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Short communication

First report of *Vexillum zelotypum* Reeve 1845 (Costellariidae: Neogastropoda) in Korea

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ABSTRACT

The costellariid gastropod *Vexillum zelotypum* Reeve 1845a is reported for the first time on Jeju Island. Four Costellariidae species are now part of the island's mollusk fauna. Comparisons are made with the original description and descriptions in the literature; some taxonomic comments are also made. The addition of new record to the island's fauna may be the result of previous insufficient sampling, global warming, and possible changes in the warm currents flowing northward to Japan and Korea.

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Introduction

Jeju Island, 33.10–33.50 North, 126.10–127.0 East, is Korea's largest and southernmost island with an area of about 1,800 km². It is situated about 80 km south of the Korean peninsula. Although cooler water currents, particularly from the eastern area of the Yellow Sea, exert some influence, the warm Tsushima Current, a branch of the Kuroshio flowing from the southwest, gives the island a warm maritime climate with mild winters and hot, humid summers, and an average yearly temperature of approximately 16°C (Chung 2007; Chen 2009). Jeju Island has a rich mollusk fauna, with over 1000 species presently recorded. This fauna is probably a combination of warm temperate (from central Japan to the Yellow Sea) and tropical and subtropical species (from southern Japan to Indo-West Pacific) (Noseworthy et al 2007).

The second author has conducted extensive surveys to enumerate the mollusk fauna, with special attention to its biodiversity, biogeography, and ecology. As a result of those surveys, several species new to the island fauna have been reported (Noseworthy and Choi 2010; Noseworthy et al 2012; Noseworthy et al 2014).

The family Costellariidae, which belongs to the Neogastropoda, consists of about 300 species, and most occur in tropical to

temperate zones. At present, three species have been reported from Korea (Noseworthy et al 2007; Noseworthy and Choi 2010). Here we report the discovery of the costellariid *Vexillum zelotypum* Reeve 1845a, the first record of this species for Korea.

Materials and methods

A mollusk survey was conducted at Yerae-dong, on the south coast of Jeju Island, on September 10, 2015 (Figure 1). The sampling area, a moderately high-energy coast, faces the East China Sea, and is composed mainly of rather flat shelves of basalt interspersed with tidepools of various sizes and depths.

One dead specimen of *V. zelotypum* Reeve 1845a was found under a rock in one of the tidepools. The specimen was washed, dried, and registered at the National Marine Biodiversity Institute of Korea. As the specimen was dead, no anatomical examination could be made. Identification of the specimen was made using the English translation of the original description written in Latin (Reeve 1845a), Reeve (1845b), and the first illustration of the type specimen (Reeve 1845c; Figure 2B), and Okutani (2000).

Systematic account

Order Neogastropoda Wenz, 1938
Family Costellariidae MacDonald, 1860
Genus *Vexillum* Röding, 1798

