

Supplementary Table S1: Significance of fitted effects for each semen volume, gross motility, concentration, and percent post-thaw motility

	Volume	Gross Motility	Concentration	Percent Post-Thaw Motility
Age at collection	***	***	***	***
Collection centre	***	***	***	***
Collection number	***	***	NS	NS
Breed season	***	*	***	**
Collection method	NS	**	NS	***

Note: *** = (p < 0.001), ** = (p < 0.01), * = (p < 0.05), and NS = (p > 0.05)

Supplementary Table S2: Uncharacterised genes associated with in each QTL identified in semen volume, gross motility, concentration, and percent post-thaw motility.

Trait	QTL Region (OAR:Mb)	Candidate Gene Symbol
Volume	3:8.41-9.41	<i>LOC105612588, LOC105612590, LOC105612594, LOC105612621</i>
	5:35.1-36.1	<i>LOC105615251, LOC101116567, LOC105615252, LOC105613755, LOC105613754, LOC105611543, LOC105611545, LOC105611544, LOC101119981, LOC105611546, LOC105611547</i>
	9:53.15-54.15	<i>LOC105613955</i>
	10:43.98-44.98	<i>LOC101121784</i>
	11:24.88-25.88	<i>LOC105610742, LOC105616326, LOC105616457, LOC105616327</i>
	12:47.91-48.91	<i>LOC105616533, LOC101103167, LOC105609714, LOC105609715, LOC105609719, LOC105616534, LOC101121791, LOC105616535, LOC101123057</i>
	12:50.08-51.08	<i>LOC101111210, LOC105616539, LOC105616540, LOC101110432, LOC105616541, LOC105616542, LOC105616543, LOC105610224, LOC105616544</i>
	25:7.12-8.12	<i>LOC105604913, LOC101113195, LOC105604914, LOC101113650, LOC105604915, LOC105604917, LOC105604916, LOC105604918</i>
	25:30.05-31.05	<i>LOC105604997, LOC105605080, LOC105605000, LOC105605091, LOC105605001, LOC105605002, LOC105605003</i>
Gross Motility	2:194.93-195.93	<i>LOC101122844</i>
	3:5.68-6.68	<i>LOC105607238, LOC105612447, LOC105607239, LOC105607240</i>
	8:50.32-51.32	<i>LOC105609780, LOC105611302, LOC105611301, LOC105615880, LOC105611299, LOC105611298</i>
	10:16.12-17.12	<i>LOC105616140, LOC105608006, LOC105616141, LOC105616142, LOC105616143</i>

	14:5.72-6.72	LOC105616821, LOC105616820, LOC105609368, LOC105616822, LOC105609367, LOC105609365, LOC105616823, LOC105609364, LOC105609363
	15:41.71-42.71	LOC105602253, LOC105602254, LOC105602255, LOC101104267
	24:25.94-26.94	LOC105604726, LOC105604725, LOC101112443, LOC101112694, LOC105604727, LOC101114075, LOC105604728, LOC105604730, LOC105604731, LOC105604732, LOC101102954, LOC101103208, LOC105604733, LOC105604736, LOC105604735, LOC101122752, LOC105604737
Concentration	2:78.38-79.38	LOC105608114
	2:220.72-221.72	LOC105606755, LOC101118589, LOC101115609, LOC105606754, LOC105606772
	2:247.37-248.37	LOC105611563, LOC105612023, LOC105611566, LOC105611567, LOC105610920, LOC101107939, LOC105610921, LOC105610922
	3:49.45-50.45	LOC101120736, LOC101120996, LOC654331, LOC101122016, LOC101121246
	5:37.91-38.91	LOC101112480, LOC105614551, LOC101112729, LOC105615341, LOC105613511, LOC101113495, LOC105613512, LOC101107959, LOC101108225, LOC101113757, LOC101108485, LOC101114017, LOC101114270, LOC101108746, LOC101114521, LOC101109012, LOC101114777, LOC101115031, LOC101115277, LOC101109269, LOC101109535, LOC101115539, LOC101115794, LOC101116054, LOC101116574, LOC101116831, LOC101117077, LOC101117332, LOC101117585
	7:55.45-56.45	LOC105607297, LOC105615718, LOC105607294, LOC105607293
	20:42.01-43.01	LOC105603856, LOC105603857, LOC105603859, LOC105603858, LOC105603860, LOC105603861, LOC105603863, LOC105603862
	25:0.24-1.24	LOC101123180, LOC105604888, LOC105604889, LOC105604890
Percent Post-Thaw Motility	1:25.28-26.28	LOC105609503, LOC105605441, LOC105609505, LOC105609934, LOC105609504, LOC105609507, LOC105609506, LOC105610201, LOC105609513, LOC105609508
	7:48.54-49.54	LOC105609699, LOC105615709, LOC105609702
	7:61.59-62.59	LOC101113241, LOC105615725, LOC105615726, LOC105612095, LOC105615727, LOC105612097, LOC105612096, LOC101112487, LOC101115542, LOC105612098
	8:76.2-77.2	LOC105615930, LOC101106779, LOC101104501
	9:52.92-53.92	LOC105611155, LOC105611156, LOC105613955
	9:57.23-58.23	LOC105616058, LOC105611122, LOC105613108, LOC105611121, LOC105616059, LOC105613105
	9:78.58-79.58	LOC105616083, LOC105616084, LOC105611867, LOC105611866, LOC101107532, LOC105611865

	14:3.12-4.12	<i>LOC105613905, LOC105602052, LOC105609376, LOC105616809, LOC105616810, LOC105616811, LOC105616812</i>
	15:13.4-14.4	<i>LOC105602135, LOC105602134, LOC105602133, LOC105602132, LOC105602131, LOC105602137</i>
	17:22.17-23.17	-
	25:12.85-13.85	<i>LOC105604934, LOC105604933, LOC105604932, LOC105601946, LOC101118756, LOC105604929, LOC101119276, LOC105605087, LOC101119530, LOC105604935, LOC105604936</i>

Note: OAR: *Ovis aries* autosome; Mb: Mega base