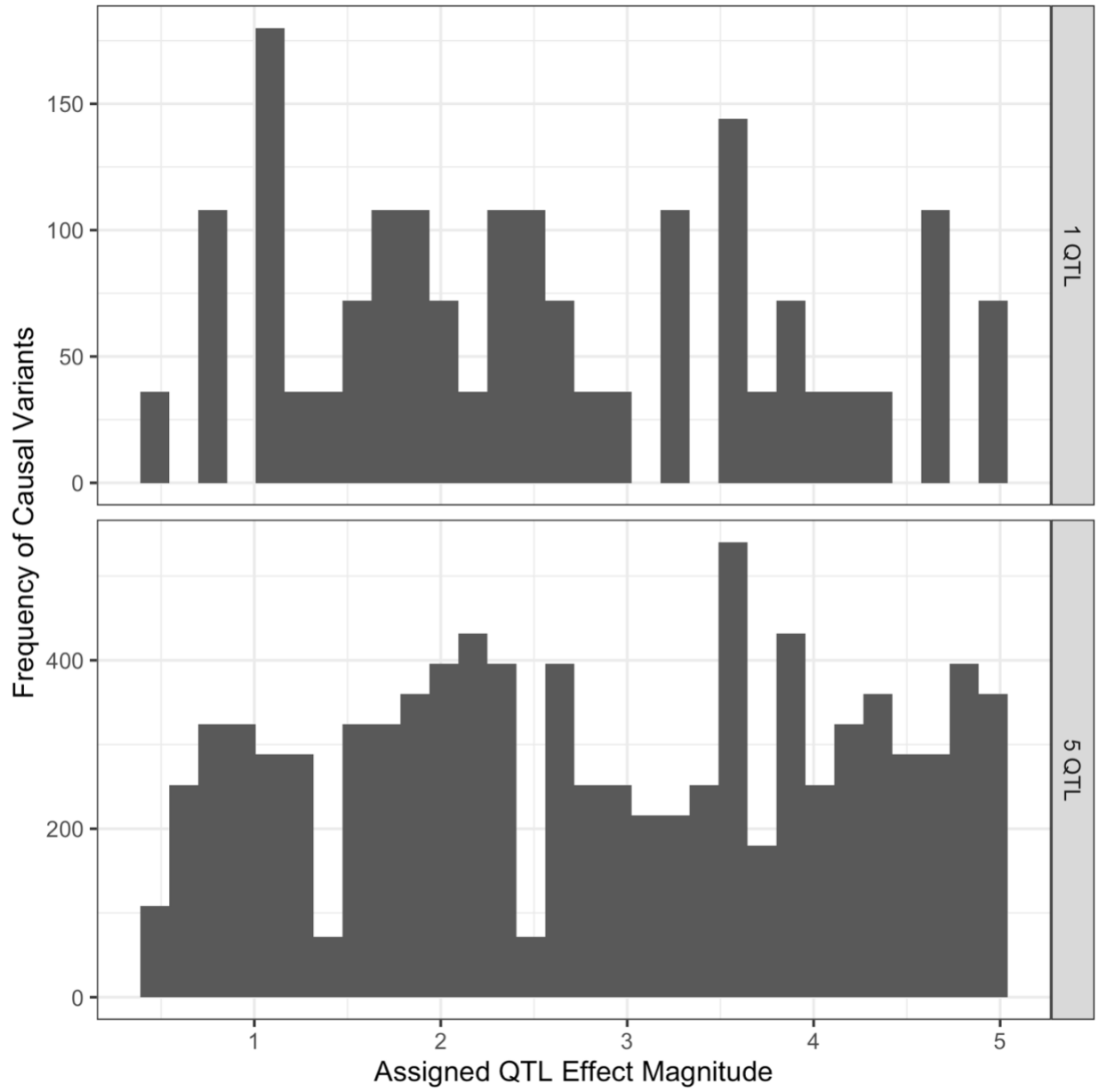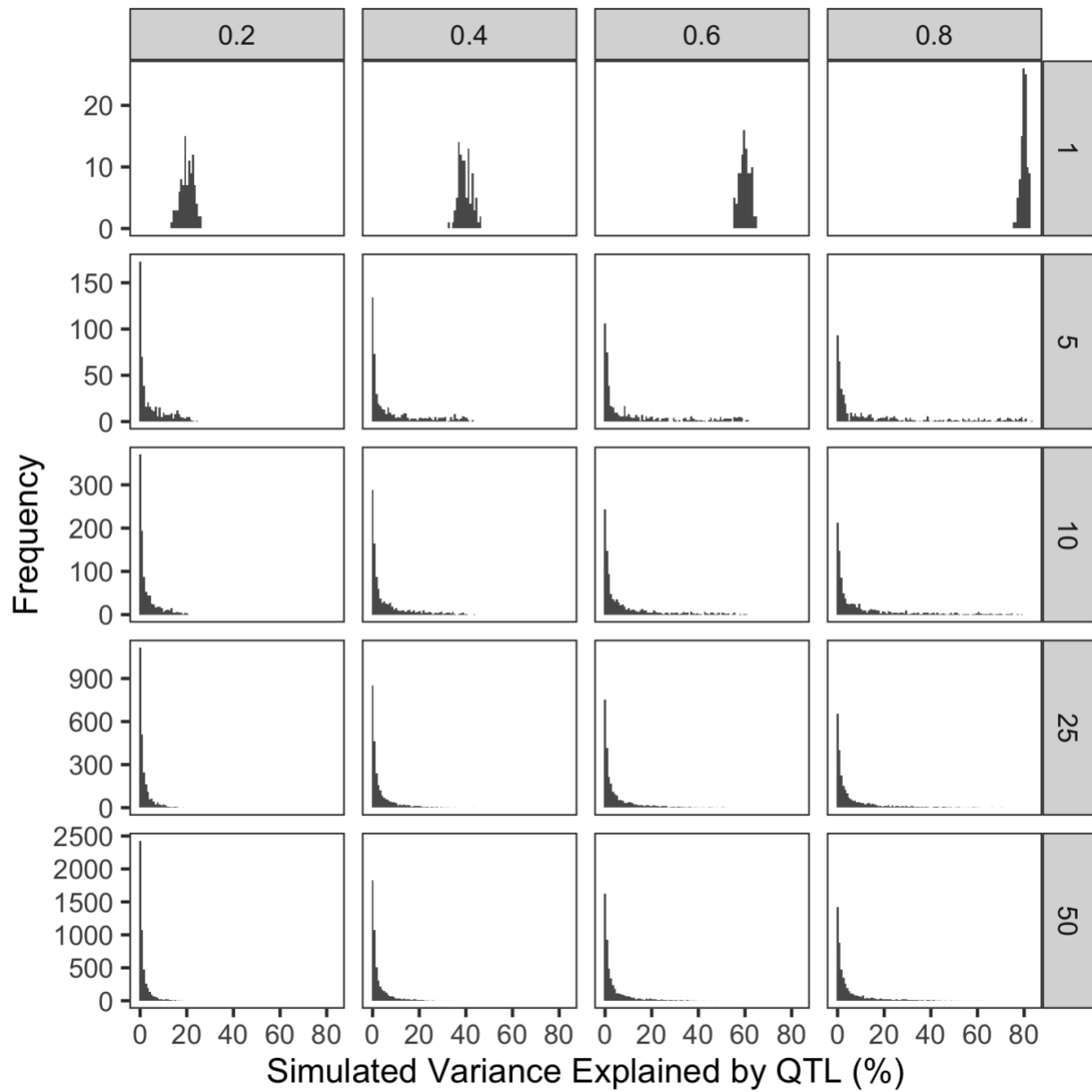Supplemental Figure 1: Flowchart describing inputs, outputs, and processes in the mapping and simulation profiles of NemaScan.

