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Marine bivalves occurring on the east coast of the Gulf of Thailand

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ABSTRACT: This study presents a list of marine bivalve species that occur along the east coast of the Gulf of Thailand, from the province of Chonburi to Trad. Of the 55 sampling sites, 20 were located in Chonburi, 10 in Rayong, 7 in Chanthaburi, and 18 in Trad. Specimens were collected from sandy beaches, muddy sand, rocky shore, and coral reefs, between April 2005 and July 2009. A total of 321 species, 43 families, and 118 genera were recorded. The most widespread species were *Tridacna crocea* and *T. squamosa* (Tridacnidae) which occurred in 37 locations, followed by *Barbatia foliata* (Arcidae) and *Liochoncha annettae* (Veneridae) presented in 36 sites, *Pedum spondyloideum* (Pectinidae) that was found in 35 sites, *Tapes literatus* that occurred in 34 sites, and *Vasticardium pectiniforme* (Cardiidae) that was registered in 33 sites. The highest diversity was observed in Rayong province with 192 species, *B. foliata* being the most common species. The lowest diversity was registered in Chanthaburi province, 76 species, where *Tellina inflata* (Tellinidae) was the most common species. In Chonburi province there were 187 species identified, of which *V. pectiniforme* and *Ctena bella* (Lucinidae) were the most common. Finally, in Trad province of the 179 species recorded the most common one was *L. annettae*.

KEYWORDS: distribution, diversity, marine mollusc

INTRODUCTION

Thailand has a long coastline extending to nearly 2815 km from the east to the south along the Gulf of Thailand and the Andaman Sea. Close to 544 km, the eastern coastline extends from the area between the river mouths of the Tajeen and Choapraya Rivers to the Cambodian border at Klong Yai, Trad Province. The east coast is composed of seven provinces, namely Bangkok, Samut Prakan, Chachoengsao, Chonburi, Rayong, Chanthaburi, and Trad. However, only in the last four provinces marine biodiversity has been examined, due to the wide variety of beaches and the high numbers of islands in those areas. In the last ten years, only a few studies on the diversity of marine molluscs in these areas were undertaken. Sanpanich[1] reported 76 species of marine bivalves in Chonburi and Rayong provinces whereas Jensen[2] by collating data from bivalves species lists published between 1889 and 2001 for the Gulf of Thailand, found that 594 species had already been recorded. This study further documents existing marine bivalve species in the east coast of Thailand.

MATERIALS AND METHODS

Specimens of marine bivalves were collected between April 2005 and July 2009 from sandy beaches, muddy sand, rocky shores, and coral reefs at islands in the Gulf of Thailand, between Chonburi and Trad provinces. The criteria for choosing the sampling sites depended on the number of beaches, islands etc. distributed in each province. Of the 55 sampling sites (Table 1, Fig. 1), 20 were located in Chonburi, 10 in Rayong, 7 in Chanthaburi, and 18 in Trad. In subtidal areas, specimens were collected by scuba divers that covered the area between shallow water on the reef flat and the reef to a maximum depth of about 18 m. Throughout the entire swash zone of beaches and on rocky shores, specimens were collected by hand-picking. Both living and dead shells were collected, as dead shells would represent species living at the site. All specimens were recorded and identified. The living specimens were preserved in 10% formalin for about 3 days and then moved to 70% alcohol. Prior to identification, shells were cleaned in sodium hypochloride 6.6% w/v overnight, washed with tap water and air dried for further study. The classification used in the present study followed the one proposed by Beesley et al[3] and Brand[4]. The species identification was made according to Abbott[5], Abbott and Dance[6], Bussarawit[7], Eisenberg[8], Glover and Taylor[9], Kira[10], Habe[11], Lamprell[12], Lamprell and Whitehead[13], Lamprell and Healy[14], Nielsen[15], Okutani[16], Oliver[17], Robba et al[18], Swennen et al[19],

Table 1 Collection sites and total number of bivalve species collected along the eastern coast of the Gulf of Thailand.

