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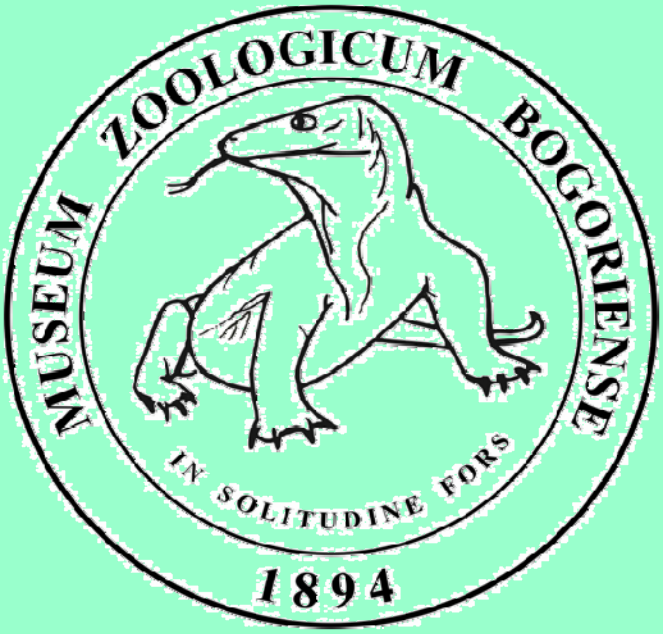

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CONTENT

TREUBIA

(A JOURNAL ON ZOOLOGY OF THE INDO-AUSTRALIAN ARCHIPELAGO)

ISSN : 0082 - 6340 Date of issue: DECEMBER 2015
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UDC: 594.1 (594)

Reni Ambarwati

New record of two mactrid bivalves (Bivalvia: Mactridae) from Indonesia

TREUBIA, December 2015, Vol. 42, pp. 1–8.

The occurrence of two mactrid bivalves, *Mactra (Mactra) queenslandica* E.A. Smith and *Heterocardia gibbosula* Deshayes, in coastal water of Sidoarjo, East Java, Indonesia is reported here. The two species are examined and illustrated based on the local specimens collected. Previously, the distribution of *M. queenslandica* was reported only from northern – north-east Australia. This finding revealed that the distribution of this bivalve reaches Indonesian waters. Meanwhile, *H. gibbosula* is common in south-east Asian waters, however this is the first record for Indonesian waters. This result indicated that more mactrid bivalves could be discovered in Indonesian waters.

(Reni Ambarwati and Trijoko)

Key words: *Heterocardia gibbosula*, *Mactra queenslandica,* Mactridae, Sidoarjo

UDC: 595.78: 577.2 (594.5)

Hari Sutrisno

Mitochondrial DNA variation of the rice yellow stem borer, *Scirpophaga incertulas* (Lepidoptera: Crambidae) in Java, Indonesia

TREUBIA, December 2015, Vol. 42, pp. 9–22.

Scirpophaga incertulas is an economically important rice pest. A systematic investigation on the biological characteristics of ecological races linked to recent changes of agricultural practices and the environment has been conducted in order to assess genetic variation of *S. incertulas* in Indonesia. A 685bp segment of mitochondrial DNA, COII, was amplified from 42 yellow stem borer samples from five locations in Java (Madiun, Ngawi, Wonogiri, Tasikmalaya, and Indramayu). Six different haplotypes (YSB1, YSB2, YSB3, YSB4, YSB5 and YSB6) were identified in the sequenced yellow stem borer populations, with haplotype YSB2 being dominant.

(Hari Sutrisno)

Key words: COII, mitochondrial DNA, *Scirpophaga incertulas*, yellow stem borer

UDC: 595.42: 595.764 (594.59)

Sri Hartini

Macrochelid mites (Acari: Mesostigmata) associated with dung beetles in Baluran National Park, East Java, Indonesia

TREUBIA, December 2015, Vol. 42, pp. 23–36.

Eight mite species of the family Macrochelidae (Acari: Mesostigmata) were collected from the body surface of dung beetles in Baluran National Park, East Java, Indonesia. Of these, one species, *Macrocheles subwallacei* sp. nov., is described as new to science. The female of *Macrocheles crispa* (Berlese, 1910) is redescribed and the male is described for the first time. The remaining six species are *Neopodocinum jaspersi* (Oudemans, 1900), *M. dispar* (Berlese, 1910), *M. hallidayi* Walter & Krantz, 1986, *M. entetiensis* Hartini & Takaku, 2005, *M. jabarensis* Hartini & Takaku, 2003 and *M. persimilis* Hartini, Dwibadra & Takaku, 2007.