Supplemental Figure 2: Effect size distribution of simulations comparing algorithm performance

Supplemental Figure 3: Distributions of simulated QTL effects expressed as the fraction of phenotypic variance explained. Horizontal panels denote the number of simulated QTL per trait and vertical panels denote the heritability of each simulated trait.
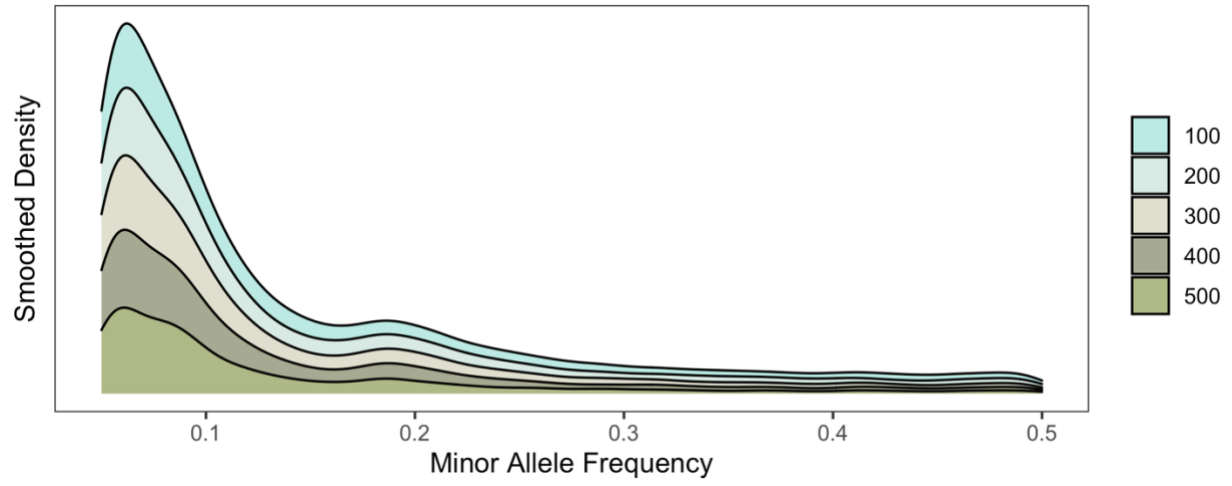
Supplemental Figure 4: Distributions of all simulated QTL minor allele frequencies among mapping populations of increasing size
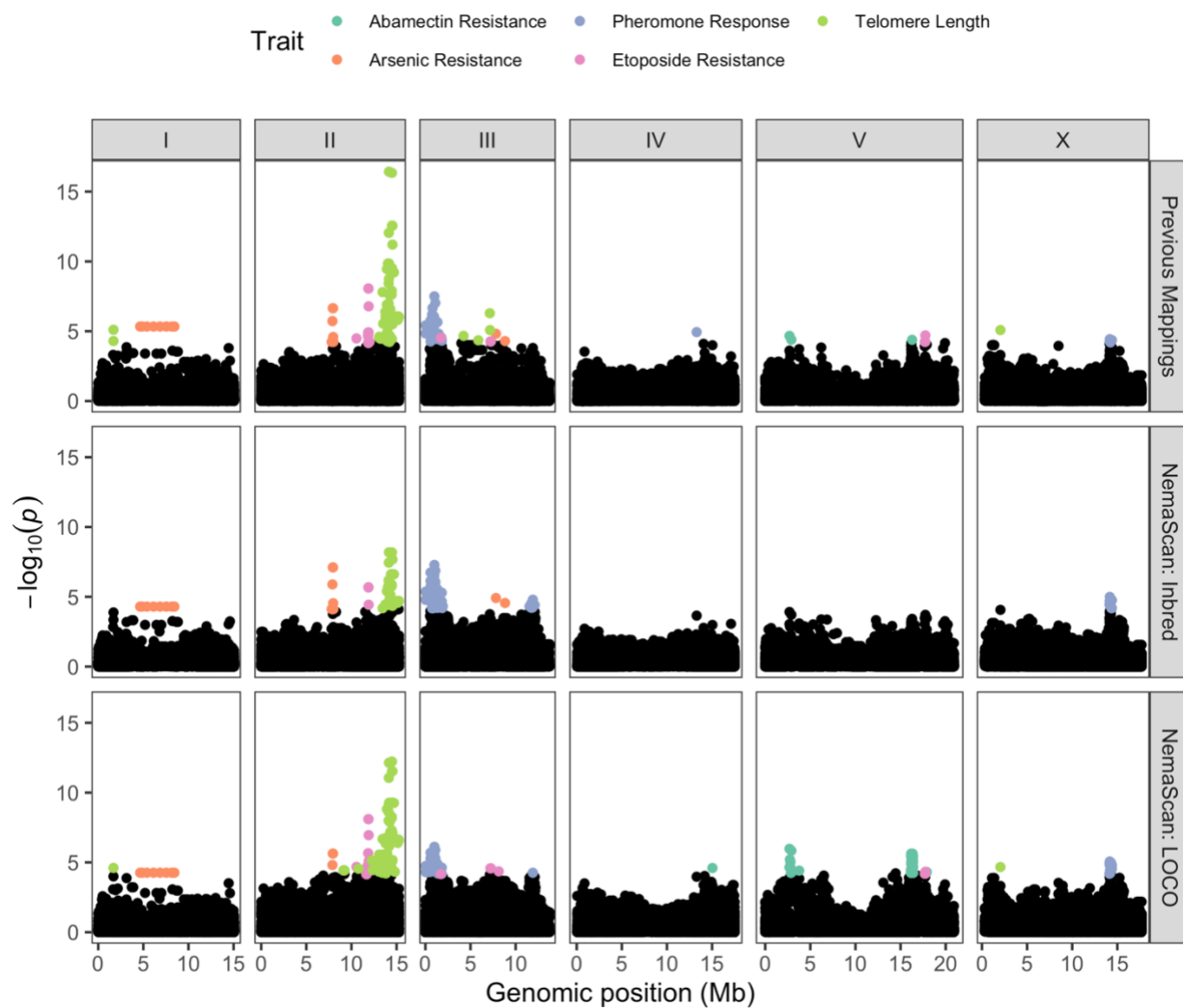
Supplemental Figure 5: Manhattan plots of previous GWA mappings and NemaScan mappings. Markers exceeding the multiple testing correction threshold are colored according to the mapped trait of interest.

