

**Table S1. Summary of two-dimensional QTL mapping.** <sup>1</sup> Square-root transformed sperm count (1x10<sup>6</sup>). <sup>2</sup> Support for the two-locus model over the null model, evidence for at least one QTL with allowance for interaction. <sup>3</sup> Support for the two-locus model over the single-locus model, allowing for interaction. <sup>4</sup> Support for the two-locus model over the additive model, evidence for interaction. <sup>5</sup> Support for the two-locus model over the null model, evidence for at least one QTL assuming no interaction. <sup>6</sup> Support for the two-locus model over the single-locus model.

	Locus 1 position (cM)		Locus 2 position (cM)		Full two-locus model <sup>2</sup>		Conditional-interactive model <sup>3</sup>		Interactive model <sup>4</sup>		Additive model <sup>5</sup>		Conditional-additive model <sup>6</sup>	
					LOD	P-value	LOD	P-value	LOD	P-value	LOD	P-value	LOD	P-value
<sup>1</sup> Normalized sperm count Sperm head morphology index	4	41.23	9	35.49	7.73	0.001	4.54	0.109	1.16	1	6.58	0.001	3.38	0.025
	1	41.31	15	23.15	7.18	0.010	2.35	1	0.08	1	7.09	0.001	2.26	0.137
	2	76.42	4	66.23	7.47	0.009	4.19	0.197	2.05	1	5.42	0.022	2.14	0.186
	2	75.42	8	45.26	6.3	0.061	3.02	0.899	0.11	1	6.19	0.008	2.91	0.018
	2	82.42	9	42.49	6.81	0.023	2.93	0.937	0.43	1	6.38	0.005	2.5	0.062
	2	76.42	15	23.15	8.83	< 0.001	4	0.276	0.08	1	8.75	<0.001	3.92	0.001
	4	67.23	8	45.26	6.56	0.040	3.67	0.486	1.46	1	5.09	0.043	2.21	0.156
	4	67.23	9	37.49	9.37	< 0.001	5.49	0.026	1.96	1	7.41	0.001	3.53	0.004
	4	67.23	15	23.15	7.97	0.005	3.14	0.842	0.33	1	7.64	0.001	2.81	0.025
	7	47.89	9	42.49	6.43	0.046	2.55	1	0.2	1	6.23	0.007	2.35	0.111
	8	45.26	9	36.49	7.93	0.005	4.05	0.253	0.01	1	7.91	<0.001	4.04	<0.001
	8	45.26	15	23.15	7.82	0.006	2.99	0.921	0.06	1	7.76	<0.001	2.93	0.018
	9	32.49	15	23.15	7.93	0.005	3.1	0.864	0	1	7.92	<0.001	3.09	0.012