6. Results of the methodological surveys

Table 3.

     The results of the survey examining the accuracy of the present method. Quadrat D3 (Table 3a) was investigated in April 2001, D8 (Table 3b) in April 2002, and D12 (Table 3c) in May 2004. For the locations of D3, D8, and D12, see Fig. 1d. In each survey, 4 or 5 researchers investigated the same quadrat by the method explained in Section 1 (overall survey, Fig. 4a), and subsequently, each of the sixty-four 1×1 m sections in the quadrat was searched by one of the researchers (detailed survey; see Fig. 4b). In the overall survey, the maximum density (no./ m²) of a mollusk species in the 8×8 m quadrats was evaluated and assigned to one of the following classes: 1 (1–9), 2 (10–99), 3 (100–999), and 4 (1000–5000). Ⓓ indicates that only one individual was found in a quadrat. In the detailed survey, the density of each species in each section (1×1 m) was evaluated according to the above criteria. Italic numerals in the first column indicate the species codes in the List of recorded species (Section 2). The results of the overall surveys are shown in the 2nd–5th (D3 and D8) or 2nd–6th (D12) columns, and those of the detailed survey are shown from the 7th (D3 and D8) or 8th (D12) column onward. The codes of the 1×1 m sections (Fig. 4b) are shown in the first row. The Italic numerals in the second row indicate the researchers: (1) S. Ohgaki, (2) H. Tanase, (3) S. Yamato, (4) N. Funayama, for 2001–D3; (1) N. Funayama, (2) H. Tanase, (3) S. Ohgaki, (4) M. Sato, for 2002– D8; (1) S. Yamato, (2) N. Funayama, (3) H. Tanase, (4) K. Komemoto, (5) S. Ohgaki, for 2004–D12. +, found but density was not evaluated; –, no data.

Figure 4.

The designs of the overall survey (a) and the detailed survey (b). In the overall survey, each researcher started from the corner (open circle) and searched for mollusk species over the entire quadrat. In the detailed survey, each researcher followed a zigzag line, recording all mollusk species encountered in each 1 × 1 m section.
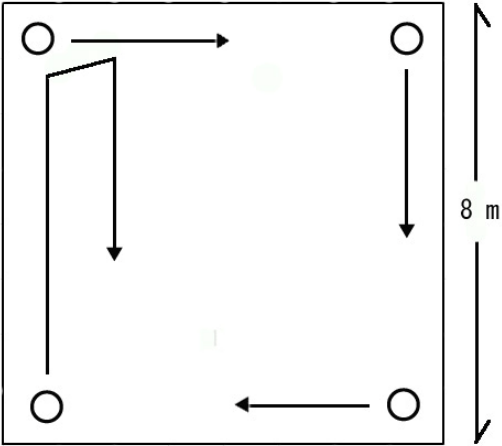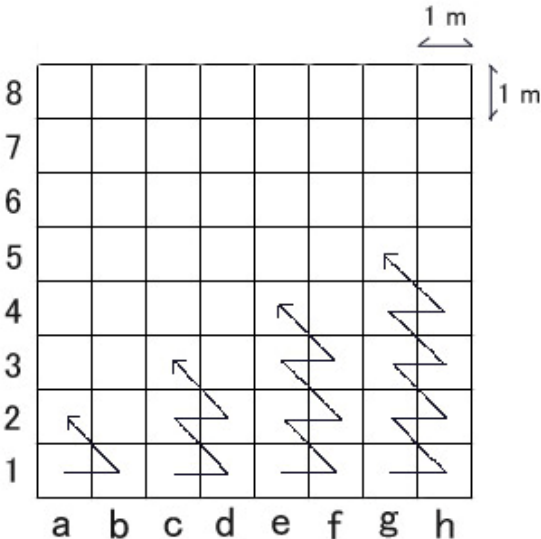
Table 3a–1					a1	a2	a3	a4	a5	a6	a7	a8	b1	b2	b3	b4	b5	b6	b7	b8
2001–D3	1	2	3	4	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
4			1	1																
13																				
15	1	2	1	2	1		1			1				1						
17	①		1																	
20	①																			
28				①																
44	①		1	①				①												
60	1		1	2																
63	1	1	2	2	1	1	1	1	1		1		1		①			1	①	
64	1	1	2	1	1	1		①		1										
73	3	2	3	3		2	3	2	2	2		1	2	2	2	3	2		1	1
77	+	2	+	+		+	+	+	+	+	+	+		+	+	+		+	+	
78	3	2	3	3	3			①			2	3	1			1	1	2	3	3
79	①	1		1																
81	2	2	3	2					1	1	1	2	1		1	1	①	2	2	1
124	1	1	1	2	①									1						
142	①		1	①	①															
161			①																	
194				①																
197				①																
198	1	1	2	2						1								①		
199		1		1				①												
211	3	3	3	4		2	2	2	3	3	3	3			2	3	3	3	3	3
212	4			4										2	3					
214			1	1		①		1												
229	2	2	3	3	3	2	3	3	3	3	1	2	2	1	3	3	2	2		2
232	+		+																	
time (min)	30	41	43	30	a + b = 110															