(Sri Hartini, Dhian Dwibadra, Masahiro Ohara and Gen Takaku)

Key words: Baluran, dung beetles, East Java, Indonesia, Macrochelidae

UDC: 574.9: 57.065

Rena Tri Hernawati

Exploring the dynamics during community assembly through community phylogenetics

TREUBIA, December 2015, Vol. 42, pp. 37–52.

Species diversity through speciation and accumulate in ecological communities, a process known as community assembly. Relying on both evolutionary mechanisms acting at regional scale and ecological mechanisms acting at local scale, the process of community assembly results from intricate interactions among mechanisms at play across varying spatial and temporal scales. During the last decade, community assembly theory has been reconsidered in the light of evolutionary dynamics of species diversification and ecological dynamics have been formalised in an explicit spatial framework (*i.e*. metacommunity theory). The aims of the present review are: (1) to present the community assembly theory and the main paradigms that have been proposed, (2) to discuss how the metacommunity theory as defined an explicit spatial framework for community ecology, (3) to discuss the potential mechanisms at play during community assembly and their associated predictions, (4) to present new approaches to study community assembly based on phylogenetics approaches and discuss how they have been integrated in empirical studies.

(Rena Tri Hernawati, Daisy Wowor and Nicolas Hubert)

Key words: biogeography, community assembly, dispersal, phylogenetic community structure, speciation

UDC: 595.42 (594.81)

Sri Hartini

Macrochelid mites (Acari: Mesostigmata) from Kaimana,West Papua, Indonesia, and endemism of macrochelid mite fauna in New Guinea Island

TREUBIA, December 2015, Vol. 42, pp. 53–67.

As a result of our investigation in Lengguru, Kaimana, West Papua, Indonesia, six species belonging to two genera of macrochelid mites (Acari: Mesostigmata: Macrochelidae) were collected from the body surface of dung beetles (Scarabaeidae). Of these, one is undescribed species *Macrocheles kaimanaensis* sp. nov. *Macrocheles hallidayi* Walter & Krantz, 1986 is newly recorded from Papua and West Papua (Indonesian parts of New Guinea Island). Males of *Holostaspella rosichoni* Hartini & Takaku, 2006 originally described from Papua were recorded for the first time. The other three species were *M. amaliae* Hartini, 2008, *M. dispar* (Berlese, 1910) and *M. waigeoensis* Hartini, 2008, which were previously collected from Raja Ampat, West Papua.

(Sri Hartini and Gen Takaku)

Key words: Indonesia, Kaimana, macrochelid mite, West Papua

Treubia 42: 1−8, December 2015

NEW RECORD OF TWO MACTRID BIVALVES (BIVALVIA: MACTRIDAE) FROM INDONESIA

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ABSTRACT

The occurrence of two mactrid bivalves, *Mactra (Mactra) queenslandica* E.A. Smith and *Heterocardia gibbosula* Deshayes, in coastal water of Sidoarjo, East Java, Indonesia is reported here. The two species are examined and illustrated based on the local specimens collected. Previously, the distribution of *M. queenslandica* was reported only from northern-north-east Australia. This finding revealed that the distribution of this bivalve reaches Indonesian waters. Meanwhile, *H. gibbosula* is common in south-east Asian waters, however this is the first record for Indonesian waters. This result indicated that more mactrid bivalves could be discovered in Indonesian waters.

Key words: *Heterocardia gibbosula*, *Mactra queenslandica,* Mactridae, Sidoarjo

INTRODUCTION

Mactrid bivalves are widely distributed in western central Pacific. In Australia, there are about forty-four species of Mactridae (Lamprell & Whitehead 1992, Lamprell & Healy 1998) that have been reported thus far. In Singapore, seventeen species of Mactridae have been found (Tan & Woo 2010). Meanwhile, Mactridae, which is well-known as a family of "surf clams", consists of almost 180 species (Huber 2010).

