

## A New Species of the Genus *Boysidia* (Pulmonata: Pupillidae) from Northern Thailand

(Satu Spesies Baharu Genus *Boysidia* (Pulmonata: Pupillidae) dari Utara Thailand)

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### ABSTRACT

*A new species of the genus Boysidia Ancey, 1881, collected from Doi Pha Tang, Chiangrai Province, Northern Thailand, is described as B. phatangensis sp. nov. The new species is characterized by its small size, conical shape with 5¼ - 5½ whorls, yellowish-brown color; aperture subquadrate consists of 6 barrier teeth, outer lip expanded. B. phatangensis seem limited to the high altitude area in northern part of Thailand.*

*Keywords:* Boysidia; microsnailes; new species; Pupillidae; Thailand

### ABSTRAK

*Spesies baharu daripada genus Boysidia Ancey, 1881, diambil dari Doi Pha Tang, wilayah Chiangrai, utara Thailand, disifatkan sebagai B. phatangensis sp. nov. Spesies baharu ini dicirikan oleh saiznya yang kecil, berbentuk kon dengan 5¼ - 5½ pusing, berwarna coklat kekuningan, apertur subkuadrat terdiri daripada 6 gigi halangan, bibir luar berkembang. B. phatangensis seolah-olah terhad kepada kawasan beraltitud tinggi di utara Thailand.*

*Kata kunci:* Boysidia; Pupillidae; siput mikro; spesies baharu; Thailand

### INTRODUCTION

Thai terrestrial microsnailes diversity are mostly contributed by major works of Panha and Burch since 1996 which described 90 new species and most of these species are from the family Pupillidae Turton, 1831 (Panha & Burch 2005). After that, more new species were described from the same family (Dumrongrojwattana 2008; Dumrongrojwattana & Panha 2006, 2005; Dumrongrojwattana & Wongkamhaeng 2013; Tanmuangpak et al. 2015; Tongkerd et al. 2013). For the genus *Boysidia* Ancey, 1881, currently there are two species in Thailand, namely, *B. chiangmaiensis* Panha and Burch (1999) described from Doi Chiang Dao Wildlife Sanctuary, collected at about 1,600-1,900 meters MSL, Chiangmai Province (Panha & Burch 1999a) and *B. tholos* (spelling in the original description (Panha & Burch 1999a) or *B. tholus* (spelling in later publication (Panha & Burch 2005; Panha et al. 2009)) described from Phanangkoy, at about 380 m MSL, Phrae Province (Panha & Burch 2005, 1999b). This land snail genus of family Pupillidae Turton, 1831, is distributed mainly in South, East and Southeast Asia (Panha & Burch 2005; Pilsbry & Hirase 1908; Pilsbry 1916-1918; Zhang et al. 2014). Most of them – 20 out of 26 species – were reported in China whereas the other 6 species scattered in Malaysia, Pakistan and in northern Thailand (Table 1; Pilsbry & Hirase 1908; Pilsbry 1916-1918; Panha & Burch 2005, 1999a, 1999b; Pokryszko et al. 2009; van Benthem Jutting

1949; Zhang et al. 2014). In this paper, a new species of *Boysidia* from Northern Thailand, *B. phatangensis* sp. nov. is described and illustrated.

### MATERIALS AND METHODS

Specimens were collected from limestone hill from Doi Pha Tang, Por Subdistrict, Wiang Kaen District, Chiang Rai Province, Northern Thailand (Figure 1). Empty shells were cleaned and air-dried. Twenty-five complete adult shell specimens were counted for whorl number and shell measurement was done for shell height (SH), shell width (SW), aperture height (AH) and aperture width (AW) by using Image J program 1.47v. Photographs were taken by using digital camera, Cannon MP-E 65 mm Macro lens, and Scanning Electron Micrographs were taken by Scanning Electron Microscope LEO 1450 VP at the Microscopic Center, Faculty of Science, Burapha University. Taxonomic description was based mainly on the literatures of Panha and Burch (2005, 1999a, 1999b). Shell dimension of type specimens are described in this publication as minimum-maximum (mean ± standard deviation). Shell terminology e.g. whorls number and apertural barrier teeth, following the work in Panha and Burch (2005).

