Supplementary Material

Supplementary Table S1. Average diagonal and off diagonal values of genomic relationship matrices (GRMs) constructed from subsets of SNPs of Brahman cow population

Marker	Diagonal				Off-diagonal			
	Mean	STD	Min	Max	Mean	STD	Min	Max
AllSNP	1.01	0.059	0.87	1.29	-0.0010	0.048	-0.010	0.65
RF400	1.03	0.10	0.73	1.37	-0.0010	0.082	-0.34	0.74
RF1000	1.02	0.071	0.83	1.34	-0.0010	0.065	-0.23	0.74
RF3000	1.01	0.051	0.86	1.25	-0.0010	0.053	-0.15	0.68
RF18453†	1.01	0.058	0.87	1.28	-0.0010	0.049	-0.096	0.65
GBM400	1.01	0.085	0.73	1.40	-0.0010	0.075	-0.29	0.70
GBM1000	1.01	0.064	0.86	1.32	-0.0010	0.060	-0.20	0.70
GBM3000	1.01	0.043	0.89	1.23	-0.0010	0.052	-0.15	0.68
GBM16600†	1.01	0.036	0.92	1.18	-0.0010	0.049	-0.10	0.65
Xgb400	1.01	0.075	0.80	1.37	-0.0010	0.073	-0.32	0.73
Xgb1000	1.01	0.054	0.86	1.25	-0.0010	0.061	-0.23	0.67
Xgb3000	1.00	0.041	0.91	1.22	-0.0010	0.053	-0.14	0.64
Xgb9122†	1.00	0.036	0.92	1.17	-0.0010	0.050	-0.11	0.65
Even400	1.01	0.10	0.77	1.43	-0.0010	0.078	-0.30	0.77
Even1000	1.01	0.081	0.82	1.38	-0.0010	0.061	-0.23	0.67
Even3000	1.00	0.063	0.86	1.25	-0.0010	0.052	-0.17	0.62

RF – Random Forests; GBM – Gradient Boosting Machine, XgBoost – Extreme Gradient Boosting; Even – evenly spaced along the genome; † The SNPs with positive variable importance values.

Supplementary Table S2. Average diagonal and off-diagonal values of inversed genomic relationship matrices (GRMs) constructed from subsets of SNPs of Brahman cow population

Marker	Diagonal				Off diagonal			
	Mean	STD	Min	Max	Mean	STD	Min	Max
AllSNP	1.79	0.25	1.12	2.73	0.018	0.032	-1.15	0.29
RF400	12.62	0.70	9.89	14.55	0.007	0.29	-3.64	1.48
RF1000	5.90	0.61	4.05	7.70	0.014	0.20	-2.92	0.96
RF3000	2.55	0.33	1.74	3.75	0.018	0.066	-1.55	0.42
RF18453	1.85	0.26	1.17	2.85	0.018	0.035	-1.17	0.31
GBM400	12.55	0.71	10.02	14.60	0.007	0.29	-3.36	1.36
GBM1000	5.68	0.59	3.91	7.42	0.014	0.20	-2.85	0.88
GBM3000	2.46	0.31	1.641	3.72	0.018	0.062	-1.53	0.39
GBM16600	1.84	0.24	1.26	2.85	0.018	0.035	-1.13	0.29
Xgb400	12.48	0.63	9.82	14.39	0.008	0.29	-3.31	1.47
Xgb1000	5.57	0.56	4.002	7.29	0.014	0.19	-2.97	0.88
Xgb3000	2.55	0.32	1.762	3.97	0.018	0.065	-1.66	0.40
Xgb9122	1.98	0.26	1.352	3.08	0.018	0.040	-1.25	1.00
Even400	12.77	0.91	9.09	14.95	0.007	0.284	-3.79	1.18
Even1000	6.19	0.73	3.63	8.38	0.014	0.21	-3.09	0.96
Even3000	2.69	0.37	1.67	4.02	0.017	0.071	-1.65	0.47

RF – Random Forests; GBM – Gradient Boosting Machine, XgBoost – Extreme Gradient Boosting; Even – evenly spaced along the genome; [†] The SNPs with positive variable importance values.

Supplementary Table S3. Five-fold cross-validation scheme - individual subset estimates of heritability (h^2) and additive genetic variances (σ_a^2) explained by different subsets of SNPs from Brahman cow population.