Figure	Number of Simulated QTL per Trait	Trait Heritability (h2)	Effect Distribution	Strain Set	Number of Strains	Simulated QTL Locations	Grouping Replicated	Approximate Replication per Group
Figure 1	1; 5	0.1; 0.2; 0.3; 0.4; 0.5; 0.6; 0.7; 0.8; 0.9	0.5-5	Hahnel et. al. 2018	203	Genome-wide	Heritability x Number of QTL	50
Figure 2	1; 5; 10; 25; 50	0.2; 0.4; 0.6; 0.8	Gamma (0.4,1.66)	CeNDR Strains	540	Genome-wide	Heritability x Number of QTL	100
Figure 3	5	0.8	Gamma (0.4,1.66)	Subsampled CeNDR Strains	100; 200; 300; 400; 500	Genome-wide	Subsampled Population	50
Figure 4	5	0.8	Gamma (0.4,1.66)	Swept Subsampled CeNDR Strains; Divergent Subsampled CeNDR Strains; Subsampled CeNDR Strains	144	Genome-wide	Subsampled Population	30
Figure 5	1	0.2; 0.5; 0.8	Uniform	All Divergent Strains; Select Swept Strains	183; 182	Chromosome-Specific Arms and Centers; Population-specific hyperdivergent regions	Heritability x Strain Set x Chromosome Region x Divergence x Chromosome	100

Supplemental Table 1: Simulation summary

Trait Heritability	Number of Simulated QTL	Group 1	Group 2	n1	n2	Adjusted p-value	Significance
0.1	1	EMMA	fastGWA-lmm-exact	50	50	1	ns
0.1	1	EMMA	fastGWA-lmm-exact-INBRED	50	50	1	ns
0.1	1	EMMA	fastGWA-lmm-exact-LOCO	50	50	0.78223	ns
0.1	1	fastGWA-lmm-exact	fastGWA-lmm-exact-INBRED	50	50	1	ns
0.1	1	fastGWA-lmm-exact	fastGWA-lmm-exact-LOCO	50	50	0.41072	ns
0.1	1	fastGWA-lmm-exact-INBRED	fastGWA-lmm-exact-LOCO	50	50	0.78223	ns
0.2	1	EMMA	fastGWA-lmm-exact	50	50	1	ns
0.2	1	EMMA	fastGWA-lmm-exact-INBRED	50	50	0.44228	ns
0.2	1	EMMA	fastGWA-lmm-exact-LOCO	50	50	1	ns
0.2	1	fastGWA-lmm-exact	fastGWA-lmm-exact-INBRED	50	50	1	ns
0.2	1	fastGWA-lmm-exact	fastGWA-lmm-exact-LOCO	50	50	1	ns
0.2	1	fastGWA-lmm-exact-INBRED	fastGWA-lmm-exact-LOCO	50	50	0.76257	ns
0.3	1	EMMA	fastGWA-lmm-exact	50	50	1	ns
0.3	1	EMMA	fastGWA-lmm-exact-INBRED	50	50	0.60446	ns
0.3	1	EMMA	fastGWA-lmm-exact-LOCO	50	50	1	ns
0.3	1	fastGWA-lmm-exact	fastGWA-lmm-exact-INBRED	50	50	1	ns
0.3	1	fastGWA-lmm-exact	fastGWA-lmm-exact-LOCO	50	50	1	ns
0.3	1	fastGWA-lmm-exact-INBRED	fastGWA-lmm-exact-LOCO	50	50	0.60446	ns
0.1	5	EMMA	fastGWA-lmm-exact	50	50	1	ns
0.1	5	EMMA	fastGWA-lmm-exact-INBRED	50	50	1	ns
0.1	5	EMMA	fastGWA-lmm-exact-LOCO	50	50	1	ns
0.1	5	fastGWA-lmm-exact	fastGWA-lmm-exact-INBRED	50	50	1	ns
0.1	5	fastGWA-lmm-exact	fastGWA-lmm-exact-LOCO	50	50	1	ns
0.1	5	fastGWA-lmm-exact-INBRED	fastGWA-lmm-exact-LOCO	50	50	1	ns
0.2	5	EMMA	fastGWA-lmm-exact	50	50	1	ns
0.2	5	EMMA	fastGWA-lmm-exact-INBRED	50	50	1	ns
0.2	5	EMMA	fastGWA-lmm-exact-LOCO	50	50	1	ns
0.2	5	fastGWA-lmm-exact	fastGWA-lmm-exact-INBRED	50	50	1	ns
0.2	5	fastGWA-lmm-exact	fastGWA-lmm-exact-LOCO	50	50	1	ns
0.2	5	fastGWA-lmm-exact-INBRED	fastGWA-lmm-exact-LOCO	50	50	1	ns
0.3	5	EMMA	fastGWA-lmm-exact	50	50	1	ns
0.3	5	EMMA	fastGWA-lmm-exact-INBRED	50	50	1	ns
0.3	5	EMMA	fastGWA-lmm-exact-LOCO	50	50	1	ns
0.3	5	fastGWA-lmm-exact	fastGWA-lmm-exact-INBRED	50	50	1	ns
0.3	5	fastGWA-lmm-exact	fastGWA-lmm-exact-LOCO	50	50	0.5337	ns
0.3	5	fastGWA-lmm-exact-INBRED	fastGWA-lmm-exact-LOCO	50	50	0.5337	ns
0.4	5	EMMA	fastGWA-lmm-exact	50	50	0.23146	ns
0.4	5	EMMA	fastGWA-lmm-exact-INBRED	50	50	0.65345	ns
0.4	5	EMMA	fastGWA-lmm-exact-LOCO	50	50	0.3213	ns
0.4	5	fastGWA-lmm-exact	fastGWA-lmm-exact-INBRED	50	50	0.3213	ns
0.4	5	fastGWA-lmm-exact	fastGWA-lmm-exact-LOCO	50	50	0.00271	**
0.4	5	fastGWA-lmm-exact-INBRED	fastGWA-lmm-exact-LOCO	50	50	0.19683	ns
0.5	5	EMMA	fastGWA-lmm-exact	50	50	0.00037	***
0.5	5	EMMA	fastGWA-lmm-exact-INBRED	50	50	0.14917	ns
0.5	5	EMMA	fastGWA-lmm-exact-LOCO	50	50	0.14917	ns
0.5	5	fastGWA-lmm-exact	fastGWA-lmm-exact-INBRED	50	50	0.04479	*
0.5	5	fastGWA-lmm-exact	fastGWA-lmm-exact-LOCO	50	50	0	****
0.5	5	fastGWA-lmm-exact-INBRED	fastGWA-lmm-exact-LOCO	50	50	0.00369	**
0.6	5	EMMA	fastGWA-lmm-exact	50	50	0	****
0.6	5	EMMA	fastGWA-lmm-exact-INBRED	50	50	0.22415	ns
0.6	5	EMMA	fastGWA-lmm-exact-LOCO	50	50	0.0589	ns
0.6	5	fastGWA-lmm-exact	fastGWA-lmm-exact-INBRED	50	50	2.00E-04	***
0.6	5	fastGWA-lmm-exact	fastGWA-lmm-exact-LOCO	50	50	0	****
0.6	5	fastGWA-lmm-exact-INBRED	fastGWA-lmm-exact-LOCO	50	50	0.00207	**
0.7	5	EMMA	fastGWA-lmm-exact	50	50	0	****
0.7	5	EMMA	fastGWA-lmm-exact-INBRED	50	50	0.48648	ns
0.7	5	EMMA	fastGWA-lmm-exact-LOCO	50	50	0.06525	ns
0.7	5	fastGWA-lmm-exact	fastGWA-lmm-exact-INBRED	50	50	6.00E-05	****
0.7	5	fastGWA-lmm-exact	fastGWA-lmm-exact-LOCO	50	50	0	****
0.7	5	fastGWA-lmm-exact-INBRED	fastGWA-lmm-exact-LOCO	50	50	0.01385	*
0.8	5	EMMA	fastGWA-lmm-exact	50	50	0	****
0.8	5	EMMA	fastGWA-lmm-exact-INBRED	50	50	0.9322	ns
0.8	5	EMMA	fastGWA-lmm-exact-LOCO	50	50	0.00826	**
0.8	5	fastGWA-lmm-exact	fastGWA-lmm-exact-INBRED	50	50	0	****
0.8	5	fastGWA-lmm-exact	fastGWA-lmm-exact-LOCO	50	50	0	****
0.8	5	fastGWA-lmm-exact-INBRED	fastGWA-lmm-exact-LOCO	50	50	0.00826	**
0.9	5	EMMA	fastGWA-lmm-exact	50	50	0	****
0.9	5	EMMA	fastGWA-lmm-exact-INBRED	50	50	0.27572	ns
0.9	5	EMMA	fastGWA-lmm-exact-LOCO	50	50	0.00501	**
0.9	5	fastGWA-lmm-exact	fastGWA-lmm-exact-INBRED	50	50	3.00E-05	****
0.9	5	fastGWA-lmm-exact	fastGWA-lmm-exact-LOCO	50	50	0	****
0.9	5	fastGWA-lmm-exact-INBRED	fastGWA-lmm-exact-LOCO	50	50	0.00012	***