Site no.	Site name	Habitats[a]	Coordinates	No. of species
1	Angsila, Chonburi	S, M	13° 18′ 57.56″ N; 100° 55′ 4.44″ E	6
2	Larn Island, Pattaya, Chonburi	C	12° 55′ 39.30″ N; 100° 46′ 29.60″ E	26
3	Krok Island, Pattaya, Chonburi	C	12° 55′ 42.29″ N; 100° 48′ 16.31″ E	44
4	Sark Island, Pattaya, Chonburi	C	12° 56′ 42.15″ N; 100° 47′ 30.30″ E	24
5	Loerm Island, Pattaya, Chonburi	C	12° 57′ 36.39″ N; 100° 39′ 13.11″ E	37
6	Pai Island, Pattaya, Chonburi	C	12° 56′ 35.52″ N; 100° 40′ 38.52″ E	50
7	Klungbadarn Island, Pattaya, Chonburi	C	12° 54′ 12.78″ N; 100° 40′ 46.69″ E	26
8	Marnvichai Island, Pattaya, Chonburi	C	12° 52′ 30.79″ N; 100° 40′ 27.42″ E	31
9	Rin Island, Pattaya, Chonburi	C	12° 47′ 43.61″ N; 100° 42′ 17.08″ E	54
10	Hin Hoo-chang, Pattaya, Chonburi	C	12° 48′ 34.55″ N; 100° 42′ 31.45″ E	55
11	Sor Beach, Toong Prong, Sattahip, Chonburi	R, S	12° 43′ 54.9″ N; 100° 50′ 2.2″ E	24
12	Nang-rong Beach, Sattahip, Chonburi	S, C	12° 36′ 55.87″ N; 100° 55′ 13.64″ E	20
13	Jorrake Island, Sattahip, Chonburi	C	12° 36′ 10.19″ N; 100° 55′ 4.13″ E	23
14	Sattahip Bay, Sattahip, Chonburi	S, M	12° 39′ 37″ N; 100° 53′ 45.8″ E	30
15	Kram Island, Sattahip, Chonburi	S, C	12° 40′ 19.2″ N; 100° 47′ 10.3″ E	44
16	Chong Samaesarn, Sattahip, Chonburi	C	12° 35′ 46.92″ N; 100° 57′ 47.37″ E	38
17	Samaesarn Island, Sattahip, Chonburi	S, C	12° 33′ 58.72″ N; 100° 56′ 57.95″ E	56
18	Karm Island, Sattahip, Chonburi	C	12° 34′ 27.93″ N; 100° 55′ 59.12″ E	35
19	Juang Island, Sattahip, Chonburi	C	12° 30′ 50.67″ N; 100° 57′ 12.93″ E	54
20	Jarn Island, Sattahip, Chonburi	C	12° 31′ 2.19″ N; 100° 58′ 16.74″ E	51
21	Sai-thong Beach, Moeng, Rayong	S	12° 40′ 11.04″ N; 101° 11′ 11.81″ E	26
22	Numrin Beach, Ban Chang, Rayong	S	12° 40′ 31.25″ N; 101° 5′ 31.90″ E	51
23	Maerumpung Beach, Klaeng, Rayong	S	12° 37′ 19.43″ N; 101° 21′ 48.16″ E	16
24	Ban Pe, Klaeng, Rayong	S	12° 36′ 43.87″ N; 101° 25′ 22.18″ E	23
25	Suanson Beach, Klaeng, Rayong	S	12° 37′ 55.08″ N; 101° 29′ 27.16″ E	34
26	Samed Island, Klaeng, Rayong	R, C	12° 34′ 0.07″ N; 101° 27′ 51.37″ E	68
27	Munnai Island, Klaeng, Rayong	S, C	12° 36′ 51.23″ N; 101° 41′ 13.54″ E	51
28	Munklarng Island, Klaeng, Rayong	S, C	12° 35′ 59.16″ N; 101° 41′ 37.31″ E	35
29	Munnork Island, Klaeng, Rayong	S, C	12° 34′ 9.52″ N; 101° 42′ 8.60″ E	77
30	Laem Maepim, Klaeng, Rayong	S	12° 38′ 37.14″ N; 101° 38′ 8.83″ E	15
31	Kungwimarn, Chanthaburi	R, C	12° 36′ 30.16″ N; 101° 52′ 11.99″ E	21
32	Kung Kraben, Chanthaburi	M	12° 34′ 26.58″ N; 101° 53′ 47.37″ E	19
33	Joaloa Beach, Chanthaburi	S, C	12° 32′ 4.68″ N; 101° 56′ 3.95″ E	14
34	Moo Bay, Chanthaburi	S, M	12° 29′ 1.83″ N; 102° 2′ 38.33″ E	9
35	Yang Bay, Chanthaburi	S, R	12° 28′ 31.50″ N; 102° 2′ 40.16″ E	4
36	Saba Island, Chanthaburi	C	12° 30′ 33.33″ N; 101° 56′ 56.59″ E	8
37	Nomsoa Island, Chanthaburi	C	12° 27′ 53.50″ N; 102° 1′ 24.41″ E	39
38	Loaya Island, Trad	C	11° 56′ 43.7″ N; 102° 24′ 4.1″ E	23
39	Wai Island, Trad	C	11° 54′ 20.37″ N; 102° 24′ 2.89″ E	44
40	Ngarm Island, Trad	C	11° 56′ 54.88″ N; 102° 26′ 15.77″ E	13
41	Kloom Island, Trad	C	11° 55′ 22.08″ N; 102° 21′ 12.20″ E	46
42	Kumpun Island, Trad	R, C	11° 47′ 8.8″ N; 102° 23′ 38.7″ E	23
43	Mapring Island, Trad	R, C	11° 48′ 16.19″ N; 102° 22′ 36.63″ E	18
44	Songpeenong Island, Trad	C	11° 48′ 32.7″ N; 102° 22′ 43.5″ E	15
45	Hin Yak Island, Trad	C	11° 47′ 19.67″ N; 102° 23′ 42.39″ E	12
46	Rung Island, Trad	C	11° 47′ 46.32″ N; 102° 22′ 56.25″ E	24
47	Hin Plai num, Trad	C	11° 51′ 3.1″ N; 102° 24′ 42.0″ E	17
48	Thonglarng Island, Trad	C	11° 49′ 11.47″ N; 102° 24′ 4.00″ E	11
49	Rayungnok Island, Trad	C	11° 48′ 0.23″ N; 102° 27′ 8.64″ E	17
50	Kradad Island, Trad	C	11° 51′ 1.03″ N; 102° 30′ 55.72″ E	41
51	Mark Island, Trad	C	11° 50′ 34.79″ N; 102° 29′ 35.09″ E	71
52	Maisee Island, Trad	C	11° 43′ 17.38″ N; 102° 30′ 41.52″ E	58
53	Hin Bungbao, Trad	C	11° 35′ 50.66″ N; 102° 31′ 46.38″ E	18
54	Pukwaen Bay, Trad	C	11° 45′ 12.73″ N; 102° 32′ 39.30″ E	19
55	Hin Kong Bay, Trad	C	11° 37′ 29.85″ N; 102° 32′ 31.69″ E	48

[a] S=sandy beach; R=rocky shore; C=coral reef; M=muddy sand.

