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Shell-bearing gastropod molluscs of the Singapore Strait

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Abstract. Molluscs were collected from 67 sites in the Singapore Strait during the second workshop (20 May–7 June 2013) of the Comprehensive Marine Biodiversity Survey (CMBS) of Singapore. A total of 175 species of shell-bearing gastropods in 52 families was identified. This represented a mean of 6.9 species per site, with species diversities ranging from 1 to 36 species across the sites sampled. The most abundant species at each site were the neogastropods *Pollia fumosa*, *Mancinella echinata* and *Drupella margariticola*, collected mainly from the intertidal zone and shallow subtidal sites.

Key words. Mollusca, Gastropoda, Singapore Strait, species list

INTRODUCTION

The molluscan diversity of Singapore has been documented since the 1800s (e.g., Traill, 1847; Chuang, 1973; Purchon & Purchon, 1981; Way & Purchon, 1981; Tan & Woo, 2010). Knowledge of the local malacofauna has also improved recently as a result of the related studies (e.g., Neo & Todd, 2013; Ng et al., 2014; Sachidhanandam et al., 2000; Tan & Sigurdsson, 1996a, b). New species of molluscs from Singapore continue to be described from time to time (e.g., Swennen, 2011; Tan et al., 2011; Jensen, 2015), and numerous new records have also been reported (e.g., Lee et al., 2015; Neo, 2014a, b; Tan & Low, 2013a–c; 2014; Tan & Ng, 2014; Toh, 2013a, b). It is thus also evident that the knowledge of the malacofauna of Singapore is far from complete, and that the documentation of the local malacofauna is an ongoing endeavour.

As part of the Comprehensive Marine Biodiversity Survey (CMBS) of Singapore undertaken to take stock of Singapore's marine biodiversity (for details see Tan et al., 2015), a workshop focusing on localities in the southern part of Singapore, the Singapore Strait, was carried out during the period of 20 May to 7 June in 2013. We report upon the marine shell-bearing gastropods identified from the material collected during the three-week long survey.

MATERIAL AND METHODS

The material examined was collected between 20 May and 7 June 2013 from habitats such as mangrove forests, coral reefs, and rocky and sandy shores, from intertidal mud, sand and reef flats to dredging or beam trawling the deeper waters offshore and SCUBA diving in the shallower waters around the coral reefs of the islands in the Singapore Strait (Table 1). Throughout the entire swash zone of beaches and on rocky shores, specimens were largely collected by hand. SCUBA diving was used for the collection from shallow water and subtidal sites. Both living and "dead" shells were collected. Dead intact shells were regarded as proof of the occurrence of the species in the area. All specimens were recorded and shells cleaned before identification; the living specimens were preserved in 70% alcohol.

The classification used in the present study largely follows Bouchet et al. (2005), Boxshall et al. (2013) and the World Register of Marine Species (WoRMS; http://www.marinespecies.org/index.php). The species identification was made according to Abbott & Dance (1990), Cernohorsky (1984), Habe (1975), Okutani (2000), Sanpanich et al. (2004), Tan & Chou (2000), and Wilson (1993, 1994).

RESULTS

A total of 175 shell-bearing gastropod species representing 59 families were identified from the 67 survey sites in the Singapore Strait within the port limits of Singapore (see Table 2). The highest species diversity was observed at site 21, the intertidal area of the Raffles Lighthouse (also known as Pulau Satumu), where 36 species were recorded. Cyrene Reef yielded 31 species, whilst Pulau Jong and Terumbu Raya off Pulau Semakau were tied at 27 species.

High species diversities of shelled gastropods in the Singapore Strait were represented by the families Nassariidae (14 species), Cerithiidae (11 species), Muricidae (11 species),

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Table 1. Sampling sites, their locations and total number of shell-bearing gastropods collected from the Singapore Strait, Singapore (DR = rectangular dredge; IT = intertidal; MG = mangrove; SB = SCUBA diving (coral brushing); SD = SCUBA diving; SW = shallow water; TB = beam trawl).

