



**Fig S5. Cartoon showing how selection can be implemented in SBVB.** Starting with an initial pedigree, SBVB generates phenotype and marker information, together with a file containing haplotype information of individuals in current pedigree. This file contains only recombination breakpoints and founder ids of that block. The user needs to provide an external tool to evaluate the individuals; once individuals are selected, a new generation pedigree that contains only the offspring of the selected candidates is appended to current pedigree. In a new call to SBVB, the software reads available haplotype information for older individuals and generates marker and phenotype data only for the new offspring, conditional on extant haplotypes.