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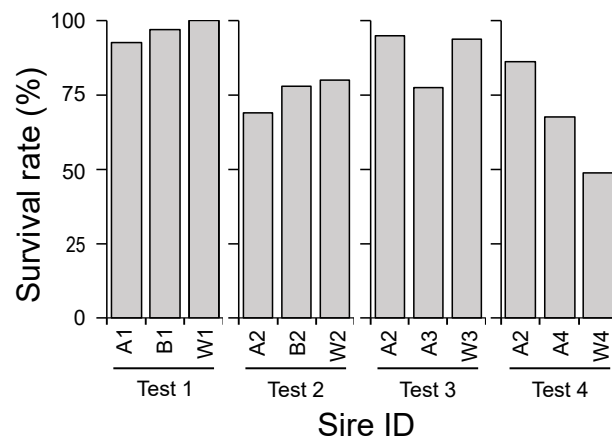


Fig. S1 Survival rate in each progeny test.

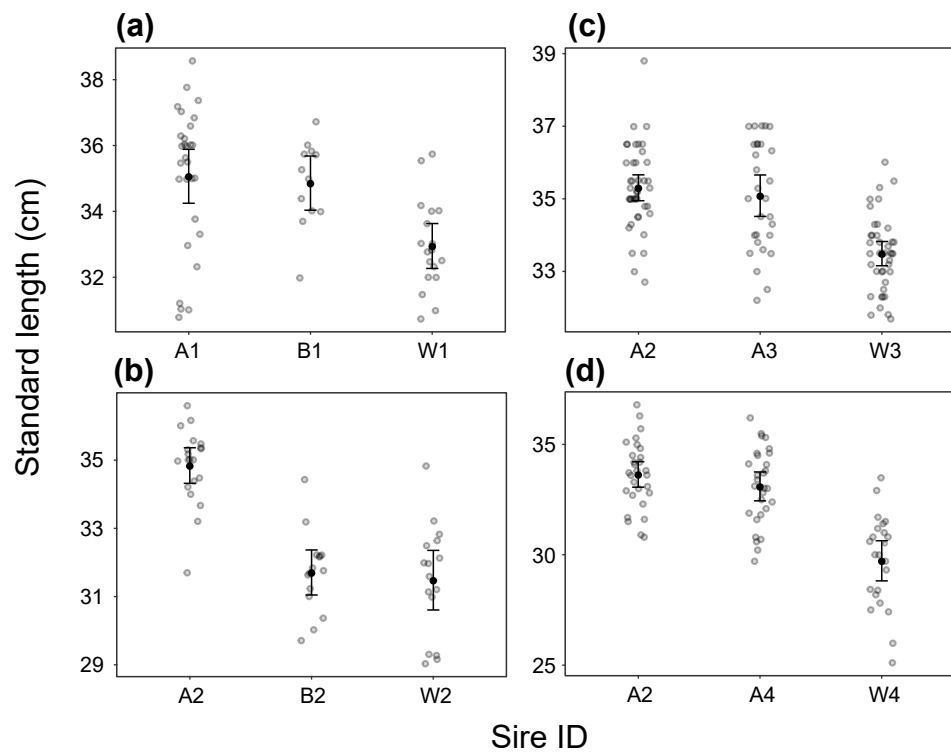


Fig. S2 The 95% confidence interval (CI) of mean standard length (SL) of male specimens in each progeny test: Test 1 (a), Test 2 (b), Test 3 (c) and Test 4 (d). The gray points indicate the observed SL of each individual, and the black points are mean SL. The black whiskers represent the 95% CI of mean SL.