Type materials were deposited in the following institutions: Zoological Research Collection of Burapha University (ZRCBUU), Chon Buri, Thailand; Thailand

TABLE 1. List of known *Boysidia* species and their distribution records

No.	Species	Locality	References
1	<i>Boysidia dosata</i> (Ancey 1881)	Lake Poyang, Jiangxi, Central China	2, 9
2	<i>Boysidia hunana</i> (Gredler 1881)	Yun - Techu-fu, Hunan throughout the Yangtse river valley, Central China	2,9
3	<i>Boysidia conspicua</i> (Moellendorff 1885)	Tsat-sing-yen or Marble Rocks of the West River above Cantn, Guangdong, South China	2, 9
4	<i>Boysidia strophostoma</i> (Moellendorff 1885)	Guangxi, Guangdong, South China and Hubei, Hunan, Central China,	2,9
5	<i>Boysidia hangchowensis</i> (Pilsbry & Hirase 1908)	Zhejiang, Hangzhou, Central China	1,2,9
6	<i>Boysidia gracilis</i> Haas, 1937	Hubei, Central China; Shanxi, North China, and Sichun, Southwest China	9
7	<i>Boysidia guiyangensis</i> Lou and Chen 1998	Kaiyang, Guizhou, Southwest China	9
8	<i>Boysidia dilamellaris</i> Chen and Wu (1995)	Ankang, Shanxi, North China	9
9	<i>Boysidia shilinensis</i> Chen and Wu (1999)	Lunan, Yunnan, Southwest China	9
10	<i>Boysidia tianxingqiaoensis</i> Lou and Chen (2000)	Tianxingqiao, Guizhou, Southwest China	9
11	<i>Boysidia tongguanensis</i> Chen and Zhang (2002)	Tongguan, Shanxi, North China	9
12	<i>Boysidia xingyiensis</i> Guo and Zhou (2006)	Xingyi, Guizhou, Southwest China	9
13	<i>Boysidia xiuwenensis</i> Zhang and Luo (2010)	Xiuwen, Guizhou, Southwest China	9
14	<i>Boysidia nanjiangensis</i> Zhang and Zhang (2011)	Kaiyang, Guizhou, Southwest China	9
15	<i>Boysidia pentadens</i> Chen and Wu (1999)	Mengla, Yunnan, Southwest China	9
16	<i>Boysidia xishanensis</i> Chen and Wu (1999)	Kunming, Yunnan, Southwest China	9
17	<i>Boysidia taibaiensis</i> Chen and Wu (1999)	Taibai, Shanxi, North China	9
18	<i>Boysidia huangguoshuensis</i> Luo and Chen (2000)	Huangguoshu, Zhenning, Southwest China	9
19	<i>Boysidia xiaoguanensis</i> Zhang et al. (2014)	Xuan'en, Enshi, Central China	9
20	<i>Boysidia xianfengensis</i> Zhang et al. (2014)	Xianfeng, Hubei, Central China	9
21	<i>Boysidia rigens</i> van Benthem Jutting (1949)	Kedah, Malaysia	3
22	<i>Boysidia salpinx</i> Thomson and Dance (1983)	Sarawak, Malaysia	4
23	<i>Boysidia paini</i> Thomson and Dance (1983)	Sarawak, Malaysia	4
24	<i>Boysidia tamtourina</i> Pokryszko et al. (2009)	Pakistan	8
25	<i>Boysidia tholos</i> Panha and Burch (1999)	Phanangkoy, Phrae, Thailand	6,7
26	<i>Boysidia Chiangmaiensis</i> Panha and Burch (1999)	Doi Chiang Dao, Chiangmai, Thailand	5
27	<i>Boysidia phatangensis</i> n. sp.	Doi Pha Tang, Chiangrai, Thailand	This study

\*References: 1 = Pilsbry and Hirase (1908); 2 = Pilsbry (1916-1918); 3 = van Benthem Jutting (1949); 4 = ; Thomson and Dance (1983); 5 = Panha and Burch (1999a); 6 = Panha and Burch (1999b); 7 = Panha and Burch (2005); 8 = Pokryszko et al. (2009); and 9 = Zhang et al. (2014)

Natural History Museum Reference Collection (THNHM), Muséum National d'Histoire Naturelle (MNHN) National Science Museum Thailand, Pathum Thani, Thailand; Natural History Museum, Mahasarakham University, Maha Sarakham, Thailand (NHMSU).

#### SYSTEMATIC PART

Family Pupillidae Turton, 1831

Genus *Boysidia* Ancey, 1881

*Boysidia phatangensis* spec. nov. (Figure 2(A)-2(E))

*Holotype* – ZRCBUU 0595 (Figure 2(A)-2(E)) – collected from Doi Pha Tang (19° 55' 50.84" N, 100° 31' 09.97") Chiangrai province, northern Thailand, 28 September 2014. Coll. Assawawattagee, S.

