

Two new species of Naticidae (Mollusca, Gastropoda) from the coast of China

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Received 5 January 2007; accepted 30 June 2007

Abstract

Two new species of Naticidae (Mollusca, Gastropoda) collected from the coast of China are described: *Cryptonaitca huanghaiensis* sp. nov. and *Sinum vittatum* sp. nov. The morphological characteristics between the new species were described and the related information was provided. The similarities and differences between the new species and related species were also compared and discussed. The new species *Cryptonaitca huanghaiensis* differed from *Cryptonaitca hirasei* and *Cryptonaitca andoi* in outer shape, operculum and radula. The new species *Sinum vittatum* is similar to *Sinum japonicum* (Lischke, 1869), but the shell of the former is flat-elliptical in shape, spire very small, slightly convex. While the latter is flat-globular in shape, apex light brown in color, without a brown band on the body whorl. The comparison results revealed that *Cryptonaitca huanghaiensis* and *Sinum vittatum* were two new species from the coast of China. Specimens studied were obtained from collections in the Marine Biological Museum, Chinese Academy of Sciences.

Key words: Mollusca, Gastropoda, Naticidae, new species, China seas

1 Introduction

The family Naticidae is a well-known family of Gastropoda Mollusca widely distributed in most coastal waters of the world, from tropical, subtropical to polar regions. Up to the present, about 400 species were recorded worldwide, and more than 70 species were found in China seas. Most species of this family inhabit sand, muddy-sand and muddy substrates from the intertidal zone to shallow waters. A few of the species live in deeper water. In China,

the distribution of the family Naticidae occurs from the northern Huanghai Sea to the South China Sea.

The shell of Naticidae usually is globose-ovate or ear-shaped. The body whorl is large and inflated, and spire low, the shell surface is smooth or ornamented with spiral striae and axial growth lines. The aperture is usually semicircular or ovate in shape, and the operculum is thick, corneous or calcareous.

In the past years, Ma and Zhang (1994), Zhang and Ma (1997) and Zhang (2003) studied the taxonomy in the family Naticidae in China. A total of 65 species belonging to three subfamilies were repor-

Foundation item: The National Natural Science Foundation of China under contract Nos KZCX2-YW-417 and 30470217.

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ted. Recently, the author examined the specimens obtained from collections in the Marine Biological Museum, Chinese Academy of Sciences, and two new species, *Cryptonatica huanghaiensis* and *Sinum vittatum*, were found in the collections from the Beibu Gulf and the northern Huanghai Sea.

2 Materials, methods and description

Genus *Cryptonatica* Dall, 1892

Cryptonatica Dall, 1892, Trans. Wagner Inst. Sci., 3: 362

Type species: *Natica clausa* Broderip & Sowerby, 1829

2.1 *Cryptonatica huanghaiensis* sp. nov. (Figs 1a—e)

Natica hirasei Pilsbry, Ma et Zhang, 1994, 4: 11, pl. 2, Fig. 11 (not *Natica hirsaei* Pilsbry, 1905).

Type materials. Holotype—the northern Huanghai Sea, the Dalian Bay, depth 40 m, in muddy-sand and gravel bottom.

11 paratypes. Collected from the northern Huanghai Sea (north to 38°N) and the Dalian Bay, depth 47 m, in mud and muddy-sand bottom.

