

THE MELONGENIDAE (MOLLUSCA: GASTROPODA) OF SINGAPORE

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INTRODUCTION

Three species of the predatory neogastropod family Melongenidae have had confirmed records from Singapore. According to the latest nomenclature, they are *Hemifusus ternatanus*, *Pugilina cochlidium*, and *Volema myristica*. In the literature recording these species from Peninsular Malaysia and Singapore, Tweedie (1957 and 1967) was probably the first to illustrate a specimen of *Pugilina cochlidium* (Linnaeus, 1758) (as *Semifusus pugilina*, also known then as the “false trumpet shell”) placed in the family Galeodidae (junior synonym of Melongenidae). *Pugilina cochlidium* [as *Melongena (Semifusus) pugilina*, and placed in the Galeodidae] was illustrated in Chuang (1961), and Tan & Ng (1988), and more records of local species were added by Lim (1969 & 1970) who listed and illustrated *Melongena paradisiaca*, *Melongena pugilina* and *Melongena ternatanus*. Later, in an early malacofauna list of Singapore, Chuang (1973) listed *Hemifusus ternatanus*, *Melongena galeodes*, *Melongena pugilina* and *Volema paradisiaca*, and a few years later in 1976, *Melongena pugilina* was featured prominently in a colourful poster published by the Singapore Science Centre. In the most comprehensive checklist of the region yet, Purchon (1981) listed *Hemifusus ternatanus*, *Melongena galeodes* and *Melongena pugilina*, placed in the Melongenidae. Chou et al. (1994), listed *Hemifusus ternatanus*, *Melingena* [sic] *pugilina*, and *Volema paradisiaca* as belonging to Melongenidae. The muddling of names was not restricted to local works. Springsteen & Leobrera (1986) inexplicably lumped *Volema (Pugilina) cochlidium*, *Volema (Hemifusus) carinifera* and *Volema (Melongena) myristica* from the Philippines under a single genus. *Melongena pugilina* and *Pugilina ternatana* were also recorded from Western Peninsular Thailand by Tantanansiriwong (1978). Wilson (1994) placed *Pugilina cochlidium* under the subfamily Melongeninae of Buccinidae owing to radula and anatomical similarities, an observation that was also noted by Tan & Phuah (1999) but this radical classification does not appear to have been followed by recent authors (e.g., Swennen et al., 2001; Dharma, 2005; Kabir et al., 2007; Robin, 2008).

As can be seen from the literature, many names have been used for these three species, leading to much confusion about the specific names and the number of melongenid species occurring here. This article aims to elucidate the Singapore melongenid species based on historical records and material obtained locally.

MATERIAL AND METHODS

Empty shells of melongenids found among beach debris, were obtained at various localities along East Coast Park to Changi Point (Fig. 1) from 24 Aug.1990 to 17 Jan.2006. The names of species adopted in this paper follow the more recent, and widely accepted works of Dharma (1988), Abbott & Dance (1990), Abbott (1991), Tan & Chou (2000), Swennen et al. (2001), Dharma (2005), Kabir et al. (2007), and Robin (2008). The familial placement of species follows those of Vaught (1989), Millard (1997), Bouchet & Rocroi (2005), and Poppe & Tagaro (2006). Specimens were deposited in the Zoological Reference Collection (ZRC), Raffles Museum of Biodiversity Research, National University of Singapore under the catalogue numbers ZRC.MOL.2847–ZRC.MOL.2851.

OBSERVATIONS AND DISCUSSION

***Pugilina cochlidium* (Linnaeus, 1758) (Fig. 1a).** – commonly known as the “spiral melongena”, is a very common snail found in muddy intertidal shores (Tan & Yeo, 2003), and monsoon canals (Tan & Phuah, 1999). It feeds mainly on barnacles and clams with its long proboscis (Tan & Phuah, 1999; Tan & Chou, 2000; Ng et al., 2007). It usually lives half buried in mud (Tan & Yeo, 2003; Chua, 2007), and can grow to 16.5 cm long (Wagner & Abbott, 1990). Lim et al. (1994) illustrated light pink egg cases, supposedly those of a whelk (*Melongena* species = *Pugilina* species) but the eggs are those of a muricid (see Tan & Sigurdsson, 1990, 1996a and 1996b). *Pugilina cochlidium* meat is a delicacy in the Philippines (Poutiers, 1998), and probably used to be eaten locally, as Chuang (1961) noted that the snail was regularly collected. *Pugilina cochlidium* was also featured as a shellfish in a large poster on Molluska Malaysia by the Fisheries Department of the Ministry of Agriculture, Malaysia (Yeap, 1990). The shells are also collected for the shellcraft