Table 3a–2	c1	c2	c3	c4	c5	c6	c7	c8	d1	d2	d3	d4	d5	d6	d7	d8	e1	e2	e3	e4	e5	e6	e7	e8
2001–D3	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	3	3	3	3	3	3	3	3
4															①									
13	1																							
15	2	1											①	1	①									
17	1	1																						
20																								
28																								
44						①																		
60	1	2								①														
63	2	2	1	2	1	×		1	2		1		1	1	2					1	1		1	
64			①	1	1	1			1		1	1		①				2		1	1			
73	2	2	2	2	2	1	1	1	3	2		2	2	1	1	2	2	2	2				2	2
77			2		1	2	1	2	1	1	2	1	1	2	1	2	+	+	+	+	+	+	+	+
78			2	2		2	2	3	2		3	2	3	3	3	3				2	2	2	2	2
79							1	1							1	2								
81		1	2	1	1	1	1	1		1					1		1	2	2	2	2	2	3	2
124	2	1																						
142																								
161																							①	
194																								
197																								
198							1					1		1			1			1			1	2
199																								
211			2	3	3	3	3	3		2	2	2	3	3	2	2	3	3	3	3	3	3	3	3
212	3	3	2																					
214	①																							
229	2		2	2	2	1	1	2	2	2	1	2	2	2	2	2	2	2	2	2	1	1	2	2
232																								
time (min)	c + d = 105																10	7	6	9	6	5	7	5

Table 3a–3	f1	f2	f3	f4	f5	f6	f7	f8	g1	g2	g3	g4	g5	g6	g7	g8	h1	h2	h3	h4	h5	h6	h7	h8
2001–D3	3	3	3	3	3	3	3	3	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4
4																								
13																								
15														1	1	+								
17																								
20																								
28																								
44																								
60																								
63			1							+				①		1								
64	2	1	2	1					1	2	1	1		2			1	1	1	1	1			1
73	1		1	2	2		1	2	1	2	2		1	2	2	1	2	2	1				2	2
77	+	+	+	+	3	+			+	+	+	+	+	+	+	+	+	+		+	+	+	+	+
78	2	3	2	3	3	2		2	4	3	3	3	4	2				3		3	3	4	3	3
79									1	1	1		1					1	1	1				
81	3	3	3	3	3	2	1	2	2	2	2	2	2	2	1	2	2	3	2	2	2	2	2	2
124	①																							
142																								
161																								
194																		①						
197																								
198						2	1	1				1		1	1	1								
199														1										
211	3	2	3	3	2	2		2	4	3	3	3	3	3	2	2	3	3	3	4	4	3	3	3
212																								
214										1														
229	1	1	1	2	2	2	3	2	2	2	2	2	1	2	3	3	2	2	2				2	2
232																								
time (min)	5	5	5	5	5	5	5	7	g + h = 110															