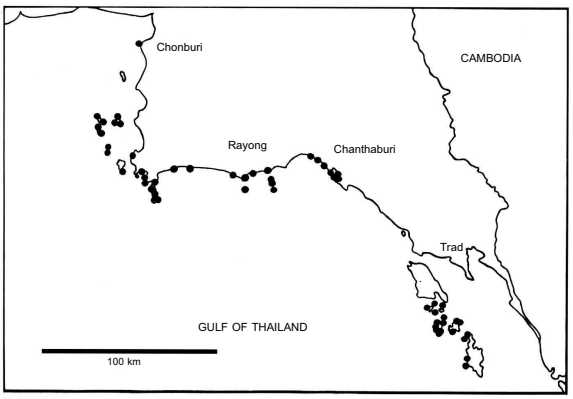

Fig. 1 Collection sites (dots) along the east coast of the Gulf of Thailand.

Tan and Chou[20], Vongpanich[21,22], Yoosukh and Duangdee[23]. Finally, specimens were deposited in the reference collection of the Institute of Marine Science museum, at Burapha University.

RESULTS

A total of 321 megabenthic bivalve species were identified representing 43 families, and 118 genera (Table 2). The most common species were *Tridacna crocea* and *T. squamosa* (Tridacnidae) found in 37 sites followed by *Barbatia foliata* (Arcidae) and *Liochoncha annettae* (Veneridae) (36 sites), *Pedum spondyloideum* (Pectinidae) (35 sites), *Tapes literatus* (34 sites), and *Vasticardium pectiniforme* (Cardiidae) (33 sites). For the 55 sites sampled, the number of species ranged between 4 and 77, giving a mean of 31.9 species per site (Table 1). Sites with high diversity of bivalve species were observed around the islands located at Rayong and Trad provinces. In Rayong, high number of species were observed in sites 29, 27, 26, and 22 which were along the beach, whereas sites 23 and 30 presented the lowest diversity of species. Within Trad province, the highest number of species was observed in sites 51 and 52 whereas the lowest diversity was recorded in sites 44, 40, 45, and 48. The lowest diversity was registered in Chanthaburi province (sites 34, 35, 36), 76 species, with *Tellina inflata* (Tellinidae) being the most common species; within this province, Nomsoa Island was the site that presented the highest number of species. The highest diversity was found in Rayong province with 192 species, *B. foliata* being the most common species. Of the 10 sites sampled in Rayong, Munnork Island was the one that presented the highest number of species. In Chonburi province there were 187 species identified, the most common of which were *V. pectiniforme* and *Ctena bella* (Lucinidae). In this province, the highest number of species was recorded in Samaesarn Island. Finally, in Trad province, the highest number of species was recorded at Mark Island. Of the 179 species recorded, the most common was *L. annettae*.

Table 2 List of bivalves collected at sites along the east coast of the Gulf of Thailand.

Bivalve species	Site
Family Arcidae	
Anadara antiquata (Linnaeus, 1758)	17, 21, 22, 25, 27, 29, 37, 51
Anadara craticulata (Nyst, 1848)	46
Anadara crebricostata (Reeve, 1844)	28, 41, 52, 53
Anadara ferruginea (Reeve, 1844)	50, 51, 53
Anadara granosa (Linnaeus, 1758)	22, 25, 30, 32, 41
Anadara inaequivalvis (Bruguiere, 1789)	14, 22, 23, 25, 31, 54
Anadara jurata Iredale, 1939*	21
Anadara pilula (Reeve, 1843)	22, 23, 27, 30, 32
Anadara rotundicostata (Reeve, 1843)	5
Anadara rufescens (Reeve, 1844)*	22, 25, 30
Anadara tricenicosta (Nyzt, 1848)*R	22
Arca navicularis Bruguiere, 1789	2, 5, 7, 21–25, 27, 29, 37, 41, 50, 51
Arca ventricosa Lamarck, 1819	3, 5, 8–10, 12, 13, 15–17, 20, 21, 26, 27, 29, 31, 33, 37, 39, 41, 49, 50, 55
Barbatia fusca (Bruguiere, 1789)	3, 6, 8, 11, 15–20, 26–29, 31, 36, 37, 39, 41, 51
Barbatia foliata (Forsskal, 1775)	2–7, 9, 10, 12, 13, 16, 19–22, 24–31, 33–35, 37–41, 43, 46, 49, 50, 52
Barbatia grayana (Dunker, 1858)	6
Barbatia iota (Iredale, 1939)	26, 28, 29, 41, 50
Barbatia virescens (Reeve, 1844)*T	52
Barbatia plicata (Dillwyn, 1817)	27–29, 37
Trisidos semitorta (Lamarck, 1835)	6, 7, 9, 16, 22, 24, 25, 39, 44, 46, 52
Family Cucullaeidae	
Cucullaea labiata (Lightfoot, 1786)	5, 9, 10, 15, 21

DISCUSSION

A total of 321 species, 43 families, and 118 genera of marine bivalve species collected between April 2005 and July 2009 along the east coast of the Gulf of Thailand from Chonburi to Trad are reported in this study. The number of species identified was higher that the one reported in previous studies. For example Suvatti[24] reported 172 species but for all

Table 2 (Cont.)

