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A Checklist of Bats in Wangtakrai Park, Nakhon Nayok Province, Central Thailand

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Abstract

The list of bats is based on data collected using naked eye and a bat detector from November 2022 to March 2024. In total, 16 species, 11 genera belonging to five families are listed. The most speciose family is Pteropodidae (5 species), followed by Vespertilionidae (4 species), Rhinolophidae (3 species), Hipposideridae (3 species), and Emballonuridae (1 species). The most common species found along the stream were *Eonycteris spelaea*, *Hipposideros larvatus*, and *Cynopterus sphinx*, respectively. In garden areas, the most common species were *Hipposideros larvatus*, *Cynopterus sphinx*, and *Scotophilus kuhlii*, indicating that habitat types influence the presence of different bat species. Comparison of bat population in each season, the rainy season was found to support the highest species diversity among bat communities.

Keywords: specimens, Natural History Museum, bats, Thailand

Introduction

Bats are mammals that can be found almost everywhere, except for the polar regions and a few oceanic islands (Karapan *et al*., 2023). More than 1,300 species of bats have been reported worldwide, accounting for approximately one-fifth of all mammal species (Wilson and Mittermeier, 2019). In Thailand, more than 145 species of bats in 11 families have been listed (Francis, 2019; Karapan *et al*., 2023; Pratumthong and Klaipet, 2024). Compared to other small mammals, bats have a relatively slow growth rate. In captivity, bats have been recorded to live up to 41 years, while their average lifespan is around 15–20 years, which is considered long for their size (Wilson *et al*., 2019; Karapan *et al*., 2023).

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The group of bats (Chiroptera) is highly diverse and interacts with various organisms in the ecosystem, including plants and animals. They play important roles such as seed and pollen dispersal, making them crucial to tropical forest ecosystems. Most bats are insectivorous, consuming a wide range of insects or specializing in certain groups. Occasionally, they may feed on spiders and other arthropods (Kalko, 1998; Fujita and Tuttle, 1991; Karapan *et al*., 2023). About one-fourth of all bats are frugivorous, adapting to specialize in consuming fruits, nectar, and pollen from specific flowers (Wilson *et al*., 2019). The feeding behavior and foraging patterns of insectivorous bats vary according to sex, age, reproductive condition, season, and colony size (Kunz, 1974).

Wang Takhrai Park (WTP) is a remarkable natural site where two swift and clear mountain streams, Khlong Wangtakrai and Khlong Maduea, converge (Figure 1). Both streams originate from the southwestern base of Khao Yai Mountain before flowing into the Nakhon Nayok River, a tributary of the Bang Pakong River basin. This study focuses on identifying the bat species residing in Wang Takhrai Park and examining their distribution within the area (National Science Museum, 2002). Understanding the ecological roles and foraging behavior of insectivorous and frugivorous bats in Wang Takhrai Park requires addressing significant knowledge gaps. Research is crucial to fill these gaps and clarify the bats' ecological roles and interactions, which is essential for developing effective conservation strategies and sustainably preserving their vital ecosystem services.

Materials and Methods

Preparation

The research plan was developed following a review of literature, including defining the survey area and preparing the necessary equipment for data collection.

Field Survey and Data Collection

1) Survey methods: insectivorous bats were observed and identified to species in the areas by using a bat detector specific in ultra-sound range (Audiomoth V 1.2.0) and the soft wave for classification (Bat Sound Pro version 4.4). Fruit-eating bats were observed and identified via naked eye in the determined walking trails at night.

2) Data collection: Characteristics of all observed bats were recorded.

3) Taxonomic classification: Bats were classified according to their taxonomic order, family, genus, and species, following the classification systems of Bhoomibakban (2000); Francis (2019), and Lekagul and McNeely (1988).

Results and Discussion

In the present paper, we list 16 species belonging to 11 genera across five families from Wangtakrai Park. The most diverse family is Pteropodidae (fruit bats), represented by species such as *Eonycteris spelaea*, *Cynopterus sphinx*, and *Pteropus lylei*. Other families include Hipposideridae (*Hipposideros diadema*, *H. galeritus*, and *H. larvatus*), Rhinolophidae (*Rhinolophus affinis*, *R. malayanus*, and *R. shameli*), Emballonuridae (*Taphozous melanopogon*) and Vespertilionidae (*Kerivoula hardwickii*, *Pipistrellus javanicus*, *Scotophilus kuhlii*, and *Tylonycteris fulvida*) and to date, the recorded bat species in the study area constitute only 11.03% of the total known bat species in Thailand.