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Table 3b–1	1	2	3	4		a1	a2	a3	a4	a5	a6	a7	a8	b1	b2	b3	b4	b5	b6	b7	b8
2002–D8	1	2	3	4		1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
2																					
4	1	1	1	1		1	1	①	①	1	1				1	1	1	1	1		
5	1	1	1	1		1	1														
7	1	1	1	1		①									①						
10				1																	
11				①																	
12	1	1	1	+				①							①						
13	2	2	2	1		1		1			2			2	1				1		1
14	1	1	1	1			1	1	①	1	1										
15	2	2	3	3		2	2	2	①	1	2	1	1	2		1	1	2	1	1	1
16						1															
17	1	1		1		1	1					1	1		1	2	1		1	1	1
18				1																	
20				1																	
22																					
23				①																	
28	1	2	1															①			
44	1	2	2	1			1	1		1	2	1	1		1	1		1	1	1	1
48	1	1	2	1						①	①								①	1	
53			+																		
58				①																	
60	1	1	1											1	①			①			
63	2	2	2	2		1	2	2	2	2	2	1	1	1	1	2	2	2	2	1	1
64								1	1								1				
73	3	2	3	3		3	3	3	3	2		2		3	3	3	3	3	3	2	2
77	+		+	2		2	+		3	2	+					2	2		2		3
78	1		2			1				2		3	3				2			2	2
81	1		2					1		1	1	3	3			1			1	3	2
82																					
88				+																	
103	①								①												
122	1	1	1	1																	
123	1	1	1	1															①	①	
124	1	2	1					1	1		1	1		1	1	1			1		
129	1																				
130	1							①													
131	①	1																			
132	2	2	2	2		①	1									1			1		1
138	①			①																	
141	①	①	①	①																	
142	1	1	1	1		1	1	1				1			1	1		①	1		1
145	1	1		+																	
197																1					
198	1	2	1											1							
199	2	2	1	1		1	1		1		1		1	1	1			1		1	1
200	2	2	2	1										1				1			
207	①	1	1	1										1							
211	+		2	2		2			3	3		3	3				2			2	3
212	3	2	3								①			3	3		①				
213	1	1	①	1											①						
214	1		1	1				1	1	1	1		1			1	1		1	1	
220	①	①																			
221																			①		①
229	3	3	4	4		3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3
230	1	3	3	1		1		2	1	1	1	1	1		1	2	1	1	2	1	2
231	1																				
234	1			1																	
235	①										①									①	
time (min)	74	–	41	–		12	10	8	8	9	10	9	–	12	11	15	10	12	8	10	12

172

Table 3b–2	c1	c2	c3	c4	c5	c6	c7	c8	d1	d2	d3	d4	d5	d6	d7	d8	e1	e2	e3	e4	e5	e6	e7	e8
2002–D8	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	3	3	3	3	3	3	3	3
2																1									
4				1	1	1		1	1	1	1	1	1	1	1	1		1	1	①	1	1		1
5						1	1				1	1		1			1	1		+	1	+		
7							1						1					①		①				
10																								
11																								
12							1							1								1	1	
13	1	1	1		1		2			1	1	2	1	2	2	1	1	2	1	2	1	2		1
14				1	1	1	2	1			1	1		1	1		①							
15	1	2	1	2	1	1	2	1	1	2	2	2	2	2	2	1	2	2	2	2		2	1	1
16																								
17																		1		1		1		1
18																								
20																	①							
22																							①	
23																								
28		1					1	1		1	1												1	1
44				1	1	1		1	1	1	1		2	1	1	1	1	1	1	1	1	1		
48						1	1	1			1	1	1	1						1	1	2	1	2
53																		+						
58																								
60		1			1				1									1			1			1
63	1	1	1		1	2	2	2	1	1	1	1	2	2	1	2	2	2	2	2	2	2	2	2
64																								
73	1	2	2	2	1	2		2	2	2		1	1	1	1	2	2	3	2		2	1	3	3
77				1	2									2				+					+	+
78																								
81																							1	
82																				+				
88																								
103																								
122													1								①	1		
123											1										①	1		
124	①	1	1	1	1				1	1		1	1	1				1		1		1		
129																								
130			①																					
131																								
132					1	1	2	1	1		1	1	1	1	1	1	1	1	2	1	2	2	2	2
138																								
141										①														
142		1			1	1		1	1	1	1	1	1	1	1					1				1
145																								
197										①	1						①			①				
198	1	1							1	1	1	1						①						
199	1	1	1	1	1	1	2		1		1	1		1		1		①				1		
200	1	2	1	1					2	2	1	2	2	1	1		1	1	1	1	1	1	1	
207											1						①							
211																								
212	2	2																						
213											1													①
214				①			1	①	1	1	1			1	1	1			①		①			
220																								
221																								
229	2	1	2	2	2	2	3	3	3	2	1	2	2	2	2	3	3	2	3	3	2	2	3	3
230		1		2	2	2		2						2	2	2	2	1		1	2	2	2	2
231																								
234																								
235																								
time (min)	8	10	10	11	9	11	10	12	12	10	10	10	13	13	10	15	14	9	7	7	9	12	15	8

