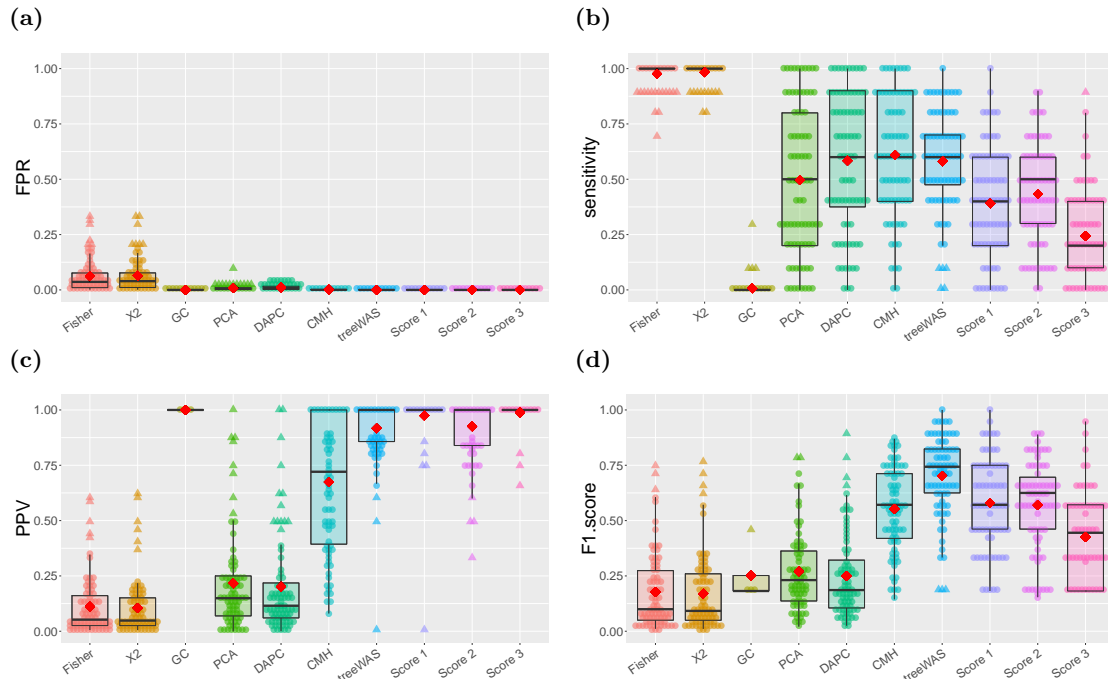
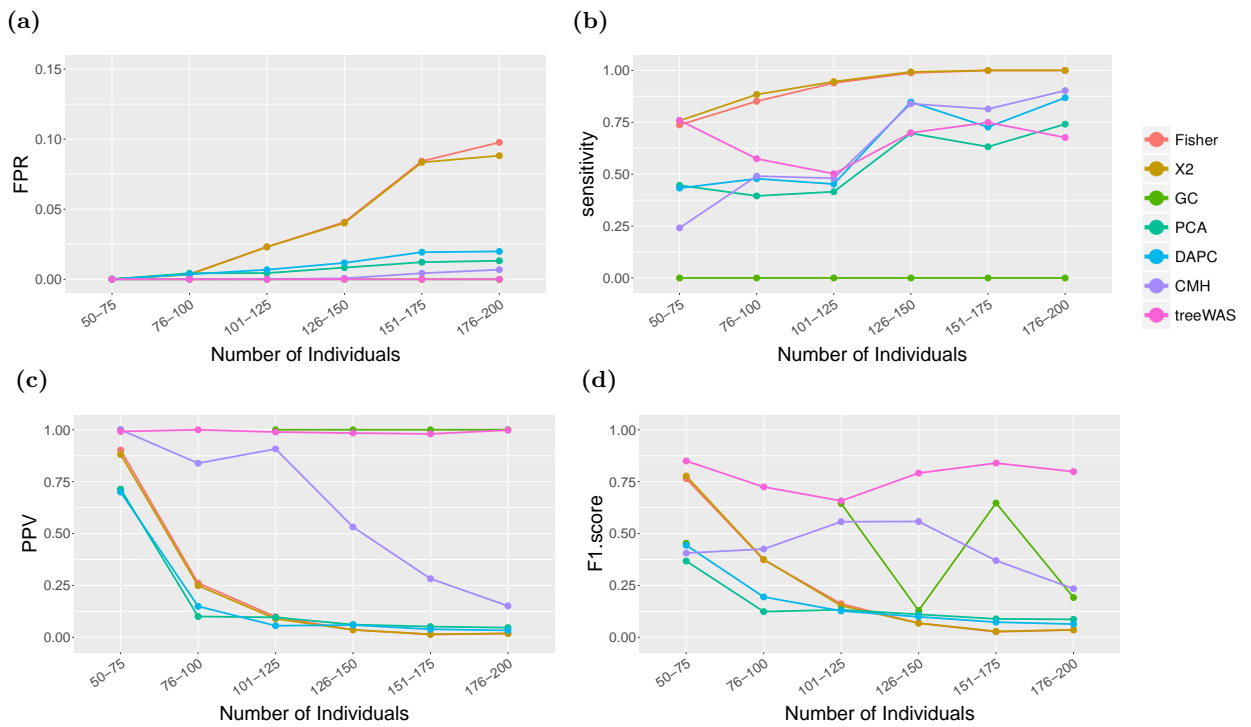