Bivalve species	Site
Family Mytilidae	
Lithophaga teres (Philippi, 1846)	5, 6, 17
Modiolus aratus Dunker, 1856	26
Modiolus areolatus Gould, 1850*	2, 52
Modiolus philippinarum Hanley, 1843	5, 7, 9, 10, 14, 15, 17, 21, 22, 25, 51
Musculista senhousia (Benson in Cantor, 1842)	1
Musculus chinensis Bernard, Cai, & Moreton, 1993*	6, 10, 42
Musculus coenobita (Vaillant, 1865)	27
Musculus sp.	3
Musculus varicosus (Gould, 1861)*	3, 10
Perna viridis (Linnaeus, 1758)	1, 2, 21, 22, 30, 34
Septifer bilocularis (Linnaeus, 1758)	2–4, 6, 7, 9, 10, 16, 18–20, 22, 24, 26, 29, 30, 37, 41, 42, 46, 47, 52, 54, 55
Septifer excisus Weigmann, 1837	20, 26, 29, 31, 41
Family Pinnidae	
Atrina pectinata Linnaeus, 1767	3, 26, 51
Atrina vexillum (Born, 1778)	9, 10, 19, 29, 37, 47, 51
Pinna bicolor Gmelin, 1791	9–11, 14, 15, 20–22, 33, 37, 51
Family Isognomonidae	
Isognomon attenuata (Reeve, 1858)*Cho	10
Isognomon ephippium (Linnaeus, 1758)	10, 17, 21
Isognomon isognomon (Linnaeus, 1758)	5, 7, 9, 11, 16, 21, 24, 26, 29, 37
Isognomon legumen (Gmelin, 1790)	24, 31, 33, 36
Isognomon nucleus (Lamarck, 1819)	13, 17, 29

Bivalve species	Site
Family Malleidae	
Malleus albus Lamarck, 1819	6, 7, 22, 24, 26, 44, 50–52
Malleus decurtatus Lamarck, 1819	7, 21
Malleus malleus (Linnaeus, 1758)	9, 23
Malleus regula (Forsskal, 1775)	3, 10
Vulsella spongiarum Lamarck, 1819*	13
Vulsella vulsella (Linnaeus, 1758)	40
Family Pteriidae	
Electroma ovata (Quoy & Gaimard, 1834)	20
Electroma physoides (Lamarck, 1819)	28, 51
Pinctada fucata (Gould, 1850)	37
Pinctada maculata (Gould, 1850)	7, 10, 14, 15, 19–22, 24, 27, 29, 38, 39, 50
Pinctada margaritifera (Linnaeus, 1758)	3, 10, 25, 26, 45
Pinctada maxima (Jameson, 1901)	29, 50
Pinctada nigra (Gould, 1850)	3, 9, 16, 19, 37
Pinctada radiata (Leach, 1814)	27
Pinctada sp.	3, 19
Pteria brevialata (Dunker, 1872)	43
Pteria peasei (Dunker, 1872)	13, 47
Pteria penguin (Roding, 1798)	9, 25, 44, 52
Family Limidae	
Limaria basilanica (Adams & Reeve, 1850)	6, 8–10, 12, 14–20, 27, 29, 39, 40, 42, 47, 50–53, 55
Limaria fragilis (Gmelin, 1791)	16, 19, 27, 37, 39, 51, 54, 55
Limatuella viali (Jousseaume MS in Lamy, 1919)	27

Thailand (Siam at that time). Sanpanich[1] reported 76 species of marine bivalves in Chonburi and Rayong provinces as mentioned before, Nielsen[15] reported 91 species from Phuket, Robba et al[18] reported 225 species from the Holocene Bangkok Clay and shallow bottoms in Phetchaburi, and Kurozumi et al[25] reported 110 species of shallow water marine bivalves from Sichang Island, Chonburi. In the present study many species are being reported for the first time in Thailand, whereas other species, although already reported for Thai waters, are first records in some of the provinces studied. For example, regarding the family Arcidae, Vongpanich reported 18 species[21], Chaitiamvong et al 4 species[26], Nielsen 5 species[15], Swennen et al 19 species[19], Sanpanich 9 species[1], and Robba et al 14 species[18] while in the present study there were identified 20 species belonging to this family. Of these 2 species *Anadara jurata* and *Anadara rufescens* are being reported for the first time and other 2 (*Barbatia virescens* and *Anadara tricenicosta*) are first records of the species in the provinces studied. Vongpanich reported 17 species of Mactridae in Thai waters and Swennen et al reported 14 species[19,22], whereas in the present study there were 16 species registered, 6 of these being reported for the first time on the provinces surveyed. Apart from those examples, there are still many first records in almost every family such as Tellinidae, Mytilidae,

Table 2 (Cont.)