Supplemental Table 2: Differences in power to detect QTL between mapping algorithms at increasing heritability for one and five underlying QTL

Trait Heritab	Number of S	Group 1	Group 2	n1	n2	Adjusted p-v	Significance
0.1	1	EMMA	fastGWA-lm	24	27	1	ns
0.1	1	EMMA	fastGWA-lm	24	25	1	ns
0.1	1	EMMA	fastGWA-lm	24	21	1	ns
0.1	1	fastGWA-lm	fastGWA-lm	27	25	1	ns
0.1	1	fastGWA-lm	fastGWA-lm	27	21	1	ns
0.1	1	fastGWA-lm	fastGWA-lm	25	21	1	ns
0.2	1	EMMA	fastGWA-lm	48	47	0.02171	*
0.2	1	EMMA	fastGWA-lm	48	44	0.69477	ns
0.2	1	EMMA	fastGWA-lm	48	47	0.69477	ns
0.2	1	fastGWA-lm	fastGWA-lm	47	44	0.07299	ns
0.2	1	fastGWA-lm	fastGWA-lm	47	47	0.00097	***
0.2	1	fastGWA-lm	fastGWA-lm	44	47	0.5322	ns
0.3	1	EMMA	fastGWA-lm	50	49	0.6066	ns
0.3	1	EMMA	fastGWA-lm	50	48	0.12139	ns
0.3	1	EMMA	fastGWA-lm	50	50	0.00282	**
0.3	1	fastGWA-lm	fastGWA-lm	49	48	0.6066	ns
0.3	1	fastGWA-lm	fastGWA-lm	49	50	0.12139	ns
0.3	1	fastGWA-lm	fastGWA-lm	48	50	0.6066	ns
0.4	1	EMMA	fastGWA-lm	50	50	1	ns
0.4	1	EMMA	fastGWA-lm	50	50	1	ns
0.4	1	EMMA	fastGWA-lm	50	50	1	ns
0.4	1	fastGWA-lm	fastGWA-lm	50	50	1	ns
0.4	1	fastGWA-lm	fastGWA-lm	50	50	1	ns
0.4	1	fastGWA-lm	fastGWA-lm	50	50	1	ns
0.5	1	EMMA	fastGWA-lm	50	50	0.01141	*
0.5	1	EMMA	fastGWA-lm	50	50	0.01141	*
0.5	1	EMMA	fastGWA-lm	50	50	0.01141	*
0.5	1	fastGWA-lm	fastGWA-lm	50	50	1	ns
0.5	1	fastGWA-lm	fastGWA-lm	50	50	1	ns
0.5	1	fastGWA-lm	fastGWA-lm	50	50	1	ns
0.6	1	EMMA	fastGWA-lm	50	50	0.11581	ns
0.6	1	EMMA	fastGWA-lm	50	50	0.36002	ns
0.6	1	EMMA	fastGWA-lm	50	50	1	ns
0.6	1	fastGWA-lm	fastGWA-lm	50	50	1	ns
0.6	1	fastGWA-lm	fastGWA-lm	50	50	0.1332	ns
0.6	1	fastGWA-lm	fastGWA-lm	50	50	0.36002	ns
0.7	1	EMMA	fastGWA-lm	50	50	0.04518	*
0.7	1	EMMA	fastGWA-lm	50	50	0.07324	ns
0.7	1	EMMA	fastGWA-lm	50	50	1	ns
0.7	1	fastGWA-lm	fastGWA-lm	50	50	1	ns
0.7	1	fastGWA-lm	fastGWA-lm	50	50	0.02181	*
0.7	1	fastGWA-lm	fastGWA-lm	50	50	0.04518	*
0.8	1	EMMA	fastGWA-lm	50	50	0.10115	ns
0.8	1	EMMA	fastGWA-lm	50	50	0.60209	ns
0.8	1	EMMA	fastGWA-lm	50	50	0.60209	ns
0.8	1	fastGWA-lm	fastGWA-lm	50	50	0.59338	ns
0.8	1	fastGWA-lm	fastGWA-lm	50	50	0.0077	**
0.8	1	fastGWA-lm	fastGWA-lm	50	50	0.21354	ns
0.9	1	EMMA	fastGWA-lm	50	50	0.19981	ns
0.9	1	EMMA	fastGWA-lm	50	50	1	ns
0.9	1	EMMA	fastGWA-lm	50	50	0.26486	ns
0.9	1	fastGWA-lm	fastGWA-lm	50	50	0.19981	ns
0.9	1	fastGWA-lm	fastGWA-lm	50	50	0.00103	**
0.9	1	fastGWA-lm	fastGWA-lm	50	50	0.26486	ns
0.1	5	EMMA	fastGWA-lm	6	10	1	ns
0.1	5	EMMA	fastGWA-lm	6	8	1	ns
0.1	5	EMMA	fastGWA-lm	6	2	1	ns
0.1	5	fastGWA-lm	fastGWA-lm	10	8	1	ns
0.1	5	fastGWA-lm	fastGWA-lm	10	2	1	ns
0.1	5	fastGWA-lm	fastGWA-lm	8	2	1	ns
0.2	5	EMMA	fastGWA-lm	22	31	1	ns
0.2	5	EMMA	fastGWA-lm	22	24	1	ns
0.2	5	EMMA	fastGWA-lm	22	19	1	ns
0.2	5	fastGWA-lm	fastGWA-lm	31	24	1	ns
0.2	5	fastGWA-lm	fastGWA-lm	31	19	0.67035	ns
0.2	5	fastGWA-lm	fastGWA-lm	24	19	1	ns
0.3	5	EMMA	fastGWA-lm	36	32	0.95233	ns
0.3	5	EMMA	fastGWA-lm	36	34	1	ns
0.3	5	EMMA	fastGWA-lm	36	42	1	ns
0.3	5	fastGWA-lm	fastGWA-lm	32	34	0.95233	ns
0.3	5	fastGWA-lm	fastGWA-lm	32	42	0.17422	ns
0.3	5	fastGWA-lm	fastGWA-lm	34	42	1	ns
0.4	5	EMMA	fastGWA-lm	45	34	1	ns
0.4	5	EMMA	fastGWA-lm	45	40	1	ns
0.4	5	EMMA	fastGWA-lm	45	49	1	ns
0.4	5	fastGWA-lm	fastGWA-lm	34	40	1	ns
0.4	5	fastGWA-lm	fastGWA-lm	34	49	1	ns
0.4	5	fastGWA-lm	fastGWA-lm	40	49	1	ns
0.5	5	EMMA	fastGWA-lm	49	38	1	ns
0.5	5	EMMA	fastGWA-lm	49	46	1	ns
0.5	5	EMMA	fastGWA-lm	49	50	1	ns
0.5	5	fastGWA-lm	fastGWA-lm	38	46	1	ns
0.5	5	fastGWA-lm	fastGWA-lm	38	50	1	ns
0.5	5	fastGWA-lm	fastGWA-lm	46	50	1	ns
0.6	5	EMMA	fastGWA-lm	49	40	0.69605	ns
0.6	5	EMMA	fastGWA-lm	49	50	0.796	ns
0.6	5	EMMA	fastGWA-lm	49	50	0.20467	ns
0.6	5	fastGWA-lm	fastGWA-lm	40	50	0.796	ns
0.6	5	fastGWA-lm	fastGWA-lm	40	50	0.0138	*
0.6	5	fastGWA-lm	fastGWA-lm	50	50	0.02481	*
0.7	5	EMMA	fastGWA-lm	50	44	1	ns
0.7	5	EMMA	fastGWA-lm	50	50	1	ns
0.7	5	EMMA	fastGWA-lm	50	50	1	ns
0.7	5	fastGWA-lm	fastGWA-lm	44	50	1	ns
0.7	5	fastGWA-lm	fastGWA-lm	44	50	0.32848	ns
0.7	5	fastGWA-lm	fastGWA-lm	50	50	1	ns
0.8	5	EMMA	fastGWA-lm	50	46	0.28505	ns
0.8	5	EMMA	fastGWA-lm	50	50	0.77132	ns
0.8	5	EMMA	fastGWA-lm	50	50	0.87436	ns
0.8	5	fastGWA-lm	fastGWA-lm	46	50	0.87436	ns
0.8	5	fastGWA-lm	fastGWA-lm	46	50	0.04972	*
0.8	5	fastGWA-lm	fastGWA-lm	50	50	0.28505	ns
0.9	5	EMMA	fastGWA-lm	50	48	0.77541	ns
0.9	5	EMMA	fastGWA-lm	50	50	0.77541	ns
0.9	5	EMMA	fastGWA-lm	50	50	0.44219	ns
0.9	5	fastGWA-lm	fastGWA-lm	48	50	0.74062	ns
0.9	5	fastGWA-lm	fastGWA-lm	48	50	0.06463	ns
0.9	5	fastGWA-lm	fastGWA-lm	50	50	0.74062	ns