These bivalves have important ecological and economic roles. In terms of their ecological role, Poutiers (1998) stated that they act as suspension filter-feeding animals in the soft bottom ecosystem. Mactrid bivalves occupy the sandy and muddy bottoms (Lamprell & Whitehead 1992); and some of the members, for example *Mactra* bivalves, can also be found in mangrove zones (Masagca *et al.* 2010) and seagrass beds (Mudjiono *et al.* 1992).

Mactrid bivalves have also important economic roles in some countries. They are edible; hence they are actively collected and consumed in the Philippines. For instance, *Mactra luzonica* is regularly traded, while *Mactra maculata* is reported as an important commercial species (Poutiers 1998). In Singapore, however, mactrid bivalves do not have economic significance (Wong 2009), despite their considerable numbers in Singapore waters. Similarly, Healy & Lamprell (1998) stated that in Australia mactrid bivalves are important marine and estuarine fauna, but they are not collected commercially.

In Indonesia, Dharma (2005) reported the occurrence of five species of Mactridae; namely *Mactra maculata* Gmelin, 1791; *M. grandis* Gmelin, 1791; *M. violacea* Gmelin, 1791; *Harvella plicataria* (Linnaeus, 1767); and *Lutraria (Psammophila) australis* Reeve, 1854. Previously, Prashad (1932), based on specimens of Siboga Expedition, pointed out seven mactrid bivalves from Indonesian waters, namely *Mactra (Mactra) maculata* Gmelin, *Mactra (Mactra) artensis* Fischer, *Mactra (Mactra) inaequalis* Reeve, *Mactra (Mactra) mera* Reeve; *Mactra (Mactrotoma) aspersa* Sowerby, *Mactra (Matrinula) dolabrata* Reeve, and *Lutraria philippinarum* Reeve. Roberts *et al*. (1982) reported *Mactra (Mactra) maculata* Gmelin from shallow water of north-west Java. Mudjiono *et al.* (1992) reported two bivalves belong to *Mactra* from the seagrass beds of Banten Bay, however the species were not identified. Since Indonesia consists of thousand of islands with long coastlines, it is very likely that there are many other mactrid bivalves to be discovered. This study covers the coastal waters of Sidoarjo, East Java, Indonesia.

MATERIALS AND METHODS

Samples of *Heterocardia gibbosula* were collected on 19 December 2009, while samples of *Mactra queenslandica* were collected on 9 January 2010, both from the coastal waters of Sidoarjo, East Java by dredging in subtidal area. Specimens were relaxed by using $MgCl_2.6H_2O$ 7.3% in sea water, and fixed by using formalin 10% in sea water. Preservation was done by using Ethanol 70%. Morphometric measurements of the specimens, including the length, height, and width of the shell, were made by using calipers. Internal morphology of the specimens was observed carefully under a magnifying lamp, and drawings were made using a computer.

RESULTS

Mactra (Mactra) queenslandica E.A. Smith, 1914

(Figs. 1, 2)

Mactra queenslandica E.A. Smith, 1914: 148; Lamprell & Whitehead 1992: pl. 36, fig. 240; Huber, 2010: 443

Material examined.−13 specimens including MZB PEL.2014, Indonesia, East Java, coastal waters of Sidoarjo, Gisik, S7º23.307’ E112º50.513’, Coll. Reni Ambarwati, 9 Jan. 2010.

Shell.−trigonal, equivalve, thin and fragile. Shell length to up 27.7 mm; shell height up to 17.9 mm; shell width up to 12 mm. Sculpture: smooth concentric striae. Umbo: inflated, prosogyrate. Colour: purple, internally and externally; dark purple in umbonal area. Internal ligament: brown, in triangular shape. Periostracum: thin brown layer. Dentition: inverted V-shaped cardinal tooth in left valve. Interior of the shell: rounded posterior adductor scar and elongated anterior adductor scar; obvious pallial line; shallow pallial sinus (approximately ⅓ of shell length) (Fig. 1).