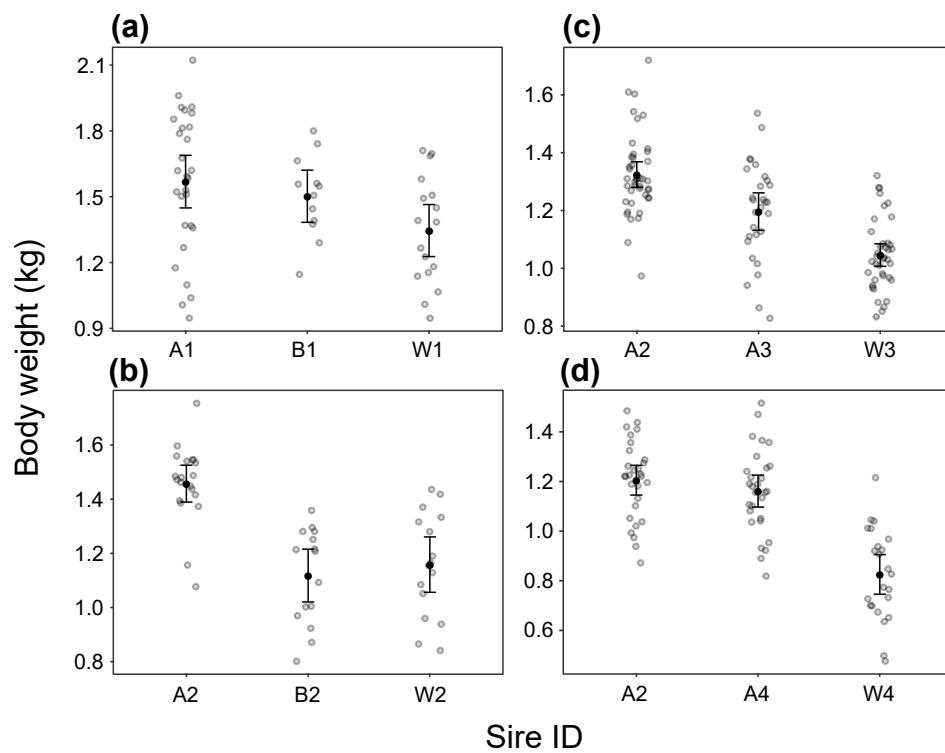


Fig. S3 The 95% confidence interval (CI) of mean body weight (BW) of male specimens in each progeny test: Test 1 (a), Test 2 (b), Test 3 (c) and Test 4 (d). The gray points indicate the observed BW of each individual, and the black points are mean BW. The black whiskers represent the 95% CI of mean BW.

