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C S D

A

. a a : / a/a a

S

I P fi *Crassostrea gigas*

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A R T I C L E I N F O

Keywords:
P fi
Crassostrea gigas
I
S
P

A B S T R A C T

T P fi (*Crassostrea gigas*) fi . R , *C. gigas* . A 29 ff . R . R , . T . S , . I , . T fi ffi P fi .

1. Introduction

T . M , ff . T fi , . R fi fi , P fi (*Crassostrea gigas*) , . F , P fi / , (N , 2001). I K , P fi 20% (K ., 2013). O , P fi , P fi .

M P fi (B ., 2004; E ., 2009; H ., 2006; W ., 2017; X ., 2017). H , P fi . A P fi , fl ff (G ., 2015). N , . T P fi ff , (B ., 2004; T S , 1961). H , fi , (G ., 2014; H ., 2006). U , . B , -QTL

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fi fi
C. gigas (W ., 2018). B
fi RNA (RNA), F .
(2018) RNA
TCONS 00951105
. U RNA , *tyrosinase*
fi
peroxidase
(F ., 2019).
I , 36 ff
,
ffi P fi
.

2. Material and methods

2.1. Parental source

A
, . B
S , C . T
(X ., 2017). S ,
(X ., 2018). B
. O
(F . 1), (B) (W).

2.2. Mating design and rearing

F WB
(W♀ B♂), BW (B♀ W♂), BB (B♀ B♂) WW (W♀ W♂)
. A
36
, 15 WB, 15 BW, 3 BB 3 WW. T
T 1.
O ,
. G

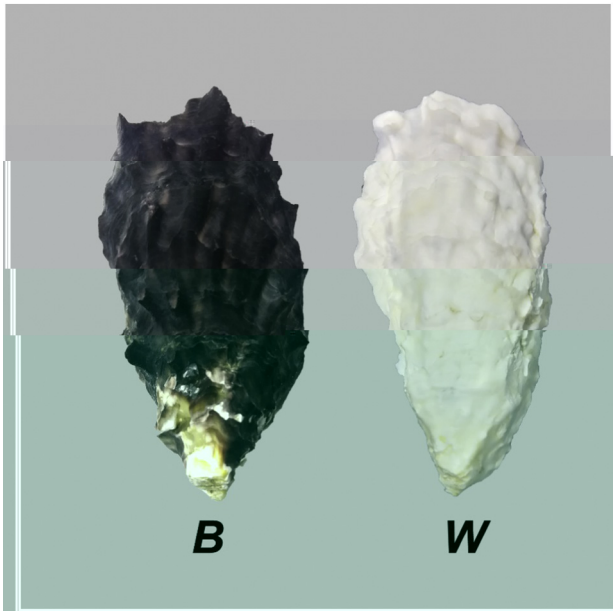

Fig. 1. R *C. gigas*.
B = B ; W = W .

. E
, . T , -
D-
70-L . S
5 L^{-1}, . T
G . (2015).
B fl , 18–22 *Isochrysis*
galbana *Nitzschia closterium*. H
fi . S
. A
,
. T S B ,
S P
.

2.3. Shell pigmentation record and statistical analysis

Off 180
2018. A
, . A
T
S (1961), fi
. T F . 2,
:

- 0, ;
- 1, ;
- 2, ;
- 3, ;
- 4, .

T
. A
(S)
(S).
A
. T fi
C -fi .
F
.

3. Results

A 29 , 6
ff 1 .
T -ff 29
T 1. O ,
. A
, ff
,
(31) (35). T
,
.
A , -ff
fi (S)
(S). A T 2,
.
T (1–2, 7–12, 14, 18,
20–22, 26–27, 30, 33, 35) -

Table 1
P [illegible] ff [illegible] 36 [illegible] *C. gigas*.