Site No.	Location	Collection Method	Coordinates	Number of Species Recorded
1	Raffles reserve (DR1)	Rectangular Dredge	1°10'125N; 103°45'419E	18
2	Raffles reserve (DR2)	Rectangular Dredge	1°10'273N; 103°45'613E	5
3	Eastern Fairway (DR14)	Rectangular Dredge	1°16'835N; 103°55'284E	15
4	Marina Barrage (DR31)	Rectangular Dredge	1°16'415N; 103°52'838E	13
5	Near Sudong & Semakau (DR70)	Rectangular Dredge	1°13'134N; 103°44'283E	2
6	Southern Fairway (DR112)	Rectangular Dredge	1°12'024N; 103°50'170E	8
7	Beside Sister's Island (DR125)	Rectangular Dredge	1°12'416N; 103°49'858E	3
8	Beside Eastern Boarding Ground A (DR127)	Beam trawl	1°12'974N; 103°52'960E	4
9	Beside St Johns Island (DR161)	Rectangular Dredge	1°12'843N; 103°51'449E	14
10	Next to Eastern Boarding Ground A (DR174)	Rectangular Dredge	1°12'202N; 103°52'178E	10
11	Terumbu Semakau (IT65)	Hand collection	1°12.649'N; 103°46.199'E	9
12	Big Sister's Island (IT81)	Hand collection		4
13	Cyrene Reef (IT86)	Hand collection	1°15.374'N; 103°44.816'E	31
14	Pulau Semakau (IT87)	Hand collection		1
15	Pulau Jong (IT93)	Hand collection	1°12.901'N; 103°47.194'E	27
16	Cyrene Reef (IT94)	Hand collection	1°15.374'N; 103°44.816'E	1
17	Raffles Light House (IT95)	Hand collection		13
18	Big Sister's Island (IT102)	Hand collection		4
19	Terumbu Pempang Tengah (IT103)	Hand collection	1°13.758'N; 103°43.736'E	4
20	St John's Island (IT107)	Hand collection		14
21	Raffles Light House (IT108)	Hand collection		36
22	St John's Island (IT118)	Hand collection	1°12.851'N; 103°51.045'E	2
23	Pulau Hantu (IT120)	Hand collection		11
24	Terumbu Raya (IT122)	Hand collection		27
25	Terumbu Pempang Laut (IT124)	Hand collection	1° 13.912'N; 103°43.402'E	7
26	Tekukor (IT140)	Hand collection	1°13.899'N; 103°50.265'E	21
27	St John's Island (MG18), Mangrove	Hand collection	1°13.240'N; 103°51.018'E	11
28	Kusu Island (SB55)	Coral brushing SCUBA	1°13.9'N; 103°52'E	1
29	Pulau Hantu (SB67)	Coral brushing SCUBA	1°13.6'N; 103°44.8'E	3
30	Kusu Island (SB132)	Coral brushing SCUBA		4
31	Pulau Hantu (SB146)	Coral brushing SCUBA		4
32	St John's Island (SD25)	Hand collection, SCUBA		8
33	Pulau Semakau (SD40)	Hand collection, SCUBA	1°12.389'N; 103°45.24'E	2
34	Lazarus Island (SD45)	Hand collection, SCUBA		8
35	Kusu Island (SD54)	Hand collection, SCUBA	1°13.9'N; 103°52'E	3
36	Pulau Jong (SD56)	Hand collection, SCUBA	1°12.55'N; 103°47.2'E	4
37	Pulau Hantu (SD66)	Hand collection, SCUBA	1°13.6'N; 103°44.8'E	2
38	Tekukor (SD84)	Hand collection, SCUBA	1°13.8'N; 103°50.25'E	5
39	Sisters' Island (small) (SD89)	Hand collection, SCUBA	1°12.9'N; 103°49.88'E	3
40	St John's Island, DRTech (SD132)	Hand collection, SCUBA	1°12.928'N; 103°51.099'E	4
41	Kusu Island (SD133)	Hand collection, SCUBA		1
42	Pulau Hantu (SD143)	Hand collection, SCUBA		5
43	Pulau Hantu (SD145)	Hand collection, SCUBA		5
44	Kusu Island (SD151)	Hand collection, SCUBA		2
45	Kusu Island (SD152)	Hand collection, SCUBA		4
46	Kusu Island (SD166)	Hand collection, SCUBA		6
47	Pulau Jong (SD167)	Hand collection, SCUBA		6
48	St John's Island, DRTech (SW6)	Hand collection	1°12.928'N; 103°51.099'E	3
49	St John's Island, DRTech (SW47)	Hand collection	1°13.116'N; 103°51.079'E	7
50	Seringat-Kias (SW53)	Hand collection	1°13.630'N; 103°51.218'E	3
51	St John's Island, DRTech (SW134)	Hand collection		9
52	St John's Island, DRTech (SW155)	Hand collection	1°13.116'N; 103°51.079'E	6
53	St John's Island (SW156)	Hand collection	1°13.348'N; 103°50.834'E	4