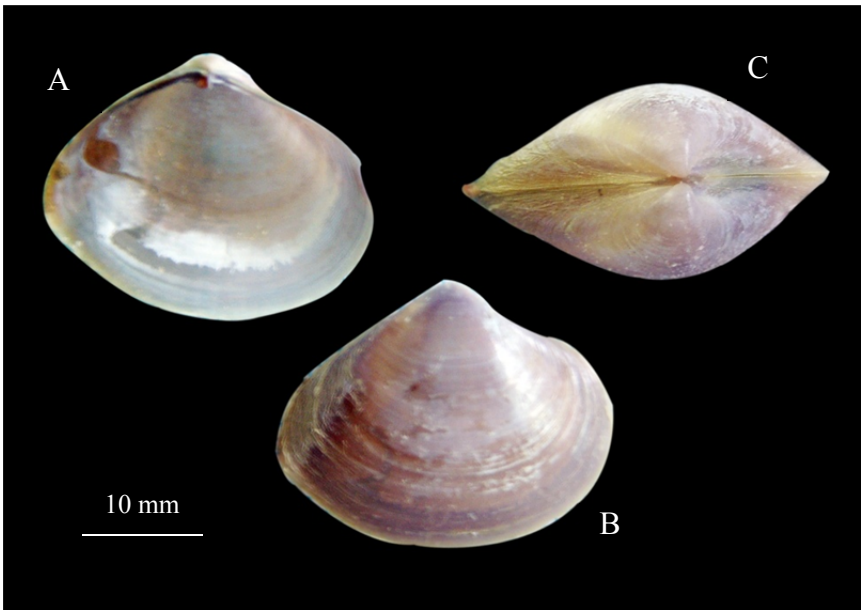

Figure 1. Morphology of *Mactra queenslandica*; A: interior of left valve; B: exterior of right valve; C: dorsal area.

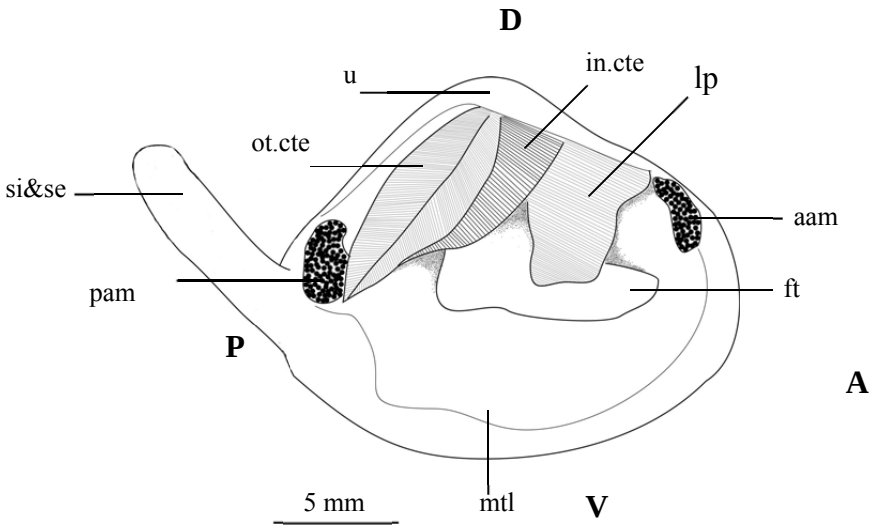

Figure 2. Internal anatomy of *Mactra queenslandica* A: anterior, P: posterior; D: dorsal; V: ventral; aam: anterior adductor muscle; pam: posterior adductor muscle; u: umbo; ot.cte: outer demibranchia; in.cte: inner demibranchia; cte: ctenidium; lp: labial palp; si: siphon inhalans; se: siphon exhalans; mtl: mantle; ft: foot.

Internal anatomy.−white yellowish flesh. Mantle edge fused at siphonal area. Siphon: long; inhalant and exhalant siphons are fused. Gill: eulamellibranchia type; outer demibranchia and inner demibranchia equal in size; outer demibranchia directed ventrically (leaf-like appearance). Foot: located at ventroanterior side; relatively small in size (Fig. 2).

Distribution.−previously known only from northern to north-east Australia (Smith 1914, Lamprell & Whitehead 1992, Huber 2010).

***Heterocardia gibbosula* Deshayes, 1855**

(Figs. 3, 4)

Heterocardia gibbosula G.P. Deshayes, 1855: 340; Morris & Purchon 1981: 325 (list); Lamprell & Whitehead 1992: 275, pl. 40 fig. 275; Swennen *et al.* 2001: 82, fig. 114; Robba *et al.* 2002: 91, pl. 12, fig. 5; Huber 2010: 452.