F [illegible]	P [illegible]				P [illegible] ff					
	F		M		4	3	2	1	0	T [illegible]
1	W♀1	0	B♂1	4	0	26	22	40	0	88
2	W♀2	0	B♂1	4	0	60	45	113	0	218
3	W♀3	0	B♂2	4	0	18	11	28	53	110
4	W♀4	1	B♂2	4	0	48	50	60	43	201
5	W♀5	0	B♂3	4	0	11	11	43	67	132
6	W♀6	0	B♂3	4	–					
7	W♀7	0	B♂4	4	0	49	15	65	0	129
8	W♀8	0	B♂4	4	0	46	36	88	0	170
9	W♀9	0	B♂5	4	0	13	17	147	0	177
10	W♀10	0	B♂5	4	0	61	21	113	0	195
11	W♀11	0	B♂6	4	0	49	48	77	0	174
12	W♀12	0	B♂6	4	0	81	79	79	0	239
13	B♀13	4	B♂7	4	81	0	0	0	0	81
14	W♀13	0	B♂7	4	0	32	13	51	0	96
15	B♀14	4	B♂8	4	99	0	0	0	0	99
16	W♀14	0	B♂8	4	–					
17	B♀15	4	B♂9	4	112	0	0	0	0	112
18	W♀15	1	B♂9	4	0	45	21	52	0	118
19	B♀1	4	W♂1	0	–					
20	B♀2	4	W♂1	0	43	33	1	4	0	81
21	B♀3	4	W♂2	0	0	30	28	54	0	112
22	B♀4	4	W♂2	0	0	39	47	77	0	163
23	B♀5	4	W♂3	1	0	10	38	63	0	111
24	B♀6	4	W♂3	0	–					
25	B♀7	4	W♂4	0	–					
26	B♀8	4	W♂4	0	0	43	45	73	0	161
27	B♀9	4	W♂5	0	0	32	29	35	0	96
28	B♀9	4	W♂5	0	–					
29	B♀11	4	W♂6	0	0	22	32	45	88	187
30	B♀12	4	W♂6	0	0	2	2	69	0	73
31	B♀13	4	W♂7	0	0	0	0	47	51	98
32	W♀13	0	W♂7	0	0	0	0	0	70	70
33	B♀14	4	W♂8	0	54	39	2	6	0	101
34	W♀14	0	W♂8	0	–					
35	B♀15	4	W♂9	0	52	51	0	0	0	103
36	W♀15	1	W♂9	0	0	8	3	23	41	75

W: W[illegible]; B: B[illegible].

[illegible] ff- [illegible]. S[illegible] (13, 15, 17) [illegible] ff [illegible]. I[illegible] (32) [illegible] ff [illegible]. F[illegible] 3, 5, 29, 31, 36, [illegible] ff [illegible] ff [illegible] 1:1. O[illegible] (4), [illegible] ff [illegible] 3:1. O[illegible]

T[illegible] ff [illegible] 29 [illegible] T[illegible] 3, [illegible] ff [illegible] F[illegible]. 2. P[illegible] ff [illegible] (20, 33, 35), [illegible] ff [illegible] fi[illegible] 1:1 [illegible]. A[illegible] ff [illegible]. Off [illegible] (13, 15, 17). A[illegible]

Off [illegible] fi[illegible] (1, 7, 8, 26, 30). T[illegible] F[illegible]. 2, [illegible] ff- [illegible] T[illegible] 4. T[illegible] fi[illegible] 3:1 [illegible]. R[illegible] T[illegible] 4. T[illegible] fi[illegible] 1, 8[illegible] 27. T[illegible].

4. Discussion

M[illegible] *Mytilus edulis* (I[illegible] H[illegible], 1977), [illegible] *Argopecten irradians* (A[illegible] C[illegible], 1988), [illegible] *Chlamys nobilis* ([illegible]., 2013). H[illegible] P[illegible] fi[illegible]. T[illegible]. F[illegible], P[illegible]. (1995) [illegible] M[illegible] ff [illegible]. K[illegible] (2016) [illegible] *Littorina obtusata*, [illegible]