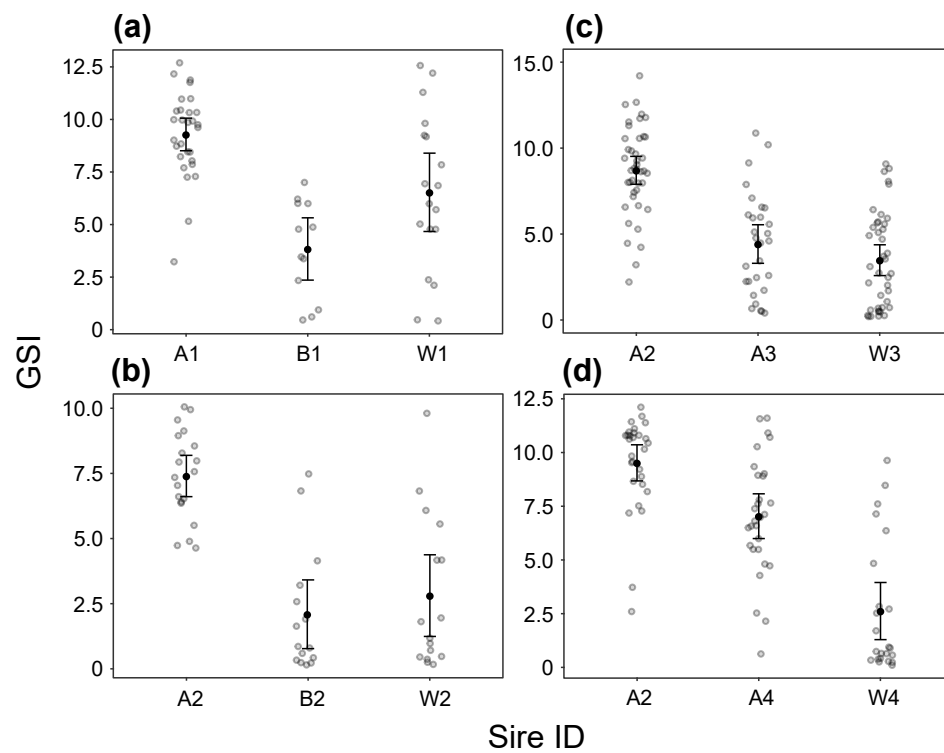


Fig. S4 The 95% confidence interval (CI) of mean gonadosomatic index (GSI) of male specimens in each progeny test: Test 1 (a), Test 2 (b), Test 3 (c) and Test 4 (d). The gray points indicate the observed GSI of each individual, and the black points are mean GSI. The black whiskers represent the 95% CI of mean GSI.

Table S1 Summary of the months of age (MOA) at sampling, the number of samples (*n*), standard length (SL), body weight (BW), gonad weight (GW) and gonadosomatic index (GSI) of female individuals in each progeny test

Test	MOA*	Sire	<i>n</i>	SL (cm)	BW (kg)	GW (g)	GSI
Test 1	20.5	A1	21	35.5 ± 1.7 ^a	1.48 ± 0.22	13.8 ± 6.5 ^a	0.9 ± 0.3 ^a
		B1	14	34.8 ± 1.3 ^{ab}	1.50 ± 0.19	9.2 ± 1.8 ^b	0.6 ± 0.1 ^b
		W1	9	33.9 ± 1.5 ^b	1.33 ± 0.21	13.0 ± 6.5 ^{ab}	0.9 ± 0.3 ^a
Test 2	20.1	A2	23	35.5 ± 0.9 ^a	1.43 ± 0.17 ^a	11.6 ± 3.3 ^a	0.8 ± 0.2 ^a
		B2	14	31.7 ± 1.1 ^b	1.06 ± 0.13 ^c	5.1 ± 1.0 ^b	0.5 ± 0.0 ^b
		W2	14	32.6 ± 2.4 ^b	1.24 ± 0.25 ^b	6.8 ± 3.3 ^b	0.5 ± 0.2 ^b
Test 3	21.1	A2	44	36.1 ± 1.3 ^a	1.32 ± 0.13 ^a	14.1 ± 5.9 ^a	1.1 ± 0.4 ^a
		A3	33	35.1 ± 1.8 ^b	1.19 ± 0.17 ^b	6.7 ± 1.9 ^b	0.6 ± 0.1 ^b
		W3	25	32.7 ± 1.2 ^c	0.91 ± 0.11 ^c	5.6 ± 1.2 ^b	0.6 ± 0.1 ^b
Test 4	21.7	A2	30	33.3 ± 1.5 ^a	1.09 ± 0.18 ^a	11.8 ± 6.8 ^a	1.0 ± 0.5 ^a
		A4	25	33.4 ± 1.4 ^a	1.09 ± 0.12 ^a	7.3 ± 2.7 ^b	0.7 ± 0.2 ^b
		W4	16	30.2 ± 1.6 ^b	0.86 ± 0.14 ^b	5.9 ± 2.8 ^b	0.7 ± 0.2 ^b

*Each test ended in early December

Values are presented as mean ± SD. Different superscript letters (a, b and c) indicate significant differences ($P < 0.05$) between families. Items sharing the same letter (i.e. a vs. ab and b vs. ab) were not significantly different

Table S2 Intercept and coefficients of corrected body weight (CBW), i.e. body weight subtracted by testes weight, and sire effects on testes weight estimated from the generalized linear model including CBW and sire as fixed effects in each progeny test