Bivalve species	Site
Family Gryphaeidae	
Hyotissa hyotis (Linnaeus, 1758)	51
Parahyotissa imbricata (Lamarck, 1819)	10, 21, 23–25
Parahyotissa numisma (Lamarck, 1819)	29, 37
Parahyotissa sinensis (Gmelin, 1791)	27
Family Ostreidae	
Crassostrea gigas Thunberg, 1793	26
Crassostrea sp.	11
Saccostrea cucullata (Born, 1778)	1, 20, 26
Saccostrea forskalii (Gmelin, 1791)	1, 9, 19, 34
Family Plicatulidae	
Plicatula australis Lamarck, 1819	2, 3, 6, 9, 10, 15–17, 19, 20, 34, 39, 47, 50
Plicatula chinensis Morch, 1853	4–6, 8, 9, 20, 22–24, 26, 29, 39, 52
Family Anomiidae	
Anomia simplex d'Orbigny, 1842*	25
Enigmonia aenigmatica (Sowerby, 1825)	32
Monia macroschisma (Deshayes, 1839)*	51
Family Placunidae	
Placuna ephippium Philipsson, 1788	5, 14, 21, 22, 25, 29
Placuna lincolnii (Gray, 1849)	3, 14, 38, 44, 51
Placuna placenta (Linnaeus, 1758)	7, 10, 25, 29, 39, 41
Family Pectinidae	
Amusium pleuronectes (Linnaeus, 1758)	2, 24, 26, 36, 38, 39, 41, 44, 52, 53
Bractaechlamys quadrilirata (Lischke, 1868)	20
Chlamys irregularis (Sowerby, 1842)*	3, 4, 9, 17–20, 40–43, 45, 47, 50–55
Chlamys madreporarum (Sowerby, 1842)	20, 29
Chlamys mollita (Reeve, 1853)*	5, 15
Chlamys senatoria subsp. *nobilis* (Reeve, 1852)	20
Chlamys curtisiana (Iredale, 1939)*	9
Chlamys superficialis (Forsskal, 1775)*	26
Complicachlamys dringi (Reeve, 1853)	3, 6, 9, 13, 15, 18, 19
Complicachlamys wardiana Iredale, 1939	8, 9, 10, 16, 19, 24, 29
Decatopecten plica (Linnaeus, 1758)	52
Decatopecten noduliferus (Sowerby, 1842)	55
Decatopecten strangei (Reeve, 1852)	6, 55
Excellichlamys histrionica (Gmelin, 1791)	9, 46, 52, 54
Excellichlamys spectabilis (Reeve, 1853)	6, 20, 31, 41, 47
Mesopeplum fenestratum (Hedley, 1901)*	3
Mimachlamys famigerator (Iredale, 1925)*	24
Mimachlamys funebris (Reeve, 1853)*	24
Mimachlamys gloriosa (Reeve, 1853)	2, 3, 6, 8, 10, 17, 18, 21, 47, 50, 51
Mimachlamys scabricostata (Sowerby, 1915)*	2
Mimachlamys senatoria (Gmelin, 1791)	9, 10, 14, 17, 24, 29, 41, 46, 51
Minnivola pyxidata Born, 1780	6, 10, 52
Pedum spondyloideum (Gmelin, 1791)	2–9, 12, 13, 15, 17–20, 27–29, 33, 36, 39, 43, 45, 50, 52
Family Spondylidae	
Spondylus albibarbatus Sowerby, 1847*	52
Spondylus anacanthus Mawe, 1823	3, 8, 15, 17, 29, 39, 42, 43, 46, 51, 52, 55
Spondylus butleri Reeve, 1856	29, 55
Spondylus castus Reeve, 1856	10, 20, 28
Spondylus imperialis Chenu, 1845	51
Spondylus lamarcki Chenu, 1845*	24
Spondylus nicobaricus Schreibers, 1793	9, 10, 26, 51, 52
Spondylus sinensis Schreibers, 1793	27, 55
Spondylus versicolor Schreibers, 1793	2, 10, 24, 29, 33, 46
Spondylus virgineus Reeve, 1856*	6
Family Trapeziidae	
Coralliophaga coralliophaga (Gmelin, 1791)	3–5, 19, 26–28, 40, 43, 50, 51, 55
Coralliophaga sp.	9, 19
Trapezium bicarinatum (Schumacher, 1817)	17, 19, 27–29, 40, 46, 49–51
Trapezium sowerbyi (Hidalgo, 1903)*	19, 39, 55
Family Cardiidae	
Acrosterigma angulata (Lamarck, 1819)	4, 6, 9, 10, 15, 17, 20, 29, 39, 52, 54
Acrosterigma cygnorum (Deshayes, 1855)*	3, 8, 41
Acrosterigma dupuchense (Reeve, 1845)	22, 24
Acrosterigma elongata (Bruguiere, 1789)	6, 9, 29, 39, 51, 55

Table 2 (Cont.)