Marker	σ_a^2	SD	σ_e^2	SD	σ_p^2	SD	h^2	SD
RF400_R1	38.66	21.31	574.75	34.18	613.41	31.52	0.063	0.035
RF400_R2	45.05	21.59	553.42	33.07	598.48	30.82	0.075	0.036
RF400_R3	31.42	19.39	559.89	32.95	591.31	30.31	0.053	0.033
RF400_R4	30.21	17.75	555.51	32.14	585.72	30.01	0.052	0.030
RF400_R5	39.94	21.06	573	33.98	612.94	31.49	0.065	0.034
average	37.06	20.22	563.31	33.26	600.37	30.83	0.062	0.034
RF1000_R1	57.9	28.25	555.6	36.9	613.5	31.64	0.094	0.046
RF1000_R2	61.95	27.8	536.79	35.7	598.74	30.91	0.10	0.046
RF1000_R3	35.84	23.08	555.29	34.93	591.13	30.27	0.061	0.039
RF1000_R4	35.00	21.64	551.14	34.05	586.15	30.02	0.060	0.037
RF1000_R5	51.05	26.42	562	36.47	613.05	31.52	0.083	0.043
average	48.35	25.44	552.16	35.61	600.51	30.87	0.080	0.042
RF3000_R1	78.84	35.57	534.86	40.68	613.71	31.76	0.13	0.057
RF3000_R2	83.13	36.13	516.94	40.22	600.08	31.12	0.14	0.059
RF3000_R3	41.49	28.44	550.04	38.07	591.53	30.29	0.070	0.048
RF3000_R4	64.58	31.45	522	38.07	586.57	30.24	0.11	0.053
RF3000_R5	72.98	33.89	540.28	40.07	613.26	31.65	0.12	0.055
average	68.20	33.10	532.82	39.42	601.03	31.01	0.11	0.055
RF18453_R1	80.31	39.26	533.17	43.69	613.48	31.7	0.13	0.064
RF18453_R2	90.46	41.95	510.4	44.46	600.87	31.18	0.15	0.069
RF18453_R3	46.38	32.07	545.07	40.38	591.45	30.29	0.078	0.055
RF18453_R4	60.17	33.83	526.62	40.41	586.79	30.17	0.10	0.058
RF18453_R5	80.9	40.22	533.22	44.43	614.12	31.73	0.13	0.065
average	71.64	37.47	529.70	42.67	601.34	31.01	0.12	0.062
GBM400_R1	48.41	22.64	564.63	33.98	613.03	31.62	0.079	0.037
GBM400_R2	45.19	22.19	554.25	33.4	599.44	30.88	0.075	0.037
GBM400_R3	28.7	19.432	562.94	33.26	591.65	30.29	0.049	0.033
GBM400_R4	64.76	23.17	520.29	31.63	585.05	30.47	0.11	0.039
GBM400_R5	26.97	18.84	586.32	34.16	613.29	31.37	0.044	0.031
average	42.81	21.25	557.69	33.29	600.49	30.93	0.072	0.035
GBM1000_R1	74.28	30.39	538.92	36.93	613.2	31.8	0.12	0.049
GBM1000_R2	74.68	31.05	525.81	36.73	600.49	31.18	0.12	0.051
GBM1000_R3	46.14	25.6	545.24	35.56	591.38	30.36	0.078	0.043
GBM1000_R4	70.51	27.92	515.23	34.74	585.74	30.35	0.12	0.047
GBM1000_R5	52.46	27.2	560.88	36.89	613.34	31.53	0.086	0.044
average	63.61	28.43	537.22	36.17	600.83	31.044	0.11	0.047
GBM3000_R1	85.36	36.67	528	41.06	613.36	31.79	0.14	0.059
GBM3000_R2	109.13	40.92	493.01	41.81	602.14	31.57	0.18	0.066
GBM3000_R3	76.96	35.03	514.91	39.82	591.87	30.62	0.13	0.059
GBM3000_R4	65.91	32.77	521.1	38.91	587	30.28	0.11	0.056
GBM3000_R5	76.08	36.17	538.04	41.47	614.12	31.73	0.12	0.058
average	82.69	36.31	519.01	40.61	601.70	31.20	0.14	0.060

