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# SINGAPORE MOLLUSCA: 8. THE FAMILY APLUSTRIDAE (GASTROPODA: HETEROBRANCHIA: ACTEONOIDEA)

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***ABSTRACT.*** — The family Aplustridae, occurring in the waters of Singapore, is reviewed. The family is represented in Singapore waters by *Hydatina albocincta* and *Hydatina zonata*. Diagnoses, figures, records, and other information on both species are provided as part of an effort to document the diversity of the malacofauna in Singapore.

***KEY WORDS.*** — Mollusca, *Hydatina*, Singapore, taxonomy, synonyms, records

## INTRODUCTION

In this instalment of a group-by-group treatments of the molluscs found in the Republic of Singapore (see Tan & Low, 2013, 2014; Ng et al., 2014), the family Aplustridae J. E. Gray, 1847, is reviewed. Hitherto two aplustrid species, *Hydatina albocincta* (van der Hoeven, 1839), and *Hydatina zonata* (Lightfoot, 1786), have been recorded. However, the presence of only *Hydatina zonata* could be confirmed by recent sightings and collections. Details of records in the literature, and notes of interest are included.

The Aplustridae is a small family of sea slugs comprising about a dozen valid species found in the tropics worldwide. Its members bear a rather thin and generally ovate shell with a large aperture and a low or sunken spire. The living animals are colourful and flamboyant, and although the animals are relatively large, they are capable of withdrawing completely or almost completely into their shells. All species are predators that appear to feed exclusively on cirratulid polychaete worms, which are swallowed whole (Rudman, 1972; Gosliner et al., 2008). Secondarily derived toxins are also sequestered from their polychaete prey for their own protection (Gosliner et al., 2008).

## MATERIAL AND METHODS

Records were collated from the available literature, and geographically-relevant material in various collections was examined. Primary synonyms and records mentioning Singapore are listed. Abbreviations of the collections from which specimens were examined in the course of this study are: ZRC = Zoological Reference Collection, Lee Kong Chian Natural History Museum (LKCNHM), National University of Singapore (NUS); TSK = collection of the first author; and CLN = collection of the third author. Measurements are given in the form of shell height (SH) × shell width (SW). Shell height is defined as the longest distance from the posterior (apical side) to the lowest part of the basal side of the peristome, and shell width is the distance between the edges of the widest part of the body whorl perpendicular to the coiling axis. All measurements are in millimetres (mm). Herein, the 'International Code of Zoological Nomenclature' is abbreviated as the Code (ICZN, 1999).

## SYSTEMATIC PART

### SUPERFAMILY ACTEONOIDEA D'ORBIGNY, 1843

Actaeoninae d'Orbigny, 1843: 106 (type genus *Acteon* Montfort, 1810).

***Remarks.*** — The family-group name Acteonoidea was first made available at the family-level (as Acteonidae) by d'Orbigny (1843: 106).

## FAMILY APLUSTRIDAE GRAY, 1847

Aplustridae Gray, 1847: 162 (type species *Aplustrum* Schumacher, 1817).
Hydatinidae Pilsbry, 1895: 385 (type species *Hydatina* Schumacher, 1817) [junior homonym of Hydatinidae Ehrenberg, 1838, see Remarks for the family].

***Remarks.*** — The family-group name Aplustridae was first made available as "Amplustrina" by Gray (1847: 162). The spelling Amplustrina was based on the name "*Amplustrum*" an incorrect subsequent spelling of *Aplustrum* Schumacher, 1817 (see Bouchet & Rocroi, 2005: 28). It is correctly spelled as Aplustridae. The family-group name Hydatinidae Pilsbry, 1895, is based on the genus-group name *Hydatina* Schumacher, 1817, but is a junior homonym of Hydatinidae Ehrenberg, 1838 (originally spelled as "Hydatinaea", see Ehrenberg, 1838: 410), for a grouping of rotifers. Hydatinidae Pilsbry, 1895, is therefore not an available name, in addition to being synonymous (and a junior subjective synonym of) the family-group name Aplustridae Gray, 1847 (see Bouchet & Rocroi, 2005: 90).