Test	Coefficient	Estimated	SE	<i>t</i>	<i>P</i>
Test 1	Intercept	-41.8	31.0	-1.346	0.1838
	Sire B1	-89.9	13.0	-6.928	<0.0001
	Sire W1	-33.6	11.9	-2.824	0.0066
	CBW	0.13	0.02	6.276	<0.0001
Test 2	Intercept	-25.6	38.3	-0.668	0.5075
	Sire B2	-57.3	12.4	-4.636	<0.0001
	Sire W2	-50.3	11.7	-4.281	<0.0001
	CBW	0.10	0.03	3.555	0.0009
Test 3	Intercept	-84.5	33.3	-2.539	0.0125
	Sire A3	-49.7	8.3	-5.955	<0.0001
	Sire W3	-45.0	9.2	-4.880	<0.0001
	CBW	0.17	0.03	6.127	<0.0001
Test 4	Intercept	-70.1	23.3	-3.002	0.0036
	Sire A4	-30.2	7.0	-4.336	<0.0001
	Sire W4	-42.3	9.5	-4.432	<0.0001
	CBW	0.17	0.02	8.191	<0.0001

Table S3 Mean testes weight (TW) and its 95% confidence interval (CI) of A2 family and W3 family at each months of age (MOA)

MOA	TW (g)					
	A2 family			W3 family		
	Mean	95% CI	Significance*	Mean	95% CI	Significance*
7.3	0.1	0.1-0.3	a	0.1	0.1-0.2	a
9.3	0.4	0.3-0.5	ab	0.3	0.2-0.4	ab
10.4	0.4	0.3-0.9	abcd	0.3	0.2-0.6	abc
11.5	0.5	0.3-1.0	abcd	0.3	0.2-0.6	abc
13.4	0.5	0.4-1.0	abc	0.5	0.3-0.8	bc
15.5	0.7	0.5-1.6	abcde	0.6	0.4-1.2	bc
17.5	1.3	0.9-2.3	cd	0.7	0.5-1.6	bcd
18.1	1.0	0.7-1.6	bc	1.0	0.7-1.8	c
18.5	1.8	1.1-3.8	cdefg	1.0	0.7-2.2	cd
19	4.7	3.2-8.8	def	1.4	1.1-2.1	c
19.4	18.0	11.7-38.8	fghi	7.0	4.6-15.1	def
20	31.6	21.6-59.1	gh	6.7	4.5-12.4	de
20.5	73.7	52.0-126.1	hi	37.8	27.4-60.9	ef
21.1	138.9	94.8-259.5	hi	34.3	23.4-64.1	efg
22.1	207.1	141.4-386.9	i	113.2	77.3-211.6	fg
24	217.7	141.6-469.8	i	163.3	111.5-305.1	g
26.1	219.1	142.6-472.9	i	113.1	77.2-211.4	fg
28.6	15.5	9.3-45.1	efghi	8.6	6.4-13.3	d

*Different superscript letters (a to i) indicate significant differences ($P < 0.05$) between MOA within each family. Items sharing the same letter (e.g. a vs. ab and bc vs. cd) were not significantly different

Table S4 Mean gonadosomatic index (GSI) and its 95% confidence interval (CI) of A2 family and W3 family at each months of age (MOA)

