

## ON THREE SPECIES OF MESODESMATIDAE (MOLLUSCA: BIVALVIA) FROM SINGAPORE

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### ABSTRACT

Three species of intertidal bivalves belonging to the family Mesodesmatidae (commonly known as “wedge clams”) have had confirmed records (Morris & Purchon, 1982; Tan & Woo, 2010) from Singapore and is diagnosable on the grounds of shell morphology. They are *Davila plana*, *Paphies striata* and *Coecella horsfieldii*. This article aims to present the local mesodesmatids pictorially with some descriptive and ecological notes.

### KEYWORDS

Systematics, taxonomy, Mollusca, Bivalvia, Mesodesmatidae, Singapore.

### INTRODUCTION

The forty or so species of equivalved Mesodesmatidae (Rosenberg, 1992) is a marine to estuarine clam family of thick shells with an internal ligament located in the center of the hinge teeth (Tan & Chou, 2000) sitting on a pit (Kilburn & Rippey, 1982; Wong, 2009). This family has close affinity to “surf clams” Mactridae (Rooij-Schuiling, 1977; Vongpanich 2000; Wong, 2009) in the superfamily Mactroidea (Vaught, 1989; Tan & Woo, 2010). Two Singaporean species (*Paphies striata* and *Coecella horsfieldii*) are found from the mid to high intertidal regions of sandy beaches, and empty shells are quite common among beach debris at the high water mark. These two larger species, however, seemed to have some commercial fishery importance (Rooij-Schuiling, 1972; Law, 1976; Morris & Purchon, 1981) in Singapore and are exploited in Fiji Islands, India and Japan (Poutiers, 1998).

### MATERIALS AND METHODS

Three dead shells of mesodesmatids (Plate 1) found among beach debris, were picked from various locations along the stretch of East Coast Park from 2<sup>nd</sup> January 1994 to 5<sup>th</sup> June 2010. These empty shells were used for illustration purposes in this paper although live (except *Davila plana*) and rapid burrowing clams (*Paphies striata*) were observed to burrow in a few centimeters of coarse sand (Nielsen, 1976), in rather high energy littoral zones. “CSY” denotes the author’s initials followed by a series of numerals and dots which tallies with the computer databases in the author’s personal collection. The illustrated specimens are to be deposited to a public museum for future reference.

The familial and generic placements adopted here were those of Vaught (1989) and Millard (1997). The species level classifications follow a combination of Beu (1971), Sakurai & Habe (1973), Tantanasiriwong (1979), Beu & Rooij-Schuiling (1982), Abbott & Dance (1990), Lamprell & Whitehead (1992), Bosch et al (1995), Kilburn & Hylleberg (2002), Hylleberg & Kilburn (2003) and Valentich-Scott (2003). No attempt was made to provide a list of synonyms of the three local species.

### SYSTEMATICS

Family Mesodesmatidae Gray, 1839  
 Genus *Davila* Gray, 1853  
 Species *Davila plana* (Hanley, 1843)  
 Plate 1, figure 1 [CSY537.2.1.2]

A white, rather smooth equivalve (Rooij-Schuilting, 1973 & 1977) clam which is thick relative to its overall size, compressed with thin brown periostracum and a tinge of light pink around the beak; general outline is somewhat subovate or subtrigonal; ligament is small and internal; lacked pallial sinus (Rooij-Schuilting, 1977); least common among the three species; fresh empty shells were seen in rather open-surf high energy zone; Lim's (1969) figure of a *Atactodea glabrata* seemed to belong to this species; two juvenile empty samples were recently observed, about two weeks after an oil spill.

Genus *Paphies* Lesson, 1830  
 Species *Paphies striata* (Gmelin, 1791)  
 Plate 1, figure 2 [CSY537.1.2.0]

A heavy shell, thick and white; ligament internal and pallial sinus is shallow; shell shape is rather variable from cuneate to subtrigonal (Abbott & Dance, 1990; Lamprell & Whitehead, 1992; Oliver, 1992) in a single population with intergrades, and usually sculptured with concentric ridges; Chuang (1971) listed two species, namely *Atactodea glabrata* and *Atactodea striata*, and is likely a confusion as a result of its variable shape; usually occurs cohabitually (Allen, 1975) with similar-shaped *Donax faba* (Donacidae) in rather high energy littoral zone instead of *Coecella horsfieldii* (Tan & Chou, 2000) which is an estuarine (Law, 1976; Oliver, 1992) mesodesmatid.

Genus *Coecella* Gray, 1853  
 Species *Coecella horsfieldii* Gray, 1853  
 Plate 1, figure 3 [CSY537.7.1.4]

A rather thick and white shell; ligament rather large (as compared to the above two species), internal and sits on a characteristic protruding resilifer (Rooij-Schuilting, 1977) or pit similar to a mactrid (Kilburn & Rippey, 1982; Wong, 2009); has weak concentric lines covered by a thin layer of brownish periostracum; pallial sinus is shallow but deeper than *Paphies striata*; favors sheltered river mouth intertidal estuarine habitat in silty muddy sand; sometime coexists (Allen, 1975) with *Glaucanome corrugata* (Glauconomidae) which is another estuarine (Law, 1976) clam of similar habit, form and size; type species of the genus *Coecella* (Sakurai & Habe, 1973).

## DISCUSSION

Populations of most marine littoral bivalves do not appear to be under threat and can rapidly colonise artificial habitats such as newly reclaimed beaches and rocky breakwaters (similar to bivalves such as *Barbatia virescens* and *Arca avellana*) if left undisturbed for an extended period of time. Increased habitat alterations like shore pollution, skimming off oil-stained surface sand after an oil slick or machines that sweep off beach debris periodically, however, may have some effects on resident populations of mesodesmatids.

