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

*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.

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

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

UDC: 594.1 (594)
Reni Ambarwati
New record of two mactrid bivalves (Bivalvia: Mactridae) from Indonesia

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: 594.52: 595.764 (594.59)
Sri Hartini
Macrochelid mites (Acari: Mesostigmata) associated with dung beetles in Baluran National Park, East Java, Indonesia

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

UDC: 594.78: 577.2 (594.5)
Hari Sutrisno
Mitochondrial DNA variation of the rice yellow stem borer, *Scirpophaga incertulas* (Lepidoptera: Crambidae) in Java, Indonesia

*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.

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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
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 MgCl₂.6H₂O 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)


Shell—trigonal, equi valve, 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.


Shell.—oval, equivelv, 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 paliar 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).

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 Macrinula 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/m², 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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