MOA	GSI					
	A2 family			W3 family		
	Mean	95% CI	Significance*	Mean	95% CI	Significance*
7.3	0.1	0.1-0.1	a	0.1	0.1-0.1	a
9.3	0.1	0.1-0.1	a	0.1	0.1-0.1	ab
10.4	0.1	0.1-0.2	ab	0.1	0.1-0.2	ab
11.5	0.1	0.1-0.2	ab	0.1	0.1-0.2	ab
13.4	0.1	0.1-0.2	a	0.1	0.1-0.2	ab
15.5	0.2	0.1-0.3	ab	0.1	0.1-0.2	ab
17.5	0.2	0.1-0.3	ab	0.1	0.1-0.2	ab
18.1	0.1	0.1-0.2	a	0.2	0.1-0.3	ab
18.5	0.2	0.1-0.4	ab	0.1	0.1-0.3	abc
19	0.5	0.4-0.9	bc	0.2	0.2-0.3	b
19.4	2.0	1.4-3.8	cd	0.8	0.6-1.5	cdef
20	3.2	2.3-5.4	d	0.8	0.6-1.4	cde
20.5	7.0	5.1-10.8	de	4.0	3.0-5.9	f
21.1	11.6	8.3-19.2	de	3.1	2.2-5.2	dfg
22.1	15.5	11.1-25.8	e	11.3	8.1-18.8	gh
24	17.6	12.1-32.6	e	13.6	9.7-22.5	h
26.1	16.7	11.4-30.9	e	11.6	8.3-19.2	gh
28.6	1.4	0.9-3.2	cde	0.9	0.7-1.2	e

*Different superscript letters (a to h) indicate significant differences ($P < 0.05$) between MOA within each family. Items sharing the same letter (e.g. a vs. ab and ab vs. bc) were not significantly different

Table S5 Mean estradiol-17 β (E2) and its 95% confidence interval (CI) of A2 family and W3 family at each months of age (MOA)

MOA	E2 (pg/ml)					
	A2 family			W3 family		
	Mean	95% CI	Significance*	Mean	95% CI	Significance*
7.3	25.1	19.0-36.8	ab	16.8	13.3-22.7	a
9.3	24.6	19.8-32.4	a	14.5	11.3-20.2	a
10.4	25.7	18.8-40.7	abc	22.2	16.8-32.6	ab
11.5	46.6	34.1-73.8	abcde	40.3	30.6-59.2	bc
13.4	45.0	34.1-66.1	abcd	24.7	19.2-34.5	ab
15.5	55.6	40.7-88.1	bcde	30.3	23.0-44.5	abc
17.5	64.6	49.0-94.9	cde	29.7	21.7-46.9	abc
18.1	100.3	79.6-135.6	de	44.3	33.6-65.1	bc
18.5	54.9	40.1-86.8	bcde	32.1	23.4-50.8	abc
19	83.9	63.6-123.1	de	60.3	49.2-77.8	c
19.4	108.8	79.5-172.1	def	76.2	55.7-120.6	cde
20	117.4	89.0-172.3	ef	128.2	97.2-188.1	def
20.5	108.2	84.2-151.4	de	156.2	123.9-211.1	def
21.1	98.1	74.4-144.1	de	146.6	111.2-215.3	def
22.1	109.4	83.0-160.6	def	256.5	194.5-376.5	f
24	280.0	204.7-443.1	f	199.0	145.5-315.0	df
26.1	69.4	50.7-109.8	cde	71.2	54.0-104.5	ce
28.6	69.7	48.1-127.0	cdef	36.0	29.0-47.5	bc

*Different superscript letters (a to f) indicate significant differences ($P < 0.05$) between MOA within each family. Items sharing the same letter (e.g. a vs. ab and ab vs. bc) were not significantly different

Table S6 Mean 11-ketotestosterone (11-KT) and its 95% confidence interval (CI) of A2 family and W3 family at each months of age (MOA)