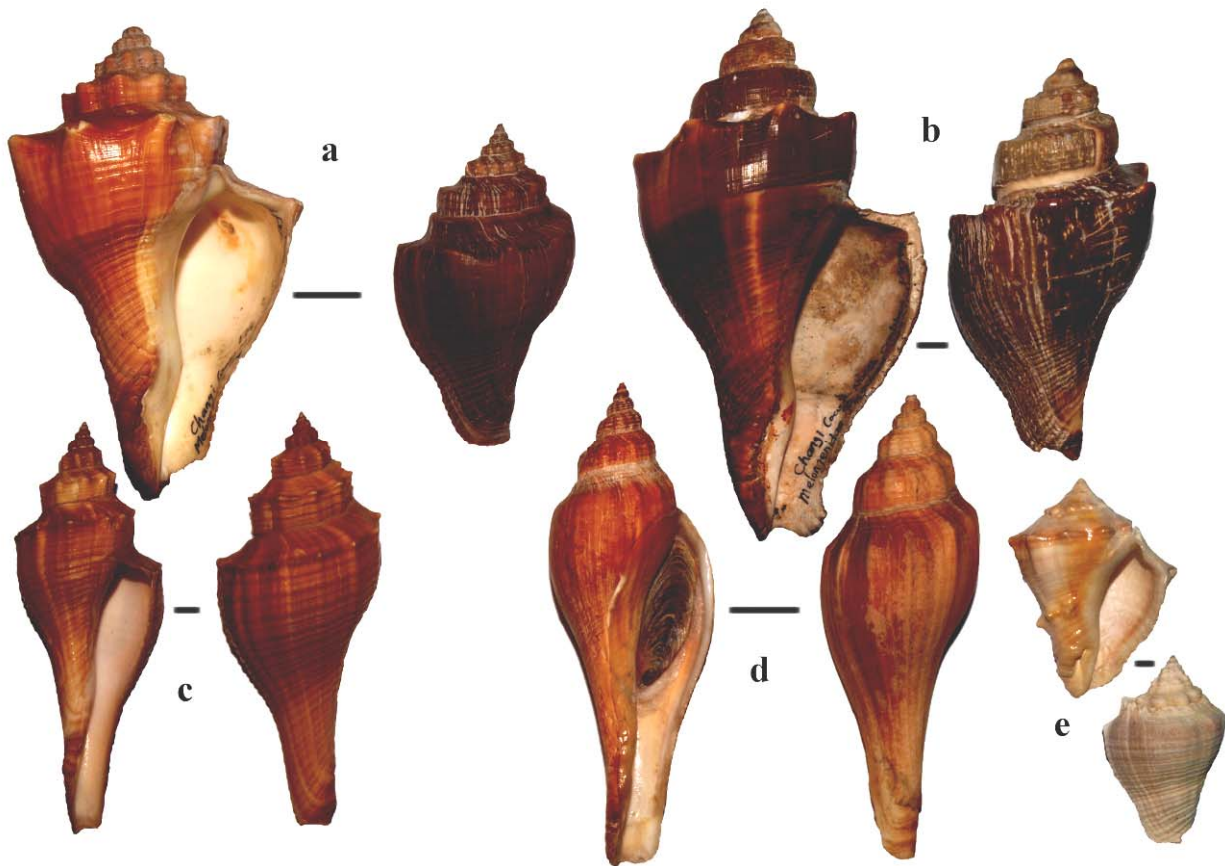


Fig. 1. *Hemifusus elongatus* (Fig. 1d) was obtained from fishers in Johore. Singapore Melongenidae: a, *Pugilina cochlidium*—96.2/69.2, Changi; b, *Pugilina cochlidium* form *wardiana*—110.0/85.2, Changi; c, *Hemifusus ternatanus*—86.5/90.0, East Coast Park; d, *Hemifusus elongatus*—110.1/99.1, Johore; e, *Volema myristica*—46.0/40.2, East Changi. Shell lengths in mm for both specimens of each species are indicated, separated by a slash.

industry in the Philippines, Thailand (pers. obs.) and Bangladesh (Kabir et al., 2007).

A different form (Fig. 1b), infrequently found at Changi beach, has a relatively sunken suture and squarish parietal callous. The differences between this form and the typical form, appear constant with no intermediates and concurs well with the diagnostic characteristics of *Pugilina wardiana* (Iredale, 1938) figured by Wilson & Gillett (1979), and the large Australian *Pugilina cochlidium* figured in Coleman (1998), and Nolf (2007). Although this form is usually treated as a synonym of *Pugilina cochlidium* (Wells & Bryce, 1988; Abbott & Dance, 1990; Wilson, 1994; Coleman, 1998; Nolf, 2007; Kabir et al., 2007), the constant differences seem to suggest that it may be, a valid species. The living snail has not been found alive locally thus far and it is believed to inhabit the subtidal region. Contacts with fishers at Changi yielded only empty shells usually inhabited by large hermit crabs (e.g., Chua, 2002; Chua et al., 2003). This form is almost always reported from the northern coast of Australia (Wilson & Gillett, 1979; Coleman, 1998; Nolf, 2007), and will certainly be a new record for Singapore if proven to be a valid species in future studies.