GBM16600_R1	81.66	39.45	531.68	43.72	613.34	31.71	0.13	0.064
GBM16600_R2	94.34	42.57	506.69	44.66	601.04	31.24	0.16	0.070
GBM16600_R3	56.83	34.58	534.77	41.32	591.6	30.38	0.096	0.059
GBM16600_R4	57.06	33.27	529.79	40.22	586.84	30.16	0.097	0.057
GBM16600_R5	80.19	40.38	534.09	44.57	614.27	31.74	0.13	0.065
average	74.02	38.05	527.40	42.90	601.42	31.04	0.13	0.063
Xgb400_R1	32.17	20.52	581.1	34.45	613.27	31.42	0.053	0.034
Xgb400_R2	21.51	19.73	578.29	34.36	599.81	30.64	0.036	0.033
Xgb400_R3	22.81	18.2	568.75	33.21	591.56	30.24	0.039	0.031
Xgb400_R4	17.74	18.05	569.93	33.39	587.67	30.03	0.030	0.031
Xgb400_R5	23.43	20.44	590.69	35.18	614.12	31.4	0.038	0.034
average	23.53	19.39	577.75	34.12	601.29	30.75	0.039	0.033
Xgb1000_R1	37.1	24.83	576.07	36.73	613.18	31.4	0.061	0.041
Xgb1000_R2	48.91	28.12	551.27	37.06	600.19	30.85	0.082	0.047
Xgb1000_R3	36.32	24.34	555.17	35.63	591.48	30.29	0.061	0.041
Xgb1000_R4	31.09	23.66	556.44	35.46	587.53	30.08	0.053	0.041
Xgb1000_R5	34.14	26.08	579.97	37.7	614.11	31.44	0.056	0.043
average	37.51	25.41	563.78	36.52	601.30	30.81	0.062	0.042
Xgb3000_R1	52.68	30.07	560.22	38.94	612.9	31.47	0.086	0.049
Xgb3000_R2	46.68	30.56	553.22	39.15	599.91	30.77	0.078	0.051
Xgb3000_R3	32.64	26.07	558.99	37.17	591.64	30.25	0.055	0.044
Xgb3000_R4	33.32	26.11	554.11	36.95	587.43	30.07	0.057	0.045
Xgb3000_R5	43.98	29.73	569.83	39.43	613.81	31.46	0.072	0.049
average	41.86	28.51	559.27	38.33	601.14	30.80	0.070	0.048
Xgb9122_R1	79.99	37.4	533.04	42.12	613.03	31.7	0.13	0.060
Xgb9122_R2	80.81	38.66	519.68	42.46	600.49	31.09	0.14	0.064
Xgb9122_R3	54.23	32.25	537.19	39.72	591.41	30.37	0.092	0.055
Xgb9122_R4	51.65	30.83	535.21	38.78	586.86	30.14	0.088	0.053
Xgb9122_R5	80.69	38.28	533.21	42.76	613.89	31.75	0.13	0.062
average	69.47	35.48	531.67	41.17	601.13	31.01	0.12	0.059
Even400_R1	33.1	20.55	597.38	35.06	630.48	32.32	0.053	0.033
Even400_R2	28.61	19.07	563.03	32.99	591.63	30.31	0.0483	0.0328
Even400_R3	10.54	16.38	584.9	33.56	595.43	30.37	0.018	0.028
Even400_R4	13.32	16.87	561.88	32.61	575.1	29.35	0.023	0.030
Even400_R5	28.6	20.41	583.86	34.56	612.46	31.37	0.047	0.0338
average	22.834	18.656	578.21	33.756	601.02	30.744	0.038	0.0318
Even1000_R1	39.17	24.2	590.47	36.97	629.64	32.23	0.0629	0.039
Even1000_R2	35.37	24.17	556.1	35.57	591.46	30.29	0.060	0.0417
Even1000_R3	16.39	21.56	579	35.86	595.39	30.38	0.028	0.037
Even1000_R4	35.87	23.15	538.69	34.26	574.56	29.43	0.062	0.040
Even1000_R5	41.84	26.46	570.35	37.24	612.19	31.39	0.068	0.043
average	33.728	23.91	566.93	35.98	600.65	30.745	0.056	0.040
Even3000_R1	76.61	34.59	552.92	40.62	629.53	32.55	0.12	0.054
Even3000_R2	43.13	27.06	548.07	37.2	591.2	30.31	0.073	0.047
Even3000_R3	36.32	28.99	559.47	38.7	595.78	30.52	0.061	0.049
Even3000_R4	71.74	31.86	502.82	37.08	574.56	29.74	0.13	0.055
Even3000_R5	62.86	33.12	549.67	40.02	612.52	31.58	0.10	0.054
average	58.13	31.124	542.59	38.72	600.72	30.94	0.097	0.052