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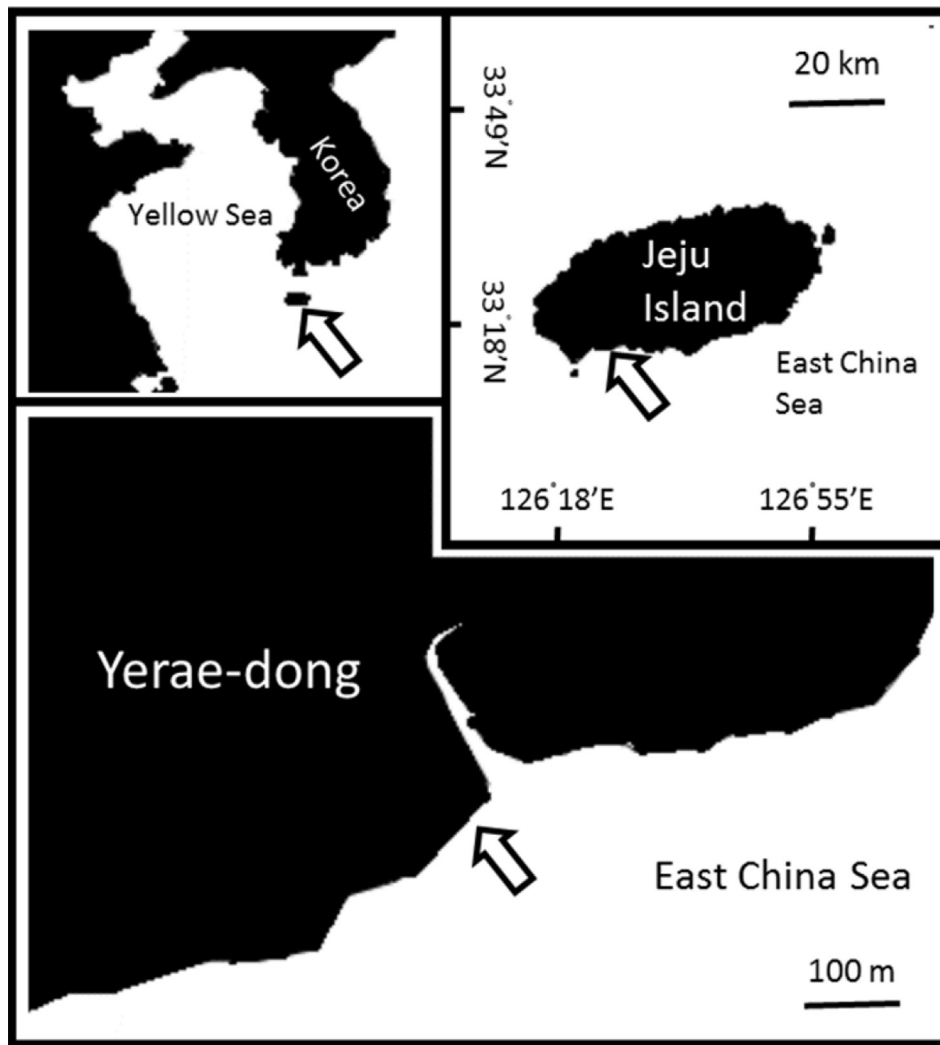


Figure 1. Survey site of *Vexillum zelotypum* Reeve 1845a.

***Vexillum zelotypum* Reeve 1845a** (Figure 2A)

Mitra zelotypa Reeve 1845a: 60; Reeve 1845b: 271–272; Reeve 1845c: pl. 38, Figure 325.

Costellaria zelotypa: Adams 1864: 200; Higo and Goto 1993: 261; Okutani 2000: 563, pl. 280, no. 47.

Turricula (Pusia) zelotypa: Tryon, 1882: 182, pl. 54, Figure 558.

Vexillum zelotypa: Chernohorsky, 1970: 55.

Vexillum (Costellaria) zelotypa: Turner, 2001: 69.

Type locality. Not designated; “A very distinct species from Mr. Cuming’s collection, concerning which he has no information as to its locality.” (Reeve 1845c)

Material examined. Jeju Island, Seogwipo-shi, Yerae-dong, 33°14′23.42″ North, 126°23′49.22″ East; September 10, 2015 (1 adult specimen).

Dimensions. Length 21.0 mm; width 10.3 mm.

Description. Shell fusiform; body whorl inflated, especially at shoulders. Strong axial ribs over-ridden by spiral riblets, creating a fenestrated (window-like) sculpture. Ashy-gray with pale red–brown or yellowish band. Axial interstices somewhat darker in color; spire may be spotted with rusty brown. Aperture pinkish and

narrow; columella and aperture sometimes spotted or streaked with purple. Columellar lip with three or four rather strong plicae (Figure 2A).

Habitat. Rock and gravel bottom, from subtidal zone to depth of 30 m (Okutani 2000).

Distribution. Korea (Jeju, new record), From Kii Peninsula, Japan to Indo-Pacific (Okutani 2000).

Discussion

Although somewhat worn, the Yerae-dong specimen agrees well with the English version of the original description of *Mitra zelotypa* in overall shape and sculpture (Reeve 1845b). Reeve (1845b) mentions the longitudinal ribbing which is “strongly, clearly cancellately ridged”, as well as four prominent columellar lirae, and also the pale violet aperture. He displays only the dorsal aspect of the type specimen in his illustration (Reeve 1845c; Figure 2B). The Yerae-dong specimen is less elongate, with a slightly angulate periphery and with only three columellar folds, but exhibits the well-developed cancellate sculpture. Furthermore, this specimen, although somewhat worn, also possesses traces of the