*Size of Holotype* – Shell height 6.77 mm, shell width 4.33 mm. Aperture width 2.69 mm, aperture height 2.82 mm. Shell width/shell height ratio = 0.64. Aperture width/aperture height ratio = 0.95.

*Paratypes* – MNHN IM-2014-6079 (2 shells) THNHM-Iv-18001 (2 shells); NHMSU 00015 (2 shells); ZRCBUU 0596 (SEM Photograph) (Figure. 2 F-H); ZRCBUU 0597 (10 shells), ZRCBUU 05968 (9 shells); ZRCBUU 0597 (10 shells) coll. S. Assawawattagee and P. Dumrongrojwattana, September-November, 2014.

*Size of Paratypes* Shell height 6.78-9.19 mm (7.38±0.55 mm) shell width 4.23-5.57 mm (4.69±0.29 mm). Aperture width 2.37-3.19 mm (2.74±0.18 mm). Aperture height 2.32-3.40 mm (2.89±0.23 mm). Shell width/shell height ratio = 0.64±0.03. Aperture width/aperture height ratio = 0.95±0.04.

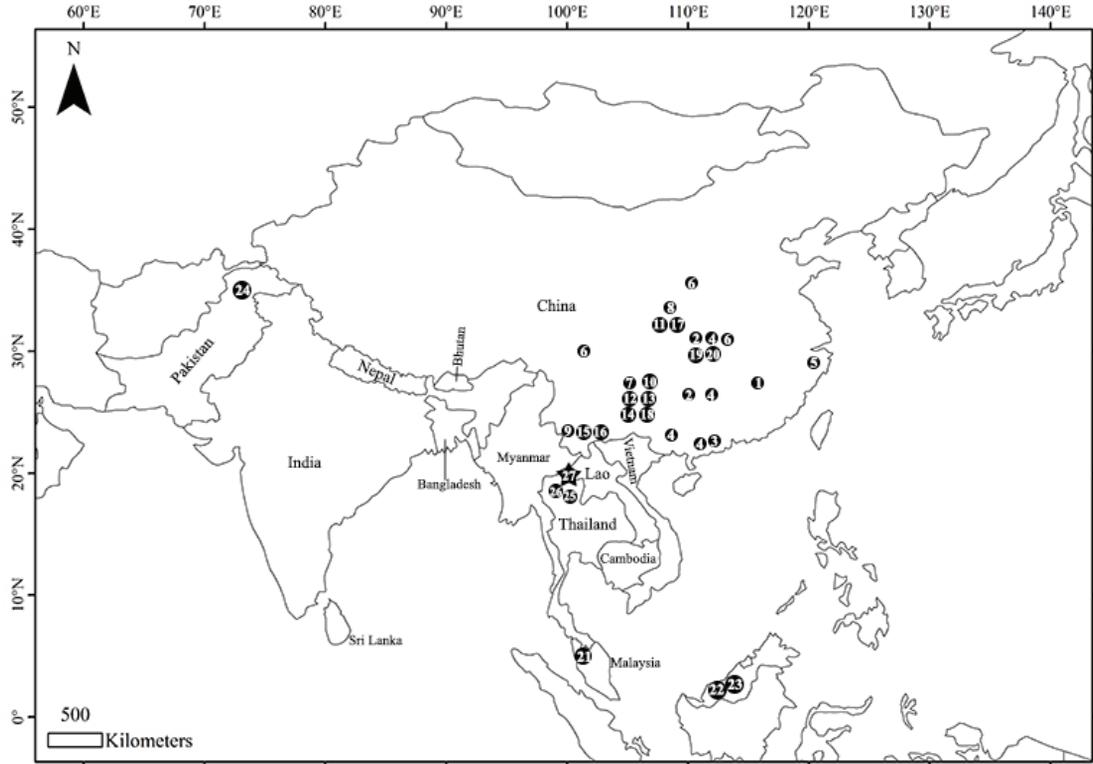


FIGURE 1. Map of Asia showing the type locality of *Boysidia phatangensis*, sp. nov., from Doi Phatang, Wiang Kaen District, Chiang Rai Province, Northern Thailand (star); and type localities of other recorded species (number indicates species from Table 1)