Supplemental Table 3: Differences in empirical FDR between mapping algorithms at increasing heritability for one and five underlying QTL

Sample Size	0-2.5	2.5-5	5-7.5	7.5-10	10-20	20-30	30-40	40-50	50-60	60-70	70-80	80-90
100	0.01 ± 0.01	0.02 ± 0.04	0.04 ± 0.05	0.07 ± 0.08	0.22 ± 0.07	0.45 ± 0.12	0.57 ± 0.14	0.73 ± 0.19	0.81 ± 0.14	0.85 ± 0.13	0.88 ± 0.11	0.91 ± 0.18
200	0.02 ± 0.02	0.06 ± 0.05	0.14 ± 0.08	0.2 ± 0.12	0.41 ± 0.1	0.53 ± 0.13	0.67 ± 0.16	0.75 ± 0.14	0.86 ± 0.12	0.92 ± 0.09	0.95 ± 0.07	0.94 ± 0.18
300	0.03 ± 0.02	0.12 ± 0.06	0.23 ± 0.12	0.36 ± 0.17	0.48 ± 0.1	0.64 ± 0.12	0.7 ± 0.15	0.82 ± 0.15	0.88 ± 0.1	0.93 ± 0.08	0.96 ± 0.06	0.96 ± 0.16
400	0.04 ± 0.02	0.15 ± 0.08	0.28 ± 0.13	0.43 ± 0.17	0.52 ± 0.13	0.68 ± 0.13	0.75 ± 0.13	0.85 ± 0.13	0.9 ± 0.1	0.94 ± 0.08	0.99 ± 0.03	0.99 ± 0.04
500	0.05 ± 0.02	0.18 ± 0.08	0.35 ± 0.13	0.49 ± 0.16	0.59 ± 0.12	0.69 ± 0.12	0.78 ± 0.14	0.86 ± 0.14	0.91 ± 0.11	0.96 ± 0.07	0.99 ± 0.03	1 ± 0

Supplemental Table 4: Average power to detect QTL explaining increasing phenotypic variance (%, columns) among subsampled populations of increasing sampling depth

Population Type	0-2.5	2.5-5	5-7.5	7.5-10	10-20	20-30	30-40	40-50	50-60	60-70	70-80	80-90
Divergent	0.01 ± 0.01	0.03 ± 0.03	0.07 ± 0.07	0.12 ± 0.1	0.28 ± 0.1	0.56 ± 0.11	0.75 ± 0.14	0.87 ± 0.12	0.92 ± 0.12	0.96 ± 0.07	0.97 ± 0.07	1 ± 0
Subsampled	0.01 ± 0.02	0.04 ± 0.05	0.07 ± 0.07	0.15 ± 0.1	0.3 ± 0.1	0.52 ± 0.12	0.64 ± 0.13	0.75 ± 0.15	0.84 ± 0.13	0.88 ± 0.11	0.9 ± 0.08	0.93 ± 0.18
Swept	0 ± 0	0.01 ± 0.02	0.04 ± 0.07	0.12 ± 0.11	0.44 ± 0.11	0.85 ± 0.09	0.98 ± 0.04	1 ± 0.02	0.99 ± 0.02	1 ± 0.01	1 ± 0	1 ± 0

Supplemental Table 5: Average power to detect QTL explaining increasing phenotypic variance (%, columns) among 144 randomly sampled divergent strains, 144 randomly sampled swept strains, and 144 randomly sampled strains from the overall CeNDR population