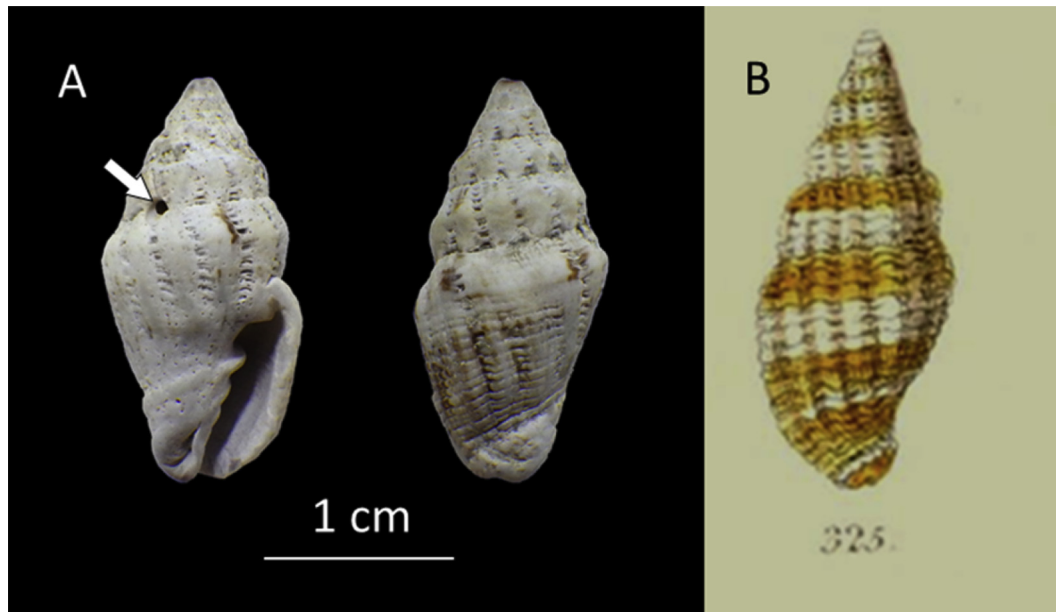


Figure 2. *Vexillum zelotypum* Reeve 1845a. A, Yerae, Jeju Island, Arrow: a hole probably drilled by carnivorous muricid gastropod; B, Type specimen of *Mitra zelotypa* Reeve 1845a (from Reeve 1845c).

broad yellowish area on the body whorl, seen best on the dorsum, and the whitish band below the periphery. Traces of the yellowish band below the suture are also present, as is the faint violet aperture (Figure 2B).

It also closely resembles the specimen Figured in Okutani (2000). The fenestrations are well-defined, and appear characteristic of this species. Furthermore, both specimens exhibit three prominent columellar lirae and siphonal fasciole. However, the specimen from Yerae-dong is roundly angulate at the periphery and possesses a protrusion on the inner lip at the posterior end of the aperture that resembles a small tooth. According to Okutani (2000), the color is “ashy grey with a white band at periphery”; the base color of the Yerae-dong specimen is grayish, with evidence of a white band, and with traces of yellow banding. Both specimens also exhibit a faint pinkish-mauve aperture.

Reeve first published the original description of *Mitra zelotypa* in the *Proceedings of the Zoological Society of London*, in September, 1845 (Reeve 1845b) using the record of a meeting where the description was read in 1844. Sometimes 1844 is given as the date of publication because the meeting was held and recorded in 1844, but it appears that 1845 is the correct date (Petit 2007; Rosenberg and Bouchet 2015).

Cernohorsky (1970) regarded *V. zelotypa* as a synonym of *Vexillum (Costellaria) rusticum* Reeve 1845a. However, it is widely accepted that *V. zelotypum* is a valid species (Héros et al 2007, Rosenberg and Bouchet 2015). Conversely, Higa (1983) considers *V. rusticum* Reeve 1845a to be a synonym of *V. zelotypum* although the former species is generally regarded as valid (Robin 2015).

The addition of new species to the island’s fauna may be not only be the result of previous insufficient sampling, but also climate change due to a change in the warm Tsushima Current (Japan Meteorological Association 2015), and global warming. A drill hole, approximately 1 mm in diameter, was observed on the left side of the shell (Figure 2A), suggesting that the present specimen had become the prey of a carnivorous gastropod. Feeding on other gastropods has been observed in some costellariids (Maes and Ræihle 1975); *V. zelotypum* may have played a role as a predator in the survey area.

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