

## A new microgastropod species, *Orbitestella amphaengensis*, (Gastropoda: Heterobranchia: Orbitestellidae) from Bangkok clay of Samut Sakorn Province, Thailand

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**Abstract.** A new species of microgastropod, *Orbitestella amphaengensis*, is described from Holocene Bangkok clay, where a whale's skeleton ( $3,380 \pm 30$  years old) was found, in Samut Sakorn Province, Central Thailand. This new orbitestellid species is characterised by the presence of prominent keels, characteristics of nodules, spiral series, and numerous axial ribs. The new species is the oldest microgastropod of this family hitherto reported in Thailand and is also the first record of the genus *Orbitestella*. The presence of this marine microgastropod indicates that the depositional environment was shallow marine deposits.

**Key words.** Gastropod, new species, taxonomy, Holocene, diversity

### INTRODUCTION

Holocene marine transgression was discovered in the lower central plain of Central Thailand from the deposition of the Bangkok clay formation (Choo Wong, 2002; Nimnate et al., 2015). In November 2020, the remains of an ancient Bryde's whale were discovered from Bangkok clay of Amphaeng Sub-district, Ban Phaeo District, Samut Sakorn Province, about 12 kilometres inland from the current coastline, Thailand (DMR, 2021). Carbon-dating of the whale's skeletal remains shows that the whale is  $3,380 \pm 30$  years old and reveals that the Amphaeng area was once part of the sea. Other fauna, such as shells, crabs, ostracods, foraminifera, shark teeth, and pollen, have been found together in the same sedimentary layer of Bangkok clay that the whale's skeleton was deposited.

Gastropods are widely distributed across many environments and throughout the geologic time scale. However, they are scarcely reported from Holocene sediments from Thailand. *Orbitestella* Iredale, 1917, is a genus of the family Orbitestellidae, that has been mostly reported from the Southern Hemisphere (e.g., Ponder, 1967, 1990, 1998; Powell, 1979; Linse, 2002). To date, the only previous record of an orbitestellid from Thailand is *Boschitellina*

*donaldi* Moolenbeek, 1994, from the Andaman Sea reported by Moolenbeek (2007), but it was neither illustrated nor described.

In the present study, a new species of *Orbitestella* from the Holocene sediment of Samut Sakorn Province, Thailand, is described on the basis of shell morphology. The new species represents the first record of this genus in Thailand and is also the oldest gastropod of this family reported in Thailand. This contribution facilitates a better understanding of the biodiversity of molluscs throughout the geologic time scale in Thailand.

### MATERIAL AND METHODS

Holocene sediment samples were collected from Bangkok clay of Amphaeng Sub-district, Ban Phaeo District, Samut Sakorn Province, Thailand (Fig. 1) in November 2020 where the ancient whale's skeleton was found (Fig. 2). The present specimen was picked up from Holocene sediment and cleaned. Photomicrographs were taken by means of a Scanning Electron Microscope (JEOL NeoScope JCM-5000) on pin stub and gold-coated at Department of Mineral Resources, Thailand. The shell was counted for whorl number, and measured for shell height (H), shell width (W), aperture height (AH) and aperture width (AW) from the resulting SEM images. The morphological terminology followed Ponder (1990) and Sasaki (2008). Type material is deposited in the Department of Earth Sciences, Faculty of Science, Kasetsart University under the repository number ESKU-2021-I-001.