Material examined: 50 specimens including MZB PEL.2008 & MZB PEL.2016, Indonesia, East Java, coastal waters of Sidoarjo, Curah Ombo, S7º26.949’ E112º50.470’, Coll. Reni Ambarwati, 19 Dec. 2009.

Shell.−oval, equivalve, thin and fragile. Shell length up to 26.9 mm; shell height to 19.2 mm; shell width up to 10.0 mm. Sculpture: smooth and irregular concentric striae. Umbo: not inflated; prosogyrate. Colour: white, internally and externally. Internal ligament: brown; shape triangular. Periostracum: thin brown layer. Dentition: inverted V-shaped cardinal tooth in left valve. Interior of the shell: rounded posterior adductor scar and elongated anterior adductor scar; obvious palial line; very deep palial sinus (approximately ¾ of shell length) (Fig. 3).

Figure 3. Morphology of *Heterocardia gibbosula*; A: interior of left valve; B: exterior of right valve; C: dorsal area.

Internal anatomy.−white flesh. Mantle edge fused at siphonal area. Siphon: very long; inhalant and exhalant siphon are fused. Gill: eulamellibranchia type; outer demibranchia are smaller than inner demibranchia; outer demibranchia directed ventrally (leaf-like appearance). Foot: located at anterior side; relatively small in size (Fig. 4).

Distribution.−Manila, Philippines (Deshayes 1855); Singapore waters (Morris & Purchon 1981; southern Gulf of Thailand (Swennen *et al.* 2001); northern Australia to Philippines and Thailand (Holocene fossil records) (Robba *et al.* 2002); Australia and Malaysia (Huber 2010).

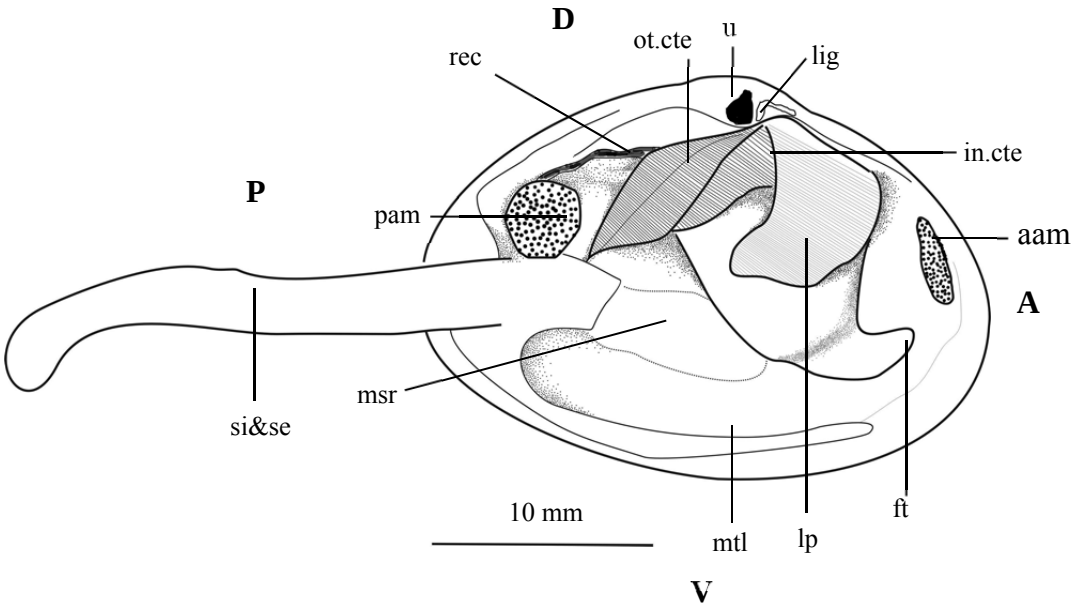

Figure 4. Internal anatomy of *Heterocardia gibbosula* A: anterior, P: posterior; D: dorsal; V: ventral; aam: anterior adductor muscle; pam: posterior adductor muscle; u: umbo; ot.cte: outer demibranchia; in.cte: inner demibranchia; cte: ctenidium; msr: retractor siphon muscle; lp: labial palp; si: siphon inhalans; se: siphon exhalans; mtl: mantle; ft: foot.