Site No.	Location	Collection Method	Coordinates	Number of Species Recorded
54	Beside Sebarok (TB5)	Beam trawl	1°10'5N; 103°46'512E	2
55	Eastern Fairway (TB15)	Beam trawl	1°16'300N; 103°55'226E	3
56	Eastern Holding (TB17)	Beam trawl	1°13'816N; 103°54'060E	2
57	Marina Barrage (TB30)	Beam trawl	1°16'186N; 103°52'375E	9
58	Around Tanah Merah (TB58)	Beam trawl	1°16'808N; 103°58'246E	5
59	South of Semakau (TB73)	Beam trawl	1°11'282N; 103°46'632E	3
60	Near Eastern Bunkering A (TB97)	Beam trawl	1°18'425N; 104°04'607E	2
61	Eastern Bunkering A (TB98)	Beam trawl	1°18'938N; 104°05'312E	3
62	Eastern Bunkering A (TB99)	Beam trawl	1°18'861N; 104°05'128E	1
63	Beside Eastern Boarding Ground A (TB128)	Rectangular dredge	1°12'889N; 103°52'460E	1
64	East Johor Strait (TB141)	Beam trawl	1°17'725N; 104°04'363E	1
65	East Johor Strait (TB142)	Beam trawl	1°17'838N; 104°04'157E	13
66	Singapore Port Limit, Near Southern Fairway (TB157)	Beam trawl	1°12'329N; 103°52'403E	1
67	Next to Eastern Boarding Ground A (TB172)	Beam trawl	1°12'180N; 103°52'125E	2

Table 2. List of shell-bearing gastropod molluscs collected from the Singapore Strait, Singapore.