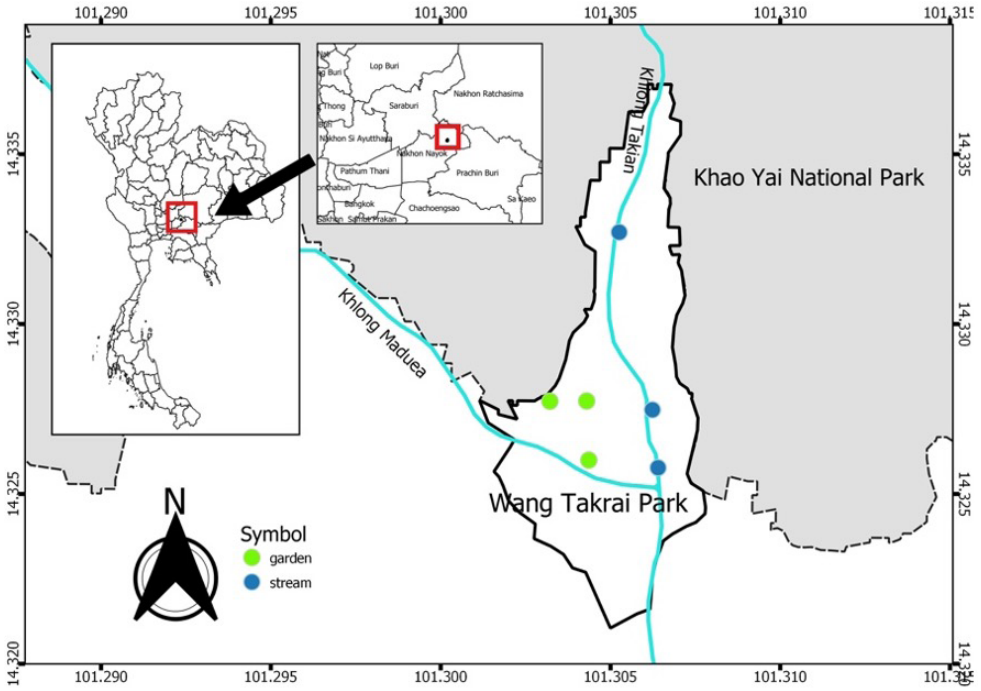

Figure 1. Study area and sampling plots to locate the trap in WTP.

From the study results of 140 bats, 133 were captured through sightings and harp traps, while seven were identified through sound waves. The most commonly found species were *Hipposideros larvatus*, *Cynopterus sphinx*, and *Eonycteris spelaea*, respectively, aligning with the study by Thani *et al*. (2016). *Hipposideros larvatus* was the most frequently found species, constituting 34.85% of the 66 samples.

The number of bat species observed in this study was relatively low compared to studies in other areas of Thailand. For instance, a study at the Kuala Lompat Research Station in Malaysia 51 insect-eating bat species were found (Kingston *et al*., 2003); in a survey of the Thung Yai Naresuan and Huai Kha Khaeng Wildlife Sanctuaries 58 bat species were found (Robinson *et al*., 1996), and in a study of bat diversity in Kim Hy Conservation Area in Vietnam a total of 36 bat species were found (Furey *et al*., 2010).

However, a study by O'Farrell and Gannon (1999) indicates that mist nets and harp traps can capture 63.5% of bats in the study area, while a bat detector can detect the sounds of 86.9% of bats in the area. Therefore, to enhance the completeness of bat species diversity surveys, both methods should be used in conjunction with surveys of bat roosting sites (Thani *et al.,* 2016).

Bats were found along streams, with 10 species (49 individuals), and in gardens, with 11 species (91 individuals). The most common species along the stream were *Eonycteris spelaea, Hipposideros larvatus*, and *Cynopterus sphinx*, respectively. In garden areas, the most common species were *Hipposideros larvatus*, *Cynopterus sphinx*, and *Scotophilus kuhlii*, respectively, indicating that habitat differences influence the presence of various bat species.