DISCUSSION

Previously, based on Siboga Expedition specimens, Prashad (1932) reported seven mactrid bivalves in Indonesian waters. Three of those species were reported by Dharma (2005), namely *Mactra maculata* (also reported by Roberts *et al.* 1982), *M. grandis* (the accepted name of *Mactra mera* based on Huber 2015a), *Lutraria australis* (the accepted name of *Lutraria philippinarum* based on Huber 2015b). Besides, Dharma (2005) also reported two other mactrids. Hence, the records for Mactridae in Indonesian waters were *Mactra maculata, M. grandis, M. violacea, M. artensis, M. inaequalis, Harvella plicataria, Lutraria australis, Oxyperas aspersa* (listed as *Mactra aspersa* by Prashad 1932), and *Mactrinula striatula* [reported as *Mactra (Matrinula) dolabrata* by Prashad (1932)]. Thus,

the finding of *M. queenslandica* and *Heterocardia gibbosula* in coastal waters of Sidoarjo adds the list of Mactridae in Indonesian waters, from nine species to eleven species.

Mactra queenslandica was found in lower intertidal and subtidal coastal waters of Sidoarjo, which are muddy in the bottom. In Australia, this bivalve was found in sandy beaches from Queensland up to Northern Territory (Lamprell & Whitehead 1992). Dharma (2005) reported three species of *Mactra* in Indonesia, and Wong (2009) reported six other species of *Mactra* from Singaporean waters but they did not find *M. queenslandica*, and hence this is the first report of this bivalve in Indonesia. Previous works revealed that the distribution of *M. queenslandica* was limited to northern to north-east Australia **(**Smith 1914, Lamprell & Whitehead 1992, Huber 2010). The occurrence of this bivalve in Sidoarjo waters, which is located in Madura Strait, shows that the range of this bivalve extends northerly from their previously known distribution, which are also tropical waters.

The specimens of *M. queenslandica* from Sidoarjo waters were typical of the specimens described by Smith (1914) and Lamprell & Whitehead (1992). However, the specimens from Sidoarjo waters were smaller (the maximum length was 27.7 mm, while the former reached 35 mm). Their habitat in northern Australia was sandy bottom, while Sidoarjo waters has muddy bottom. This could influence the size of bivalves, but their physical features remained the same.

The second bivalve, *Heterocardia gibbosula,* was found in a dense population, approximately 100 individuals/m^2, in a subtidal area of coastal waters of Sidoarjo, which has muddy bottom. This result revealed that *H. gibbosula* was not only found in the sandy zone (Lamprell & Whitehead 1992), but also could be found in muddy bottom. In addition, the long siphon indicated that this bivalve can burrow deeply.

Previously, Morris & Purchon (1981) and later Wong (2009) and Tan & Woo (2010) also reported that this bivalve was found in Singapore, although complete shells or live specimens were not found during the research (Wong 2009). Robba *et al.* (2002) and Swennen *et al.* (2001) reported the occurrence of *H. gibbosula* in the Gulf of Thailand. Though it seems common elsewhere, this is the first reported discovery in Indonesia. Besides, the finding of *H. gibbosula* in Sidoarjo waters complemented this distribution data. Moreover, based on Sartori (2015) *H. gibbosula* is the only species belong to genus *Heterocardia*. Hence, this new record of *H. gibbosula* will be valuable input.

Although the two mactrids do not have economic significance role in the area, because local people have not consumed them, they are still potential because of their

abundance. Some mactrids, *Mactra luzonica, M. maculata, M. grandis*, were actively collected for consumption in Philippines (Poutiers 1998). Besides, the significance of mactrids as suspension feeders in soft bottom ecosystem can not be neglected.

The findings of *Mactra queenslandica* and *Heterocardia gibbosula* in Indonesia are regarded as new records for Indonesia. These suggest that more mactrid bivalves could be discovered and further investigations are warranted in Indonesian waters.

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We are very grateful to Dr. Richard C. Willan, Senior Curator Museum and Art Gallery, Northern Territory, Australia for his assistance in verifying the species identification. We are also deeply indebted to Professor Beth Clark-Gareca, Ph.D. and Professor Mien A. Rifai for their help in preparing the manuscript of this paper.

