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, *Crassostrea gigas*

D

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Keywords:
fi
Crassostrea gigas

(*Crassostrea gigas*) ... *C. gigas* ... *C. gigas* ... 460 ... 11 ... 0.215 ... 0.092 ... 0.980 ... 0.094 ... 0.423 ... 0.042, ... (r = 0.729, P = 0.000, = 29). ... 7 ... 3:1 (P = 0.833), ... *C. gigas* ...

1. Introduction

(..., 1993). ... (..., 2006). ... (*Crassostrea gigas*), ... (..., 2001). ... 20% (..., 2013). ... (..., 2004; ..., 1961), ... (..., 2009). ... (..., 2009; ..., 2015). ... (..., 2004), ... (..., 2004; ..., 2013), ... *C. gigas*. ... *C. gigas* (..., 2015; ..., 2015), ... *C. gigas* ... (..., 2004; ..., 2013), ...

* C ... 266003, C
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w

w fi (., 2015),

w w

w

w w - C. gigas, w

ffi .

2. Materials and methods

2.1. Spawning and nursery protocol

2010, w - - C. gigas w w -

, C ,

fi - w

w . 2011–2013, - ,

w -

- , 10%.

, w

. C. gigas

w - w

, C . 30 w

30 w -

(w w ff). E

w

. A w

70% D A . F

w 24 24 C 30 ,

D-

w 500

. B w

w . (2015). B fl ,

w 15 / ,

5 / 1 / 7 14 , -

w w w w

fi w 25 C. w w

Isochrysis galbana 120 μ

w C

, W

w ,

. A w , -

w

. A 30 , w

w

C (36.89 , 121.52 E).

2.2. Shell and mantle edge pigmentation measurement

A ff w 24 w

w , w 70% D A

0.100 w

w

w

. A

C . (1998), w

1 1.0 .

w 5 w A

10 w 30 .

A w 10,000

10 w -

500 (A_{500}).

w

-721 [redacted] – w , -

w 1 w

w 500 . A w

. A_{500}

, .

ff w w w ,

6% 2

(., 2006), .

W E . (2009). A

(D80) w w w

. B -

w -

fl . A w w

w -

w 6.0 (C ., D, [redacted] A). -

/C / / A w

(A); w

w

D ,

0 (w) 2.4

( ). (D) w

.

2.3. Parentage assignment

D A w w

. (2006). F C 11

(C -117, C -120 C -198; C -146, C 3

C -210; 0 0129 E11, 0 0007 B07 C 4; C -200

0 408293) (., 2017) w

. w

A 8–5.1 (., 2006).

ff (-

), w

(= - - ff-

)

(., 2006).

w w 95% -

fi w .

2.4. Data analysis

w A 3.0 (., 2009) w

(h^2)

($r_{P/G}$). A w ( )

w

w :

$$y = Xb + Z_1a + Z_2c + Z_3d + e \quad \text{(Model 1)}$$

w y , b

fi ff , a ff , c

/ ff -

, d ff , e

ff .

fi ff

w (-) (

., 2009) (L).

, c d w fi w

1. w w :

$$y = Xb + Za + e \quad \text{(Model 2)}$$

[redacted] 2, w

$h^2 = \sigma_a^2/(\sigma_a^2 + \sigma_e^2)$, w σ_a^2 σ_e^2

. w

w w $r_{P/G} = \sigma_{12}/\sqrt{\sigma_1^2} \cdot \sqrt{\sigma_2^2}$, w σ_{12} -

w w

, σ_1^2 σ_2^2

1 2, .

A - w

Table 1
ff 30 , , .

	D				(A_{500})		(D)	
1	1	11	0.427	0.109		0.669	0.054	
	2	4	0.546	0.154		0.674	0.017	
	3	11	0.399	0.115		0.659	0.033	
2	4	22	0.603	0.208		0.782	0.102	
	5	0	–			–		
	6	8	0.603	0.159		0.797	0.116	
3	7	30	0.425	0.177		0.708	0.081	
	8	23	0.439	0.127		0.738	0.121	
	9	12	0.624	0.179		0.718	0.109	
4	10	6	0.520	0.136		0.674	0.030	
	11	6	0.605	0.275		0.728	0.087	
	12	2	0.504	0.199		0.756	0.090	
5	13	15	0.621	0.178		0.782	0.107	
	14	2	0.440	0.138		0.702	0.008	
	15	17	0.632	0.270		0.810	0.144	
6	16	18	0.516	0.193		0.705	0.102	
	17	1	0.255			0.619		
	18	11	0.513	0.208		0.760	0.086	
7	19	22	0.427	0.120		0.709	0.099	
	20	7	0.400	0.123		0.686	0.049	
	21	7	0.562	0.145		0.811	0.114	
8	22	4	0.529	0.412		0.691	0.099	
	23	46	0.513	0.179		0.762	0.120	
	24	35	0.469	0.173		0.699	0.091	
9	25	46	0.539	0.159		0.737	0.102	
	26	20	0.635	0.229		0.807	0.131	
	27	12	0.565	0.161		0.748	0.136	
10	28	12	0.427	0.105		0.722	0.125	
	29	5	0.523	0.175		0.776	0.121	
	30	45	0.562	0.188		0.726	0.129	
		460	0.520	0.189		0.737	0.112	

W w . w , - w w ff - .