Bivalve species	Site
Acrosterigma gratiosa (Deshayes, 1855)	10, 14–17, 19, 27, 29
Acrosterigma luteomarginata (Voskuil & Onverwagt. 1991)*	42
Acrosterigma mendanaense (Sowerby, 1896)*	47
Acrosterigma rosemariensis Wilson & Stevenson, 1977*	42, 49, 50
Acrosterigma transcendens (Melvill & Standen, 1899)	5–10, 15–18, 20, 29, 44, 47, 49–52, 55
Acrosterigma unicolor (Sowerby, 1834)*	43, 45, 52, 54, 55
Acrosterigma wilsoni (Voskuil & Onverwagt. 1991)	38, 41, 52
Afrocardium erugatum (Tate, 1889)*	15, 44, 50, 52, 55
Ctenocardia virgo (Reeve, 1845)	13, 22, 23, 27, 41, 51, 55
Lunulicardia auricula (Niebuhr In Forsskal, 1775)*	25
Fragum fragum (Linnaeus, 1758)	27
Fragum hemicardium (Linnaeus, 1758)	14, 18, 22–24, 29, 30, 46, 50, 51, 55
Fragum unedo (Linnaeus, 1758)	7, 8, 10, 51
Fulvia aperta (Bruguiere, 1789)	2–9, 11, 15–18, 26–28, 38, 39, 42–46, 48–53, 55
Laevicardium multipunctatum (Sowerby in Broderip & Sowerby, 1833)	42, 45, 52, 55
Laevicardium undatopictum (Pilsbry, 1904)*	41
Trachycardium maculosum (Wood, 1815)	29
Vasticardium pectiniforme (Born, 1778)	2–9, 11–15, 17–22, 25, 26, 28, 29, 32, 33, 37, 39–41, 43, 44, 51, 55
Vepricardium coronatum (Spengler, 1799)	31, 32, 39, 53
Vepricardium incarnatum (Reeve. 1844)*	21, 38
Vepricardium multispinosum (Sowerby, 1838)	23
Vepricardium sinense (Sowerby, 1840)	39, 46
Family Carditidae	
Beguina semiorbiculata (Linnaeus, 1758)	3, 4, 6, 10, 12, 15, 16, 19, 20, 26–29, 31, 37, 39, 41, 52, 54
Cardita variegata Bruguiere, 1792	5, 6, 12, 13, 15–20, 26–29, 37, 39, 43, 47, 49, 54
Family Chamidae	
Chama asperella Lamarck, 1819	4, 10, 14–17, 20, 23, 26, 31, 37
Chama brassica Reeve, 1847	26, 37, 48
Chama limbula Lamarck, 1819*	25
Chama pacifica Broderip, 1834	27
Chama plinthota Cox, 1927*	13, 15, 16, 20, 27, 51
Chama ruderalis Lamarck, 1819	27
Family Corbiculidae	
Geloina erosa (Solander, 1786)	32, 34
Family Crassatellidae	
Bathytormus radiatus (Sowerby, 1825)	11, 14, 22, 25, 26, 28, 29, 39, 41, 50–53
Family Lucinidae	
Euanodontia ovum (Reeve, 1850)	5, 8, 9, 12, 15, 17, 19, 20, 26, 29, 51, 52
Cryptophysema vesicula (Gould, 1850)	6, 8, 9, 12, 15, 17, 18, 20, 29, 39, 51
Codakia tigerina (Linnaeus, 1758)	17, 20, 29, 39
Ctena bella (Conrad, 1834)	3–13, 15–20, 27–29, 39, 48
Ctena sp.	14
Epicodakia gunnamatta Iredale, 1930*	4, 11, 19
Fimbria sowerbyi (Reeve, 1841)*	41
Lepidolucina odontotis (Salisbury, 1934) n. comb.*	30
Linga crassilirata (Tate, 1887)*	26
Family Ungulinidae	
Diplodonta subrotundata Issel, 1869	3, 4, 6, 7, 9, 10, 12, 13, 16, 19, 20, 26–29, 43, 46, 47, 49, 50, 52–55
Family Mactridae	
Lutraria philippinarum Reeve, 1854	3, 5, 7–10, 14, 16–20, 26, 28, 29, 40–43, 45, 48–50, 52, 54
Mactra abbreviata Lamarck, 1819*	14
Mactra achatina Holten, 1802	3, 10
Mactra antecedens Iredale, 1930	4–6, 9–13, 15, 16, 18–20, 28, 29, 49, 55
Mactra artensis Montrouzier in Fischer, 1850*	14, 17, 22
Mactra cuneata Gmelin, 1791*[Cho]	15, 17, 22, 51
Mactra dissimilis Reeve, 1854	22, 25–27, 30, 51
Mactra grandis Gmelin, 1791	14, 21, 22, 25, 26, 30, 37, 39, 51
Mactra pellucida Gmelin, 1791	21, 22, 25
Mactra pusilla (Adams, 1855)*	22
Mactra sericea Reeve, 1854*	41
Meropesta nicobarica (Gmelin, 1791)	25, 27, 38, 51

Table 2 (Cont.)

