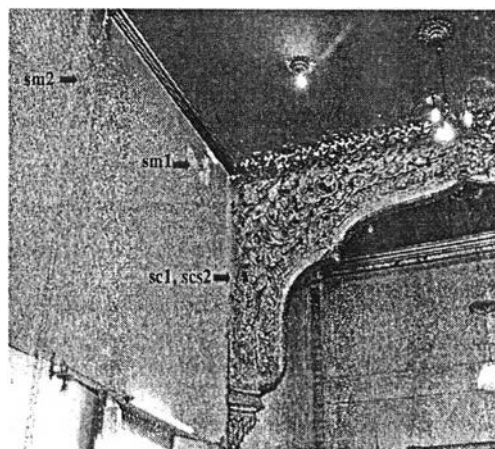


Figure 3.3. Nest sites of White-nest Swiftlets in the sacred building of Suthiwatwararam Temple, Samut Sakhon Province. Sm1 and sm2 are sites at the smooth and flat wall with no supporter, nests attached at one and two-dimension surface; sc1 and scs2 are sites at the sculpture wall with no supporter, nests attached at one and two-dimension surface and without and with supporter.

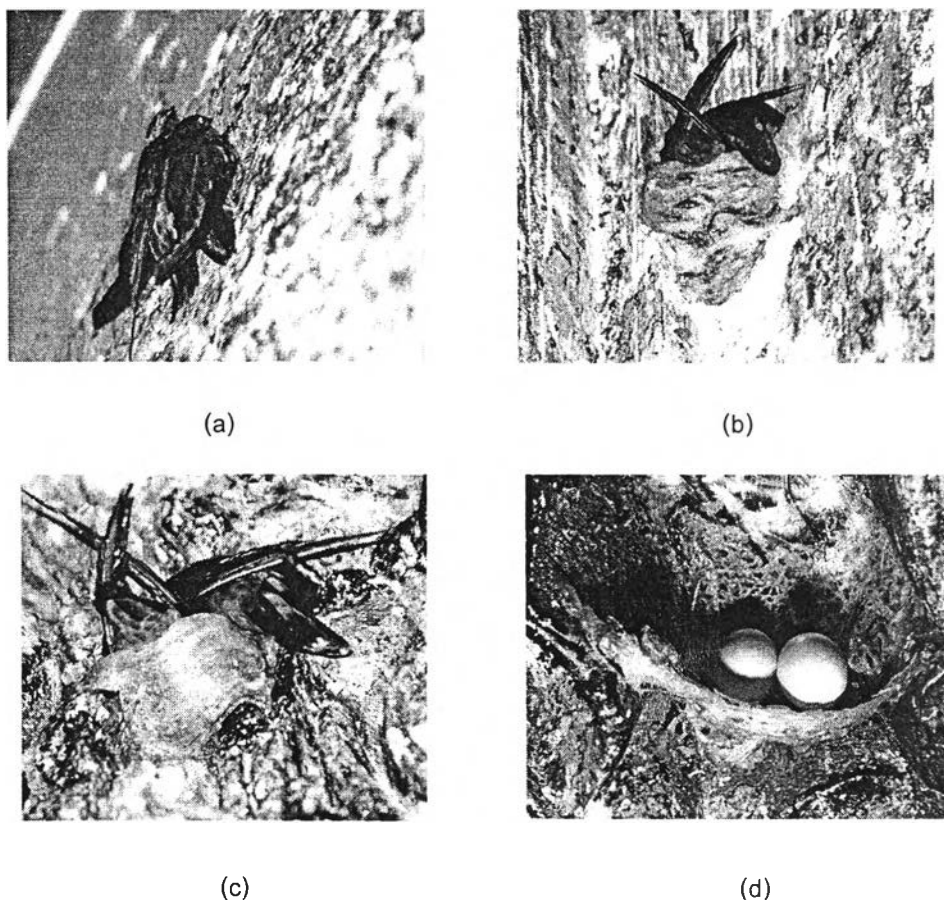


Figure 3.4. Nests of White-nest Swiftlets at different sites in the sacred building : (a) nest at sm1 site; (b) nest at sm2 site; (c) nest at sc1 site and (d) nest at scs2 site.

Samut Sakhon Province is located in the northern part of the gulf of Thailand, with the area of 872 km² at latitude 13° 24-44' N and longitude 100 ° 11-44' E. The northern and eastern borders connect to Nakhon Pathom Province and Bang Khun Thian District of Bangkok while the western side connects to Ratchaburi and Samut Songkhram Provinces. Tha Chin River is the main river of this province, running down from Nakhon Chaisi District in Nakhon Pathom Province, passing the middle area of the province and emerging to the gulf of Thailand at Tha Chalom Subdistrict where the sacred building is located. The south of the province is surrounded by intertidal mud, sand or salt flats, salt marshes with degraded mangrove communities. The land are used for salt field, shrimp and fish ponds. Fisheries are operated at the shallow coastal area and the open sea.