REFERENCES

Deshayes, M.G.P. 1855. Descriptions of new shells, from the collection of H. Cuming, Esq *Proceedings of the Zoological Society of London* **22** (for 1854): 317-371.

Dharma, B. 2005. *Recent and Fossil Indonesian Shells*. Conchbooks, Hackenheim, 424 pp.

Healy, J.M. & K. Lamprell 1998. Superfamily Mactroidea. *In*: Beesley, P.L., G.J.B. Ross & A. Wells (eds.), *Mollusca: The Southern Synthesis. Fauna of Australia.* Vol. **5**. CSIRO Publishing, Melbourne, Part A xvi, 563 pp.

Huber, M. 2010. *Compendium of bivalves*. Conchbooks, Hackenheim, 901 pp.

Huber, M. 2015a. *Mactra mera.* In: MolluscaBase (2015). World Register of Marine Species. [Online] <http://www.marinespecies.org/aphia.php?p=taxdetails&id=540724> [Accessed 2015-10-26]

Huber, M. 2015b. *Lutraria philippinarum*. In: MolluscaBase (2015). World Register of Marine Species. [Online] <http://www.marinespecies.org/aphia.php?p=taxdetails&id=540501> [Accessed 2015-10-27].

Lamprell, K. & T. Whitehead 1992. *Bivalves of Australia.* Volume 1. Crawford House Press, Bathurst, New South Wales, 288 pp.

Lamprell, K. & J. Healy 1998. *Bivalves of Australia.* Volume 2. Leiden: Backhuys Publishers, 182 pp.

Masagca, J.T., A.V. Mendoza & E.T. Tribiana 2010. The status of mollusk diversity and physical setting of the mangrove zones in Catanduanes Island, Luzon, Phillipines. *Biotropia* **17** (2): 62-76.

Mudjiono, W., W. Kastoro & W. Kiswara 1992. Molluscan communities of seagrass beds of Banten Bay, West Java. In: Chou, L.M. & C.R. Wilkinson (eds), *Third ASEAN Science & Technology Week Conference Proceedings*, Vol. 6, Marine Science: Living Coastal Resources, 21–23 September 1992, Singapore, pp. 289–300.

Morris, S. & R.D. Purchon 1981. The marine shelled mollusca of West Malaysia and Singapore. Part 3, Bivalvia. *Journal of Molluscan Studies* **47** (3): 322–327.

Poutiers, J.M. 1998. Bivalves (Acephala, Lamellibranchia, Pelecypoda). *In*: Carpenter K.E. & V.H. Niem (eds), *FAO Spesies Identification Guide for Fishery Purposes; The Living Marine Resources of the Western Central Pacific*. Volume **1**. FAO, Rome, 686 pp.

Prashad, B. 1932. The lamellibranchia of the Siboga Expedition, Systematic Part II Pelecypoda (exclusive Pectinidae). In: M. Weber, ed. *Siboga-Expeditie 1899-1900*. E.J. Brill, Leiden. Monographe 53c, 1-353 pp.

Robba E., I. Di Geronimo, N. Chaimanee, M. P. Negri, R. Sanfilippo, 2002. Holocene and recent shallow soft-bottom mollusks from the northern Gulf of Thailand area: Bivalvia. *Bollettino Malacologico, Roma* **38** (5-8): 49-132.

Sartori, A.F. 2015. *Heterocardia* Deshayes, 1855. In: MolluscaBase (2015). World Register of Marine Species. [Online] <http://www.marinespecies.org/aphia.php?p=taxdetails&id=492533> [Accessed 2015-10-27]

Smith, E. A. 1914. A list of Australian Mactridae, with a description of new species. *Proceedings of the Malacological Society, London* (**11**): 137-151.

Swennen, C., R.G., Moolenbek, N. Ruttanadakul, H. Hobbelink, H. Dekker & S. Hajisamae 2001. The molluscs of the southern Gulf of Thailand. *Thai Studies in Biodiversity* **4**: 1–210.

Tan, S.K. & H.P.M. Woo 2010. *A Preliminary Checklist of the Molluscs of Singapore*. Raffles Museum of Biodiversity Research, Singapore, 78 pp.

Wong, H.W. 2009. The Mactridae (Mollusca: Bivalvia) of East Coast Park, Singapore. *Nature in Singapore* **2**: 283–296.