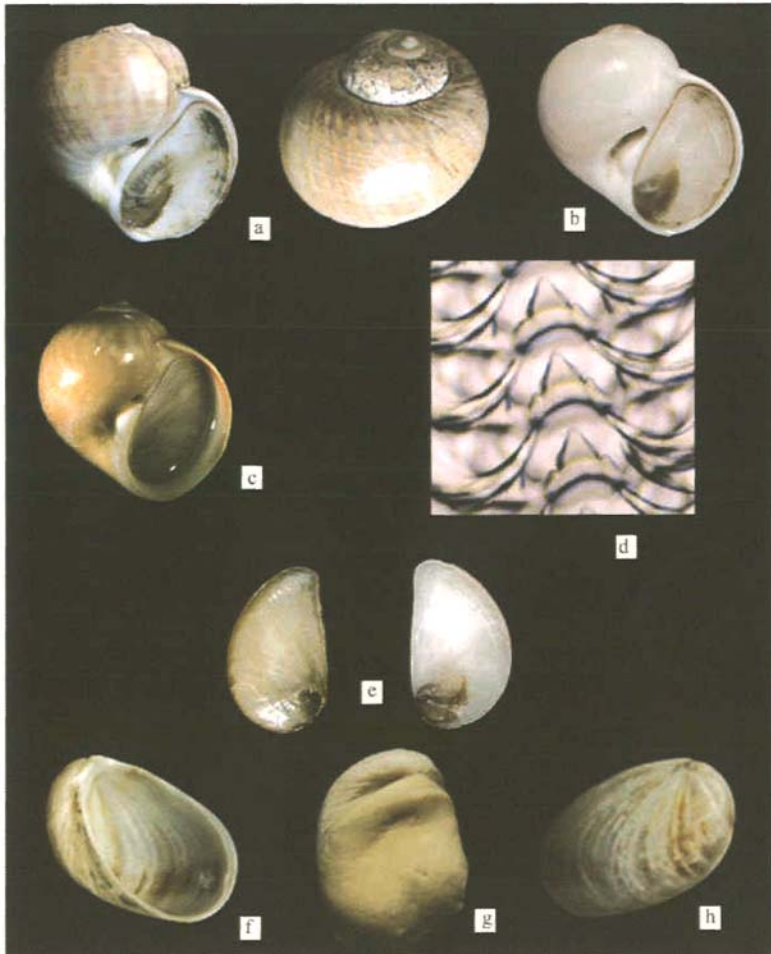


Fig. 1. *Cryptonatica huanghaiensis* sp. nov. and *Sinum vittatum* sp. nov. a—e. *Cryptonatica huanghaiensis* sp. nov. a. Holotype, b and c. Paratype, d. Radula, e. Operculum, and f—h. *Sinum vittatum* sp. nov.



Fig. 2. Morphological comparison of new species and similar species. a. *C. huanghaiensis*, b. *C. andoi* and c. *C. hirasei* (from Okutani, 2000).

Description. Shell moderate in size, nearly globose, solid, with 4 ~ 5 whorls, suture shallow. Spire low, body whorl large and round. Shell surface smooth, yellowish-brown and/or yellowish-white in color, base white, with irregular wavy longitudinal purple-brown lines and flecks on body whorl. Some specimens without weak flecks. Aperture large, semicircular, inner aperture gray-white or light brown in color, outer lip semicircular; inner lip nearly straight, parietal callus thick, columellar callus semilunate, umbilicus small and deep. Operculum calcareous, semicircular, white in color, with two shallow marginal grooves, and a fine rib between the two grooves. Nucleus large, dark-brown, located at the inner lower part.

Holotype. Shell length 33.0 mm, breadth 31.0 mm.

Paratypes. Shell length 17.0 mm, breadth 16.5 mm.

Holotype and 11 paratype specimens are deposited in the Marine Biological Museum, Chinese Academy of Sciences (Qingdao).

Habit. Cold-temperate species. Found on mud, muddy-sand and gravel substrates in the 45 ~ 60 m depth in the northern Huanghai Sea. Uncommon.

Distribution. Collected only from the northern Hanghai Sea and the Dalian Bay.

Remarks. The new species is similar in shape to *Cryptonaitca hirasei* (Pilsbry), but differs from the latter in the following three respects: (1) *Cryp-*

tonaitca hirasei has a nearly round columellar callus that completely covers the umbilicus; the new species has a smaller columellar callus that does not completely cover the umbilicus; (2) the new species has two shallow marginal grooves on the operculum, while *Cryptonaitca hirasei*'s operculum is smooth and without grooves, the margin having only a fine rib; (3) the flecks on the shell surface of the two species are also different. The color of new species varies, among the 12 specimen collected, one is yellowish-white in color (Fig. 3), without flecks.