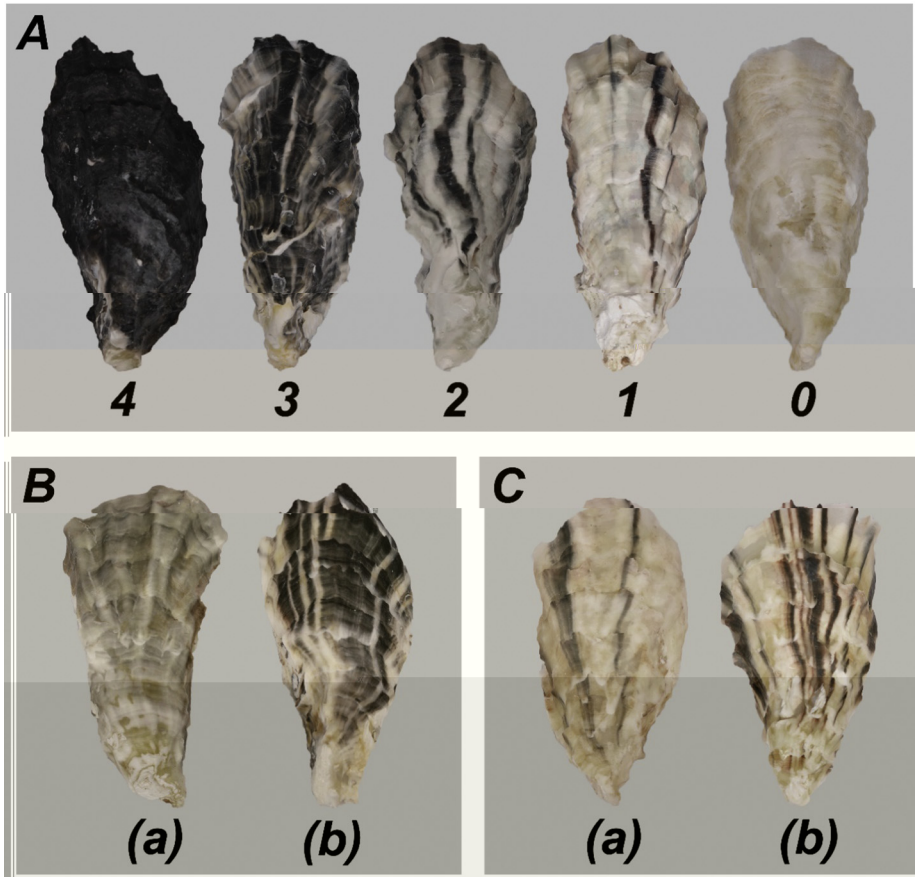

Fig. 2. R ff- . A: Off ff (: 0–4); B: Off ( ) ( ); C: Off ( ) ( ). (F fi , .)

Table 2
I 29 .

F	P		L A		P ff				
	F	M	F	M	S	S	T	E	X^2 (P)
1	S	S		AA	88	0	88	1:0	NA
2	S	S		AA	218	0	218	1:0	NA
3	S	S		A	57	53	110	1:1	0.787
4	S	S	A	A	152	49	201	3:1	0.908
5	S	S		A	65	67	132	1:1	0.902
7	S	S		AA	129	0	129	1:0	NA
8	S	S		AA	170	0	170	1:0	NA
9	S	S		AA	177	0	177	1:0	NA
10	S	S		AA	195	0	195	1:0	NA
11	S	S		AA	174	0	174	1:0	NA
12	S	S		AA	239	0	239	1:0	NA
13	S	S	A	AA	81	0	81	1:0	NA
14	S	S		AA	96	0	96	1:0	NA
15	S	S	AA	AA A	99	0	99	1:0	NA
17	S	S	AA	AA	112	0	112	1:0	NA
18	S	S	A	AA	118	0	118	1:0	NA
20	S	S	AA		81	0	81	1:0	NA
21	S	S	AA		112	0	112	1:0	NA
22	S	S	AA		163	0	163	1:0	NA
23	S	S	AA	A	111	0	111	1:0	NA
26	S	S	AA		161	0	161	1:0	NA
27	S	S	AA		96	0	96	1:0	NA
29	S	S	A		99	88	187	1:1	0.569
30	S	S	AA		73	0	73	1:0	NA
31	S	S	A		47	51	98	1:1	0.775
32	S	S			0	70	70	0:1	NA
33	S	S	AA		101	0	101	1:0	NA
35	S	S	AA		103	0	103	1:0	NA
36	S	S	A		34	41	75	1:1	0.566

S : S ; S : S .
L A: L ; A: S ; : S .