Family	Scientific Name	Site Number
Lottiidae	*Patelloida saccharinoides* Habe & Kosuge, 1966	21, 51
Nacellidae	*Cellana radiata* (Born, 1778)	51
Fissurellidae	*Diodora mus* (Reeve, 1850)	2, 24
	Diodora singaporensis (Reeve, 1850)	21, 26
	Emarginula sp.	1
Haliotidae	*Haliotis ovina* Gmelin, 1791	34
	Haliotis planata G.B. Sowerby II, 1882	17
Chilodontidae	*Hybochelus cancellatus* (Krauss, 1848)	32
Trochidae	*Chrysostoma paradoxum* (Born, 1778)	11, 13, 15, 21, 24
	Clanculus margaritarius (Philippi, 1846)	32
	Ethminolia nektonica (Okutani, 1961)	4
	Ethminolia vitiliginea (Menke, 1843)	9
	Euchelus asper (Gmelin, 1791)	26
	Euchelus atratus (Gmelin, 1791)	13, 15, 17, 20, 21, 23, 25, 26, 30, 40
	Lirularia pygmaea (Yokoyama, 1922)	3
	Monodonta labio (Linnaeus, 1758)	15, 17, 21, 23, 26, 49, 51
	Trochus maculatus Linnaeus, 1758	13, 15, 17, 19, 20, 21, 24, 25, 38, 51
Calliostomatidae	*Calliostoma* sp.	30, 31, 40
Turbinidae	*Angaria delphinus* (Linnaeus, 1758)	13
	Angaria sphaerula (Kiener, 1838)	34
	Astralium calcar (Linnaeus, 1758)	10
	Turbo reevei Philippi, 1847	47
	Turbo bruneus (Röding, 1798)	11, 16, 17, 26, 38
	Turbo intercostalis Menke in Philippi, 1846	10, 15, 17, 19, 20, 21, 24, 25, 26, 31
Neritidae	*Clithon oualaniense* (Lesson, 1831)	50
	Nerita albicilla Linnaeus, 1758	20, 26, 51
	Nerita chamaeleon Linnaeus, 1758	20, 23, 26, 49
	Nerita undata Linnaeus, 1758	17, 20, 21, 26, 49, 51

Family	Scientific Name	Site Number
Cerithiidae	*Cerithium coralium* Kiener, 1841	15, 20, 23, 24, 26, 27
	Cerithium tenellum G.B. Sowerby II, 1855	13
	Cerithium traillii G.B. Sowerby II, 1855	15, 21, 24, 42
	Cerithium zonatum (Wood, 1828)	15, 21
	Clypeomorus bifasciata (G.B. Sowerby II, 1855)	21, 23
	Clypeomorus irrorata (Gould, 1849)	21
	Clypeomorus pellucida (Hombron & Jacquinot, 1852)	27
	Rhinoclavis articulata (A. Adams & Reeve, 1850)	13
	Rhinoclavis aspera (Linnaeus, 1758)	13, 24
	Rhinoclavis sinensis (Gmelin, 1791)	13, 15, 21
	Rhinoclavis sordidula (Gould, 1849)	23, 34
Batillariidae	*Batillaria zonalis* (Bruguière, 1792)	50
Planaxidae	*Fossarus tornatilis* (Gould, 1859)	9
	Planaxis sulcatus (Born, 1780)	20, 21, 49
Potamididae	*Cerithideopsilla cingulata* (Gmelin, 1791)	27
	Telescopium telescopium (Linnaeus, 1758)	27
	Terebralia sulcata (Born, 1778)	27
Siliquariidae	*Tenagodus anguinus* (Linnaeus, 1758)	1
	Tenagodus armatus (Habe & Kosuge, 1967)	1
	Tenagodus cumingii (Mörch, 1861)	1, 2, 9, 24
Cypraeidae	*Bistolida ursellus* (Gmelin, 1791)	39
	Eclogavena quadrimaculata (J.E. Gray, 1824)	47
	Erosaria miliaris (Gmelin, 1791)	11
	Erronea caurica (Linnaeus, 1758)	29
	Erronea errones (Linnaeus, 1758)	13, 14, 15, 17, 19, 20, 21, 24, 25, 26, 37
	Erronea pallida (J.E. Gray, 1824)	6
	Mauritia arabica (Linnaeus, 1758)	12, 44
	Palmadusta contaminata (J. E. Gray in G.B. Sowerby I, 1832	10
	Purpuradusta gracilis (Gaskoin, 1849)	13
Ovulidae	*Phenacovolva barbieri* Lorenz & Fehse, 2009	9
Pediculariidae	*Pseudocypraea alexhuberti* cf. Lorenz, 2006	8
Littorinidae	*Echinolittorina feejeensis* (Reeve, 1857)	21
	Echinolittorina malaccana (Philippi, 1847)	19, 20, 21, 49
	Echinolittorina vidua (Gould, 1859)	21
	Littoraria articulata (Philippi, 1846)	15, 21, 27
	Littoraria intermedia (Philippi, 1846)	27
	Littoraria melanostoma (J. E. Gray,1839)	27
	Littoraria pallescens (Philippi, 1846)	27
	Littoraria strigata (Philippi, 1846)	27
Naticidae	*Eunaticina papilla* (Gmelin, 1791)	4
	Natica bibalteata G.B. Sowerby III, 1914	65
	Natica vitellus (Linnaeus, 1758)	4, 13
	Notocochlis cernica (Jousseaume, 1874)	3, 24
	Notocochlis gualteriana (Récluz, 1844)	3
	Polinices albumen (Linnaeus, 1758)	13
	Polinices flemingianus (Récluz, 1844)	13
	Polinices mammilla (Linnaeus, 1758)	13, 24
	Polinices powisianus (Récluz, 1844)	42
	Tanea areolata (Récluz, 1844)	13
	Tanea lineata (Röding, 1798)	24
Rissoidae	*Rissoina striata* (Quoy & Gaimard, 1833)	15, 21
Tornidae	*Circulus* sp.	65

