

Distribution of intertidal molluscan species around Motoshima Island, 2005

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Distribution of intertidal molluscan species was investigated around Motoshima Island, at the mouth of Tanabe Bay, central Japan (33°44'N, 135°21'E; Fig. 1). The whole coast of the island was divided into 45 survey plots, in which all the molluscan species was sought and identified. The maximum density (no./ m²) was evaluated for each species in each plot. The field survey was carried out at spring low tides during 20-24th in July 2005. One researcher covered one area, and the time spent for each plot was 10-30min. Eighty-eight species were recorded from the whole coast of the island. The result is shown in Table 1.

Additional surveys for environmental parameters were undertaken on 5th August in 2006 and 12th February in 2007. Temperature and salinity of close-shore water were measured in each plot. The salinity was gauged by a refractometer. Water transparency was measured on 5th August in 2006: the horizontal distance, not vertical as usual, at which the Secchi disk disappeared was recorded, because of the shallowness of close-shore bottom. The result is shown in Table 2.

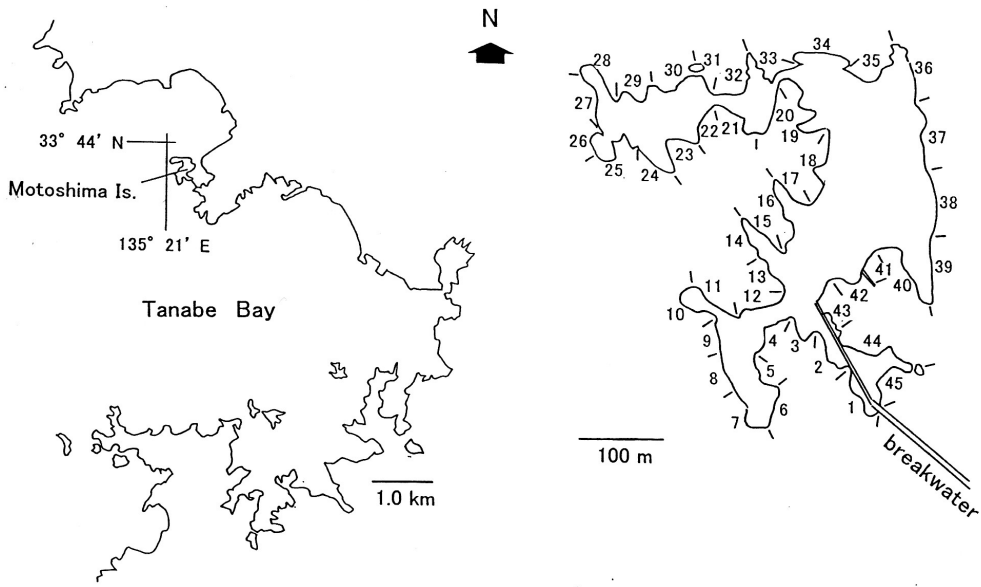


Fig. 1. Study area. Numerals in the right figure are plot codes.

Table 1. List of the mollusc species found in the 45 survey plots. The numerals and signs indicate maximum density of each species in each plot: 0, none; 1, 1-9 / m^2 ; 2, 10-99 / m^2 ; 3, 100-999 / m^2 ; 4, >1000 / m^2 . ①, only one individual was encountered. +, found but density not evaluated. Numerals in the top row coincides with the plot codes in Fig. 1, and those in the left-hand column show species codes. Ts, the total number of species found in the plot. Tp, the total number of plots occupied by all the species.

