

Supplemental Table S1. The distribution of SNPs on each chromosome based on bovine genome UMD3.1 assembly.

Chr.	Size (Mb)	SNP No.	Average distance (kb)	SNP density (SNP/Mb)	Percentage (%)
1	161.1	3691	43.65	22.91	6.11%
2	140.8	3208	43.89	22.78	5.31%
3	127.9	2830	45.19	22.13	4.69%
4	124.5	2809	44.32	22.56	4.65%
5	125.8	2754	45.68	21.89	4.56%
6	122.6	2694	45.51	21.97	4.46%
7	112.1	2594	43.22	23.14	4.30%
8	116.9	2555	45.75	21.86	4.23%
9	108.1	2377	45.48	21.99	3.94%
10	106.4	2399	44.35	22.55	3.97%
11	110.2	2496	44.15	22.65	4.13%
12	85.4	1973	43.28	23.1	3.27%
13	84.4	1996	42.28	23.65	3.31%
14	81.3	2029	40.07	24.96	3.36%
15	84.6	1871	45.22	22.12	3.10%
16	77.9	1882	41.39	24.16	3.12%
17	76.5	1717	44.55	22.44	2.84%
18	66.1	1532	43.15	23.18	2.54%
19	65.3	1493	43.74	22.86	2.47%
20	75.8	1660	45.66	21.9	2.75%
21	69.1	1600	43.19	23.15	2.65%
22	61.8	1490	41.48	24.11	2.47%
23	53.4	1236	43.2	23.15	2.05%
24	65.3	1567	41.67	24	2.59%

25	44.1	1079	40.87	24.47	1.79%
26	51.8	1203	43.06	23.22	1.99%
27	48.7	1091	44.64	22.4	1.81%
28	46.1	1105	41.72	23.97	1.83%
29	60	1134	52.91	18.9	1.88%
X	88.5	2322	43.91	26.24	3.85%
SUM	2642.5	60387	1317.18	688.41	100%

Chr., Chromosome; Average distance (kb), the average distance of the adjacent SNPs; SNP density (SNP/Mb), the number of SNP per Mb on each chromosome; Percentage (%), the percentage of SNPs on each chromosome to the total SNPs.

Supplemental Table S2. Detail information of the suggestive SNPs ($P < 10^{-4}$) for milk production traits.

SNP ID	Chr.	Position (bp)	Traits	P-value	Within gene	< 100 Kb genes
AX-85063846	1	131,078,192	PM	7.47E-05	-	<i>PRR23B, PRR23A</i>
AX-85090843	2	44,835,901	FY270	9.81E-05	-	<i>NEB, RIF1, TNFAIP6, NMI</i>
AX-85065882	2	64,355,274	FY270	5.86E-05	<i>NCKAP5</i>	-
AX-85164478	2	102,244,080	PM	2.97E-05	<i>SPAG16</i>	<i>SNORA11</i>
AX-85139229	3	43,305,853	PP270	1.13E-05	<i>SASS6</i>	<i>DBT, LRRC39, TRMT13</i>
AX-85148558	3	43,334,940	FP270, PP270	1.03E-05	<i>MFSD14A</i>	<i>SASS6, SLC35A3</i>
AX-85106096	3	43,379,700	FP270, PP270	1.46E-05	<i>MFSD14A</i>	<i>SLC35A3, U5</i>
AX-85073877	3	43,484,703	PP270	4.18E-06	-	<i>U5, AGL</i>
AX-85099740	3	119,182,436	PP270	4.78E-05	<i>HDAC4</i>	-
AX-85106185	5	21,866,208	PM, PY270	6.50E-05	-	<i>SNORD107</i>
AX-85060036	5	36,318,696	PM	9.35E-05	<i>TMEM117</i>	-
AX-85052611	7	78,484,726	PM, MY270	6.79E-05	-	-
AX-85125375	9	14,329,106	FP270	6.05E-05	-	-
AX-85080253	12	83,626,905	MY270, PY270	5.53E-05	-	-
AX-85063131	14	66,712,566	FY270	1.12E-06	<i>VPS13B</i>	<i>MGC148714, COX6C, SNORA70</i>
AX-85063132	14	66,956,481	FY270	1.53E-05	<i>VPS13B</i>	<i>SNORA70, MIR599</i>
AX-85104008	14	66,983,758	FY270	3.59E-05	<i>VPS13B</i>	<i>MIR599, bta-mir-599</i>
AX-85104009	14	67,189,025	FY270	1.97E-05	<i>VPS13B</i>	<i>MIR599, bta-mir-599</i>

AX-85079883	14	67,222,684	FY270	2.28E-05	<i>VPS13B</i>	<i>MIR599, bta-mir-599</i>
AX-85067364	14	67,498,630	FY270	6.27E-05	-	<i>OSR2</i>
AX-85098533	20	25,275,029	PM, FY270, PY270	8.81E-05	-	<i>ARL15</i>
AX-85047365	24	11,943,840	FP270	9.15E-06	-	-
AX-85069196	25	21,731,755	PP270	2.23E-05	-	<i>CHP2, PRKCB</i>
AX-85125732	X	95,496,898	MY270	7.08E-05	-	<i>MAGED4B</i>
AX-85088666	X	95,533,629	MY270	6.74E-05	-	<i>MAGED4B</i>
AX-85148496	X	108,521,008	MY270	4.26E-05	-	<i>ATP6AP2</i>

Chr., Chromosome; Position, SNP position based on *Bos taurus* UMD 3.1 genome assembly;
 Within gene, gene that the SNP located in; < 100 Kb genes, genes within 100 kb flanking region
 next to the SNP