In different forest types, such as dry evergreen forests and dry dipterocarp forests, statistically significant differences in bat species were observed (Thani *et al*., 2016). According to Marinho-Filho (1991), the distribution and abundance of fruit-eating and nectar-feeding

bats are correlated with the timing and distribution of fruits and flowers. Additionally, the physical characteristics of wings and echolocation of insectivorous bats are less suited for open areas (Phommexay *et al*., 2011). However, some bat species, such as *C. sphinx* and *H. larvatus*, take advantage of open habitats and are often common and widely distributed (Lekagul and McNeely, 1988). Furthermore, riparian areas are sources of various fruits that are food for frugivorous bats (MacSwiney *et al*., 2009). Habitats with water sources may be another important habitat for bats (Thani *et al*., 2016).

The number of bats observed in each season varied. The rainy season accounted for 45% of all captured bats, the winter season for 18.6%, and the summer season for 36.4%. These findings align with Thani *et al*. (2016), who reported the highest bat species diversity during the rainy season. Similarly, Mello (2009) observed peak abundance of Phyllostomid bats in the equatorial regions of the New World during this period. Seasonal changes, particularly the increased availability of food sources during the rainy season (Pech-Canche *et al*., 2011), influence bat abundance. Furthermore, rainfall may stimulate bat reproductive activities (Mello *et al*., 2004).

Checklist
Order Chiroptera
Family Pteropodidae

1. *Cynopterus brachyotis* (Müller, 1838) (Figure 3D)

Collecting data. Stream: 14–16.XI.2022 (1 male); 13–17.III.2023 (2 females); 17–21.VII.2023 (1 male, 1 female). Garden: 11–15.III.2023 (1 female).

Remarks. *Cynopterus brachyotis* is an uncommon bat found in WTP. It can be found both in the dry and rainy seasons. Its flight paths were along streams and in gardens.

2. *Cynopterus sphinx* (Vahl, 1797) (Figure 3F)

Collecting data. Stream: 14–16.XI.2022 (1 female); 13–17.III.2023 (1 female); 17–21.VII.2023 (1 male, 3 females). Garden: 13–17.XI.2023 (2 male, 6 females); 11–15.III.2024 (1 male, 4 females); 18–22.VII.2024 (6 male, 10 females).

Remarks. The greater short-nosed fruit bat (*C. sphinx*) is a common bat species found throughout the park. These bats can be observed year-round, regardless of the season. Their flight paths often follow natural water sources like streams and are frequently seen in gardens, especially those with fruit-bearing trees such as fig trees.

3. *Eonycteris spelaea* (Dobson, 1871) (Figure 3E)

Collecting data. Stream: 14–16.XI.2022 (1 male, 3 females); 13–17.III.2023 (2 females); 17–21.VII.2023 (5 males, 10 females). Garden: 13–17.XI.2023 (1 male, 1 female).

Remarks. *Eonycteris spelaea*, a common bat species, is frequently found in WTP. Regardless of the season, whether it's dry or rainy, these bats can be observed flying along streams and in garden areas.

4. *Pteropus lylei* Andersen, 1908

Collecting data. Stream: 14–16.XI.2022 (1 sex unknown).

Remarks. *Pteropus lylei* is a rare bat species found within the WTP during the dry season. This species flies through the WTP to reach their food sources.