***Hemifusus ternatanus* (Gmelin, 1791) (Fig. 1c.)** – also called the “ternate false fusus” (Abbott & Dance, 1990; Abbott, 1991), is seldom found alive intertidally and specimens encountered on the shore are often inhabited by hermit crabs. This slender species is usually found in clean fine sand (unlike *Pugilina cochlidium*), and preys mainly on clams by strangulation using its large foot (pers. obs.). *Hemifusus ternatanus* (synonym *Hemifusus cariniferus* Habe & Kosuge) has close morphological and geographical affiliations with *Hemifusus elongatus* (Fig. 1d) which has a much rounder shoulder and is more elongated in its general outline. *Hemifusus elongatus* (Lamarck, 1822) can be found subtidally off the south-east of Johore (as informed by Johore fishers) and may occur in Singapore waters owing to the great proximity. There is already an unconfirmed local sighting of *Hemifusus elongatus* (H. W. Wong, pers. comm.) and if proven, will be a new record for Singapore. Regionally, *Hemifusus elongatus* was reported from Singkep Island, East Sumatra by Dharma (2005) and from Phu Quoc Island in Vietnam (Thach, 2005).

***Volema myristica* (Röding, 1798) (Fig. 1e).** – commonly known as the “nutmeg melongena” (Abbott & Dance, 1990), and a variety of other seashells (Chua et al., 2003), used to be common at Mata Ikan near Bedok beach on the east coast of Singapore (now reclaimed) during the 1960s to 1970s (D. Andris, pers. comms.). Although badly-weathered shells were seen during the course of this study, none were found alive. However, viable populations can still be found in nearby Johore and Pulau Bintan, Indonesia, and as *Volema myristica* appears to share the same habitats as *Hemifusus ternatanus*, it may be merely a matter of time before this species establishes itself in local waters again. *Volema paradisiaca* Röding, 1798 was listed by Lim (1969 and 1970), Chuang (1973) and Chou et al. (1994) as occurring locally but this is believed to be a misidentification of *Volema myristica* (synonym *Volema galeodes* Lamarck) because *Volema paradisiaca* occurs in East Africa (Abbott & Dance, 1990; Robin, 2008) and is not known from this region.

CONCLUSIONS

The predatory neogastropod family Melongenidae is represented by three species in Singapore, namely *Hemifusus ternatanus*, *Pugilina cochlidium*, and *Volema myristica*. According to an unconfirmed report, a fourth species, *Hemifusus elongatus*, occurs in Singapore as well. A summary of all the names applied to the family and these species is given in Table 1, for the convenience of the reader.

Table 1. Singapore melongenid names and their synonyms.

S/No.	Name of Family/Species	Remarks
1.	False trumpet shell	Common name of <i>Semifusus pugilina</i> of Tweedie (1957 and 1967)
2.	Galeodidae	Synonym of Melongenidae
3.	<i>Hemifusus cariniferus</i> (Habe & Kosuge, 1965)	Synonym of <i>Hemifusus ternatanus</i>
4.	<i>Hemifusus elongatus</i> (Lamarck, 1822)	Unconfirmed fourth species in Singapore, related to <i>Hemifusus ternatanus</i>
5.	<i>Hemifusus ternatanus</i> (Gmelin, 1791)	Preferred name of this species
6.	<i>Melongena myristica</i>	Synonym of <i>Volema myristica</i>
7.	<i>Melongena pugilina</i>	Synonym of <i>Pugilina cochlidium</i>
8.	<i>Melongena ternatanus</i>	Synonym of <i>Hemifusus ternatanus</i>
9.	Melongenidae	Preferred name of this family
10.	Nutmeg melongena	Common name of <i>Volema myristica</i> of Abbott & Dance (1990)
11.	<i>Pugilina cochlidium</i> (Linnaeus, 1758)	Preferred name of this species
12.	<i>Pugilina ternatana</i>	Synonym of <i>Hemifusus ternatanus</i>
13.	<i>Pugilina wardiana</i> (Iredale, 1938)	May be a valid species, but treated as a synonym of <i>Pugilina cochlidium</i>
14.	<i>Semifusus pugilina</i>	Synonym of <i>Pugilina cochlidium</i>
15.	Spiral melongena	Common name of <i>Pugilina cochlidium</i> of Abbott & Dance (1990) and Tan & Yeo (2003)
16.	Ternate false fusus	Common name of <i>Hemifusus ternatanus</i> of Abbott & Dance (1990) and Abbott (1991)
17.	<i>Volema cochlidium</i>	Synonym of <i>Pugilina cochlidium</i>
18.	<i>Volema galeodes</i> Lamarck, 1822	Synonym of <i>Volema myristica</i>
19.	<i>Volema myristica</i> Röding, 1798	Preferred name of this species
20.	<i>Volema paradisiaca</i> Röding, 1798	Name misapplied to <i>Volema myristica</i> by Lim (1969 and 1970), Chuang (1973), and Chou et al. (1994)

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