Family	Scientific Name	Site Number
Strombidae	*Canarium urceus* (Linnaeus, 1758)	11, 13, 15, 21, 23, 24, 25, 37, 52
	Dolomena variabilis (Swainson, 1820)	42
	Lambis lambis (Linnaeus, 1758)	11
	Laevistrombus canarium (Linnaeus, 1758)	48
Cassidae	*Phalium glaucum* (Linnaeus, 1758)	13
Bursidae	*Bufonaria rana* (Linnaeus, 1758)	3, 58, 61, 62, 65
Ranellidae	*Gyrineum gyrinum* (Linnaeus, 1758)	10, 56
	Gyrineum natator (Röding, 1798)	8, 26, 63, 65, 67
Hipponicidae	*Cheilea* sp.	1
Triviidae	*Trivirostra oryza* (Lamarck, 1810)	6, 7, 11, 13, 21, 24, 43
Vermetidae	*Serpulorbis* sp.	24
Xenophoridae	*Stellaria solaris* (Linnaeus, 1764)	3, 65
Epitoniidae	*Epitonium liliputanum* (A. Adams, 1861)	4
	Epitonium pyramidale (G.B. Sowerby II, 1844)	3
Eulimidae	*Annulobalcis yamamotoi* Habe, 1974	18
Triphoridae	*Inella japonica* Kuroda & Kosuge, 1963	9
	Litharium kurodai Kosuge, 1962	9
	Litharium marceda (Laseron, 1958)	9
	Nototriphora alba (Kosuge, 1961)	9, 10
	Triphora taeniolata Hervier, 1897	9
	Viriola tricincta (Dunker, 1860)	9
Buccinidae	*Engina armillata* (Reeve, 1846)	6, 15, 34, 35, 46
	Nassaria acuminata (Reeve, 1844)	1, 3, 58, 59
	Nassaria pusilla (Röding, 1798)	4, 66
	Phos sp.	2
	Pollia fumosa (Dillwyn, 1817)	6, 7, 9, 10, 11, 13, 15, 17, 21, 22, 24, 25, 26, 36, 38, 45, 46, 47, 65
Columbellidae	*Cotonopsis hirundo* (Gaskoin, 1852)	8
	Euplica borealis (Pilsbry, 1904)	13, 15, 29, 34, 36
	Euplica scripta (Lamarck, 1822)	15, 18, 21, 23, 24, 26, 34
	Mitrella bicincta (Gould, 1860)	6
	Mitrella moleculina (Duclos, 1840)	21
	Pardalinops testudinaria (Link, 1807)	13, 15, 21, 22, 26, 32, 34, 35, 46
	Pictocolumbella ocellata (Link, 1807)	15, 20, 21, 49
	Pseudamycla formosa (Gaskoin, 1852)	3
	Pyrene pudica (Brazier, 1877)	9
	Pyrene splendidula (G.B. Sowerby I, 1844)	6, 7, 36, 46
Fasciolariidae	*Fusinus undulatus* (Gmelin, 1791)	67
	Latirolagena smaragdulus (Linnaeus, 1758)	32
Nassariidae	*Nassarius albescens albescens* (Dunker, 1846)	57
	Nassarius castus (Gould, 1850)	3, 5, 11, 12, 13, 15, 21, 24, 60, 65
	Nassarius concinnus (G.B. Sowerby I & Powys, 1835)	2,55
	Nassarius crematus (Hinds, 1843)	4
	Nassarius fuscolineatus (E.A. Smith, 1875)	34
	Nassarius gaudiosus (Hinds, 1844)	13
	Nassarius livescens (Philippi, 1849)	52
	Nassarius multipunctatus (Schepman, 1911)	8
	Nassarius pauper (Gould, 1850)	24
	Nassarius pullus (Linnaeus, 1758)	50
	Nassarius crenoliratus (A. Adams, 1852)	4, 10, 13, 21, 24, 52, 57
	Nassarius splendidulus (Dunker, 1846)	57
	Nassarius subtranslucidus (Smith, 1903)	4
	Nassarius succinctus (A. Adams, 1852)	4