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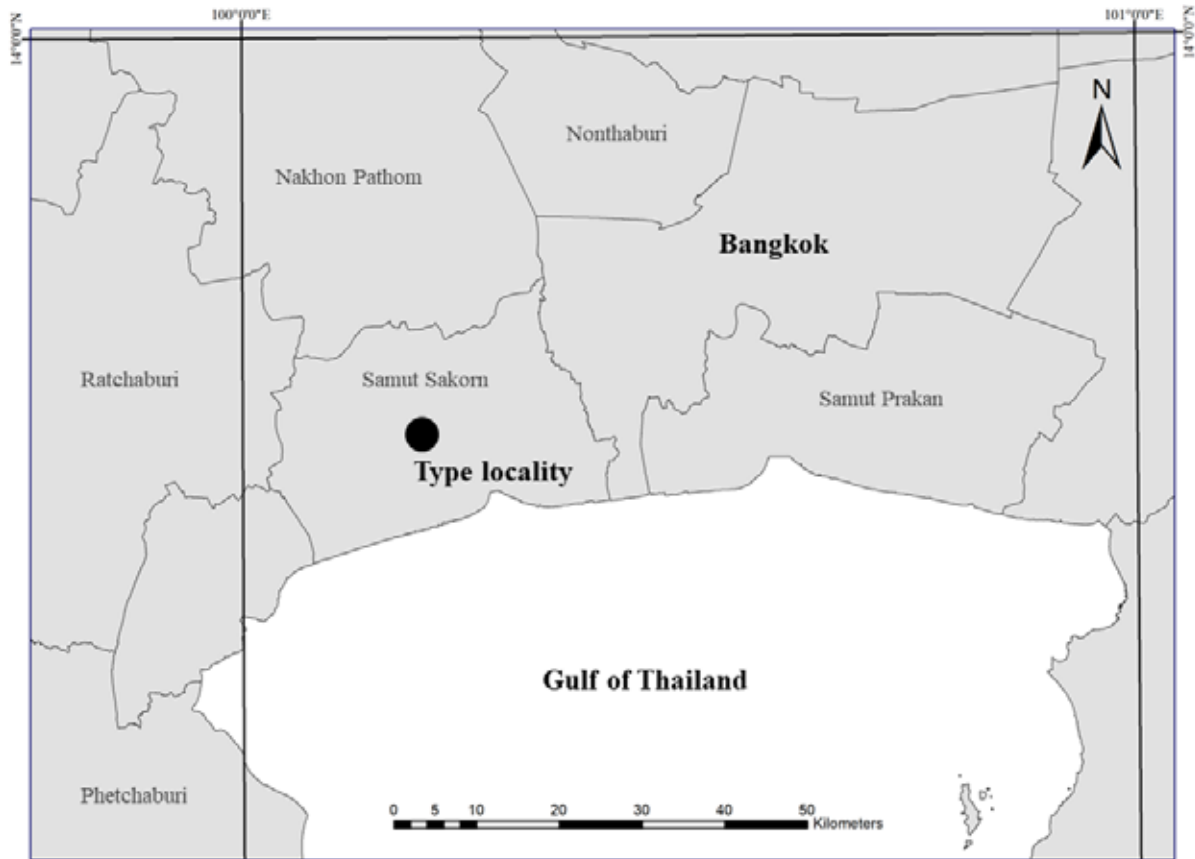


Fig. 1. Approximate location of type locality of *Orbitestella amphaengensis*, new species: Amphaeng Sub-district, Ban Phaeo District, Samut Sakorn Province, Thailand.



Fig. 2. The ancient Bryde's whale remains were discovered from Bangkok clay about 12 kilometres inland from the current coastline, the Gulf of Thailand. Photograph by: Adulwit Kaweera

## TAXONOMY AND SYSTEMATICS

### Superorder Heterobranchia Gray, 1840

### Family Orbitestellidae Iredale, 1917

### *Orbitestella* Iredale, 1917

**Type species.** *Cyclostrema bastowi* Gatliff, 1906.

**Diagnosis.** Shell thin, pellucid, discoidal, dextral, of few whorls and of peculiar sculpture: widely umbilicate; columella vertical; aperture never varied, irregular in shape, edges thin.

### *Orbitestella amphaengensis*, new species (Fig. 3)

**Material examined.** Holotype (H 0.88 mm, W 1.79 mm, AH 0.79 mm, AW 0.86 mm) (ESKU-2021-I-001), Thailand, Samut Sakorn Province, Ban Phaeo District (13°35'52.296"N, 100°11'29.8032"E), coll. C. Ketwetsuriya, 26 November 2020.

**Etymology.** After Amphaeng Sub-district, where the studied gastropod material was found.

**Description.** Shell dextral, minute, discoidal, tightly coiled with a flat spire and widely phaneromphalous. Suture well marked and deeply impressed. Protoconch consisting of ca.