MOA	11-KT (pg/ml)					
	A2 family			W3 family		
	Mean	95% CI	Significance*	Mean	95% CI	Significance*
7.3	154.9	118.4-223.6	abc	158.2	126.4-211.2	abc
9.3	119.0	96.5-155.0	ab	59.9	46.9-82.6	d
10.4	79.3	58.5-122.9	ab	61.0	46.6-88.1	d
11.5	90.2	66.6-139.9	ab	108.9	83.2-157.2	ad
13.4	81.8	62.5-118.1	a	147.2	115.4-203.0	abc
15.5	147.9	109.1-229.3	abc	162.7	124.5-235.0	abce
17.5	175.8	134.4-253.9	abc	210.7	155.5-326.7	abce
18.1	312.6	249.8-417.4	c	287.3	219.7-414.9	bcef
18.5	217.5	160.5-337.3	bc	199.5	147.3-309.4	abce
19	303.0	231.7-437.6	c	163.9	134.7-209.5	abc
19.4	373.5	275.6-579.2	cd	281.7	207.9-436.9	bcef
20	371.7	284.3-536.8	cd	213.4	163.2-308.1	abce
20.5	371.0	291.0-511.8	cd	250.5	200.2-334.5	abce
21.1	349.5	267.3-504.8	cd	312.4	238.9-451.2	bef
22.1	361.8	276.7-522.5	cd	336.9	257.6-486.5	ef
24	800.2	590.5-1240.8	d	684.9	505.4-1062.1	f
26.1	186.0	137.3-288.4	abc	122.4	93.6-176.7	acd
28.6	183.3	127.7-324.4	abcd	151.9	123.2-197.9	ac

*Different superscript letters (a to f) indicate significant differences ($P < 0.05$) between MOA within each family. Items sharing the same letter (e.g. a vs. ab and c vs. bc) were not significantly different

Table S7 Mean testosterone (T) and its 95% confidence interval (CI) of A2 family and W3 family at each months of age (MOA)

MOA	T (pg/ml)					
	A2 family			W3 family		
	Mean	95% CI	Significance*	Mean	95% CI	Significance*
7.3	124.0	90.2-198.7	abc	234.6	179.5-338.5	abc
9.3	137.2	106.8-191.6	ab	76.7	57.4-115.6	d
10.4	127.8	89.1-225.8	abcd	102.5	74.5-164.2	ad
11.5	166.9	116.4-294.9	abcd	112.3	81.6-179.9	ad
13.4	67.9	49.4-108.8	a	145.5	108.9-219.2	ad
15.5	161.2	112.4-284.9	abcd	156.4	113.7-250.6	abd
17.5	200.9	146.0-321.8	abcd	255.0	177.8-450.6	abcef
18.1	273.1	209.0-394.0	bcd	196.4	142.7-314.6	abcde
18.5	335.2	233.8-592.2	bcde	303.8	211.8-536.7	abcef
19	536.5	389.9-859.5	de	423.1	334.3-576.2	bcef
19.4	826.0	576.1-1459.4	ef	533.8	372.2-943.0	cefg
20	1167.1	848.3-1869.9	ef	603.0	438.3-966.2	efg
20.5	1368.7	1024.3-2061.8	ef	774.3	592.5-1117.1	fg
21.1	833.6	605.9-1335.5	ef	947.5	688.7-1518.1	fg
22.1	1246.5	906.0-1997.0	ef	1511.3	1098.4-2421.2	g
24	2085.2	1454.2-3684.0	f	1569.6	1094.6-2773.1	g
26.1	361.0	251.8-637.8	cde	298.1	216.7-477.6	abcef
28.6	185.8	121.3-396.7	abcdef	97.8	76.2-136.6	d

*Different superscript letters (a to g) indicate significant differences ($P < 0.05$) between MOA within each family. Items sharing the same letter (e.g. a vs. abcd and d vs. ad) were not significantly different

Table S8 Mean standard length (SL) and its 95% confidence interval (CI) of A2 family and W3 family at each months of age (MOA)