Survey plots	1	2	3	4	5	6	7	8
Polyplacophora 多板綱								
Chitonidae クサズリガイ科								
1 <i>Ischnochiton comptus</i> ウスヒザラガイ								
2 <i>Placiphorella stimpsoni</i> ババガセ								
3 <i>Acanthopleura japonica</i> ヒザラガイ	2	2	2	2	1	2		1
4 <i>Acanthopleura loochooana</i> リュウキュウヒザラガイ		①						
5 <i>Onithochiton hirasei</i> ニシキヒザラガイ	①					1	1	1
Acanthochitonidae ケハダヒザラガイ科								
6 <i>Acanthochitona achates</i> ヒメケハダヒザラガイ	1	1		1	1	1	1	
7 <i>Acanthochitona dissimilis</i> ビロウドヒザラガイ								
Gastropoda 腹足綱								
Patellidae ツタノハガイ科								
8 <i>Scutellastra flexuosa</i> ツタノハガイ					1	1	1	1
Nacellidae ヨメガカサガイ科								
9 <i>Cellana grata</i> ベッコウガサ			①	2	1			
10 <i>Cellana nigrolineata</i> マツバガイ			1	1				
11 <i>Cellana toreuma</i> ヨメガカサ	2	2	2	2	1	1	1	
Lottidae ユキノカサガイ科								
12 <i>Patelloida saccharina lanx</i> ウノアシ					①			
13 <i>Patelloida pigmaea</i> ヒメコザラ								
14 <i>Lottia kogamogai</i> コガモガイ	2				①		1	2
15 <i>Lottia tenuisculpta</i> コモレビコガモガイ								
16 <i>Nipponacmea schrenkii</i> アオガイ								
17 <i>Nipponacmea gloriosa</i> サクラアオガイ								
18 <i>Nipponacmea fuscoviridis</i> クサイロアオガイ								
19 <i>Nipponacmea nigrans</i> クモリアオガイ								
20 <i>Nipponacmea concinna</i> コウダカアオガイ								
Haliotidae ミミガイ科								
21 <i>Haliotis varia</i> イボアナゴ		①			①			
22 <i>Haliotis diversicolor aquatilis</i> トコブシ								
Fissurellidae スカシガイ科								
23 <i>Montfortula picta</i> スソカケガイ		①		①			①	1
24 <i>Macroschisma dilatatum</i> ヒラスカシガイ							①	
Trochidae ニシキウズガイ科								
25 <i>Chlorostoma xanthostigma</i> クマノコガイ								
26 <i>Omphalius rusticus</i> コシタカガンガラ								①
27 <i>Omphalius nigerrimus</i> ヒメクボガイ								
28 <i>Trochus maculatus</i> ニシキウズ							①	1

Survey plots	1	2	3	4	5	6	7	8
29 <i>Trochus rota</i> ウズイチモンジ		①	①			①		1
30 <i>Tectus pyramis</i> ギンタカハマ								
31 <i>Monodonta labio confusa</i> イシダタミ								
32 <i>Monodonta neritoides</i> クロツケガイ								
33 <i>Diloma suavis</i> メクラガイ	2	1	1	1	1	1		2
34 <i>Broderipia iridescens</i> ハナザラガイ	①							
35 <i>Calliostoma unicum</i> エビスガイ								
36 <i>Conotalopia mustelina</i> アワジチグサ								
37 <i>Angaria neglecta</i> カタベガイ								
38 <i>Astlarium haematragum</i> ウラウズガイ								
39 <i>Turbo stenogyrus</i> コシダカサザエ								
40 <i>Turbo coronatus coreensis</i> スガイ								
Neritidae アマオブネガイ科								
41 <i>Nerita albicilla</i> アマオブネ					①	①		
Planaxidae ゴマフニナ科								
42 <i>Planaxis sulcatus</i> ゴマフニナ								
Batillariidae ウミニナ科								
43 <i>Batillaria cumingii</i> ホソウミニナ								
Littorinidae タマキビ科								
44 <i>Peasiella habei</i> コビトウラウズ	+		+					
45 <i>Nodilittorina radiata</i> アラレタマキビ	4	4	4	4	4	4	4	4
46 <i>Nodilittorina trochoides</i> イボタマキビ		①						
47 <i>Littorina brevicula</i> タマキビ								
Hipponicidae スズメガイ科								
48 <i>Hipponix foliacea</i> カワチドリ								
49 <i>Hipponix conica</i> キクスズメ								
50 <i>Hipponix trigona</i> スズメガイ								
Vermetidae ムカデガイ科								
51 <i>Serpulorbis imbricatus</i> オオヘビガイ			1	1	1	1		
Cypraeidae タカラガイ科								
52 <i>Cypraea gracilis</i> メダカラ								
53 <i>Cypraea miliaris</i> ハツユキダカラ								
54 <i>Cypraea helvola helvola</i> カモンダカラ								
Muriciae アッキガイ科								
55 <i>Cronia margariticola</i> ウネレイシダマシ								
56 <i>Ergalatax contractus</i> ヒメヨウラク						①	1	
57 <i>Muricodrupa fusca</i> レイシダマシモドキ								
58 <i>Morula musiva</i> シマレイシダマシ	2	2	2	3	2	2	1	2