The inner areas of the province comprise of plantations, fish and shrimp ponds, natural swamps and ditches, rice and other crop fields. Most of these lands lie at the northwest, west and southwest of the province and are about 15-30 km from the breeding site of the White-nest Swiftlet. The swamps and ditches that join the Tha Chin river are parts of the irrigation system that are important to the cultivated areas. There are some lands used for the ornamental tree farm (i.e. orchids) and fresh water fisheries (i.e. prawns, fishes and softshelled turtles). Other are urban and industrial areas.

The average annual rainfall at Samut Sakhon Province during the study period was 1,420.8 mm in which the average annual rainfall during November 2000 and April 2001 was 50.22 mm and during May and October 2001 was 211.1 mm. By the amount of rainfall, the period of November 2000 - April 2001 and May - October 2001 were classified as dry and wet seasons, respectively. Data of the monthly rainfall were obtained from Thai Meteorological Department.

The ambient temperature and relative humidity measured at the sacred building during daytime were 31.23 ± 1.06 °C, 61.05 ± 5.15 % in dry season and 29.82 ± 0.92 °C, 57.57 ± 5.19 % in wet season.

3.1.1.1 Human activities in the sacred building

Since the sacred building is built for keeping the coffin of the late abbot therefore, the building is open everyday for the public. There are many people coming to the sacred building to offer food and flowers to the image of the late abbot. Candles and incense sticks are always lit during paying respect.

3.1.2 Si-Ha Islands, Phatthalung Province

Si-Ha Islands (Ko Si Ko Ha) is named for a group of islands, comprising of Ko Kan Tang, Ko Khem, Ko Na Thewada, Ko Ru Sim, Ko Thai Tham Kham, Ko Ran Kai, Ko Poi, Ko Ta So and Ko Yai So. The islands are located in Songkhla Lake ($7^{\circ}25'N$, $100^{\circ}15'E$), of Phatthalung Province, southern Thailand (Figure 3.5).

Si-Ha Islands, elevation ca 63-100 m above sea level has limestone caves of various sizes which are roosting and nesting habitat of sympatric species such as White-nest Swiftlets *A. fuciphagus*, Black-nest Swiftlets *A. maximus*, bats, rats, snakes and invertebrates. At some cave entrances, there are a few nesting sites of Glossy Swiftlets *Collocalia esculenta*.