The new species is similar in shape to *Cryptonaitca andoi* (Nomura, 1935), but differs from the latter in the following respects: the body whorl of *Cryptonaitca andoi* with 2 white color bands, and the operculum with 1 thick rib and 2 thin marginal grooves; whereas the operculum of the new species with 2 wide shallow marginal grooves and 1 thin rib (Figs 3a and b).



Fig. 3. Morphological comparison of opercula. a. Operculum of *Cryptonaitca huanghaiensis* and b. operculum of *Cryptonaitca andoi*.

Anatomical study on the radula showed that the radula of new species is identical with that of the genus *Cryptonaitca* described by Golikov and Sirenko (1988). However, the comparison between the radula of the new species and that of *Cryptonaitca andoi* showed the central tooth is different from each other, which verifies they belong to different species (Figs 4a and b).

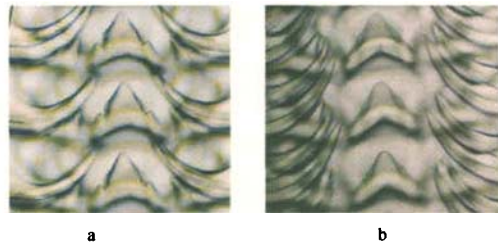


Fig. 4. Morphological comparison of radulas. a. Radula of *Cryptonaitca huanghaiensis* and b. radula of *Cryptonaitca andoi*.

A *t*-test was conducted to compare the morphological differences between the samples of *Cryptonaitca huanghaiensis* and *Cryptonaitca andoi*. The results showed the length, breadth and aperture height of the two species samples were significantly different (Table 1).

Genus *Sinum* Reoding, 1798
Sinum Roeding, 1798, Mus. Bolten., p. 14
Sigaretus Lamarck, 1799, Mem. Soc. Nat. Hist. Paris, p. 77
Type species: *Sinum haliotideum* Roeding, 1798 = *Helix halioidea* Linnaeus, 1758.

2.2 *Sinum vittatum* sp. nov. (Figs 1f—h)

Type material. Holotype—South China sea, the Beibu Gulf (21°56'N, 109°30'E), depth 21 m, in muddy-sand and muddy bottom.

Table 1. *t*-test results of length, breadth and aperture height of *C. huanghaiensis* and *C. andoi* samples

Species	Sample No.	Length (mean plus or minus SD)	Breadth (mean plus or minus S D)	Aperture height (mean plus or minus SD)
<i>C. huanghaiensis</i>	9	25.4 ± 6.1	24.2 ± 5.9	19.2 ± 4.4
<i>C. andoi</i>	10	36.1 ± 10.3	33.25 ± 9.7	26.9 ± 7.8
<i>t</i> -test		<i>P</i> < 0.05	<i>P</i> < 0.05	<i>P</i> < 0.05

Description. Shell small, flattened elliptical in shape, thin and fragile, with 4 whorls, suture shallow. Spire very small, slightly convex, body whorl especially large. The surface with thin spiral cords and radial ridges. Shell white in color, with a brown band on the body whorl. Aperture large and oblique, interior white, outer lip thin and curved, upper part of the inner lip expanding slightly and covering the umbilicus, which is reduced to a narrow slot. Animal large and unable to draw back completely into its shell. Usually there is a corneous operculum in *Sinum*, however, the operculum was not observed in the new species.

Holotype. Shell length 12.5 mm, breadth 18.5 mm.

Holotype deposited in the Marine Biological Museum, Chinese Academy of Sciences (Qingdao).

Habit. Tropical species. Found on muddy and sandy bottom in shallow water. Uncommon.

Distribution. Collected only from the Beibu Gulf, the South China Sea.

Remarks. The new species is similar to *Sinum japonicum* (Lischke, 1869), but the shell of new species is flat-elliptical in shape, spire very small, slightly convex, while *Sinum japonicum* is flat-globular in shape, apex light brown in color, without a brown band on the body whorl, spire relatively high.

Acknowledgements

The author thanks Mr. Wei Peng for his help in radula anatomy and photography.

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