Survey plots	1	2	3	4	5	6	7	8
59 <i>Morula iostoma</i> イトマキレイシダマシ								
60 <i>Mancinella siro</i> シロレイシ								
61 <i>Thais clavigera</i> イボニシ	2	2	2	1	1	2	1	2
62 <i>Thais kyteistina</i> クリフレイシ							1	1
63 <i>Thais bronni</i> レイシガイ	2						1	1
Columbellidae フトコロガイ科								
64 <i>Euplica scripta</i> フトコロガイ							1	
65 <i>Mitrella bicincta</i> ムギガイ								
Buccinidae エゾバイ科								
66 <i>Engina menkeana</i> ゴマフホラダマシ								
Mitridae フデガイ科								
67 <i>Strigatella scutula</i> ヤタテガイ								
Aplysiidae アメフラシ科								
68 <i>Aplysia kurodai</i> アメフラシ								
Siphonariidae カラマツガイ科								
69 <i>Siphonaria japonica</i> カラマツガイ								
70 <i>Siphonaria sirius</i> キクノハナガイ	①	①	1	①		1	1	1
71 <i>Siphonaria acmaeoides</i> シロカラマツ								
Bivalvia 二枚貝綱								
Arcidae フネガイ科								
72 <i>Barbatia virescens</i> カリガネエガイ	①				①	1	1	
73 <i>Arca boucardi</i> コベルトフネガイ								
Mytilidae イガイ科								
74 <i>Xenostrobus atratus</i> クログチ			2	4	4			
75 <i>Mytilus galloprovincialis</i> ムラサキイガイ								
76 <i>Septifer bilocularis</i> クジャクガイ								
77 <i>Septifer virgatus</i> ムラサキインコ	3				①	3	3	3
78 <i>Hormomya mutabilis</i> ヒバリガイモドキ		4	4	4				
Pteriidae ウグイスガイ科								
79 <i>Pinctada martensii</i> アコヤガイ								
Ostreidae イタボガキ科								
80 <i>Crassostrea gigas</i> マガキ								
81 <i>Crassostrea nippon</i> イワガキ								
82 <i>Saccostrea mordax</i> オハグログガキ	1	1			1	1	2	3
83 <i>Saccostrea kegaki</i> ケガキ	3	4	4	4	4	4	3	4
84 <i>Dendostrea crenulifera</i> ノコギリガキ								①
85 Ostreidae gen. sp. カキ類					①			
Carditidae トマヤガイ科								

Survey plots	1	2	3	4	5	6	7	8
86 <i>Cardita leana</i> トマヤガイ						①		
Chamidae キクザルガイ科								
87 <i>Chama japonica</i> キクザルガイ			①	①	1			1
Ptericalidae イワホリガイ科								
88 <i>Claudiconcha japonica</i> セミアサリ				①		①		
Total no. species	17	16	16	17	21	20	19	19