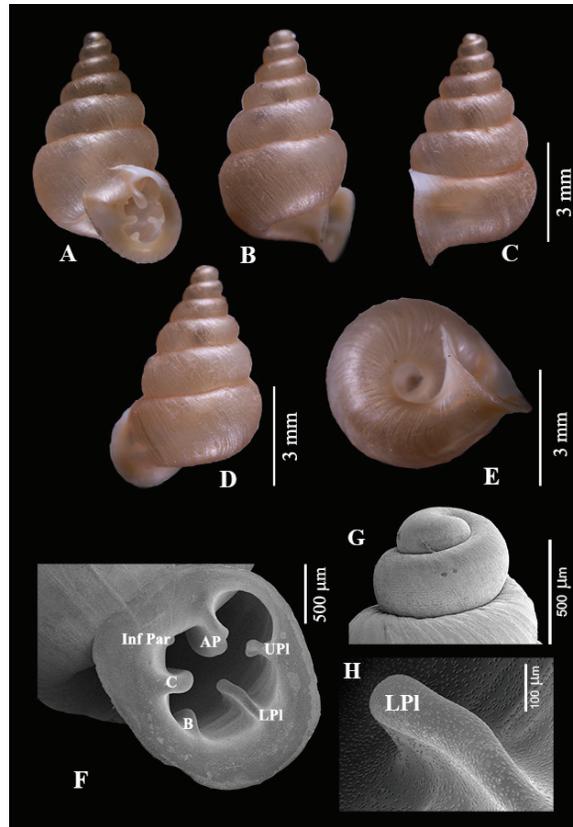


FIGURE 2. A-E. Holotype of *Boysidia phatangensis* sp. nov. A) front view, B-C) side view, D) back view and E) Bottom view. F-H: Paratype: F) Apertural view, G) Microsculpture of protoconch and H) Microsculpture of apertural wall and apertural barrier teeth surface PA = angulo-parietal tooth, UPI = upper-palatal tooth, LPI = lower-palatal tooth, B = basal, C = columellar tooth, and Inf Par = infraparietal tooth

## DESCRIPTION

Shell small, slightly thin, conical shape, with  $5\frac{1}{4}$ - $5\frac{1}{2}$  convex whorls. The spire high with the last whorl slightly expanding; last whorl adnate. Surface sculptured smooth with fine and uneven growth lines. Shell color yellowish-brown. Sutures deeply impressed. Shell width about 0.64 times as long as height. Apex blunt and smooth. The protoconch contains  $1\frac{1}{4}$  whorls, gradually increased in size to the teleoconch whorls. The microsculpture mesh-like, reticulated, which are superimposed evenly-spaced continuous raised thin spiral threads. Teleoconch convex, surface smooth with oblique fine and dense uneven growth lines. Body whorl enlarged, adnate and also with oblique uneven fine and dense growth lines which gradually thinner near peristome. Aperture subquadrate, slightly oblique to the left and rather adnate to the surface of the last whorl. Aperture width about 0.95 times as long as height. Peristome thick and expanded. The aperture contains six barrier teeth which are five major teeth, and one tiny tooth. The angular and parietal lamellae fused together into the largest tooth (PA) reaching to the edge of peristome. Two palatal folds presented. Upper-palatal (UPI) fold located at the edge of peristome while lower-palatal fold (LPI) located deep inside the aperture. Basal tooth (B) moderately small, located near the edge of peristome. Columellar fold (C) large and strong, set horizontally with columellar. This tooth also located at the edge of peristome. The infraparietal lamellae small and low, appeared as a tiny knob, located deeper inside the aperture. The microsculpture of apertural wall and apertural barrier teeth surface, are consist of densely and fine granules. Umbilicus is deep and widely opened.

*Etymology* We named this new species '*phatangensis*', refers to type locality of the new species, Doi Pha Tang, Chiangrai Province, Northern Thailand.

*Type locality* Doi Pha Tang, Por Subdistrict, Viengkean District, Chiangrai Province, Northern Thailand at about 1,520 m above mean sea level (MSL).

*Geographic Distribution and Habitat* *Boysidia phatangensis* sp. nov. was only known from the type locality and seem to be limited live in high altitude of limestone hills in the northern part of Thailand. Live snails preferring hang on the surface of the moist and humid limestone with bryophytes, i.e. mosses and lichens or in cleft of rock, hidden under moist decayed wood and debris.

*Remark* The third new boysidian species, *B. phatangensis* sp. nov., belong to the group of the subgenus *Boysidia*. This new species differs from congener in Thailand, *B. Chiangmaiensis* Panha and Burch (1999) and *B. tholos* Panha and Burch (1999), not only by the shell shape but also by apertural teeth which is six barrier teeth in this new species and three barrier teeth in both former described species. Compared to other congeneric species from Malaysia, *B. rigens* van Benthem Jutting, 1949, the shell of *B. phatangensis* sp. nov. distinctly less barrier

teeth, six teeth while Malaysian species has seven barrier teeth and Thai species has larger shell size than Malaysian species. *B. phatangensis* sp. nov. also differs from China's species, *B. conspicua*, *B. dorsata*, *B. hangchowensis*, *B. sianoguanensis* by having more barrier teeth, more larger size, and conic shell.

