

Evolutionary reduction in testes size and competitive fertilization success in response to the experimental removal of sexual selection in dung beetles

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Table A1. ANOVAs of thorax width and log body weight, across 20 generations of three replicate lines of *Onthophagus taurus* breeding either monogamously or polygamously.

	SS	df	MS	F	P
Thorax width					
Selection history	0.003	1	0.003	0.02	0.908
Line[selection history] ¹	0.685	4	0.171	1.15	0.336
Generation	1.871	1	1.871	14.74	<0.001
Selection × Generation	0.003	1	0.003	0.01	0.945
Generation × Line[selection history] ²	2.393	4	0.598	4.71	<0.001
Error ³	79.084	623			
Body weight					
Selection history	0.035	1	0.035	7.39	0.053
Line[selection history] ¹	0.019	4	0.005	0.49	0.742
Generation	0.158	1	0.158	19.54	<0.001
Selection × Generation	0.000	1	0.000	0.01	0.949
Generation × Line[selection history] ²	0.164	4	0.041	5.07	<0.001
Error ³	5.043	623			

¹Error term for effect of selection history.

²Error term for effect selection × generation.

³Error term for effect of the covariate generation.

Table A2. ANOVAs of absolute log horn length, and residual horn length from a smoothing spline fitted to the plot of horn length on thorax width, across generations 5, 14 and 17 of three replicate lines of *Onthophagus taurus* breeding either monogamously or polygamously.

	SS	df	MS	F	P
log Horn length					
Selection history	0.040	1	0.040	0.21	0.700
Line[selection history] ¹	0.764	4	0.191	2.30	0.057
Generation	0.829	1	0.829	9.76	0.002
Selection × Generation	0.180	1	0.180	5.32	0.082
Generation × Line[selection history] ²	0.135	4	0.034	0.40	0.810
Error ³	75.432	888			
Residual horn length					
Selection history	0.071	1	0.071	0.17	0.703
Line[selection history] ¹	1.702	4	0.426	4.11	0.003
Generation	0.075	1	0.075	0.80	0.371
Selection × Generation	0.114	1	0.114	0.31	0.608
Generation × Line[selection history] ²	1.477	4	0.369	3.97	0.003
Error ³	82.555	888			

¹Error term for effect of selection history.

²Error term for effect of selection × generation.

³Error term for effect of the covariate generation.

Table A3. Switch point thorax widths and their 95% confidence intervals for populations of males sampled at generations 5, 14, and 17 of three replicate lines of *Onthophagus taurus* breeding either monogamously or polygamously.

Selection history	Generation		
	5	14	17
Polygamous (1)	4.86 {4.78, 4.93}	4.89 {4.79, 5.00}	4.91 {4.76, 5.08}
Polygamous (2)	4.89 {4.70, 5.00}	4.56 {4.47, 4.70}	4.74 {4.62, 4.84}
Polygamous (3)	4.91 {4.83, 4.99}	4.82 {4.77, 4.87}	4.81 {4.70, 4.91}
Monogamous (1)	4.75 {4.66, 4.84}	4.82 {4.73, 4.96}	4.89 {4.80, 4.97}
Monogamous (2)	4.83 {4.77, 4.90}	4.83 {4.71, 4.87}	4.85 {4.72, 4.99}
Monogamous (3)	4.70 {4.61, 4.82}	4.85 {4.79, 4.90}	4.76 {4.69, 4.81}

Table A4. ANOVA of the switchpoint thorax width between minor and major male phenotypes, across generations 5, 14 and 17 of three replicate lines of *Onthophagus taurus* breeding either monogamously or polygamously.

	SS	df	MS	F	P
Selection history	0.0006	1	0.0006	0.09	0.771
Generation	0.0001	1	0.0001	0.02	0.901
Selection × Generation	0.0236	1	0.0236	3.09	0.101
Error	0.1067	14			

Figure A1. Changes in raw testes weight across 20 generations and three replicate monogamous (open symbols) and polygamous (closed symbols) breeding lines of *Onthophagus taurus*.

