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

Bang-on Changlom

Office of Natural Science Research, National Science Museum Thailand, 39, Moo 3, Khlong 5, Khlong Luang, Pathum Thani 12120, Thailand

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Corresponding author
bang-on Changlom
E-mail: bangon.neang@gmail.com

Editor
Dr. Weeyawat Jaitrong
E-mail: polyrhachis@yahoo.com/
weeyawat@nsm.or.th

Abstract

A pioneering study was conducted to assess the mollusks diversity of Wangtakrai Park, Nakhon Nayok Province in central Thailand, a long-standing recreational site with no previous molluscan records. Over a two-year period (2022-2024), six sampling rounds using nocturnal line transects and surveys along stream banks yielded 14 species, 12 genera from eight families of molluscan species. These included nine species and eight genera from four families of land snails and five species, four genera from four families of freshwater snails. The invasive alien species, *Pomacea canaliculata*, was also found.

Keywords: Mollusk diversity, Wangtakrai Park, land snails, freshwater snails, invasive species, *Pomacea canaliculata*, biodiversity assessment, Thailand

Introduction

Wangtakrai Park is a resort and botanical garden owned by the Chumphot-Phanthip Foundation. The Park is located in Hin Tang Subdistrict, Mueang Nakhon Nayok District, Nakhon Nayok Province, approximately 120 kilometers from Bangkok, and it offers a natural escape close to the city. Despite its long history as a popular recreational spot, the park still retains a significant amount of natural beauty. However, extensive tourism activities have impacted on various plant and animal species in the area.

Land snails and slugs are terrestrial mollusks that have fully adapted to living on land (Chanidaporn and Sakboworn, 2002). They can be found in a wide variety of habitats, from underleaf litter and trees, mountains to caves, and they inhabit all types of forests. Land snails play a crucial role in the food chain. Some snake species prey on land snails. While land snails are often considered detritivores or herbivores, this observation highlights their role as a food source for some predators (Wiya, 2008). In Thailand, over 600 species of land snails have been reported (Panha, 1999). However, taxonomic studies of land snails in Thailand have been limited. Most studies have been conducted at a broad scale, with few reporting species diversities at the local level (Chanidaporn and Sakboworn, 2002; Panha and

Thanamitramanee, 1997; Dumrongrojwattana *et al*., 2007; Panha and Burch, 2005; Boon-ngam *et al*., 2009). Freshwater mollusks are a primary component of benthic communities, commonly found inhabiting the bottom of water bodies. Comprising both gastropods and bivalves, these mollusks play a crucial role in ecosystems as a food source for other aquatic organisms and as a vital link in the food chain. Additionally, certain freshwater mollusk species can serve as indicators of water quality (Phuengchimplee and Niyomthai, 2012). In recent times, populations of freshwater mollusks in natural water bodies have experienced significant declines. This decline is attributed to both natural factors and human activities, such as floods, droughts, overharvesting of edible mollusk species, and the degradation of water bodies due to urban expansion, agriculture, tourism, and industrial activities.

A comprehensive survey of land snails, slugs, and freshwater mollusks was conducted in Wangtakrai Park. The study aimed to catalogue and map the distribution of molluscan species, providing valuable insights into the biodiversity of the park.

Materials and Methods

An extensive collection of land snails, slugs, and freshwater mollusks was acquired from seven sampling sites in Wangtakrai Park and surrounding areas (Figure 1) over a two-year period (March 2022 to July 2024). The study involved nighttime line transect surveys to assess the diversity and abundance of land snails and slugs in the terrestrial ecosystems. The freshwater mollusks were collected along stream banks. Six surveys were conducted throughout the two-year period to cover all seasons: November 14–16, 2022; March 13–17, 2023; July 17–21, 2023; November 13–17, 2023; March 11–15, 2024; and July 8–12, 2023. respectively.

The collected specimens are now deposited in the Natural History Museum of the National Science Museum, Thailand (THNHM). Detailed information on the sampling sites is provided in Table 1.