Table 3b–3	f1	f2	f3	f4	f5	f6	f7	f8	g1	g2	g3	g4	g5	g6	g7	g8	h1	h2	h3	h4	h5	h6	h7	h8
2002–D8	3	3	3	3	3	3	3	3	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4
2																								
4	1	1		1	1	1			①	1	1	①	①	①		1		1	1		①	1	1	1
5					1	1			1	1	1	1	1	1	1			1					1	1
7		①								1	①	1		1				1	①		①			
10				1								①	①	1		1		1				1		①
11									1	1		①		①	①				①	①				
12									①	1	①							①						
13	1		①		1	1	1	1		1	1		1	1	1	1	1		1	①	1		1	1
14									1	1	1	1		1	1	1	1					1	1	1
15		1	1	2	1		2	2	1	1	1	1	2	2	1	1	1		2		2	1	1	1
16																							1	1
17	1				1		1		1		1	1	1	1	1	1	1	1			1		1	1
18																						①		
20									①			①						1						
22																								
23											1							1	1					
28						①	1																	
44		1	1	2			1	①	1	2	2	1		1	1	1	1	2			1	1		
48			1	1					①	1														
53				+																				
58															①									
60												①		①			①		①				①	①
63	1	1	1	1	1	①	1	1	2	2	2	2	1	1	2	2	2	2	1	1	1	1	1	1
64																								
73	2		2	2	2		2	2	3	3	3	3	2	2	2	3	4	3	2		2	1	2	2
77		+							2	2	2	2			2	2							3	
78																								
81																								
82										1				1										
88																							1	
103																								
122				①	①	①	①			1	1	2	1		1				1	1	①	1	2	1
123				①	1	1	1	1	①	1	1	①	1	1	1			①	1	1	1	2	1	
124	1	1		1																				
129																								
130						①																		
131								①																
132	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	1	1	1	1	1	2	1	2	2
138																						①		
141																							1	
142			1	1		1	1	1	1	1	1	1	1		1		1	1	1	1		1	1		1
145					1	1													1	1				
197																								
198																								
199			1							1	1		①	①	①	1		①		①				①
200		1			①		1	1					1	1	1						1			
207	①											1	1	①						①	①			①
211									1	2	2	2												2
212																								
213							1					1	①	1		1			1	1		1	1	1
214													①	①										
220																								
221																								
229	3	3	2	3	2	1	2	2	3	3	3	3	2	1		3	2	2			2	2	2	3
230	1	1	2	2	1	2	2	2	1	1	1	1	1	2	2	3	2	2	1	1	1	1	2	3
231					①														1				①	1
234																			①	①			1	
235																								
time (min)	13	10	8	9	14	9	10	10	9	15	17	11	7	7	15	11	10	7	24	7	12	11	11	8

Table 3c–1						a1	a2	a3	a4	a5	a6	a7	a8	b1	b2	b3	b4	b5	b6	b7	b8
2004–D12	1	2	3	4	5	1	1	1	1	1	5	5	5	1	1	1	1	1	1	5	5
3	①		1	1																	
4	1	2	1	1	2	1	1		2	2	1	1		2		1	2	2		1	1
5	1	2	1		1	1			1	1					1	1		1	1		
6																					
7	1	1	1	1	1	1	1			1		1	1	1	1		1				
8	①						2	1							1	1					
10	1	1	1	1	2		①	1			2	2	2							3	3
13	1	1	2	1	1	1	1	1		1				1						1	1
14																					
15	1	2		2	2	1	2	2	2	3	1			2	1	2	2		2	2	1
16	2	1	1	2	2		2	1	1		1	1	1	1	2	1		+	1		
17	1	2	1	1	1	1	2	1	1	1	1	1	①	2	1	1	1	+	1		1
18	1											1									
26	①	1	①																		
28	1	2	1	1	1					①	1	1							2		1
48	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	3	2	2	2	2
53				+								①									
77			2																		
87	1	1			1															1	1
88		1		①																	
94			①	①	①																
123		①			1																
124																					
129	①	①																			
130	1	1	1	1	1		1	1							①						
131																					
132	2	1	1	1	2				1						①	①	1	1			
141	1	1		①	1	1	1	1	1						1		1	①			
142	2	1	1	2	1	1	1		1						1		1	1	+		①	1
143			1	①																	
144	①	①	①																		
145	①	1	①																		
148		①																			
176																				①	
199		1			1																
200	2	1	2	2	2		2	1		1		1	1		2	1			2	1	2
202																					
207	2	1	1	1	1		1							1	1						①
212	4	4	3	4	4	3	3	3	1	3	4	4	4	3	3	3	2		3	4	2
213	2	1	1	1	1		①										1	1		①	
214	3		1	1	3	3	2	1	2	2	2	2		3	2	3	2	1	1		
216																					
220		①																			
222		①		①		1															
229	2	2	2	2	2	2	1	2	2	2	2	2	2	2	2	2	1	1	2	2	2
230	3	2	2	2	2	1			3	2	1	1			2	1	1	3	2	①	①
233																				①	
234																					
235																					
time (min)	52	55	50	42	38	11	10	12	9	10	7	6	5	10	10	9	9	9	9	6	5

