

***Trifarcidium morrisoni* spec. nov., a deep water cardiid from off Western Australia, with notes on *T. nomurai* Kuroda & Habe, 1951 (Bivalvia, Cardiidae)**

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*Trifarcidium morrisoni* spec. nov. is described from Western Australia and compared with *T. nomurai*. A range extension of the latter is given.

Key words: Bivalvia, Cardiidae, *Trifarcidium*, systematics, new species, Australia, Japan, Indo-West Pacific.

The genus *Trifarcidium* Kuroda & Habe, 1951 is so far considered to be monotypic, with *T. nomurai* Kuroda & Habe, 1951, as type species. This species is confined to Japan (Higo et al., 1999; Okutani, 2000), the South China Sea (Higo et al., 1999) and the Philippines (unpublished data, colln JJTP). Recently, when studying largely unidentified small cardiids from the WAM, a single valve originating from Western Australia could be identified (fig. 4), which implies a considerable range extension to the South. Surprisingly, apart from this valve, another congeneric hitherto undescribed species was detected in this West Australian material. It clearly differs from similarly sized *T. nomurai* by its rounded outline, more delicate rib structure and especially the finer sculpture of anterior concentric threads. It is described below as *Trifarcidium morrisoni* spec. nov.

Abbreviations: AMS = Australian Museum Sydney, Australia; Fr. = fragment(s); H = height; JJTP = Colln J.J. ter Poorten, Hilversum, The Netherlands; L = length; MH = Colln M. Huber, Seuzach, Switzerland; p.v. = paired valves; WAM = Western Australian Museum, Welshpool, Australia; v. = valve; W = width; ZMA = Zoölogisch Museum Amsterdam, The Netherlands.

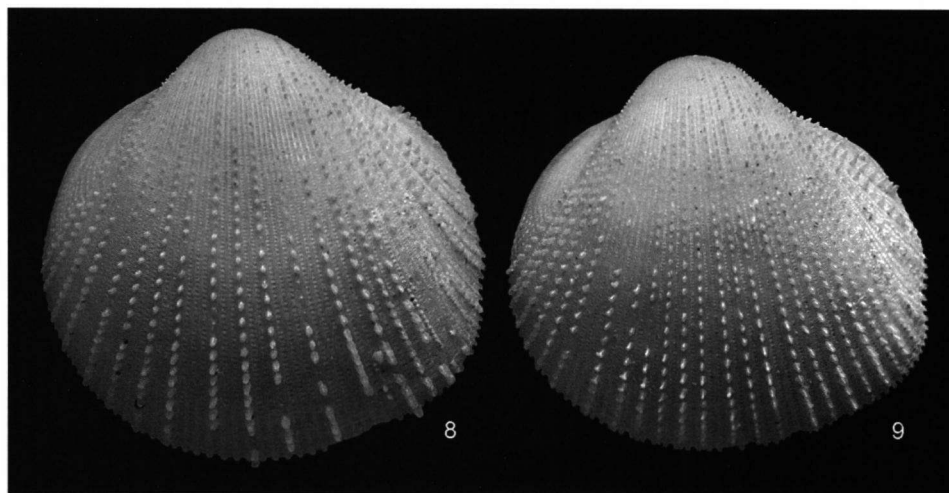
***Trifarcidium morrisoni* spec. nov. (figs 5-9)**

*Trifarcidium morrisoni*, type series. — AUSTRALIA, Western Australia, S of Rowley Shoals, 17°20'S-119°10'E, depth 300 m, leg. K. Ozawa, 20.xii.1969, sta. UMD/69/21 (holotype, WAM S29458/1 v.; paratypes WAM S15912/7 v., 6 fr.; paratypes ZMA Moll 4.07.005/4 v.); Western Australia, 100 nautical miles NW of Port Hedland, 18°47'S-117°58'E, depth 154 m, triangular dredge, grey mud and shell rubble, leg. L.M. Marsh, 28.iii.1982, sta. SO2/82/10A (paratype, WAM S15903/1 v.); Western Australia, NW. of Cape Leveque, 14°52.2'S-121°41.7'E to 14°53.7'S-121°39.9'E, depth 220-224 m, Engel trawl on soft bottom, leg. S.M. Slack-Smith, 16.ii.1984, sta. SO1/84/085 (paratype, WAM S15911/1 v.); Western Australia, WNW of Lacepede Archipelago, 15°57.2'S-120°46.2'E to 15°59.05'S-120°44.6'E, depth 296-298 m, Engel trawl on soft bottom, leg. S.M. Slack-Smith, 10.ii.1984, sta. SO1/84/055 (paratype, WAM S15908/1 v.).