3. Results

3.1. Parentage assignment and summary statistic in families

A 528 w , w 460 29 30 (1). F 68 , fi - ffi . A w , w 0–46 . - w 1.

3.2. Heritability and correlation

fi (2) w 2. w . (0.215 0.092) w (0.156 0.078). w w (0.980 0.094), w (0.423 0.042). - w fi ($r = 0.729$, $P = 0.000$, = 29) (F . 1). - w w 18 (F . 2), w ff w . w .

Table 2
A (,) w - fi , 2.

A ( )		0.00777		0.00196
( )		0.0284		0.0106
E		0.215	0.092	0.156 0.078
A ((1, 2))		0.00383		
((1, 2))		0.00521		
E		0.980	0.094	
E		0.423	0.042	

w , - w fi - ($P < 0.05$). F 15 30 w w , w 7 w w - (“ ” “ ”). C - w “ ” “ ” ff fi 3:1 ($\chi^2 = 0.044$, = 30, $P = 0.833$).

4. Discussion

w , (B ., 2004; ., 2013). w fi ff . B - w - , (C ., 1998; ., 2011; ., 2001; ., 1995). w ,

fi *C. gigas* -
w
w
w w
A 3.0 w (
., 2009).
w
ff
ff (fi , 2007). w
w
-
(., 2008; ., 2013;
, 2004; C , 2004).
/ ff w fi
w E .
(2009). fi ff w
(., 2004) (F ., 2016).
C / ff w

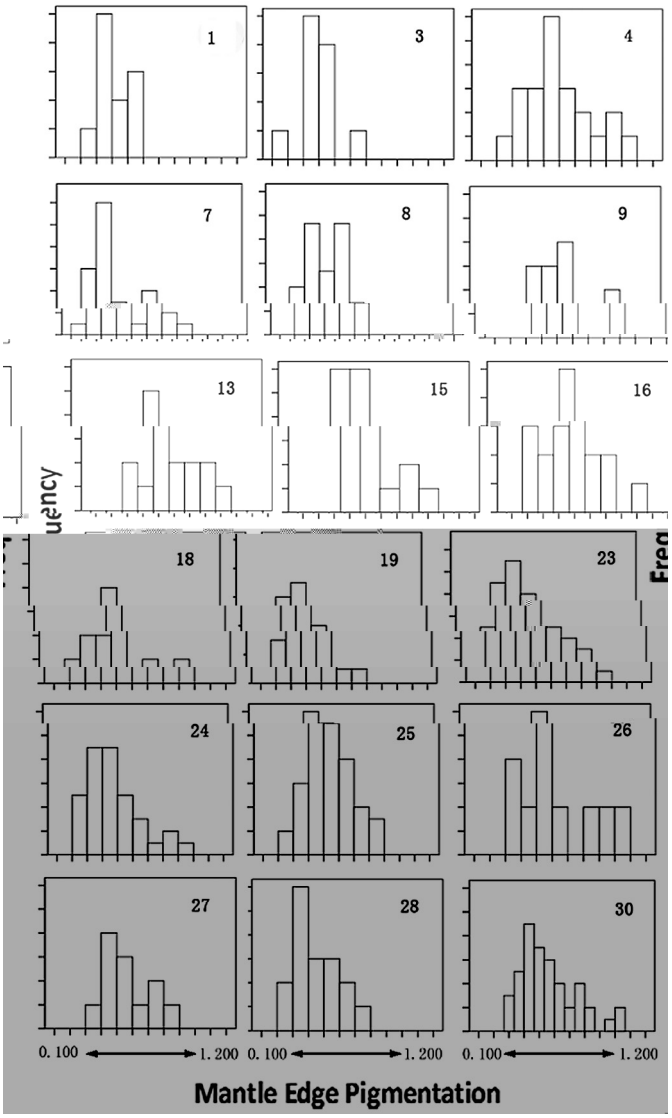

Fig. 2. D w 18 - (= 11 46). - A_{500} = 0.100 ( ) A_{500} = 1.200 ( ).

“ ” w . ′ (E ., 2009). F w fi - w *C. gigas*.

5. Conclusion

′ - *C. gigas* - . w ff , . *C. gigas* w .

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w ′ F C (31772843), (2016 D 06A06), , D C (17-3-3-64-).

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