MOA	Sire	SL (cm)		
		Mean	95% CI	Significance*
7.3	A2	18.2	17.7-18.8	a
	W3	17.5	17.0-18.0	
9.3	A2	22.9	22.3-23.5	b
	W3	21.8	21.2-22.4	
10.4	A2	23.2	22.3-24.0	bc
	W3	22.0	21.3-22.8	
11.5	A2	24.1	23.2-25.0	bc
	W3	22.8	22.1-23.7	
13.4	A2	24.7	23.9-25.5	c
	W3	23.4	22.7-24.1	
15.5	A2	27.2	26.2-28.3	d
	W3	25.7	24.8-26.6	
17.5	A2	30.4	29.3-31.5	e
	W3	28.4	27.5-29.5	
18.1	A2	31.0	30.1-32.0	e
	W3	29.0	28.2-29.9	
18.5	A2	31.1	29.9-32.4	ef
	W3	29.1	28.0-30.2	
19	A2	32.7	31.8-33.8	efg
	W3	30.5	29.7-31.4	
19.4	A2	34.1	32.8-35.6	fghi
	W3	31.7	30.6-33.0	
20	A2	32.9	31.8-34.1	efgh
	W3	30.6	29.6-31.7	
20.5	A2	34.5	33.4-35.6	gh
	W3	32.0	31.1-32.9	
21.1	A2	34.4	33.3-35.7	ghi
	W3	32.0	30.9-33.1	
22.1	A2	34.6	33.4-35.9	ghi
	W3	32.1	31.1-33.2	
24	A2	35.6	34.3-37.0	hi
	W3	33.0	31.8-34.2	
26.1	A2	35.7	34.4-37.2	hi
	W3	33.1	32.0-34.3	
28.6	A2	37.4	36.1-38.8	i
	W3	34.5	33.5-35.6	

*Significant differences in the patterns of changes in SL between families were not supported by comparison of the generalized linear model (GLM), indicating the changes in SL were the same between the two families. Different superscript letters (a to i) indicate significant differences ($P < 0.05$) between MOA including both families. Items sharing the same letter (e.g. b vs. bc and e vs. ef) were not significantly different

Table S9 Mean body weight (BW) and its 95% confidence interval (CI) of A2 family and W3 family at each months of age (MOA)

MOA	Sire	BW (g)		
		Mean	95% CI	Significance*
7.3	A2	159.1	145.7-175.2	a
	W3	153.7	141.2-168.6	
9.3	A2	340.5	314.8-370.9	b
	W3	316.6	294.1-342.7	
10.4	A2	347.0	312.0-390.9	b
	W3	322.1	291.7-359.5	
11.5	A2	382.1	343.3-430.7	bc
	W3	352.1	319.0-392.9	
13.4	A2	409.9	372.7-455.4	bc
	W3	375.7	344.2-413.5	
15.5	A2	506.6	454.5-572.3	c
	W3	455.3	412.8-507.6	
17.5	A2	706.0	633.5-797.4	de
	W3	610.2	554.2-678.7	
18.1	A2	695.4	634.7-768.9	d
	W3	602.2	554.8-658.4	
18.5	A2	787.4	699.1-901.2	def
	W3	670.0	604.3-751.7	
19	A2	825.6	753.5-912.9	de
	W3	697.4	646.5-757.1	
19.4	A2	897.0	795.4-1028.3	defg
	W3	747.7	674.7-838.4	
20	A2	902.9	812.5-1015.9	ef
	W3	751.8	686.8-830.4	
20.5	A2	1055.9	960.8-1171.9	fgh
	W3	855.0	790.1-931.5	
21.1	A2	1197.8	1074.5-1353.0	ghi
	W3	945.7	863.9-1044.6	
22.1	A2	1304.4	1168.9-1475.5	hi
	W3	1011.0	923.4-1116.9	
24	A2	1402.2	1242.7-1608.7	i
	W3	1068.7	971.1-1188.1	
26.1	A2	1279.8	1136.0-1465.3	hi
	W3	996.1	905.2-1107.4	
28.6	A2	1238.0	1101.4-1413.2	hi
	W3	970.6	890.0-1067.2	

*Significant differences in the patterns of changes in BW between families were not supported by comparison of the generalized linear model (GLM), indicating the changes in BW were the same between the two families. Different superscript letters (a to i) indicate significant differences ($P < 0.05$) between MOA including both families. Items sharing the same letter (e.g. b vs. bc and d vs. de) were not significantly different