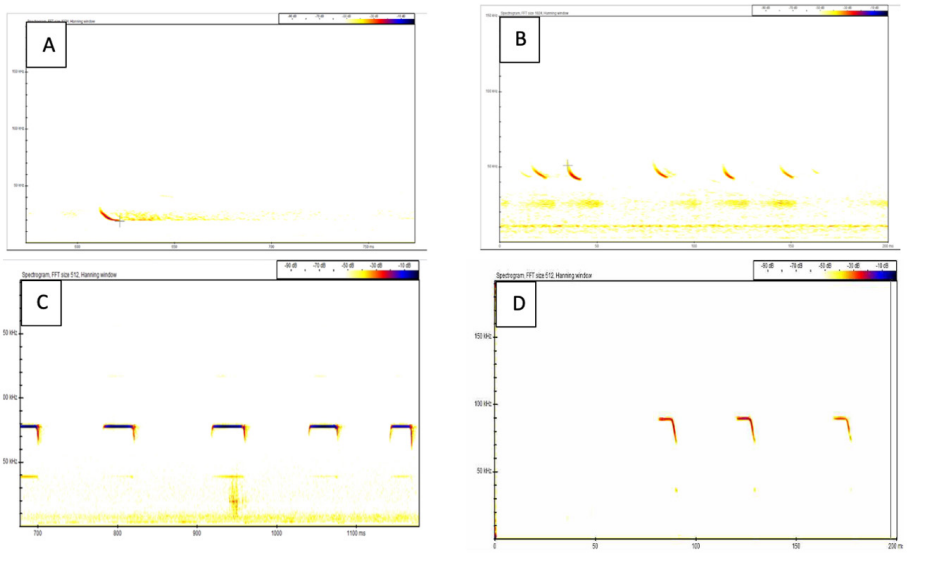

Figure 2. Sound frequency of bats in Wangtakrai Park. A, *Taphozous melanopogon*; B, *Scotophilus kuhlii*; C, *Rhinolophus malayanus*; D, *Hipposideros larvatus*.

5. *Rousettus leschenaultii* (Desmarest, 1820)

Collecting data. Stream: 13–17.III.2023 (1 male).

Remarks. *Rousettus leschenaultii* is a fruit bat species. We found an individual of this species in the dry season from a flight path along a stream in the park.

Family Hipposideridae

6. *Hipposideros diadema* Geoffroy, 1813 (Figure 3A)

Collecting data. Garden: 11–15.III.2024 (1 male).

Remarks. *Hipposideros diadema* is a very rare bat found in WTP. It can be found in the dry season. Its flight paths were along in garden.

7. *Hipposideros galeritus* Cantor, 1846 (Figure 3B)

Collecting data. Garden: 11–15.III.2024 (1 male,1 female).

Remarks. *Hipposideros galeritus* is a very rare bat found in WTP. It can be found in the dry season. Its flight paths were along gardens**.**

8. *Hipposideros larvatus* (Horsfield, 1823) (Figures 2D, 3C)

Collecting data. Stream: 14–16.XI.2022 (1 male, 2 females); 13–17.III.2023 (1 male); 17–21.VII.2023 (2 males). Garden: 13–17.XI.2023 (1 female); 11–15.III.2024 (6 males, 25 females); 18–22.VII.2024 (5 males, 15 females).

Remarks. *Hipposideros larvatus sphinx* is a common bat found in WTP. It can be found both in the dry and rainy seasons. Its flight paths were along streams and in gardens.

Family Rhinolophidae

9. *Rhinolophus affinis* Horsfield, 1823

Collecting data. Stream: 14–16.XI.2022 (1 female); 17–21.VII.2023 (3 males, 2 females).

Remarks. *Rhinolophus affinis* is an uncommon bat species found in WTP. It can be found both in the dry and rainy seasons. Its flight paths were along streams.

10. *Rhinolophus malayanus* Bonhote, 1903 (Figure 2C)

Collecting data. Garden: 13–17.XI.2023 (1 male); 11–15.III.2024 (1 female).

Remarks. *Rhinolophus malayanus* is an uncommon bat found in WTP. It can be found both in the dry and rainy seasons. Its flight paths were in gardens.

11. *Rhinolophus shameli* Tate, 1943

Collecting data. Garden: 13–17.XI.2023 (2 males).

Remarks. *Rhinolophus shameli* is a rare bat species found in WTP. It can be found in the dry seasons. Its flight paths were in gardens.

Family Emballonuridae

12. *Taphozous melanopogon* Temminck, 1841 (Figure 2A)

Collecting data. Garden: 13–17.XI.2023 (1 sex unknown).

Remarks. *Taphozous melanopogon* is a rare bat found in WTP. It can be found in the rainy seasons. Its flight paths were in gardens

Family Vespertilionidae

13. *Kerivoula hardwickii* (Horsfield, 1824)

Collecting data. Garden: 11–15.III.2024 (1 female).