Family	Scientific Name	Site Number
Melongenidae	*Pugilina cochlidium* (Linnaeus, 1758)	13
Muricidae	*Chicoreus brunneus* (Link, 1807)	15, 17, 21, 23, 24, 26, 28, 32, 45, 46
	Chicoreus torrefactus (G.B. Sowerby II, 1841)	18, 39, 41, 42, 47
	Drupella margariticola (Broderip in Broderip & G.B. Sowerby I, 1833)	11, 13, 15, 17, 18, 20, 21, 23, 24, 26, 32, 33, 42, 49, 52, 53
	Drupella rugosa (Born, 1778)	13, 24, 26, 43, 52
	Ergalatax contracta (Reeve, 1846)	1, 9, 31, 33, 43, 54, 57, 65
	Indothais sacellum (Gmelin, 1791)	3, 30, 35, 40, 45, 59, 65
	Mancinella echinata (Blainville, 1832)	1, 6, 13, 15, 17, 21, 23, 24, 25, 26, 32, 38, 43, 44, 47, 53, 59
	Morula iostoma (Reeve, 1845)	43
	Morula spinosa (H. Adams & A. Adams, 1853)	15, 21, 45
	Murex trapa Röding, 1798	3, 4, 55, 57, 61
	Reishia bitubercularis (Lamarck, 1822)	15, 20, 26, 38, 51, 53
	Tenguella musiva (Kiener, 1835)	15, 17, 20, 21, 26, 53
Costellariidae	*Vexillum intertaeniatum* (G.B. Sowerby II, 1874)	52
	Vexillum crocatum (Lamarck, 1811)	36
	Vexillum dennisoni (Reeve, 1844)	10
	Vexillum vulpecula (Linnaeus, 1758)	57
	Zierliana ziervogelii (Gmelin, 1791)	27
Marginellidae	*Cryptospira fischeri* (Bavay, 1902)	1
	Cryptospira tricincta (Hinds, 1844)	3, 4, 5, 10, 57, 58, 60, 64
Mitridae	*Mitra puncticulata* Lamarck, 1811	15
	Mitra tabanula Lamarck, 1811	24, 32
	Pterygia undulosa (Reeve, 1844)	24
Volutidae	*Cymbiola nobilis* (Lightfoot, 1786)	29
Olividae	*Miniaceoliva miniacea* (Röding, 1798)	13
Clathurellidae	*Etremopa gainesii* (Pilsbry, 1895)	46
Conidae	*Leporiconus granum* Röckel, D. & H. Fischöder, 1985	47
Drilliidae	*Clavus exasperatus* (Reeve, 1843)	13
	Clavus pusilla (Garrett, 1873)	31, 65
	Drillia ballista Maltzan, 1883	10
Horaiclavidae	*Paradrillia inconstans* (E.A. Smith, 1875)	65
Turridae	*Funa jeffreysii* (Smith, 1875)	1, 2, 3, 58
	Gemmula cosmoi (Sykes, 1930)	3, 4, 55, 57, 65
	Turridrupa albogemmata Stahlschmidt & Fraussen, 2011	54
	Turris nadaensis Azuma, 1973	12
	Turris undosa (Lamarck, 1816)	56
Cancellariidae	*Merica sinensis* (Reeve, 1856)	61
Architectonicidae	*Architectonica maxima* (Philippi, 1849)	58
	Heliacus caelatus (Hinds, 1844)	65
Mathildidae	*Mathilda scalaris* (Kuroda & Habe in Kuroda, Habe & Oyama, 1971)	3, 4, 57
Pyramidellidae	*Milda ventricosa* (Guérin, 1831)	13, 24
Siphonariidae	*Siphonaria atra* Quoy & Gaimard, 1833	12, 21, 51
	Siphonaria laciniosa (Linnaeus, 1758)	21, 51