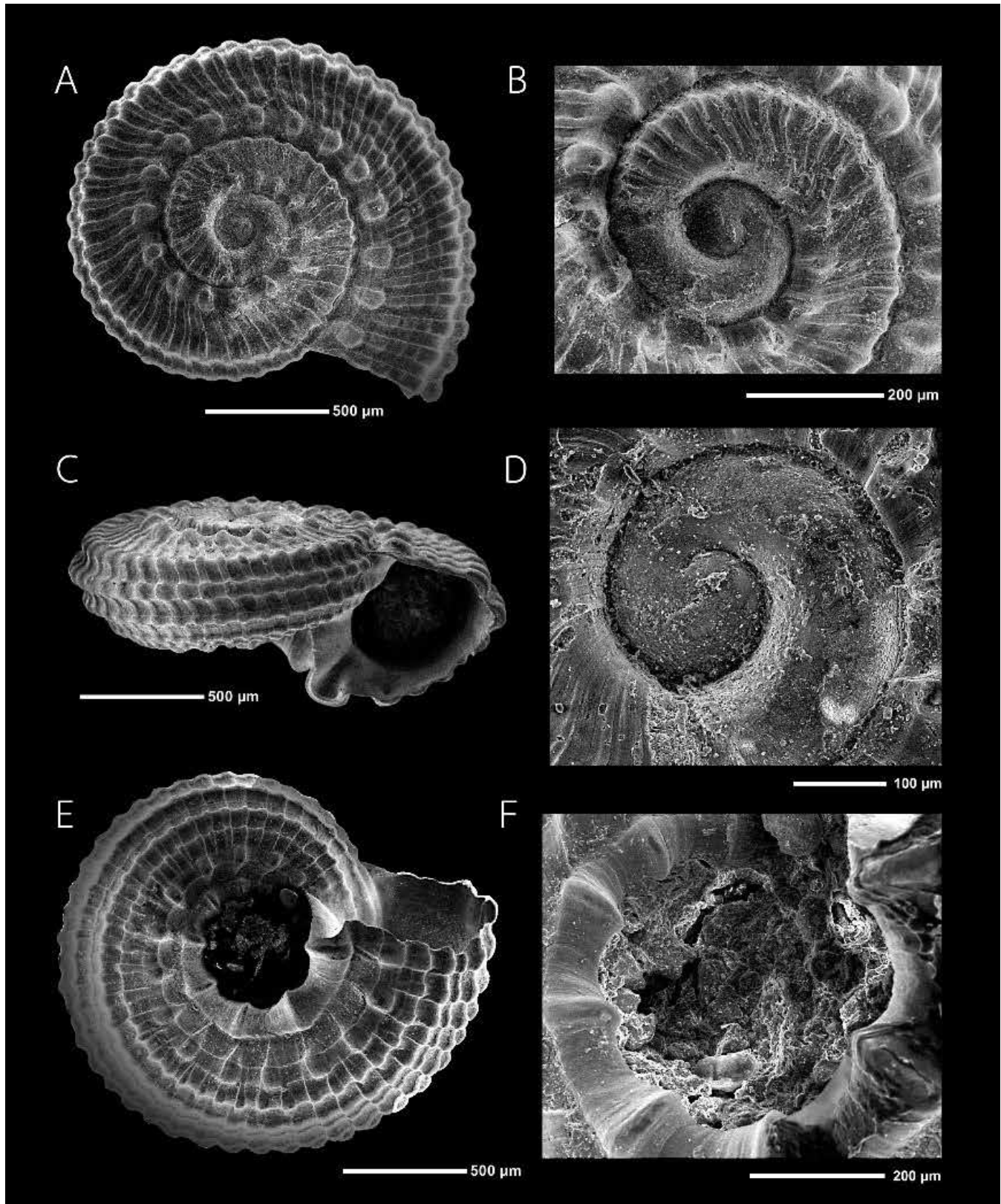


Fig. 3. Holotype of *Orbitestella amphaengensis*, new species (ESKU-2021-I-001). A, apical view; B, early whorl; C, front view; D, protoconch; E, umbilical view; F, close-up of umbilical view.