Table 3c–2	c1	c2	c3	c4	c5	c6	c7	c8	d1	d2	d3	d4	d5	d6	d7	d8	e1	e2	e3	e4	e5	e6	e7	e8
2004–D12	2	2	2	2	2	2	5	5	2	2	2	2	2	2	5	5	3	3	3	3	3	3	5	5
3																						①		
4	2	1		1		1	2	1	1	1		2	1		2			1		1		1	1	
5			1	1			1					1			①		1	1	1	1	1			
6																						①		
7	1		①	1	1	1	1	1		①		1	1	1	1				1	1		1		
8					①	①																		
10			1					2			1				2	2						1	1	1
13	1	1	1					①	1		1													
14																								
15	1	2		2	2		2		1	1		2			1		2	1	2			2	1	
16	2						1	1	1	1	1				1	1		1	1		1			
17	2	1			1												1	1	1					
18																								
26																						①		
28	1	1	1	1	2						1	1	2	1					1		1			
48	2	2	2	2	2	2	2	2	2	2	2		1				1	2	1				1	
53																								
77																								
87								1						①									①	
88														①		①								
94																								
123																						1	1	
124																								
129																								
130	①		①						①			①		1								1	1	1
131																								
132		+	2	2	1	1	1	1			2	2	2	2	2	2			①	1	1	2	1	2
141		1	1	1						1	1		1	1										1
142	1	1	1	1	①		①						1		2	1	1		1	1		1	1	2
143				①																				
144																								
145																								
148																								
176																								
199							①												2					
200		1					1		1		1		2	1			1				1	2	1	
202														1										
207		①	①				1		①	1	1	1	2	1	①			①	1	1		1		
212	4	4	4	4	3	3	3		4	4	4	4	4	3	4	3	3	4	4	3	3	3	3	4
213	1	①	1	1	1		①		1		1	1	1	1	①				1		1	1	①	
214	2	2	2	3	2	2					3	2		2	2			1	1					
216												①												
220																								
222								①	①															
229	2	2	2	2	2	2	2	1	2	2	2	2	2	2	2	1			1					
230	2	2	2		1	1	1	1	2	2	1	1					1	2						
233																								
234																								
235																								
time (min)	13	7	6	7	10	6	7	5	9	7	9	–	7	8	7	6	10	5	5	10	7	9	8	8

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Table 3c–3	f1	f2	f3	f4	f5	f6	f7	f8	g1	g2	g3	g4	g5	g6	g7	g8	h1	h2	h3	h4	h5	h6	h7	h8
2004–D12	3	3	3	3	3	3	3	5	4	4	4	4	4	4	4	5	4	4	4	4	4	4	4	5
3						①																		
4		1	1	1	1	1	1		1	1	2	2	2	2	2	1	1	1	2	2	2	2	2	1
5		1		1	1	1				1			1	①	①	1	1	1	1	1	1		1	
6																								1
7	1		1				1		1	1	1	①		①	1	1						①	1	1
8																								
10	1	1								1					2	2	1			1				2
13						①	1		1					1				1		1	1	1		
14													2							1				
15			1		1	1			1	1	2	2	2		1		1	1	2	2	2	2	1	2
16	1	2	1	1	1	1			1	1		1		1			1	1	1		1	1	2	1
17	1	1	1	1				①	1	1	1	2	1	2					2	2		2		
18									1															
26						1																		
28	1	1	1	1		1	1		1	1	1	1	2	1	1			1	1	1	1	1		1
48	1	2	2	2	2	2	1		1	1	1		2	2	2	1	1	1	1	2	2	2	1	2
53																								
77																								
87																								
88																								
94																								
123																								
124										1								1						
129																								
130	1						1	1										1						1
131																		①						
132	1		1		1	1	1	2	2	1	1	1	1	1	1		1	2		1	1	1		2
141							1																	
142		1				1	1			1	1			1			1	2		1				1
143											①							1						
144																								
145																		①						
148																								
176																								
199				1													1	1					1	1
200	1		①	1	2	2	2		1	1	1	2	2	1	1	1	1	2		2	2	2	1	1
202																								
207			1			1	1			①	1		1		1	①							1	1
212	1	4	3	3	3	1	2	3	3	3	1					3	4	3	3					
213	1		1		1			①	1		1	1				1	1	1	1		①	①		①
214									1	1	1	2	1					1		1	1	1		
216																								
220																								
222																								
229	1				2				2	2	2	2	1	1	1		1	2	1			1	2	1
230	2	2		2	2	1	1		2	2	2	2	2	2	2		2	2	2	2	1	2	2	1
233																								
234													①		1			1				①		
235																		①						
time (min)	10	–	10	10	6	14	8	6	9	8	8	6	6	6	8	8	8	–	6	11	6	7	7	–