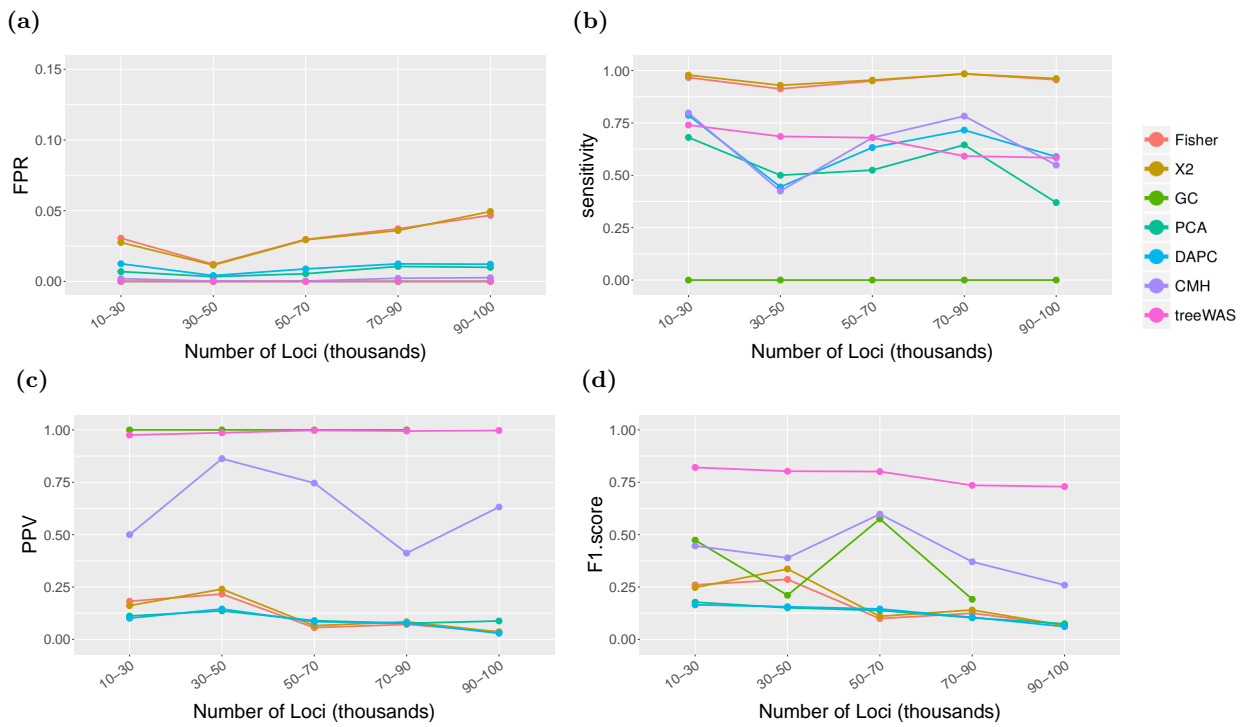
## S9 Appendix. Simulation Set C (variable size).



**Performance by association test (Set C, accessory genome).** Each association testing method was applied to a set of simulated datasets containing 100 individuals and 5,000 genetic loci, a size typical of gene presence-or-absence data ( $N = 80$ ). Datasets were simulated with a relatively high level of recombination,  $R = 0.2$ , so that performance could be examined under conditions of frequent gain and loss of genetic elements.



**Performance by number of individuals (Set C).** Each association testing method was applied to datasets simulated across a range of sizes, ranging the number of individuals from 50 to 200 and the number of loci from 10,000 to 100,000 ( $N = 80$ ). All simulated datasets in this figure were generated with  $R = 0.01$ . Here, the interquartile mean performance of each association testing method is presented by number of individuals.



**Performance by number of genetic loci (Set C).** Each association testing method was applied to datasets simulated across a range of sizes, ranging the number of individuals from 50 to 200 and the number of loci from 10,000 to 100,000 ( $N = 80$ ). All simulated datasets in this figure were generated with  $R = 0.01$ . Here, the interquartile mean performance of each association testing method is presented by number of genetic loci.