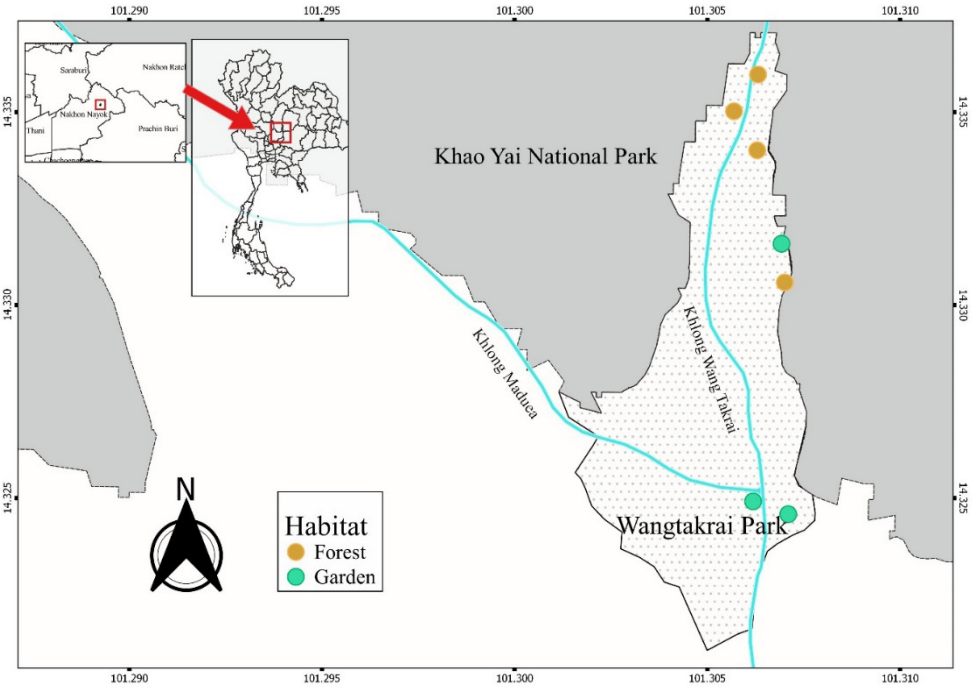

Figure 1. Map of the study area representing the sampling sites.

Table 1. The sampling sites of the mollusks in Wangtakrai Park.

Sites	Lat	Long	Localities	Type of habitats
S01	14.33501	101.30569	Wangtakrai Park	Forest
S02	14.33597	101.30631	Wangtakrai Park	Forest
S03	14.33400	101.30629	Wangtakrai Park	Forest
S04	14.33158	101.30692	Wangtakrai Park	Garden
S05	14.33058	101.30700	Wangtakrai Park	Forest
S06	14.32458	101.30709	Wangtakrai Park	Garden
S07	14.32491	101.30618	Wangtakrai Park	Garden

Results and Discussion

A total of 14 species, 12 genera from eight families of molluscan species were found in Wangtakrai Park, comprising nine species, eight genera from four families of land snails and five species, four genera from four families of freshwater snails. The land snails found in Wangtakrai Park can be categorized into two groups based on their habitats: 1) litter snails, including *Cyclophorus volvulus*, *Hemiplecta distincta*, *Sarika siamensis*, and *Valiguna siamensis*, which inhabit the leaf litter; and 2) tree snails, including *Leptopoma perlucidum*, *Durgella levicula*, and *Megaustenia siamensis*. These findings are consistent with previous studies by Dumrongrojwattana *et al*. (2007) and Boon-ngam *et al*. (2009).

The terrestrial snail species most frequently encountered were *Hemiplecta distincta*, *Sarika siamensis*, and *Cyclophorus volvulus*. Less common species included *Sarika resplendens*, *Megaustenia siamensis*, *Leptopoma perlucidum*, and *Durgella levicula*. Freshwater snails were dominated by *Filopaludina polygramma*, *Lymnaea* sp., and *Anentome helena*, with *Filopaludina sumatrensis speciosa* being less prevalent. The alien species, *Pomacea canaliculata* was also found in the study area.

Table 2. Numbers of mollusks genera and species found in the study area.

family	**No. of genera**	**No. of species**
Cyclophoridae	3	3
Viviparidae	1	2
Ampullariidae	1	1
Nassariidae	1	1
Lymnaeidae	1	1
Helicarionidae	1	1
Ariophantidae	3	4
Veronicellidae	1	1
Total	**12**	**14**

Checklist of species

Family Cyclophoridae

Subfamily Cyclophorinae

1. *Cyclophorus volvulus* (Müller, 1774) (Figure 2A)

Material examined. 10.VIII.2022, B. Changlom leg., BC00003; 16.XI.2023, B. Changlom leg., BC00017.

Habitat. This species is found living on the forest floor.

Distribution in the study area. S01, S02, S03, and S05.

2. *Cyclotus gassiesianus* Crosse, 1867

Material examined. 6.VIII.2022, B. Changlom leg., BC00008; 7.VIII.2022, B. Changlom leg., BC00009.

Habitat. This species was found on leaf litter on the forest floor in the night.

Distribution in the study area. S01, S02, S03, and S05.

3. *Leptopoma perlucidum* (Grateloup, 1840) (Figure 2B)

Material examined. 10.VII.2022, B. Changlom leg., BC00010; 9.IV.2024, B. Changlom leg., BC00018; 11.IV.2024, B. Changlom leg., BC00019.

Habitat. This is a tree snail. It is usually found under leaves at night.

Distribution in the study area. S05.