Bivalve species	Site
Raeta meridionalis Tate, 1889*	17, 41
Raeta pellicula (Reeve, 1854)*	6
Raeta sp.	27
Spisula coppingeri (Smith, 1884)*Cho	6
Family Mesodesmatidae	
Paphies striata (Gmelin, 1791)	17, 29, 37, 51
Family Pharidae	
Cultellus attenuatus Dunker, 1861*Cha	32
Ensiculus cultellus (Linnaeus, 1758)	26
Family Solenidae	
Solen brevis Gray, 1832	26
Solen grandis Dunker, 1862	22, 25
Family Donacidae	
Donax brazieri Smith, 1892*	31
Donax cuneatus Linnaeus, 1758	19, 22, 23, 26, 29, 51
Donax faba Gmelin, 1791	1, 19–22, 24–26, 29, 51
Donax semigranosa (Dunker, 1877)	14, 25, 26, 30
Family Psammobiidae	
Asaphis violascens (Forsskal, 1775)	11, 14, 16, 17, 19–21, 26, 29, 34, 36, 37, 39, 41, 51, 52
Gari amethystus (Wood, 1815)*	55
Gari livida (Lamarck, 1818)*	17
Gari maculosa (Lamarck, 1818)	3, 5, 6, 9, 10, 15, 16, 19, 26, 54, 55
Gari modesta (Deshayes, 1855)*	51
Gari oriens (Deshayes, 1855)	3, 5, 6, 8, 10, 18, 27, 38, 41
Gari pallida (Deshayes, 1831)	16
Gari pulcherrima (Deshayes, 1855)	41, 46, 52, 54, 55
Gari truncata (Linnaeus, 1767)	19, 26
Gari weinkauffi (Crosse, 1864)	27, 51, 55
Hiatula ruppelliana (Reeve, 1857)*	22
Family Semelidae	
Leptomya sp.	19
Leptomya subrostrata (Issel, 1869)	12, 17, 20, 27–29, 55
Semele amabilis Adams, 1854	39
Semele australis (Sowerby, 1832)	26, 28, 29, 37, 41
Semele carnicolor (Hanley, 1845)	5, 6, 9, 16, 20, 33, 42, 50–52, 55
Semele duplicata (Sowerby, 1833)*	17, 19
Semele jukesii (Reeve, 1853)	3, 6, 10, 13, 15, 17, 19, 20, 26, 27, 50, 53
Semele lamellosa (Sowerby, 1830)	3, 5, 6, 8, 9, 14, 16, 17, 19, 27, 28, 46, 50, 53
Semele monilis Tate, 1891*	55
Semele sinensis Adams, 1854	22, 25, 26, 31, 33, 55
Family Solecurtidae	
Solecurtus quoyi Reeve, 1874*	10
Solecurtus subcandidus Sturany, 1899*	6, 17, 38, 52
Family Tellinidae	
Exotica assimilis (Hanley, 1844)*	2, 39
Exotica clathrata Deshayes, 1835	16, 27, 28, 39, 51, 52, 55
Exotica donaciformis (Deshayes, 1854)	27, 53
Leporimetis spectabilis (Hanley, 1844)	9, 22, 23, 25, 41, 50
Macalia bruguieri (Hanley, 1844)	9, 12, 16, 18, 25–29, 31, 37, 41–43, 50
Macoma cygnus (Hanley, 1844)	39
Psammotreta edentula (Spengler, 1797)	14, 32, 36, 37
Psammotreta solenella (Deshayes, 1854)*	39
Psammotreta sp.	32
Tellina australis Deshayes, 1854	22
Tellina bougei Sowerby, 1909	3–6, 8–10, 15, 17–20, 29, 38, 42, 44, 46, 51, 52
Tellina capsoides Lamarck, 1818	22, 32
Tellina deltoidalis Lamarck, 1818	29
Tellina diluta Smith, 1885*	8, 26, 50, 55
Tellina exculta Gould, 1850*	11, 45, 51
Tellina imbellis Hanley, 1844*	41
Tellina inflata Gmelin, 1791	26, 38, 39, 41, 44, 52
Tellina lanceolata Gmelin, 1791	51, 55
Tellina lilium Hanley, 1844*R	26, 51
Tellina ovalis Sowerby, 1825	38, 51
Tellina pharaonis Hanley, 1844*	26, 51
Tellina plicata Valenciennes, 1827	17, 51
Tellina radians Deshayes, 1854	5, 7, 18, 28, 51, 54, 55
Tellina rostrata Linnaeus, 1758	51
Tellina serricostata Tokunaga, 1906*	5, 14, 17
Tellina sp.	10, 11
Tellina staurella Lamarck, 1818	17
Tellina timorensis (Lamarck, 1818)	22
Tellina triradiata H.Adams, 1871*	11
Tellina verrucosa Hanley, 1844	6, 55
Tellina virgata Linnaeus, 1758*Cho	11, 17, 29
Tellina botanica (Hedley, 1918)*	26, 37
Tellina elegantissima Smith, 1885	26

Table 2 (Cont.)