Simulated Divergence	Simulated Chromosome Region	I	II	III	IV	V	X
Hyperdivergent	Arm	0.001170	0.028880	0.000680	0.037160	0.007740	0.075990
Non-Hyperdivergent	Arm	0.062080	0.011320	0.000220	0.005160	0.020250	0.000460
Hyperdivergent	Center	0.093920	0.191940	0.000000	0.002130	0.000730	0.001240
Non-Hyperdivergent	Center	0.250980	0.005060	0.000030	0.002930	0.000000	0.003450
Hyperdivergent	Tip	0.504990	0.595700		0.740690	0.497570	0.000010
Non-Hyperdivergent	Tip	0.077100	0.614290	0.083260	0.063850	0.000110	0.016960

Supplemental Table 6: Differences in power to detect QTL between different chromosomes controlling for hyper-divergence and historic recombination groups (tips, arms, and centers)

Strain Set	Group 1	Group 2	n1	n2	Adjusted p-value	Significance
swept.chr.sims	Hyperdivergent_Arm	Hyperdivergent_Center	1859	1038	1	ns
swept.chr.sims	Hyperdivergent_Arm	Hyperdivergent_Tip	1859	700	1	ns
swept.chr.sims	Hyperdivergent_Arm	Non-Hyperdivergent_Arm	1859	1890	1	ns
swept.chr.sims	Hyperdivergent_Arm	Non-Hyperdivergent_Center	1859	1009	0.69252	ns
swept.chr.sims	Hyperdivergent_Arm	Non-Hyperdivergent_Tip	1859	695	1	ns
swept.chr.sims	Hyperdivergent_Center	Hyperdivergent_Tip	1038	700	1	ns
swept.chr.sims	Hyperdivergent_Center	Non-Hyperdivergent_Arm	1038	1890	1	ns
swept.chr.sims	Hyperdivergent_Center	Non-Hyperdivergent_Center	1038	1009	1	ns
swept.chr.sims	Hyperdivergent_Center	Non-Hyperdivergent_Tip	1038	695	1	ns
swept.chr.sims	Hyperdivergent_Tip	Non-Hyperdivergent_Arm	700	1890	1	ns
swept.chr.sims	Hyperdivergent_Tip	Non-Hyperdivergent_Center	700	1009	1	ns
swept.chr.sims	Hyperdivergent_Tip	Non-Hyperdivergent_Tip	700	695	1	ns
swept.chr.sims	Non-Hyperdivergent_Arm	Non-Hyperdivergent_Center	1890	1009	0.35341	ns
swept.chr.sims	Non-Hyperdivergent_Arm	Non-Hyperdivergent_Tip	1890	695	1	ns
swept.chr.sims	Non-Hyperdivergent_Center	Non-Hyperdivergent_Tip	1009	695	1	ns
unswept.chr.sims	Hyperdivergent_Arm	Hyperdivergent_Center	2030	1222	0	****
unswept.chr.sims	Hyperdivergent_Arm	Hyperdivergent_Tip	2030	344	1	ns
unswept.chr.sims	Hyperdivergent_Arm	Non-Hyperdivergent_Arm	2030	2021	1	ns
unswept.chr.sims	Hyperdivergent_Arm	Non-Hyperdivergent_Center	2030	1285	0	****
unswept.chr.sims	Hyperdivergent_Arm	Non-Hyperdivergent_Tip	2030	291	0.6635	ns
unswept.chr.sims	Hyperdivergent_Center	Hyperdivergent_Tip	1222	344	0.00147	**
unswept.chr.sims	Hyperdivergent_Center	Non-Hyperdivergent_Arm	1222	2021	0	****
unswept.chr.sims	Hyperdivergent_Center	Non-Hyperdivergent_Center	1222	1285	0.21109	ns
unswept.chr.sims	Hyperdivergent_Center	Non-Hyperdivergent_Tip	1222	291	0.6635	ns
unswept.chr.sims	Hyperdivergent_Tip	Non-Hyperdivergent_Arm	344	2021	1	ns
unswept.chr.sims	Hyperdivergent_Tip	Non-Hyperdivergent_Center	344	1285	0	****
unswept.chr.sims	Hyperdivergent_Tip	Non-Hyperdivergent_Tip	344	291	0.62177	ns
unswept.chr.sims	Non-Hyperdivergent_Arm	Non-Hyperdivergent_Center	2021	1285	0	****
unswept.chr.sims	Non-Hyperdivergent_Arm	Non-Hyperdivergent_Tip	2021	291	0.6635	ns
unswept.chr.sims	Non-Hyperdivergent_Center	Non-Hyperdivergent_Tip	1285	291	0.03955	*

Supplemental Table 7: Power to detect simulated in hyper-divergent regions or different parts of the chromosome within the mapping populations

