Table S5

In the following tables, the second and third column contain the percentage of the 5000 traits for which the corresponding heritability estimates ($\hat{h}_r^2$ and $\hat{h}_m^2$) were contained in the intervals in the first column. The remaining columns show the correlation (r) between simulated and predicted genetic effects, averaged over these traits. 20 QTLs were simulated, which explained 50 percent of the genetic variance. Each trait was simulated for a randomly drawn training (200 accessions) and validation set (50 accessions). Genetic effects were predicted using G-BLUP, based on either a mixed model for the individual plants (replicates) or for the genotypic means.

Table S5(a) : **Prediction accuracy (r) of G-BLUP for** 5000 **simulated traits, for the structured regmap population, and a simulated heritability of** 0.2.

interval	$\hat{h}_r^2$	$\hat{h}_m^2$	r (replicates) Training set	r (means) Training set	r (replicates) Validation set	r (means) Validation set
$[0, 0.1)$	3.08 %	9.88 %	0.637	0.654	0.216	0.218
$[0.1, 0.3)$	93.96 %	76.38 %	0.770	0.770	0.280	0.279
$[0.3, 0.5)$	2.96 %	13.52 %	0.816	0.803	0.325	0.313
$[0.5, 0.7)$	0 %	0.22 %		0.782		0.287
$[0.7, 0.9)$	0 %	0 %				
$[0.9, 1]$	0 %	0 %				
$[0, 1]$	100 %	100 %	0.767	0.763	0.279	0.278

Table S5(b) : **Prediction accuracy (r) of G-BLUP for** 5000 **simulated traits, for the structured regmap population and a simulated heritability of** 0.5.

interval	$\hat{h}_r^2$	$\hat{h}_m^2$	r (replicates) Training set	r (means) Training set	r (replicates) Validation set	r (means) Validation set
$[0, 0.1)$	0 %	0.04 %		0.709		0.328
$[0.1, 0.3)$	0 %	5.24 %		0.836		0.269
$[0.3, 0.5)$	51.42 %	46.54 %	0.886	0.887	0.302	0.300
$[0.5, 0.7)$	48.58 %	42.12 %	0.905	0.903	0.333	0.337
$[0.7, 0.9)$	0 %	5.84 %		0.905		0.343
$[0.9, 1]$	0 %	0.22 %		0.888		0.386
$[0, 1]$	100 %	100 %	0.895	0.892	0.317	0.317

Table S5(c) : **Prediction accuracy (r) of G-BLUP for** 5000 **simulated traits, for the structured regmap population and a simulated heritability of** 0.8.

interval	$\hat{h}_r^2$	$\hat{h}_m^2$	r (replicates) Training set	r (means) Training set	r (replicates) Validation set	r (means) Validation set
$[0, 0.1)$	0 %	0 %				
$[0.1, 0.3)$	0 %	0.02 %		0.877		0.299
$[0.3, 0.5)$	0 %	1.42 %		0.930		0.283
$[0.5, 0.7)$	0.04 %	19.26 %	0.953	0.955	0.400	0.318
$[0.7, 0.9)$	99.96 %	59.26 %	0.964	0.964	0.343	0.344
$[0.9, 1]$	0 %	20.04 %		0.965		0.365
$[0, 1]$	100 %	100 %	0.964	0.962	0.343	0.343

Table S5(d) : **Prediction accuracy (r) of G-BLUP for 5000 simulated traits, for the HapMap population and a simulated heritability of** 0.2.

interval	$\hat{h}_r^2$	$\hat{h}_m^2$	r (replicates) Training set	r (means) Training set	r (replicates) Validation set	r (means) Validation set
$[0, 0.1)$	1.74 %	28.64 %	0.616	0.632	0.259	0.273
$[0.1, 0.3)$	96.7 %	40.7 %	0.673	0.674	0.341	0.348
$[0.3, 0.5)$	1.56 %	17.8 %	0.711	0.684	0.364	0.382
$[0.5, 0.7)$	0 %	5.8 %		0.681		0.366
$[0.7, 0.9)$	0 %	2.84 %		0.675		0.370
$[0.9, 1]$	0 %	4.22 %		0.669		0.357
$[0, 1]$	100 %	100 %	0.672	0.664	0.340	0.335

Table S5(e) : **Prediction accuracy (r) of G-BLUP for 5000 simulated traits, for the HapMap population and a simulated heritability of** 0.5.

interval	$\hat{h}_r^2$	$\hat{h}_m^2$	r (replicates) Training set	r (means) Training set	r (replicates) Validation set	r (means) Validation set
$[0, 0.1)$	0 %	6 %		0.811		0.285
$[0.1, 0.3)$	0 %	21.02 %		0.851		0.366
$[0.3, 0.5)$	51.78 %	22.56 %	0.862	0.867	0.395	0.413
$[0.5, 0.7)$	48.22 %	17.5 %	0.877	0.871	0.416	0.428
$[0.7, 0.9)$	0 %	10.86 %		0.873		0.426
$[0.9, 1]$	0 %	22.06 %		0.871		0.422
$[0, 1]$	100 %	100 %	0.869	0.863	0.405	0.401

Table S5(f) (given as Table 6 in the main text) : **Prediction accuracy (r) of G-BLUP for 5000 simulated traits, for the HapMap population and a simulated heritability of** 0.8.

interval	$\hat{h}_r^2$	$\hat{h}_m^2$	r (replicates) Training set	r (means) Training set	r (replicates) Validation set	r (means) Validation set
$[0, 0.1)$	0 %	2.58 %		0.890		0.289
$[0.1, 0.3)$	0 %	8.34 %		0.937		0.373
$[0.3, 0.5)$	0 %	12.34 %		0.954		0.409
$[0.5, 0.7)$	0.04 %	15.9 %	0.942	0.959	0.208	0.423
$[0.7, 0.9)$	99.96 %	15.62 %	0.961	0.961	0.431	0.443
$[0.9, 1]$	0 %	45.22 %		0.961		0.448
$[0, 1]$	100 %	100 %	0.961	0.956	0.431	0.428