*Trifarcidium nomurai*, material examined. — JAPAN, 1990 (JJTP 227/1 p.v.); Honshu, Aichi Pref., Mikawa Wan (ZMA, coll. N. Koekoek/1 p.v.; JJTP 455/3 p.v.; 2201/1 p.v.); Honshu, Aichi Pref., Mikawa,



Figs 1-7. *Trifarcardium* spec. 1-4, *Trifarcardium nomurai*. 1-3, Philippines, Bantayan Isl., tangle nets, depth 80-100 m, coll. JJTP 1170, H 11.5 mm; 4, Western Australia, 17°20'S-119°10'E, depth 300 m, coll. WAM S29459, H 16.0 mm. 5-7, *T. morrisoni* spec. nov., holotype, Western Australia, 17°20'S-119°10'E, depth 300 m, coll. WAM S29458, H 11.7 mm.



Figs 8-9. *Trifarcidium morrisoni* spec. nov., paratypes, Western Australia, 17°20'S-119°10'E, depth 300 m coll. ZMA Moll 4.07.005. 8, H 11.0 mm; 9, H 9.8 mm.

trawled, depth 91-146 m (JJTP 1524/2 p.v.; 2202/2 p.v.); Honshu, Mie Pref., Enshu Nada, offshore, trawled, depth 100-200 m (JJTP 1752/1 p.v.); Honshu, Wakayama Pref., Kii Peninsula, Cape Shio, 100 m (MH QQ38/3 p.v.). PHILIPPINES, Bantayan Isl., 11°12'N-123°45'E, taken by tangle nets, depth 80-100 m (JJTP 1170/1 p.v.); Mindanao, N. side, Aliguay Isl., offshore, dredged, depth 50-150 m., 2005 (JJTP 3179/1 p.v.). AUSTRALIA, Western Australia, S. of Rowley Shoals, 17°20'S-119°10'E, depth 300 m, leg. K. Ozawa, 20.xii.1969, sta. UMD/69/21 (WAM S29459/1 fr.).

**Description.** — Shell relatively small, thin, rounded, the length slightly exceeding the height. Nearly equilateral with postero-dorsal margin slightly truncated. Exterior with circa 95 fine thread-like radial ribs. Interstices punctuated; every second, third or fourth carrying small but erect, blunt spinelets, hollowed dorsally. Occasionally, a secondary row of spinelets can be present. Towards the posterior slope the punctuations in the interstices become progressively of a more laminate nature, consisting of densely placed laminae; towards the anterior slope abruptly changing into a strongly different morphology. This zone is ornamented with numerous very fine, slightly undulating commarginal threads, crossed by highly weakened, unsculptured radial riblets. Composition of the hinge typical for the genus, with two laterals and two very unequal cardinals. Hinge-plate gently rounded. Lunula smooth, not well delimited; lunular heart poorly defined, margins raised and thickened on both valves. External and internal colour uniformly white.

Dimensions of the holotype, the largest valve observed (figs 5-7): L 11.9 mm, H 11.7 mm;  $\frac{1}{2}$ W 4.6 mm.

**Etymology.** — This species is named after Hugh Morrison for his contributions to malacology, especially regarding the Western Australian molluscan fauna.

**Remarks.** — *Trifarcidium morrisoni* spec. nov. is known so far from loose valves only, originating from a depth varying between 154 and 300 m, found on soft bottoms. The number of sculptured ribs shows a high degree of intraspecific variation (figs 8-9), whereas the outline of the observed material is rather homogeneous. It most closely resembles its sole congener, i.e. *T. nomurai* Kuroda & Habe, 1951 (figs 1-4, and Schneider, 1995, fig. 15 [showing details of sculpture]). The differences are pointed out in table 1.

	<i>T. nomurai</i>	<i>T. morrisoni</i>
Mean L/H ratio	0.95 (range 0.91-1.02; n = 16)	1.03 (range 0.99-1.07; n = 11)
Mean L/W ratio	1.16 (range 1.08-1.32; n = 16)	1.36 (extrapolated; range 1.24-1.47; n = 12)
Maximum height	22.9 mm (JJTP coll. nr. 3179)	11.7 mm (holotype)
Anterior slope	Coarse, undulating, anastomosing	Fine, slightly undulating threads
Outline	Quadrangular	Rounded
Hinge plate	Rather straight	Gently curved
Lunula	Area bordering anterior zone well delimited	Gradually transferring into anterior zone
Sculpture of interstices	Distantly placed spines	Close-set spinelets

Table 1. Comparison between the specific characters of *Trifaricardium nomurai* and *T. morrisoni*.

Poutiers (1992) mentions the presence of a *Trifaricardium* species from northeast Australia. However, the depicted left valve (fig. 2m, coll. AMS) appears to belong to *Frigidocardium* Habe, 1951, as the typical concentric threads on the anterior slope are lacking. The material was not available for study.

*Trifaricardium nomurai* as depicted by Zhongyan (2004: pl. 145 fig. b) is not in accordance with the morphology of that species. On the other hand, the description '... sculpture of surface divided in two parts; anterior surface small, without spine[s] and with fine radiating threads crossed by concentric lines' (Zhongyan, 2004: 264), clearly refers to a *Trifaricardium*. *Trifaricardium morrisoni* has an even more rounded appearance, has one to three interstices lacking spines (never 4 as in Zhongyan's shell) and the crossbars in the interstices appear finer. His description and figure might refer to another undescribed *Trifaricardium*. More material is needed to solve this issue.

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