### Genus *Hydatina* Schumacher, 1817

*Hydatina* Schumacher, 1817: 57, 186, 187 (type species *Hydatina filosa* Schumacher, 1817 [= *Hydatina physis* (Linnaeus, 1758), see remarks below], by monotypy; gender feminine).
*Hydatoria* Iredale, 1936: 334 (type species *Bulla cinctoria* Perry, 1811, by original designation) [not and available name as no description/diagnosis was given and name was published after 1930 (see Article 13.1.1 of the Code, ICZN, 1999: 17)].

***Remarks.*** — The type species of *Hydatina* Schumacher, 1817, is *Hydatina filosa* Schumacher, 1817, by monotypy, and not by subsequent designation (e.g., Voskuil, 1995: 29) (see Article 68.3 of the Code, ICZN, 1999: 71). *Hydatina filosa* Schumacher, 1817, was proposed as a substitute name for *Bulla physis* Linnaeus, 1758, and both names are therefore objective synonyms (Article 61.3.4, ICZN, 1999: 64).

### *Hydatina albocincta* (van der Hoeven, 1839)

(Fig. 1)

*Bulla albocincta* van der Hoeven, 1839: 245–247, pl. 10 (type locality: China).

**Singapore records:**
*Hydatina albocincta* – Chuang, 1973: 199 [first record]. — Tan & Woo, 2010: 51 (after Chuang, 1973; Chou et al., 1994). — Wang et al., 2011: 406 [the unnumbered fig. is *Hydatina zonata*, not *Hydatina albocincta*].
*Hydatina albocinata* [sic] – Chou et al., 1994: 75.

***Material examined.*** — **Philippines**: Manila Bay (TSK 6205), 1990s.

***Distribution in Singapore.*** — Data unavailable.

***Habitat.*** — Sand bottom, intertidal zone to 100 m deep (Hori, 2000).

***Diagnosis.*** — The following diagnosis is adapted from Voskuil (1995). Shell medium-sized, globose and thin, to about 40 mm shell height; body whorl very large, smooth with numerous axial lines; shell colour dirty white, usually with four brown bands which are not bordered by black lines.

***Remarks.*** — Neither specimens or photographic records nor identifiable records of *Hydatina albocincta* from Singapore could be located during the course of this study (see ***DISCUSSION***). Photographs of a live animal (Fig. 1A) and shell (Fig. 1B), from Papua New Guinea and the Philippines respectively, are herein figured for illustrative purposes. This species can be easily differentiated from *Hydatina zonata* by the alternating, usually four, white and brown spiral bands on the body whorl (see also ***Remarks*** for that species).

The largest of van der Hoeven's syntypic specimens (RMNH 56617) was selected as the lectotype by van der Bilj & Voskuil (1993).