Intertidal filter-feeding bivalves are useful indicators (as physical remains) of shore health. For example, it might be possible to use these clams to gauge the impact of oil dispersants on the intertidal shore after an oil spill (Flam, 2010). Many high-tidal clams would have suffocated after the tides have receded and unusually high numbers of dead shells would be indicative of something afloat. However, due to the lack of taxonomical and ecological works, and under-sampling of the malacofauna in Singapore, there are hardly any localised historical or population data available for most species as a comparison.

*Davila plana* was first recorded by Morris & Purchon in 1981. The recent sightings of two empty samples separately in two locations in East Coast Park were a good indication (despite the oil slick) of the resilience of such species to the constantly changing landscape of Singapore's coastlines over the decades. Moreover, the hypothesised two species-pairs (familiarily unrelated) namely *Paphies striata* with *Donax faba*, and between *Coecella horsfieldii* and

*Glaucanome corrugata* have shown convergences in habit, form (Allen, 1975) and size, and should deserve further research into their taxonomical and ecological niches from mid to high littoral habitats.

### ACKNOWLEDGEMENTS

I would like to thank Dr. R. N. Kilburn (formerly of Natal Museum, Pietermaritzburg, South Africa) for helping the author with some identifications and references on the local molluscs especially *Coecella horsfieldii* (was otherwise identified as “*Sinovacula virens*”) and *Glaucanome corrugata*, in letter correspondences in 1994. He has inspired the author to embark on some local and regional private malacofauna studies, and trips ever since. Thanks are due to my many malacologist-enthusiast colleagues and friends (former molluscan.com, ShellNutX listserv and on social networking websites) for fruitful discussions and sharing of all the precious information regarding Singapore and regional shelled molluscs. Thanks to M. van der Wal of Library NCB Naturalis, Leiden for paper scans. I am also most grateful to an anonymous proofreader and two reviewers for suggesting improvements on this article.

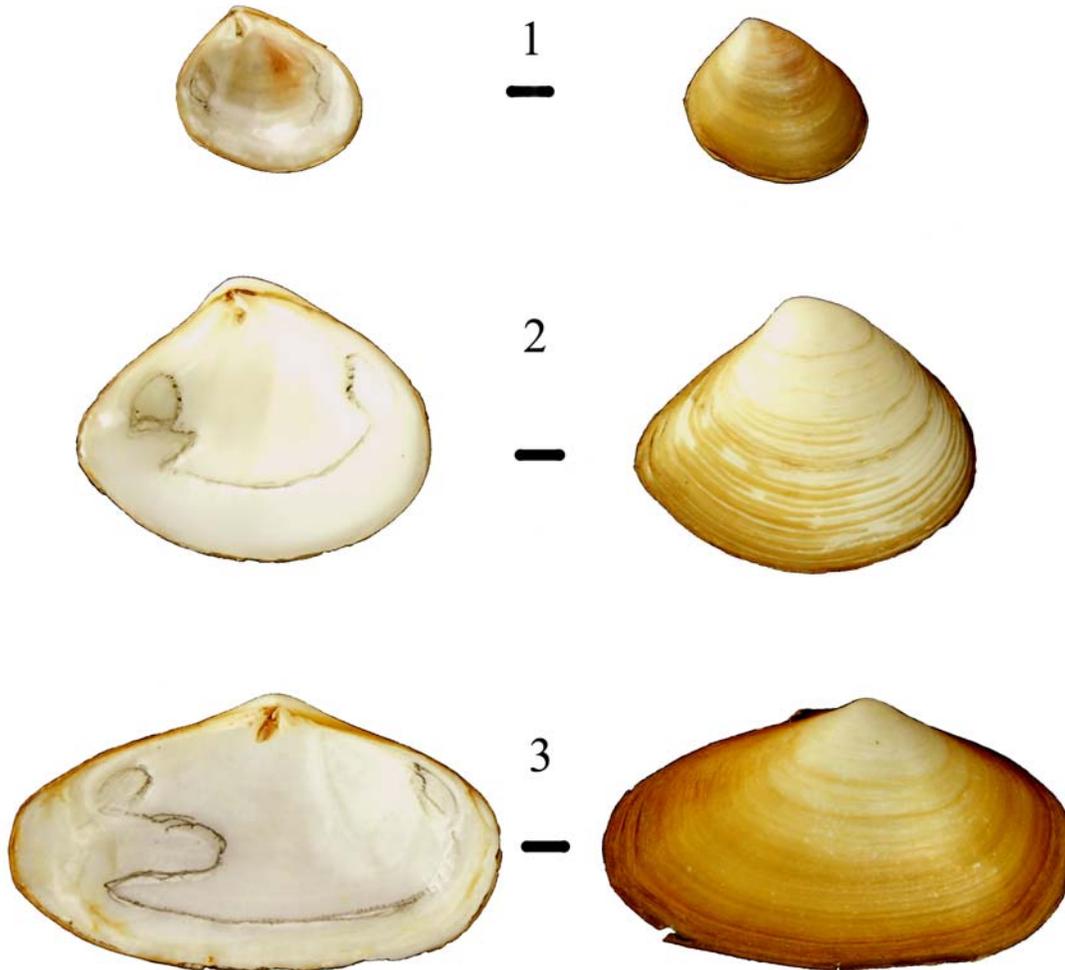


Plate 1 – Singapore Mesodesmatidae. Left column – left valves and right column – right valves. Figure 1 – *Davila plana* (Hanley, 1843); 16.0mm [CSY537.2.1.2]. Figure 2 – *Paphies striata* (Gmelin, 1791); 29.2mm [CSY537.1.2.0]. Figure 3 – *Coecella horsfieldii* Gray, 1853; 40.8mm [CSY537.7.1.4].

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