Remarks. *Kerivoula hardwickii* is a rare bat species found in WTP. It can be found in the dry season. Its flight path was in gardens and might be along the forest edge.

14. *Pipistrellus* sp.

Collecting data. Stream: 17–21.VII.2023 (1 sex unknown).

Remarks. *Pipistrellus* sp. is a rare bat found in WTP. It can be found in the rainy seasons. Its flight path was along the stream.

15. *Scotophilus kuhlii* Leach, 1821 (Figure 2B)

Collecting data. Stream: 17–21.VII.2023 (1 sex unknown); 13–17.XI.2023 (1 sex unknown); 11–15.III.2024 (sex unknown); 18–22.VII.2024 (1 sex unknown).

Remarks. is a rare bat found in WTP. It can be found both in the dry and rainy seasons. Its flight paths were along streams and gardens.

16. *Tylonycteris fulvida* (Blyth, 1859)

Collecting data. Stream: 13–17.III.2023 (1 male).

Remarks. *Tylonycteris fulvida* is a very rare bat found in WTP. It can be in the dry seasons. Its flight paths were along the forest edge.

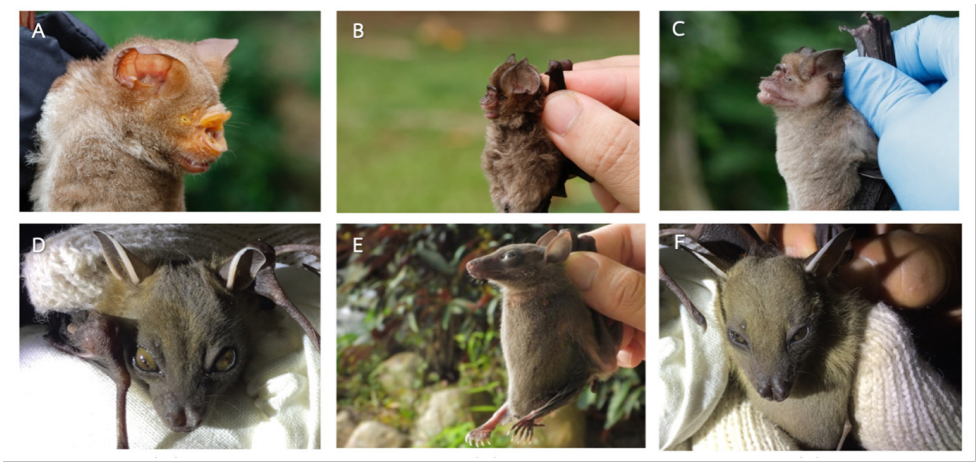

Figure 3. Bats in Wangtakrai Park. A, *Hipposideros diadema*; B, *Hipposideros galeritus*; C, *Hipposideros larvatus*; D, *Cynopterus brachyotis*; E, *Eonycteris spelaea*; F, *Cynopterus sphinx*

Conclusion

From the study in the WTP, a total of 140 bats were recorded. Of these, 133 were observed and captured using a harp trap, while 7 were identified through acoustic analysis. The most commonly found species were *Hipposideros larvatus*, *Cynopterus sphinx*, and *Eonycteris spelaea*. A total of 16 species, representing 11 genera across five families, were identified. The family Pteropodidae (fruit bats) was the most diverse, followed by Vespertilionidae, Rhinolophidae, Hipposideridae, and Emballonuridae. *Eonycteris spelaea*, *H. larvatus*, and *C. sphinx* were the most common species found along the stream. In garden areas, the most common species were *H. larvatus*, *C. sphinx*, and *Scotophilus kuhlii*, indicating that habitat type influences the presence of different bat species. Comparison of bat population in each season, the rainy season was found to support the highest species diversity among bat communities.

In addition to the ecological services provided by bats in Wang Takhrai Park, such as seed dispersal and pollination, certain fruit-eating bat species can sometimes damage farmers' fruit crops. This may lead to hunting or population control measures targeting these bats. Therefore, raising awareness among farmers and local residents about the ecological value of bats is crucial. Utilizing research data to promote awareness in these areas is essential to ensure continued conservation efforts beyond the completion of the research project.

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References

Bhoomibakban, N. 2000. *Wildlife Management*. Department of Forest Biology, Faculty of Forestry, Kasetsart University, Bangkok. 291 pp.