AllSNP _R1	85.53	40.62	527.83	44.42	613.37	31.73	0.14	0.066
AllSNP _R2	99.80	43.53	500.99	45.16	600.79	31.25	0.17	0.071
AllSNP _R3	55.17	34.21	536.14	41.3	591.3	30.33	0.093	0.058
AllSNP _R4	58.89	33.55	527.66	40.38	586.55	30.13	0.10	0.057
AllSNP _R5	82.67	40.63	531.19	44.74	613.86	31.71	0.14	0.066
average	76.41	38.51	524.76	43.2	601.17	31.03	0.13	0.064

RF – Random Forests; GBM – Gradient Boosting Machine, XgBoost – Extreme Gradient Boosting; Even – evenly spaced along the genome; h^2 – heritability; σ_e^2 – residual variance. [†] The SNPs with positive variable importance values.

Supplementary Table S4. Five-fold cross-validation scheme - individual subset estimates of average accuracy of genomic prediction by different subsets of SNPs from Brahman cow population

Marker	Accuracy
RF400_R1	0.416
RF400_R2	0.321
RF400_R3	0.427
RF400_R4	0.350
RF400_R5	0.252
average	0.353
RF1000_R1	0.336
RF1000_R2	0.278
RF1000_R3	0.513
RF1000_R4	0.408
RF1000_R5	0.278
average	0.363
RF3000_R1	0.366
RF3000_R2	0.361
RF3000_R3	0.679
RF3000_R4	0.368
RF3000_R5	0.290
average	0.413
RF18453_R1	0.371
RF18453_R2	0.332
RF18453_R3	0.631
RF18453_R4	0.473
RF18453_R5	0.294
average	0.420
GBM400_R1	0.345
GBM400_R2	0.318
GBM400_R3	0.599
GBM400_R4	0.080
GBM400_R5	0.475
average	0.363
GBM1000_R1	0.388
GBM1000_R2	0.390
GBM1000_R3	0.609
GBM1000_R4	0.241
GBM1000_R5	0.479
average	0.421
GBM3000_R1	0.441
GBM3000_R2	0.358
GBM3000_R3	0.526
GBM3000_R4	0.533
GBM3000_R5	0.448
average	0.461
GBM16600_R1	0.361

GBM16600_R2	0.321
GBM16600_R3	0.567
GBM16600_R4	0.487
GBM16600_R5	0.346
average	0.416
Xgb400_R1	0.099
Xgb400_R2	0.196
Xgb400_R3	0.280
Xgb400_R4	0.286
Xgb400_R5	0.154
average	0.203
Xgb1000_R1	0.287
Xgb1000_R2	0.106
Xgb1000_R3	0.343
Xgb1000_R4	0.305
Xgb1000_R5	0.241
average	0.256
Xgb3000_R1	0.166
Xgb3000_R2	0.299
Xgb3000_R3	0.506
Xgb3000_R4	0.402
Xgb3000_R5	0.269
average	0.328
Xgb9122_R1	0.279
Xgb9122_R2	0.341
Xgb9122_R3	0.573
Xgb9122_R4	0.513
Xgb9122_R5	0.260
average	0.393
Even400_R1	0.202
Even400_R2	0.084
Even400_R3	0.204
Even400_R4	0.223
Even400_R5	0.165
average	0.176
Even1000_R1	0.012
Even1000_R2	0.181
Even1000_R3	0.366
Even1000_R4	0.216
Even1000_R5	0.299
average	0.215
Even3000_R1	0.025
Even3000_R2	0.308
Even3000_R3	0.499
Even3000_R4	0.177
Even3000_R5	0.440
average	0.290
AllSNP _R1	0.375
AllSNP _R2	0.293

AllSNP _R3	0.612
AllSNP _R4	0.501
AllSNP _R5	0.342
average	0.425