Trait Heritability	Strain Set	Group 1	Group 2	n1	n2	Adjusted p-value	Significance
0.2	swept.chr.sims	Hyperdivergent_Arm	Hyperdivergent_Center	604	350	1	ns
0.2	swept.chr.sims	Hyperdivergent_Arm	Hyperdivergent_Tip	604	235	1	ns
0.2	swept.chr.sims	Hyperdivergent_Arm	Non-Hyperdivergent_Arm	604	618	1	ns
0.2	swept.chr.sims	Hyperdivergent_Arm	Non-Hyperdivergent_Center	604	326	1	ns
0.2	swept.chr.sims	Hyperdivergent_Arm	Non-Hyperdivergent_Tip	604	242	0.44771	ns
0.2	swept.chr.sims	Hyperdivergent_Center	Hyperdivergent_Tip	350	235	1	ns
0.2	swept.chr.sims	Hyperdivergent_Center	Non-Hyperdivergent_Arm	350	618	1	ns
0.2	swept.chr.sims	Hyperdivergent_Center	Non-Hyperdivergent_Center	350	326	1	ns
0.2	swept.chr.sims	Hyperdivergent_Center	Non-Hyperdivergent_Tip	350	242	0.48932	ns
0.2	swept.chr.sims	Hyperdivergent_Tip	Non-Hyperdivergent_Arm	235	618	1	ns
0.2	swept.chr.sims	Hyperdivergent_Tip	Non-Hyperdivergent_Center	235	326	0.31217	ns
0.2	swept.chr.sims	Hyperdivergent_Tip	Non-Hyperdivergent_Tip	235	242	1	ns
0.2	swept.chr.sims	Non-Hyperdivergent_Arm	Non-Hyperdivergent_Center	618	326	0.31217	ns
0.2	swept.chr.sims	Non-Hyperdivergent_Arm	Non-Hyperdivergent_Tip	618	242	1	ns
0.2	swept.chr.sims	Non-Hyperdivergent_Center	Non-Hyperdivergent_Tip	326	242	0.02386	*
0.2	unswept.chr.sims	Hyperdivergent_Arm	Hyperdivergent_Center	652	394	0.17654	ns
0.2	unswept.chr.sims	Hyperdivergent_Arm	Hyperdivergent_Tip	652	120	1.00E-05	****
0.2	unswept.chr.sims	Hyperdivergent_Arm	Non-Hyperdivergent_Arm	652	630	0.47818	ns
0.2	unswept.chr.sims	Hyperdivergent_Arm	Non-Hyperdivergent_Center	652	416	0.14027	ns
0.2	unswept.chr.sims	Hyperdivergent_Arm	Non-Hyperdivergent_Tip	652	104	0.03318	*
0.2	unswept.chr.sims	Hyperdivergent_Center	Hyperdivergent_Tip	394	120	0	****
0.2	unswept.chr.sims	Hyperdivergent_Center	Non-Hyperdivergent_Arm	394	630	0.01998	*
0.2	unswept.chr.sims	Hyperdivergent_Center	Non-Hyperdivergent_Center	394	416	0.84406	ns
0.2	unswept.chr.sims	Hyperdivergent_Center	Non-Hyperdivergent_Tip	394	104	0.00109	**
0.2	unswept.chr.sims	Hyperdivergent_Tip	Non-Hyperdivergent_Arm	120	630	0.00028	***
0.2	unswept.chr.sims	Hyperdivergent_Tip	Non-Hyperdivergent_Center	120	416	0	****
0.2	unswept.chr.sims	Hyperdivergent_Tip	Non-Hyperdivergent_Tip	120	104	0.47783	ns
0.2	unswept.chr.sims	Non-Hyperdivergent_Arm	Non-Hyperdivergent_Center	630	416	0.00892	**
0.2	unswept.chr.sims	Non-Hyperdivergent_Arm	Non-Hyperdivergent_Tip	630	104	0.14043	ns
0.2	unswept.chr.sims	Non-Hyperdivergent_Center	Non-Hyperdivergent_Tip	416	104	0.00065	***
0.5	swept.chr.sims	Hyperdivergent_Arm	Hyperdivergent_Center	626	342	2.00E-05	****
0.5	swept.chr.sims	Hyperdivergent_Arm	Hyperdivergent_Tip	626	231	1	ns
0.5	swept.chr.sims	Hyperdivergent_Arm	Non-Hyperdivergent_Arm	626	635	1	ns
0.5	swept.chr.sims	Hyperdivergent_Arm	Non-Hyperdivergent_Center	626	338	0.00027	***
0.5	swept.chr.sims	Hyperdivergent_Arm	Non-Hyperdivergent_Tip	626	225	1	ns
0.5	swept.chr.sims	Hyperdivergent_Center	Hyperdivergent_Tip	342	231	0.00403	**
0.5	swept.chr.sims	Hyperdivergent_Center	Non-Hyperdivergent_Arm	342	635	3.00E-05	****
0.5	swept.chr.sims	Hyperdivergent_Center	Non-Hyperdivergent_Center	342	338	1	ns
0.5	swept.chr.sims	Hyperdivergent_Center	Non-Hyperdivergent_Tip	342	225	0.06213	ns
0.5	swept.chr.sims	Hyperdivergent_Tip	Non-Hyperdivergent_Arm	231	635	1	ns
0.5	swept.chr.sims	Hyperdivergent_Tip	Non-Hyperdivergent_Center	231	338	0.02052	*
0.5	swept.chr.sims	Hyperdivergent_Tip	Non-Hyperdivergent_Tip	231	225	1	ns
0.5	swept.chr.sims	Non-Hyperdivergent_Arm	Non-Hyperdivergent_Center	635	338	0.00051	***
0.5	swept.chr.sims	Non-Hyperdivergent_Arm	Non-Hyperdivergent_Tip	635	225	1	ns
0.5	swept.chr.sims	Non-Hyperdivergent_Center	Non-Hyperdivergent_Tip	338	225	0.20773	ns
0.5	unswept.chr.sims	Hyperdivergent_Arm	Hyperdivergent_Center	666	405	0.01638	*
0.5	unswept.chr.sims	Hyperdivergent_Arm	Hyperdivergent_Tip	666	123	0	****
0.5	unswept.chr.sims	Hyperdivergent_Arm	Non-Hyperdivergent_Arm	666	678	1	ns
0.5	unswept.chr.sims	Hyperdivergent_Arm	Non-Hyperdivergent_Center	666	415	0.0184	*
0.5	unswept.chr.sims	Hyperdivergent_Arm	Non-Hyperdivergent_Tip	666	99	0.02587	*
0.5	unswept.chr.sims	Hyperdivergent_Center	Hyperdivergent_Tip	405	123	0.02451	*
0.5	unswept.chr.sims	Hyperdivergent_Center	Non-Hyperdivergent_Arm	405	678	0.02451	*
0.5	unswept.chr.sims	Hyperdivergent_Center	Non-Hyperdivergent_Center	405	415	1	ns
0.5	unswept.chr.sims	Hyperdivergent_Center	Non-Hyperdivergent_Tip	405	99	1	ns
0.5	unswept.chr.sims	Hyperdivergent_Tip	Non-Hyperdivergent_Arm	123	678	0	****
0.5	unswept.chr.sims	Hyperdivergent_Tip	Non-Hyperdivergent_Center	123	415	0.02222	*
0.5	unswept.chr.sims	Hyperdivergent_Tip	Non-Hyperdivergent_Tip	123	99	0.67914	ns
0.5	unswept.chr.sims	Non-Hyperdivergent_Arm	Non-Hyperdivergent_Center	678	415	0.02587	*
0.5	unswept.chr.sims	Non-Hyperdivergent_Arm	Non-Hyperdivergent_Tip	678	99	0.03264	*
0.5	unswept.chr.sims	Non-Hyperdivergent_Center	Non-Hyperdivergent_Tip	415	99	1	ns
0.8	swept.chr.sims	Hyperdivergent_Arm	Hyperdivergent_Center	623	344	1.00E-05	****
0.8	swept.chr.sims	Hyperdivergent_Arm	Hyperdivergent_Tip	623	232	1	ns
0.8	swept.chr.sims	Hyperdivergent_Arm	Non-Hyperdivergent_Arm	623	633	1	ns
0.8	swept.chr.sims	Hyperdivergent_Arm	Non-Hyperdivergent_Center	623	338	0	****
0.8	swept.chr.sims	Hyperdivergent_Arm	Non-Hyperdivergent_Tip	623	227	1	ns
0.8	swept.chr.sims	Hyperdivergent_Center	Hyperdivergent_Tip	344	232	0.00077	***
0.8	swept.chr.sims	Hyperdivergent_Center	Non-Hyperdivergent_Arm	344	633	0	****
0.8	swept.chr.sims	Hyperdivergent_Center	Non-Hyperdivergent_Center	344	338	1	ns
0.8	swept.chr.sims	Hyperdivergent_Center	Non-Hyperdivergent_Tip	344	227	0.0196	*
0.8	swept.chr.sims	Hyperdivergent_Tip	Non-Hyperdivergent_Arm	232	633	1	ns
0.8	swept.chr.sims	Hyperdivergent_Tip	Non-Hyperdivergent_Center	232	338	1.00E-04	***
0.8	swept.chr.sims	Hyperdivergent_Tip	Non-Hyperdivergent_Tip	232	227	1	ns
0.8	swept.chr.sims	Non-Hyperdivergent_Arm	Non-Hyperdivergent_Center	633	338	0	****
0.8	swept.chr.sims	Non-Hyperdivergent_Arm	Non-Hyperdivergent_Tip	633	227	0.58038	ns
0.8	swept.chr.sims	Non-Hyperdivergent_Center	Non-Hyperdivergent_Tip	338	227	0.004	**
0.8	unswept.chr.sims	Hyperdivergent_Arm	Hyperdivergent_Center	697	402	1.00E-05	****
0.8	unswept.chr.sims	Hyperdivergent_Arm	Hyperdivergent_Tip	697	98	1.00E-05	****
0.8	unswept.chr.sims	Hyperdivergent_Arm	Non-Hyperdivergent_Arm	697	694	0.82137	ns
0.8	unswept.chr.sims	Hyperdivergent_Arm	Non-Hyperdivergent_Center	697	422	0	****
0.8	unswept.chr.sims	Hyperdivergent_Arm	Non-Hyperdivergent_Tip	697	78	0.5219	ns
0.8	unswept.chr.sims	Hyperdivergent_Center	Hyperdivergent_Tip	402	98	0.28599	ns
0.8	unswept.chr.sims	Hyperdivergent_Center	Non-Hyperdivergent_Arm	402	694	0	****
0.8	unswept.chr.sims	Hyperdivergent_Center	Non-Hyperdivergent_Center	402	422	0.82137	ns
0.8	unswept.chr.sims	Hyperdivergent_Center	Non-Hyperdivergent_Tip	402	78	0.82137	ns
0.8	unswept.chr.sims	Hyperdivergent_Tip	Non-Hyperdivergent_Arm	98	694	0	****
0.8	unswept.chr.sims	Hyperdivergent_Tip	Non-Hyperdivergent_Center	98	422	0.5219	ns
0.8	unswept.chr.sims	Hyperdivergent_Tip	Non-Hyperdivergent_Tip	98	78	0.21659	ns
0.8	unswept.chr.sims	Non-Hyperdivergent_Arm	Non-Hyperdivergent_Center	694	422	0	****
0.8	unswept.chr.sims	Non-Hyperdivergent_Arm	Non-Hyperdivergent_Tip	694	78	0.20355	ns
0.8	unswept.chr.sims	Non-Hyperdivergent_Center	Non-Hyperdivergent_Tip	422	78	0.82137	ns