1.5 whorls, entirely smooth and rounded without visible ornamentation (diameter 320  $\mu\text{m}$  in Fig. 3B, D). Boundary between protoconch and teleoconch conspicuously marked. Teleoconch of ca. 2 whorls; early teleoconch (first  $\frac{1}{4}$  whorl) with the angulation placed just below adapical suture forming crest and one additional angulation situated at the abapical surface forming periphery; whorls sculptured by numerous strongly spaced axial ribs; spaces between axial ribs concave. Later teleoconch whorl ornamented with four prominent spiral carinas; carina 1 located close to adapical suture with row of strong nodules, continuing from crest of early teleoconch; carina 2 placed at a distance of about from the total width of the whorl, becoming from the second angulation of early teleoconch; carina 3 which is the strongest carina on mid-whorl of body whorl forming prominent peripheral keel; carina 4 angulated at transition to base. Whorls densely ornamented with approximately 42 strong axial ribs; intersections of axial ribs and spiral carinas forming prominent elongated nodules at all four carinas, which is strongest and largest at first carina. Whorl face between carinas slightly concave; whorls surface between first and second carinas ornamented with three spiral cords which may be slightly nodular; transition from whorl face to base distinctly angular by fourth carina. Base with up to four distinct spiral cords and weak threads, including one formed by carination after fourth spiral carina. Numerous evenly spaced distinct axial ribs present on whorl face of base; the number of axial ribs decreasing into umbilical area; intersection of basal spiral cords and axial ribs also nodular. Aperture subcircular, four distinct sinuations corresponding to these four carinas; inner lip thin aperture, as wide as high.

**Differential diagnosis.** This single specimen can be differentiated from other *Orbitestella* species by the presence of prominent spiral cords, characteristics of nodules, spiral series, axial ribs, and strong carinas at base. This new species is the most similar to *Orbitestella praetoreuma* Laws, 1939, from New Zealand figured in Beu & Maxwell (1990) in shell shape and having rows of prominent nodules on upper surface. However, the new species differs from *O. praetoreuma* in having much denser and more distinct axial ribs. Moreover, the protoconch of the new species is rounded without visible ornamentation, but that of *O. praetoreuma* is strongly keeled and elaborately sculptured. *Orbitestella amphaengensis*, new species, also resembles *O. bermudezi* (Aguayo & Borro, 1946) as illustrated by Lima et al. (2011) from Brazil. However, *O. bermudezi* has two peripheral cords, while the new species has four prominent spiral cords, and the former species has denser and finer spiral threads and weaker axial ribs on upper whorl surface, is much smaller, and has a shallower umbilicus. *Orbitestella decorata* Laseron, 1954, described from New South Wales has more convex whorls and the keels are not sharp but are broad and low. *Orbitestella patagonica* Simone & Zelaya, 2004, from Argentina has much more rounded whorls without keels and ribs, which distinctly differs from *O. amphaengensis*, new species, in shape and sculpture. *Orbitestella ponderi* Linse, 2002, from Argentina has a more protruding peripheral spiral cord and lacks nodules on upper whorl. *Orbitestella hinemoa* Mestayer, 1919, from New Zealand is also similar

in shape and profile, but *O. hinemoa* differs in details of ornaments such as the presence of nodules, spiral threads, and axial ribs.

**Distribution.** This new species is only known from the type locality thus far (Fig. 1).

## ACKNOWLEDGEMENTS

We are gratefully thankful to Chatchai Sukserm, Earth Sciences student, Faculty of Science, Kasetsart University for collecting and preparing the sediment samples. Doungrutai Saesaengseerung, Fossil Protection Division, Department of Mineral Resources for her help with SEM work. We are indebted to Pannipa Saetian, Department of Mineral Resources for helping with the fieldwork. We would like to thank Adulwit Kaweera for providing his photograph and helping with the fieldwork. Anonymous reviewers are acknowledged for reviewing this paper.

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