Table 3
I - 29 .

F -.	P - -		L - B		P - -ff					
	F	M	F	M	S -	S	U -	T -	E -	X^2 (P)
1	U -	S -	BB		0	88	0	88	0:1	NA
2	U -	S -	BB		0	218	0	218	0:1	NA
3	U -	S -	BB		0	57	53	110	0:1	NA
4	S	S -	BB		0	158	43	201	0:1	NA
5	U -	S -	BB		0	65	67	132	0:1	NA
7	U -	S -	BB		0	129	0	129	0:1	NA
8	U -	S -	BB		0	170	0	170	0:1	NA
9	U -	S -	BB		0	177	0	177	0:1	NA
10	U -	S -	BB		0	195	0	195	0:1	NA
11	U -	S -	BB		0	174	0	174	0:1	NA
12	U -	S -	BB		0	239	0	239	0:1	NA
13	S -	S -			81	0	0	81	1:0	NA
14	U -	S -	BB		0	96	0	96	0:1	NA
15	S -	S -			99	0	0	99	1:0	NA
17	S -	S -			112	0	0	112	1:0	NA
18	S	S -	BB		0	118	0	118	0:1	NA
20	S -	U -		B	43	38	0	81	1:1	0.693
21	S -	U -		BB	0	112	0	112	0:1	NA
22	S -	U -		BB	0	163	0	163	0:1	NA
23	S -	S		BB	0	111	0	111	0:1	NA
26	S -	U -		BB	0	161	0	161	0:1	NA
27	S -	U -		BB	0	96	0	96	0:1	NA
29	S -	U -		BB	0	99	88	187	0:1	NA
30	S -	U -		BB	0	73	0	73	0:1	NA
31	S -	U -		BB	0	47	51	98	0:1	NA
32	U -	U -	A -	A -	0	0	70	70	-:-	NA
33	S -	U -		B	54	47	0	96	1:1	0.621
35	S -	U -		B	52	51	0	101	1:1	0.944
36	S	U -	BB - B	BB	0	34	41	75	0:1	NA

L - B: L - ; B: S ; : S - .

Table 4
I “ ” “ ” fi .

F -.	P - -		L - C		P -	P -ff				E -	X^2	P
	F	M	F	M		3	2	1	T -			
1	S	S	C	C	S	19	10	35	64	3:1	0.732	0.002
					S	7	12	5	24			
7	S	S	C	C	S	34	9	55	98	3:1	0.885	0.050
					S	15	6	10	31			
8	S	S	C	C	S	31	23	76	130	3:1	0.8	0.009
					S	15	13	12	40			
26	S	S	C	C	S	23	37	63	123	3:1	0.795	0.000
					S	20	8	10	38			
30	S	S	C	C	S	2	2	50	53	3:1	0.706	0.457
					S	0	0	20	20			
T -	–	–	–	–	S	109	80	279	468	–	–	–
					S	57	40	56	153			

S : S - ; S : S - .
L - C: L - ; C: S ; : S .

. S , . I , . T fi , fl . T , , (H , 1975; ff . H - , - L P , 1990; S - B , 2000). I , . N - , , . I . T ff , , .

T[illegible], [illegible], [illegible]. I[illegible], [illegible]. T[illegible] fi[illegible]. T[illegible] P fi[illegible]. S[illegible], [illegible] fi[illegible].

I[illegible], [illegible], [illegible]. F[illegible], [illegible]. A[illegible], [illegible], [illegible]. I[illegible].

Acknowledgments

T[illegible] N[illegible] N[illegible] S F[illegible] C[illegible] (31772843), S[illegible] P[illegible] (2017L GC009), [illegible] F[illegible] R[illegible] F[illegible] C[illegible] U[illegible] (201762014), [illegible] T[illegible] S[illegible] S[illegible] P[illegible] S[illegible].

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