Supplemental Table 8: Empirical FDR of mappings as a function of whether QTL were simulated in divergent regions and different chromosomal regions

Strain Set	Simulated Divergence	Simulated Chromosome Region	Group 1	Group 2	n1	n2	Adjusted p-value	Significance
unswept.chr.sims	Hyperdivergent	Center	I	II	105	100	0.01679	*
unswept.chr.sims	Hyperdivergent	Center	II	III	100	230	0.002	**
unswept.chr.sims	Hyperdivergent	Center	III	V	230	387	0.0051	**
unswept.chr.sims	Hyperdivergent	Center	III	X	230	220	0.00646	**
unswept.chr.sims	Hyperdivergent	Tip	IV	X	89	43	0.00446	**
unswept.chr.sims	Hyperdivergent	Tip	V	X	156	43	0.00749	**
swept.chr.sims	Non-Hyperdivergent	Arm	II	V	488	233	0.04509	*

Supplemental Table 9: Power to detect simulated QTL on different chromosomes, within hyper-divergent regions, historic recombination groups, and strain sets

Strain Set	Simulated Divergence	Simulated Chromosome Region	Group 1	Group 2	n1	n2	Adjusted p-value	Significance
swept.chr.sims	Hyperdivergent	Arm	I	II	168	483	0.00007	****
swept.chr.sims	Hyperdivergent	Arm	I	III	168	359	0.00001	****
swept.chr.sims	Hyperdivergent	Arm	I	IV	168	360	0.00006	****
swept.chr.sims	Hyperdivergent	Arm	I	V	168	236	0.00002	****
swept.chr.sims	Hyperdivergent	Arm	I	X	168	247	0	****
swept.chr.sims	Hyperdivergent	Arm	II	X	483	247	0.00054	***
swept.chr.sims	Hyperdivergent	Arm	III	X	359	247	0.01327	*
swept.chr.sims	Hyperdivergent	Arm	IV	X	360	247	0.00343	**
unswept.chr.sims	Hyperdivergent	Arm	III	X	343	269	0.03806	*
unswept.chr.sims	Hyperdivergent	Center	I	II	102	99	0.00015	***
unswept.chr.sims	Hyperdivergent	Center	I	III	102	221	0	****
unswept.chr.sims	Hyperdivergent	Center	I	V	102	383	0	****
unswept.chr.sims	Hyperdivergent	Center	I	X	102	216	0.00015	***
unswept.chr.sims	Hyperdivergent	Center	III	IV	221	180	0.0002	***
unswept.chr.sims	Hyperdivergent	Center	IV	V	180	383	0.00085	***
swept.chr.sims	Hyperdivergent	Tip	III	IV	24	183	0.00191	**
swept.chr.sims	Hyperdivergent	Tip	III	V	24	303	0.00099	***
swept.chr.sims	Hyperdivergent	Tip	III	X	24	145	0.00002	****
unswept.chr.sims	Hyperdivergent	Tip	I	V	27	156	0.00523	**
unswept.chr.sims	Hyperdivergent	Tip	III	V	14	156	0.01308	*
swept.chr.sims	Non-Hyperdivergent	Arm	I	II	190	488	0.02112	*
swept.chr.sims	Non-Hyperdivergent	Arm	I	III	190	374	0.00002	****
swept.chr.sims	Non-Hyperdivergent	Arm	I	IV	190	376	0.00001	****
swept.chr.sims	Non-Hyperdivergent	Arm	I	V	190	232	0.00731	**
swept.chr.sims	Non-Hyperdivergent	Arm	I	X	190	226	0	****
swept.chr.sims	Non-Hyperdivergent	Arm	II	X	488	226	0.00004	****
swept.chr.sims	Non-Hyperdivergent	Arm	V	X	232	226	0.01199	*
unswept.chr.sims	Non-Hyperdivergent	Arm	I	V	408	404	0.04823	*
unswept.chr.sims	Non-Hyperdivergent	Arm	IV	V	289	404	0.04823	*
swept.chr.sims	Non-Hyperdivergent	Center	I	IV	15	114	0.04399	*
swept.chr.sims	Non-Hyperdivergent	Center	I	X	15	321	0.01193	*
swept.chr.sims	Non-Hyperdivergent	Center	II	X	216	321	0.00542	**
swept.chr.sims	Non-Hyperdivergent	Center	III	X	155	321	0.00028	***
unswept.chr.sims	Non-Hyperdivergent	Center	I	III	157	237	0.00608	**
unswept.chr.sims	Non-Hyperdivergent	Center	I	V	157	364	0.00018	***
unswept.chr.sims	Non-Hyperdivergent	Center	III	X	237	185	0.00703	**
unswept.chr.sims	Non-Hyperdivergent	Center	IV	V	199	364	0.02493	*
unswept.chr.sims	Non-Hyperdivergent	Center	V	X	364	185	0.00018	***
swept.chr.sims	Non-Hyperdivergent	Tip	I	III	15	24	0.02849	*
swept.chr.sims	Non-Hyperdivergent	Tip	II	III	63	24	0.00959	**
swept.chr.sims	Non-Hyperdivergent	Tip	III	IV	24	176	0.02297	*
swept.chr.sims	Non-Hyperdivergent	Tip	III	X	24	99	0.02148	*

Supplemental Table 10: Empirical FDR of mappings as a function of whether QTL were simulated on different chromosomes, within hyper-divergent regions, historic recombination groups, and strain sets