Bivalve species	Site
Tellina emarginata Sowerby, 1825	26, 29, 38
Tellina palatum (Iredale, 1929)	27, 51
Tellina remies Linnaeus, 1758	26, 37, 41, 51
Tellina umbonella Lamarck, 1818*	26
Family Tridacnidae	
Tridacna crocea Lamarck, 1819	2–10, 12, 13, 15, 17–20, 26–29, 31, 33, 36–46, 48–53
Tridacna maxima (Roding, 1798)	19
Tridacna squamosa Lamarck, 1819	2–10, 12, 13, 15, 17–20, 26–29, 31, 33, 36–46, 48–53
Family Glauconomidae	
Glauconome plankta (Iredale, 1936)*	32
Family Petricolidae	
Petricola sp.	26
Family Veneridae	
Anomalocardia squamosa (Linnaeus, 1758)	11, 14, 21, 22, 24, 30, 32
Antigona chemnitzii (Hanley, 1844)	46
Antigona lamellaris Schumacher, 1817	18, 23, 52
Callista impar (Lamarck, 1818)*	31
Callista kingii (Gray, 1826)*	41, 44
Callista lilacina (Lamarck, 1818)*	14
Circe scripta (Linnaeus, 1758)	8, 10, 11, 14, 15, 17, 18, 20–22, 25, 29, 37, 41, 50–52
Circe sulcata Gray, 1838	2, 6, 15, 18, 51
Clementia papyracea (Gray, 1825)	18, 38
Dosinia bruguieri (Gray, 1838)*	46
Dosinia crocea Deshayes, 1853	14
Dosinia dautzenbergi Fischer-Piette & Delmas, 1967	16, 32
Dosinia erythraea Romer, 1860	2–6, 8–10, 12, 16–19, 26–29, 41–43, 50–55
Dosinia exasperata (Philippi, 1847)	22
Dosinia histrio (Gmelin, 1790)	29, 48
Dosinia juvenilis (Gmelin, 1791)	22, 32, 52
Dosinia trigona (Reeve, 1850)	22, 32
Dosinia tumida (Gray, 1838)	32
Gafrarium catillus Hedley, 1909	27
Gafrarium dispar (Holten, 1802)	5, 6, 9, 12, 13, 15, 17–20, 26–29, 39
Gafrarium divaricatum (Gmelin, 1791)	3, 14, 18, 19, 21, 22, 29, 31, 33, 35, 37
Gafrarium tumidum Roding, 1798	11, 14, 22, 29, 32, 34, 37, 51
Globivenus embrithes (Melvill & Standen, 1899)	4, 9, 10, 15–17, 19, 20, 29, 52
Irus macrophylla (Deshayes, 1853)	50, 55
Lioconcha annettae Lamprell & Whitehead, 1990	2–11, 15–20, 27–29, 38–44, 46–55
Lioconcha ornata (Dillwyn, 1817)	33, 37, 47
Lioconcha philippinarum (Hanley, 1844)	37
Lioconcha polita (Roding, 1798)	2, 4, 6–8, 10–11, 13, 15, 18, 22, 38, 39, 41, 42, 44–46, 50, 52, 53, 55
Marcia hiantina (Lamarck, 1818)	21, 22, 24, 25, 34
Marcia japonica (Gmelin, 1791)	25
Meretrix meretrix (Linnaeus, 1758)	1, 22, 25, 26, 30, 31
Meretrix casta (Chemnitz, 1782)	23, 24, 25, 30
Paphia gallus (Gemlin, 1791)	21, 22, 25, 39, 49, 55
Paphia semirugata (Philippi, 1847)	3, 32
Paphia undulata (Born, 1778)	29, 38, 42
Periglypta puerpera (Linnaeus, 1771)	2, 5–10, 12, 13, 15–17, 19, 20, 26, 28, 29, 33, 37, 39, 41, 42, 47–50, 52, 53, 55
Pitar affinis (Gmelin, 1791)	15, 52, 55
Pitar citrinus (Lamarck, 1818)	29, 51
Pitar japonicus Kuroda & Kawamoto, 1956*	2, 22, 31
Pitar lineolatus (Sowerby, 1854)	2, 3, 9, 10, 15, 20, 29, 47, 51, 52
Pitar nancyae Lamprell & Whitehead, 1990	3, 6, 7, 16, 18, 26, 27, 40, 41, 45, 48, 50, 52–54
Placamen calophyllum (Philippi, 1836)	22, 27, 32, 39, 43, 52, 55
Sunetta contempta Smith, 1891	23
Sunetta truncata (Deshayes, 1854)	23, 30
Tapes decussatus (Linnaeus, 1758)	20, 26, 29, 31, 34, 35, 37
Tapes literatus (Linnaeus, 1758)	2–6, 8–10, 12, 15–20, 26, 28, 29, 37–42, 46–55
Tapes sulcarius (Lamarck, 1818)*	17
Tapes variegatus Sowerby, 1852	11, 13, 17, 19
Tawera laticostata (Ohdner, 1917)*	2
Timoclea marica (Linnaeus, 1758)	10, 11, 15–17, 28, 29, 37, 38, 41, 42, 44, 50, 51, 54
Timoclea recognita (Smith, 1885)	51, 52, 55
Timoclea scandularis (Hedley, 1909)*	51, 52
Timoclea subnodulosa (Hanley, 1844)	2–10, 18–20, 22, 27–29
Family Gastrochaenidae	
Cucurbitula cymbium (Spengler, 1783)	25, 26, 39

Table 2 (Cont.)

Bivalve species	Site
Gastrochaena cuneiformis Spengler, 1783	9, 16, 20, 28, 29
Gastrochaena mytiloides Lamarck, 1818	9
Gastrochaena pexiphora Sturany, 1899*[R]	26
Family Corbulidae	
Corbula crassa Reeve, 1843 (non Hinds)	52
Corbula erythrodon Lamarck, 1818	3, 8, 13, 18, 29, 52
Corbula macgillivrayi Smith, 1885*	26
Corbula modesta Hinds, 1843	31
Corbula scaphoides (Hinds, 1843)	27, 29, 52
Corbula smithiana Brazier, 1879*	11, 14, 17, 26, 29, 50
Family Pholadidae	
Parapholas quadrizonata (Spengler, 1797)*[Cho]	19, 20
Pholadidea fauroti Jousseaume, 1888*	5
Family Teredinidae	
Bactronophorus thoracites (Gould, 1856)	32
Family Laternulidae	
Laternula anatina (Linnaeus, 1758)	11
Laternula truncata (Lamarck, 1818)	15, 32
Family Thraciidae	
Thracia jacksonensis Smith, 1786*	55
Family Clavagellidae	
Brechites philippinensis (Chenu, 1843)	13

* First record for Thailand.
*Cha First record for Chanthaburi province.
*Cho First record for Chonburi province.
*R First record for Rayong province.
*T First record for Trad province.

Pectinidae, etc. Most of the species identified showed a high spatial distribution occurring in several stations and provinces (Table 2). This study is an important contribution for the knowledge of the marine biodiversity of the east coast of the Gulf of Thailand. Moreover, the information presented here is of utmost importance for scientists that devote their research to a specific species, since it gives an updated picture on the spatial distribution of the species.

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