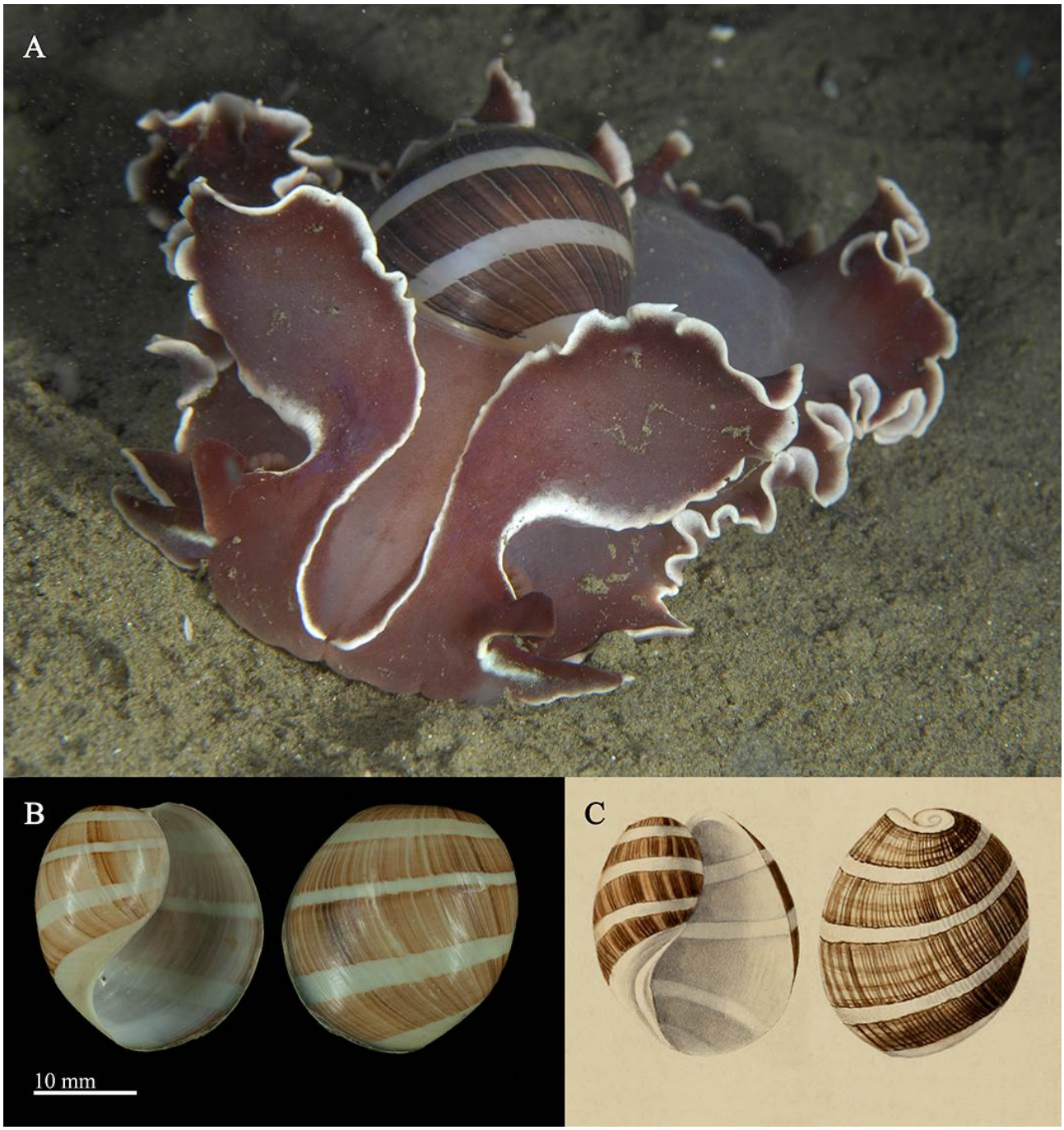


Fig. 1. *Hydatina albocincta* (van der Hoeven, 1839): A, live animal in situ from Papua New Guinea; B, shell from Manila Bay, the Philippines (TSK; SH 25.0 × SW 22.5 mm); C, Original figure of *Bulla albocincta* reproduced from van der Hoeven (1839: pl. 10). (Photographs by: Alicia Hermosillo [A] and S. K. Tan [B]).

### ***Hydatina zonata* (Lightfoot, 1786)**

(Figs. 2, 3)

*Bulla zonata* Lightfoot, 1786: 8, 164 (type locality: Coromandel Coast, India [“Coromandel”]).
*Bulla circulata* Martyn, 1789: unnumbered pl., fig. 95 (type locality: none stated/traced) [not an available name, see Remarks for this species].
*Bulla velum* Gmelin, 1791: 3433, sp. 36 (type locality: none stated/traced).
*Bulla cinctoria* Perry, 1811: unnumbered plate caption, pl. 40, *Bulla* fig. 1 (type locality: none stated/traced).
*Hydatina vexillum* G. B. Sowerby II, 1868: unnumbered plate caption, pl. 2, fig. 4 (type locality: Sri Lanka [“Ceylon”]).
*Hydatina inflata* Dunker, 1877: 69, 70 (type locality: Japanese seas [“maris Japonici”]).
*Bulla fasciata* Bruguière, 1792: 380 (type locality: Tharangambadi, India [“Tranquebar”]) [after Voskuil, 1995: 36].