Naticidae (11 species), Columbellidae (10 species), Trochidae (9 species), Cypraeidae (9 species) and Littorinidae (8 species) (see Table 2). In terms of distribution, *Pollia fumosa* (Buccinidae) was the most common species found at 19 sites, followed by *Mancinella echinata* and *Drupella margariticola* (Muricidae), which occurred in 17 and 16 sites respectively (Table 2). The number of species collected ranged between 1 and 36 across all 67 sites, giving a mean of 6.9 species per site (see also Table 1). The most abundant species recorded at each site in descending order were *Pollia fumosa* (Buccinidae)*, Mancinella echinata* (Muricidae) and *Drupella margariticola* (Muricidae). In contrast, there were numerous families represented by single species, including the true limpets, *Hybochelus cancellatus* (Chilodontidae), *Rissoina striata* (Rissoidae), *Bufonaria rana* (Bursidae), *Miniaceoliva miniacea* (Olividae), *Leporiconus granum* (Conidae), etc.

DISCUSSION

The number of species recorded during the three-week workshop does not seem high compared to some 850 species of gastropods listed by Tan & Woo (2010). This is nevertheless understandable considering that the material was collected over a limited period of time, and that the task of finding the animals carried out by personnel with varying abilities and interests. Shelled gastropods characteristic of the mangroves were also poorly represented (e.g., rissoids, assimineids, ellobiids) as such habitats are now mainly confined to the shores of the Johor Straits. Despite these constraints, overall patterns in Singapore gastropod diversity observed by Lim (1970, unpublished), Way & Purchon (1981) and Tan & Woo (2010) appear to be reflected in our checklist. The diversity of larger families (Nassariidae, Muricidae, Cerithiidae, Naticidae) found in this study were comparable to those recorded by previous studies carried out in the past. Nevertheless, one conspicuous discrepancy is the low diversity of the family Conidae observed as compared to earlier studies. Some 15 species of *Conus* from Singapore were listed by Lim (1969), and Way & Purchon (1981) listed four species as present in Singapore, but we came across only one species (*Leporiconus granum*) during the workshop. Although a living specimen of *Conus recluzianus* from Lazarus Island in the Singapore Strait was reported by Toh et al. (2014a) and a freshly dead shell of *C. marmoreus* was observed on Pulau Hantu (Toh, 2014), it would appear that the diversity of this family has been reduced considerably in Singapore over the last fifty years. However, a number of species collected before and after the workshop that was hitherto undocumented previously from Singapore were reported elsewhere recently (e.g., Tan & Low, 2013; Lee & Ong, 2014; Toh et al., 2014b). We anticipate that more species will be added to the list of gastropods occurring in Singapore after all the material collected by the CMBS are sorted and determined, although some species may have become locally extinct.

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