	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27
1											1								
2							①												
3	2	2	2		2	2	2	1	1	2	1	1	1	2	1	1	1	2	2
4					1										1	1			
5	1		1	1									①			1			
6			1	1	1		1	1			1			1	1	1		1	①
7							①												
8							1						①					1	
9	①			1	1	2		1		1									
10				1	1		1	1			1			1					
11	1	①	1	1	2	1	3	2	2	3	2		1	2	1	1	1	1	
12		1				1	2							1					
13														2					
14	2	1			1														
15				1											1				
16													1						
17										1	1		1	1					
18														1					
19										1									
20																			
21	①		1				①									1	1		1
22																1			
23		①	1		1	1									①	①			①
24																			
25																			
26											①	1							
27									2	3	3	1	2	3					
28		1	1																
29		1	1					①					1						
30																			
31							1			1	2	1	1	2		1			
32										1	2								
33	1	1		1	1		1					①				1	1		2
34																			
35			1																
36		①																	
37																			
38									①			①		①		1			

	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27
39		①	①					1		1	1					①			
40				①			1	1	1	1	1	1	①	2					
41		1		①		①	1	1	2	1	1	1	1	1	1	1	1		①
42																			
43																			
44			+	+	+							+							
45	4	4	4	4	4	4	4	3	4	3	3	4	4	3	4	4	4	4	3
46																			
47										1									
48									1			1	1			①			
49														1					
50																			
51				1	2		1	1	1	2	1	1	1	2	1	1	1	1	
52																			①
53							①												
54																			
55				①				1	1	1	1	2	1	1	1	1			
56								①			1								
57																			
58	3	3	3	3	2	2	3	3	2	3	3	2	2	3	3	2	3	2	2
59	1		1					①								1	1		
60		①																	
61	2	2	2		1	1	1	2	2	1	2	1		1	2	1	3	1	
62			1		①	1		2			2			1	1	1		2	
63	1	1	1			①									1	2	2	1	1
64	1		1					1	1	1	1	1		1		1	1		
65										2	2								
66																①			
67																			
68					①														
69																	①		
70			1		2		2				1	1	2	2		1			①
71																			
72			1		①	①	1	1	①	2	2	①	1	2	1	1	1	1	1
73																			
74			3	3	4		3	3	4	3	4		4	3	4	4	4		
75							3				1				3				

	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27
76								1	1	1	①	1	1		1				
77	3	3	3			3	①	2								3	2	3	2
78			4	3		4	3	4	4	4	4	4	2	4	3		4	4	
79													①			①			
80																			
81				①		①				1	2			1	1				
82	2			1	1	2	1	2	1		1	1	2		1			①	
83	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4
84	1	1	2				1	1	2		1	2	2		1	1	1	1	
85							①												
86									①										
87			1	1			1	1	1	1	1	1	1		1	1			
88					1	①	1	1											
Ts	17	19	26	20	22	18	30	28	22	26	33	24	26	27	24	32	19	16	14

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	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	Тр
1			①																2
2																			1
3	2		1		1		①	1	1	1	1	2	1	1			1	2	38
4												①							5
5					①														10
6			1							1	①							1	21
7																			1
8																			7
9																			9
10				1															9
11	1	2	1	2	1	1		1	1									1	33
12	1			1														1	8
13												1	1	1					4
14				2						1	2		1						11
15										1									3
16										1									2
17										1									5
18																			1
19											①	1							3
20													1						1
21																			8
22																			1
23	1																		12
24																			1
25		1																	1
26									1										4
27			1						1	3		1						1	11
28					①				①										6
29		1				①			1										11
30	①																		1
31				1	1			1	1	3	2	1	2	1		1			17
32																			2
33					①														17
34																			1
35									①										2
36																			1
37			①																1
38						1													5

	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	Тр
39									①										7
40		①						1	2	2	2	2	2	1	2	2	2	2	21
41		2	1						1	1			1			1			23
42															3	1		2	3
43														3	4	3			3
44	+									+									8
45	3	3	3	3	3	3	4	3	3	3	4	2	2		2	2	2	2	44
46											①					1	①		4
47												2							2
48	1	1		1					1										8
49																		2	2
50							①										1		2
51		①	1	①	1			1	2	1	①	1	2		2		2	2	31
52																			1
53																			1
54						①													1
55		1	1			1	1		1									①	16
56																			4
57											1	1	①						3
58	2	3	2	2	2	2	1	2	1	2				1			①	1	40
59		1			1														7
60																			1
61	1			2	1	1	1		1	1	1	1	1					2	35
62					1				1										13
63	1			1	1	1			1	1									18
64									1										12
65																			2
66																			1
67						①													1
68																			1
69																			1
70	1			1		1			①									2	21
71													1						1
72		1	1	1	1	1			1	1	1				①			1	30
73				1	1				1									①	4
74	4	3	4	4		4	4	4		3	2	2	3	3	4	2	4	4	32
75		4		4		3		3				①							8

