Table S1 Characterization of the four scenarios analyzed in this study to assess the contributions of (i) pedigree relationships among individuals in the training set (*TS*) and recurrent selection candidates (*RSC*) captured by SNPs, (ii) co-segregation of QTL and SNPs, and (iii) ancestral linkage disequilibrium (LD_A) between QTL and SNPs to persistency of prediction accuracy $r_{g,\hat{g}}$ and cumulative genetic gain $\sum \Delta G$ in synthetics. Note that pairs of SNP markers and pairs of QTL were always allowed to be in LD_A.

Scenario	TS and RSC are	QTL and SNPs in	Relationship matrix calculated from	Type
$Re-LD_A-SNP$	Related ($P_{TS} = P_{RSC}$)	LD_A	SNPs	Realistic
$Re-LD_A-Ped$		LD_A	Pedigree records	Realistic
$Re-LE_A-SNP$		LE_A	SNPs	Artificial
$Un-LD_A-SNP$	Unrelated ($P_{TS} \cap P_{RSC} = \emptyset$)	LD_A	SNPs	Realistic