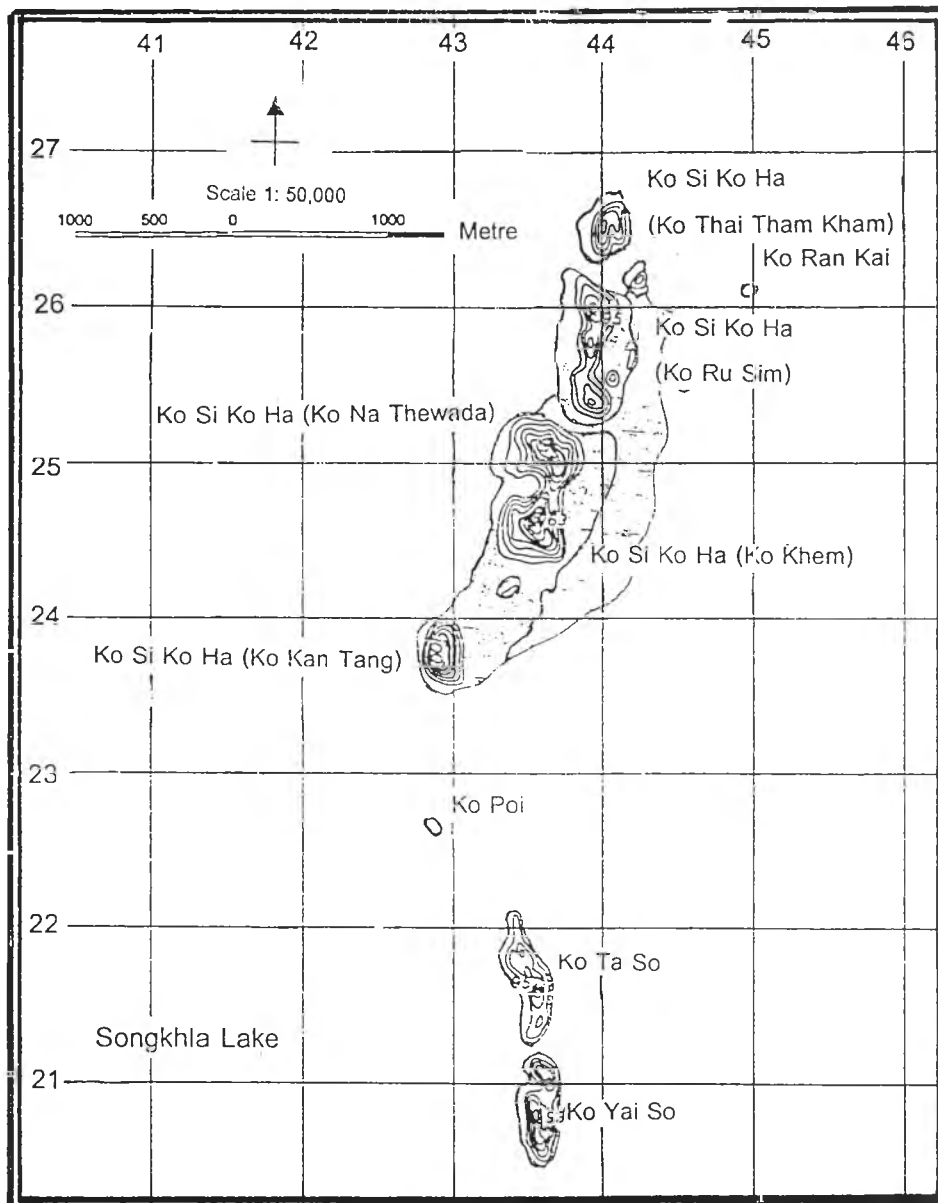


Figure 3.5. Map of Si-Ha Islands in Songkhla Lake, Phatthalung Province. The map was adapted from the topographic map with the scale of 1: 50,000, provided by the Royal Thai Survey Department.

The examination of harvested nest morphology was carried out at the Headquarters of Rung Nok Lam Thong (Siam) Company Ltd., the concessionaire which are constructed on Ko Na Thewada in March, April and August 2000. The study on nest-site characteristics of White-nest Swiftlets living in caves was carried out in 8 caves of 3 islands (Nong Kwai and Aai Chick caves on Ko Ta So; Tab Yai, Tam Mod and Ru Fin caves on Ko Na Thewada; Tam Nam, Ru Sim and Rang Wauw caves on Ko Ru Sim). All studied caves are dry caves indicating by the absence of stalactites and stalagmites (Gillieson,1996; Siriporbibul, 2001). The entrances to Tab Yai, Ru Sim and Tam Mod cave, are on the cliffs, facing the sea so that these caves are classified as the hanging cave. Tam Nam cave has the entrance at the surface of sea water level in which bird nests locate in the hall above the sea water. The rest has the entrance at ground level.

There are several chambers of varying sizes in each cave, ranging from a few to hundreds of cubic meter. Chambers are located from 1 m - >10 m away from the cave entrance. Normally, light enters the cave through the entrance, and sometimes through aperture in roof of the cave. Thus the main chamber, near the cave entrance is dimly lit but most of the chambers and side-branches are completely dark. Cave floors are covered with bird and bat droppings, feathers, debris of eggs and dead chicks together with gabages such as expired batteries, matches, etc. This always makes the air inside the cave foul. The ambient temperature and relative humidity in cave during the study period ranged from 27 to 32 °C and from 69 to 81 %, respectively. The average annual rainfall in year 2000 was 2,569.9 mm.

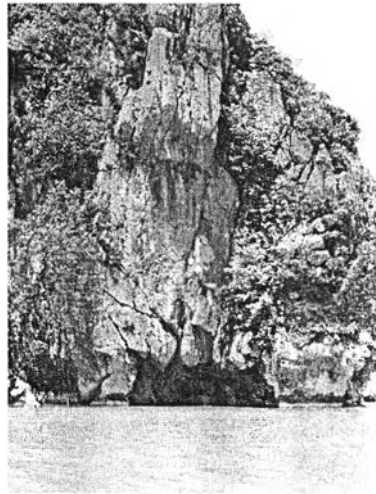


Figure 3.6. Ru Fin cave, one of the nesting site of White-nest Swiftlets at Si-Ha Islands in Songkhla Lake, Phatthalung Province.

3.2 The study species

The study species was the White-nest Swiftlet living in the sacred building and in the cave of Si-Ha Islands, Phatthalung Province. The population in the sacred building has established for more than 30 years. There are more than 2,000 breeding pairs living in this building (Figure 3.7 and 3.8) during the study period.



Figure 3.7. An adult of White-nest Swiftlets in the sacred building, Suthiwatwararam Temple, Samut Sakhon Province. Bar = 10 mm.



Figure 3.8. White-nest Swiftlets at the sculpture wall in the sacred building, Suthiwatwararam Temple, Samut Sakhon Province.