	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	Тр
76			1		1			1											10
77				2		1				①	1								19
78		4	4	3	4	3			3	3	3	3	3		3	3	4	4	31
79															①		①	①	5
80							2			2	2	1	3	2	3	2	3	3	10
81				1	2	2	1	2		1	1	1							14
82	1																		19
83	3	4	4	4	4	4	4	4	4	3	3	3	3	2	3	3	3	4	45
84	2	1	1				1											1	19
85																			2
86				①															3
87	①	1					①		1				1		2		1	1	23
88									①	1	①								9
Тs	17	18	17	21	19	18	12	12	27	24	19	18	17	9	12	11	13	23	896

Table 2. Data of environmental parameters. ‘Feb.’, 5th August in 2006. ‘Aug.’, 12th February in 2007. ‘Temp.’, temperature (°C). ‘Sal.’, Salinity (‰). ‘Tr’, Transparency (m). ‘Air’, Air temperature at the field. These parameters were measured during 15:00 to 16:15 in February, and 9:10 to 10:40 in August.

Plot	Temp.		Sal		Tr	Plot	Temp.		Sal.		Tr.
	Feb.	Aug.	Feb.	Aug.	Aug.		Feb.	Aug.	Feb.	Aug.	Aug.
1	17.2	29.1	34.1	31.9		26	17.1	29.2	34.1	31.4	8.9
2	17.0	29.2	34.5	31.8	6.2	27	17.2	29.5	34.1	31.4	
3	17.1	29.1	34.1	31.7		28	17.1	29.5	34.1	31.3	
4	17.2	29.1	34.1	31.8		29	17.2	29.4	34.5	31.3	
5	17.2	29.2	33.7	31.9		30	16.6	29.5	34.1	31.6	
6	17.2	29.7	34.5	31.9		31	17.0	29.4	34.5	31.3	
7	17.2	29.1	34.1	31.7	7.0	32	17.2	30.0	34.1	31.4	6.5
8	17.2	29.6	34.1	31.8		33	16.9	29.2	34.1	31.7	
9	17.1	29.8	34.1	31.7		34	16.8	29.3	34.5	31.8	
10	17.3	29.3	34.1	31.8		35	16.8	29.8	34.1	31.7	6.0
11	17.2	29.3	34.5	31.6		36	16.6	30.0	34.1	31.4	
12	17.1	29.6	34.5	31.8		37	16.2	31.4	34.1	31.4	3.4
13	17.1	29.4	34.1	31.8		38	14.9	30.6	34.1	31.9	1.8
14	17.2	29.6	34.1	31.4	6.7	39	15.0	30.6	34.1	31.9	
15	17.2	29.6	34.5	31.3		40	15.4	30.4	33.7	30.4	1.1
16	17.2	29.6	34.1	31.5		41	15.0	30.3	34.1	31.6	
17	17.1	29.6	34.1	31.7		42	15.8	30.7	33.7	31.7	1.2
18	17.1	29.4	34.1	31.8		43	15.3	30.8	33.7	31.8	
19	17.3	31.2	33.7	31.6	3.8	44	15.2	30.2	34.1	31.4	
20	17.1	29.7	33.7	31.3		45	14.9	30.2	34.1	31.9	4.2
21	17.1	30.1	34.5	31.6							
22	17.0	29.5	34.5	31.7		Air	16.2	30.1			
23	17.1	29.0	34.5	31.6	6.2						
24	17.2	29.1	34.5	31.3							
25	17.1	29.2	34.5	31.5							