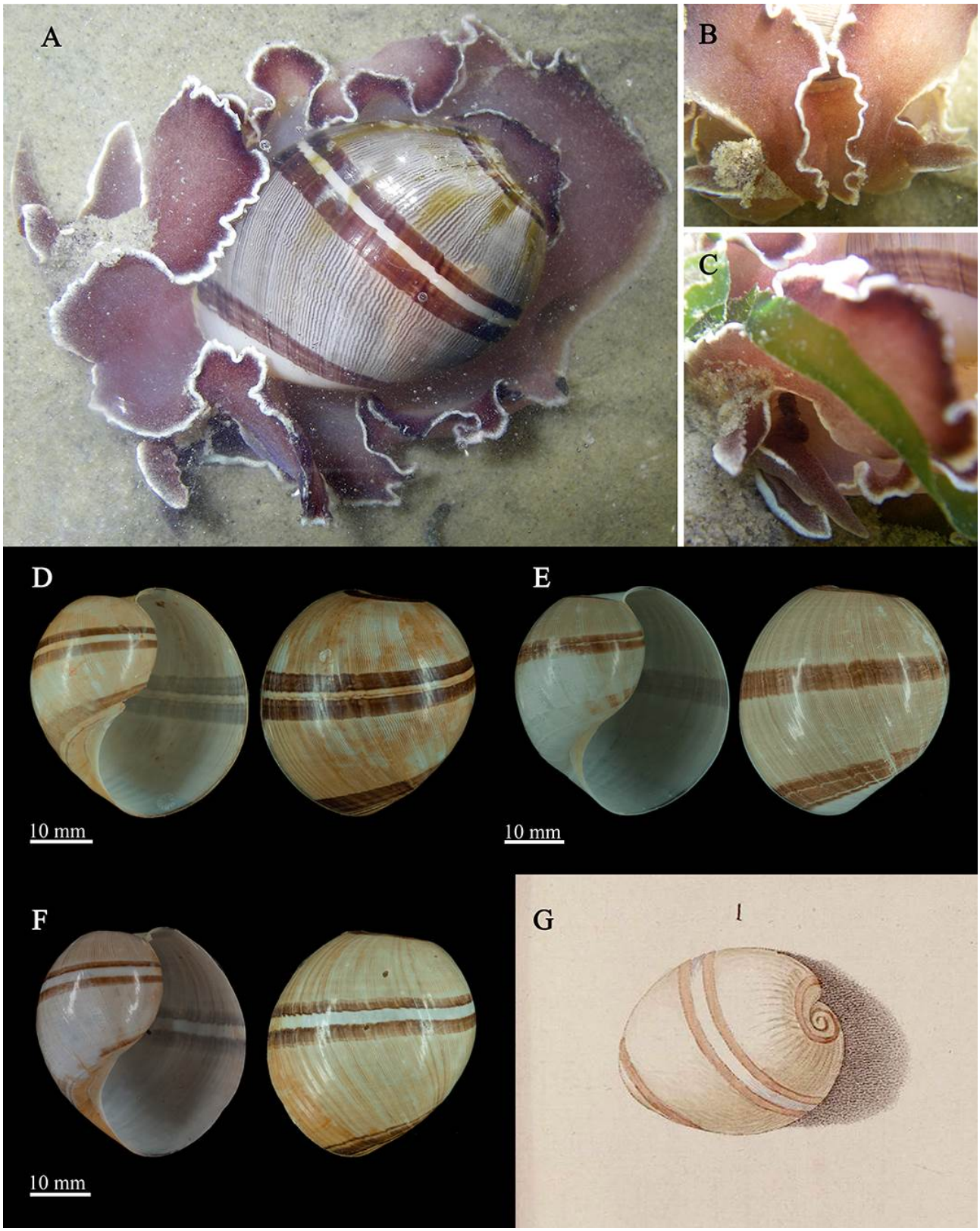


Fig. 2. *Hydatina zonata* (Lightfoot, 1786): A–C, live animal from Chek Jawa, Pulau Ubin, Singapore (B–C, closer look at the well-developed tentacular processes of the headshield); D–F, shells from Sungei Loyang area, Pasir Ris, Singapore (CLN; D, SH 37.1 × SW 35.3 mm; E, SH 40.1 × SW 36.1 mm; F, SH 38.5 × SW 34.6 mm); G, Syntype of *Bulla zonata* Lightfoot, 1786, figured by Born (1780: pl. 9, fig. 1; as *Bulla amplustre*). (Photographs by: C. H. Toh [A–C] and S. K. Tan [D–F]).