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## REFERENCES

- Dumrongrojwattana, P. 2008. A new species of *Aulacospira* (Pulmonata: Stylommatophora: Pupillidae) from Eastern Thailand. *The Natural History Journal of Chulalongkorn University* 8(1): 57-59.
- Dumrongrojwattana, P. & Panha, S. 2006. Two new species of *Aulacospira* from Eastern Thailand (Pulmonata: Stylommatophora: Pupillidae). *The Natural History Journal of Chulalongkorn University* 6: 121-124.
- Dumrongrojwattana, P. & Panha, S. 2005. A new species of *Aulacospira* from Thailand (Pulmonata: Stylommatophora: Pupillidae). *The Natural History Journal of Chulalongkorn University* 5: 15-16.
- Dumrongrojwattana, P. & Wongkamhaeng, K. 2013. A new species of *Sinoennea* from Southern Thailand. (Pulmonata: Diapheridae). *Spira* 5(1-2): 1-3.
- Panha, S. & Burch, J.B. 2005. An introduction to the microsnailes of Thailand. *Malacological Review* 37/38: 1-155.
- Panha, S. & Burch, J.B. 1999a. First recorded and new species of *Boysidia* and *Sinoennea* from Thailand. *Malacological Review* 31/32(1/2): 117-122.
- Panha, S. & Burch, J.B. 1999b. New taxa of Pupillidae (Pulmonata: Stylommatophora) from Thailand. *Walkerana* 10(24): 113-134.
- Panha, S., Sucharit, C., Dumrongrojwattana, P., Tumpeesuwan, C., Tumpeesuwan, S., Boon-ngam, P. & Chajirawong, R. 2009. Land Snails. In *Checklist of Mollusca Fauna in Thailand*, edited by Nabhitabhata, J. Bangkok: Office of Natural Resources and Environmental Policy and Planning. p. 576.
- Pilsbry, H. 1916-1918. Pulmonata, Pupillidae (Gastrocoptinae). *Manual of Conchology*, second series: Pulmonata, vol. 24, i-xii, 1-380, pls. 1-24. The Conchological Department. Philadelphia: Academy of Natural Sciences.
- Pilsbry, H.A. & Hirase, Y. 1908. New Land Shells of the Chinese Empire: I. *Proceedings of the Academy of Natural Sciences of Philadelphia* 60(1): 37-43.
- Pokryszko, B.M., Auffenberg, K., Hlaváč, J.Č. & Naggs, F. 2009. Pupilloidea of Pakistan (Gastropoda: Pulmo nata):

- Truncatellinae, Vertigininae, Gastrocoptinae, Pupillinae (In Part). *Annales Zoologici* 59(4): 423-458.
- Tanmuangpak, K., Dumrongrojwattana, P., Tumpeesuwan, C. & Tumpeesuwan, S. 2015. *Sinoennea loeiensis*, a new species of diapherid microsnail (Pulmonata: Streptaxoidea: Diapheridae) from Phu Pha Lom Limestone Hill, Loei Province, Northeastern Thailand. *Raffles Bulletin of Zoology* 63: 293-300.
- Thomson, F.G. & Dance, P.S. 1983. Non-marine mollusks of Borneo II Pulmonata: Pupillidae, Clausiliidae. III Prosobranchia: Hydrocenidae, Helicinidae. *Bulletin of the Florida State Museum, Biological Sciences* 29(3): 101-152.
- Tongkerd, P., Sutcharit, C. & Panha, S. 2013. Two new species of micro land snails from two islands in the Andaman Sea (Prosobranchia: Diplommatinidae; Pulmonata: Pupillidae). *Tropical Natural History* 13(2): 65-76.
- van Benthem Jutting, W.S.S. 1949. The Malayan species of *Boysidia*, *Paraboysidia*, *Hypselostoma* and *Gyliotrachela* (Gastropoda, Pulmonata, Vertiginidae) with a catalogue of all the species hitherto described. *Bulletin of the Raffles Museum* 21: 5-47.
- Zhang, W-H., Chen, D-N. & Zhou, W-C. 2014. Two new species of the genus *Boysidia* from China, with a preliminary discussion of its geography (Pulmonata: Stylommatophora: Pupillidae). *Zoological Systematics* 39(4): 570-575.

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