Family Viviparidae

Subfamily Bellamyinae

4. *Filopaludina polygramma* (E. von Martens, 1860) (Figure 3A)

Material examined. 9.VII.2024, B. Changlom leg., BC00021.

Habitat. Clinging to submerged objects and creeping on the seabed.

Distribution in the study area. S06 and S07.

5. *Filopaludina sumatrensis speciosa* (Deshayes, 1876)

Material examined. 15.XI.2022, B. Changlom leg., BC00015.

Habitat. Clinging to submerged objects and creeping on the seabed.

Distribution in the study area. S06 and S07.

Family Ampullariidae
Subfamily Pomaceinae

6. *Pomacea canaliculata* (Lamarck, 1822) (Figure 3B)

Material examined. 15.XI.2022, B. Changlom leg., BC00016.

Habitat. *Pomacea canaliculata* is an alien mollusk species. It often attaches to aquatic plants.

Distribution in the study area. S06.

Family Nassariidae
Subfamily Anentominae

7. *Anentome helena* (von dem Busch, 1847) (Figure 3C)

Material examined. 9.VII.2024, B. Changlom leg., BC00022; 11.VII.2024, B. Changlom., BC00026.

Habitat. This species was found crawling on the seabed in search of food

Distribution in the study area. S04 and S06.

Family Lymnaeidae
Subfamily Lymnaeinae

8. *Lymnaea* sp. (Figure 3D)

Material examined. 11.VII.2024, B. Changlom leg., BC00027.

Habitat. This species was found attached to aquatic plants.

Distribution in the study area. S04 and S06.

Family Helicarionidae
Subfamily Durgellinae

9. *Durgella levicula* (Benson, 1859)

Material examined. 10.VII.2022, B. Changlom leg., BC00011.

Habitat. This snail species is commonly seen clinging to leaves after rainfall.

Distribution in the study area. S01, S02, S03, and S05.

Family Ariophantidae
Subfamily Ariophantinae

10. *Hemiplecta distincta* (Pfeiffer, 1850) (Figure 2C)

Material examined. 14.XI.2022, B. Changlom leg., BC00012; 15.XI.2022, B. Changlom leg., BC00013; 9.VII.2024, B. Changlom leg., BC00023.

Habitat. This snail species was observed creeping on the forest floor, particularly in areas with thick leaf litter around tree bases.

Distribution in the study area. S01, S02, S03, S04, S05, S06, and S07.

11. *Megaustenia siamensis* (Haines, 1855) (Figure 2D)

Material examined. 14.XI.2022, B. Changlom leg., BC00014; 9.VII.2024, B. Changlom leg., BC00020.

Habitat. This species is found under leaves.

Distribution in the study area. S05.

Figure 2. Land snails in the study area. A, *Cyclophorus volvulus* (Müller, 1774); B, *Leptopoma perlucidum* (Grateloup, 1840); C, *Hemiplecta distincta* (L. Pfeiffer, 1850); D, *Megaustenia siamensis* (Haines, 1855); E, *Sarika siamensis* (L. Pfeiffer, 1856); F, *Valiguna siamensis* (E. von Martens, 1867).

Subfamily Macrochlamydinae

12. *Sarika resplendens* (Philippi, 1847)

Material examined. 16.XI.2022, B. Changlom leg., BC00005; 18.XI.2022, B. Changlom leg., BC00006.

Habitat. This species was found on bathroom walls and at the base of shrubbery.

Distribution in the study area. S01, S02, S03, S04, S05, S06, and S07.

13. *Sarika siamensis* (Pfeiffer, 1856) (Figure 2E)

Material examined. 15.XI.2022, B. Changlom leg., BC00004; 13.XI.2022, B. Changlom leg., BC0007.

Habitat. This snail was found at the base of wild banana trees, seedlings, and in leaf litter. It is a leaf-eating snail and is considered pests in seedling nurseries.

Distribution in the study area. S01, S02, S03, S04, S05, S06, and S07.

Figure 3. Freshwater snails in the study area. A, *Filopaludina polygramma* (E. von Martens, 1860); B, *Pomacea canaliculata* (Lamarck, 1822); C, *Anentome helena* (von dem Busch, 1847); D, *Lymnaea* sp.

Family Veronicellidae

14. *Valiguna siamensis* (E. von Martens, 1867) (Figure 2F)

Material examined. 13.XI.2022, B. Changlom leg., BC00001; 15.XI.2022, B. Changlom leg., BC00002; 8.VII.2024, B. Changlom leg., BC00024; 11.VII.2024, B. Changlom leg., BC00025.

Habitat. It is commonly found in humid environments such as plant pots, bathroom and kitchen walls, and damp soil.

Distribution in the study area. S01, S02, S03, S04, S05, S06, and S07.

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