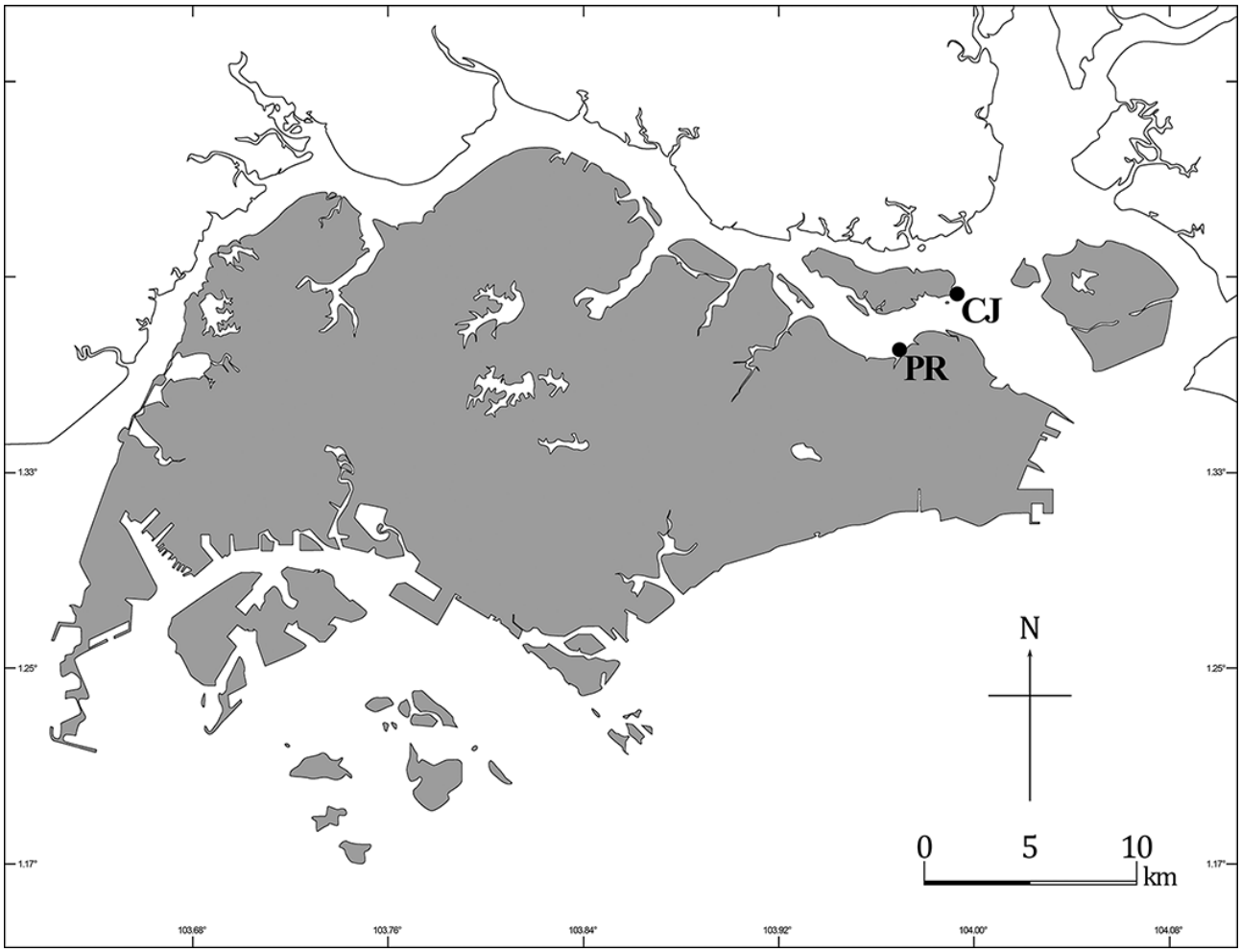


Fig. 3. Distribution of *Hydatina zonata* (Lightfoot, 1786) in Singapore based on material examined in this study. Locations where *Hydatina zonata* has been found: PR, Pasir Ris (vicinity of Sungei Loyang); CJ, Pulau Ubin (Chek Jawa). Data for *Hydatina albocincta* (van der Hoeven, 1839) is unavailable.

**Singapore records:**

*Hydatina velum* – Chuang, 1973: 199 [first record]. — Chou et al., 1994: 75.

*Hydatina zonata* – Tan & Woo, 2010: 51 (after Chuang, 1973; Chou et al., 1994). — Wang et al., 2011: 406, unnumbered fig. [erroneously captioned as *Hydatina albocincta*].

***Material examined***. — **Singapore.** Pasir Ris: near mouth of Sungei Loyang (ZRC.MOL.2918), muddy sand at low tide, 27 Dec.2007; near Sungei Loyang (CLN), empty shells and fresh dead animals washed up along strandline, Dec.2007. Pulau Ubin, Chek Jawa (ZRC.MOL.5709), in seagrass lagoon, 4 Jan.2014.

***Distribution in Singapore*.** — See Fig. 3.

***Habitat.*** — Muddy sand or fine sand bottom, from the intertidal zone to 50 m deep (Hori, 2000; pers. obs.).

***Diagnosis*.** — The following diagnosis is adapted from Voskuil (1995). Shell medium-sized, globose and thin, to about 40 mm shell height; body whorl very large, smooth with numerous axial lines; shell colour yellowish white, with two broad greyish brown bands bordered by thin to comparatively wide dark brown lines.

***Remarks*.** — Although shell colouration and patterning are generally not regarded as reliable characteristics, these appear to be the most reliable and consistent taxonomic characters in differentiating *Hydatina zonata* from *Hydatina albocincta*. The two can be easily distinguished by the band patterns on their shells even with variations