Francis, C.M. 2019. *A Field Guide to Mammals of Thailand and South-East Asia (2 nd Edition)*. Bloomsbury Wildlife, london. 416 pp.

Fujita, M.S. and M.D. Tuttle. 1991. Flying foxes (Chiroptera: Pteropodidae): threatened animals of key ecological and economic importance. *Conservation Biology* 5: 455–464.

Furey, N.M., I.J. Mackie and P.A. Racey. 2010. Bat diversity in Vietnamese limestone karst areas and the implications of forest degradation. *Biodiversity and Conservation* 19: 1821–1838.

Kalko, E.K.V. 1998. Organization and diversity of tropical bat communities through space and time. *Zoology* 101: 281–297.

Karapan, S., A. Wongwai and P. Soisook. 2023. *Cave-dwelling bats of Thailand*. Wildlife Research Division, Department of National Parks, Wildlife and Plant Conservation, Bangkok. 151 pp.

Kingston, T., C.M. Francis, Z. Akbar and T.H. Kunz. 2003. Species richness in an insectivorous bat assemblage from Malaysia. *Journal of Tropical Ecology* 19: 11–12.

Kunz T.H. 1974. Feeding ecology of a temperate insectivorous bat (*Myotis velifer*). *Ecology* 55: 693–711.

Lekagul, B. and J.A. McNeely. 1988. *Mammals of Thailand* (2nd Edition). Bangkok, Sahakornbhat. 758 pp.

MacSwiney, M.C., B. Bolivar, F.M. Clarke and P.A. Racey. 2009. Insectivorous bat activity at cenotes in the Yucatán Peninsula, Mexico. *Acta Chiropterologica* 11: 139–147.

Marinho-Filho, J.S. 1991. The coexistence of two frugivorous bats and the phenology of their food plants in Brazil. *Journal of Tropical Ecology* 7(1): 59–67.

Mello, M.A.R. 2009. Temporal variation in the organization of a Neotropical assemblage of leaf-nosed bats (Chiroptera: Phyllostomidae). *Acta Oecologica* 35: 280–286.

Mello, M.A.R., G.M. Schittini, P. Selig and H.G. Bergallo. 2004. A test of the effects of climate and fruiting of piper species (Piperaceae) on reproductive patterns of the bat Carollia perspicillata (Phyllostomidae). *Acta Chiropterologica* 6(2): 309–318.

National Science Museum. 2002. *Natural Heritage of Thung Luang Rangsit Pathum Thani*. National Science Museum Thailand, Pathum Thani. 222 pp.

O'Farrell, M.J. and W.L. Gannon. 1999. A comparison of acoustics versus capture techniques for the inventory of bats. *Journal of Mammalogy* 80: 24–30.

Pech-Canche, J.M., C.E. Moreno and G. Halffter. 2011. Additive partitioning of phyllostomid bat richness at fine and coarse spatial and temporal scales in Yucatan, Mexico. *Ecoscience* 18(1): 42–51.

Phommexay, P., C. Satasook, P. Bates, M. Pearch and S. Bumrungsri. 2011. The impact of rubber plantations on the diversity and activity of understorey 45 insectivorous bats in southern Thailand. *Biodiversity and Conservation* 20: 1441–1456.

Pratumthong,D. and A. Khlaipet. 2024. The bat specimens in the family Pteropodidae (Chiroptera) deposited in the Natural History Museum of the National Science Museum Thailand. *Thai Specimens* 3: 1–26.

Robinson, M.F., S. Bumrungsri and J.E. Hill. 1996. Chiroptera from Thung Yai Naresuan and Huai Kha Khaeng Wildlife Sanctuaries. *Natural History Bulletin of the Siam Society* 44: 243–247.

Thani, N. 2016. *Species diversity and diet of bats in Sakaerat Environmental Research Station*. Suranaree University of Technology, Nakhon Ratchasima. 62 pages.

Wilson, D.E., R. Mittermeier, A. Russell, L. Velikov, A. Mascacarell, L. Sogorb, B. Marti and J. Rodriguez. 2019. *Handbook of the Mammals of the World* Vol 9. Bats. Lynx Editions, Barcelona. 1008 pp.