taken into consideration. Shells of *Hydatina zonata* seem to be usually more globose while that of *Hydatina albocincta* is more commonly somewhat elongate or constricted at the posterior end, but significant overlapping variations exist for this to be a useful character.

The name *Bulla zonata* Lightfoot, 1786, was based on a shell identified and figured as *Bulla amplustre* Linnaeus, 1758 by Born (1780: 204, pl. 9, fig. 1). *Bulla amplustre* Linnaeus, 1758, is now generally accepted as *Hydatina amplustre* (Linnaeus, 1758) (e.g., Voskuil, 1995; Hori, 2000; Gosliner et al., 2008), and the shell figured by Born (1780: pl. 9, fig. 1) is clearly not conspecific with this species. The work entitled 'The Universal Conchologist' by Martyn (1784–1787) is not available for nomenclatural purposes (see ICZN, 1956). The species-group name *Bulla vexillum* G. B. Sowerby II, was published in 1868 not 1867 (see Petit, 2009: 50).

## DISCUSSION

*Hydatina albocincta* and *Hydatina zonata* are both widely distributed throughout the tropical Indo-Pacific (see Voskuil, 1995), and were first recorded from Singapore by Chuang (1973). However, because no specimen or photographic record of *Hydatina albocincta* could be located, it remains unclear if there could have been confusion since misidentification of the two species is not uncommon (e.g., Gosliner et al., 2008; Wang et al., 2011). It is thus possible that only one species occurs in Singapore. Nevertheless, as Singapore is located within the known distribution range of *Hydatina albocincta*, it is here provisionally regarded as a valid record for the local malacofauna. Future reports to confirm its presence will be desirable.

## ACKNOWLEDGEMENTS

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