Table S1 False positive rates using two calibration methods

	False positive rate (KLD)					
	Using McCulloch's (1989) calibration			Using pseudo-observed data		
Dataset	α = 5%	α = 1%	α = 0.1%	α = 5%	α = 1%	α = 0.1%
12	0.002 (1.164)	0.000 (1.959)	0.000 (3.108)	2.764 (0.011)	0.374 (0.045)	0.026 (0.211)
13	0.000 (1.164)	0.000 (1.959)	0.000 (3.108)	1.226 (0.016)	0.076 (0.076)	0.004 (0.349)
14	0.016 (1.164)	0.010 (1.959)	0.002 (3.108)	3.308 (0.035)	0.514 (0.174)	0.048 (0.801)
15	0.008 (1.164)	0.000 (1.959)	0.000 (3.108)	1.880 (0.091)	0.164 (0.434)	0.002 (1.520)
16	0.068 (1.164)	0.008 (1.959)	0.000 (3.108)	1.722 (0.247)	0.194 (0.853)	0.008 (2.019)
17	0.140 (1.164)	0.020 (1.959)	0.000 (3.108)	1.712 (0.374)	0.186 (1.047)	0.022 (1.942)
18	0.182 (1.164)	0.010 (1.959)	0.000 (3.108)	1.478 (0.521)	0.178 (1.179)	0.010 (1.948)

SelEstim analyses of datasets 12–18. Left-hand side: proportion (%) of markers that were classified as outliers, using the threshold KLD = 1.164, 1.959 and 3.108, which equal the KLD between two Bernoulli distributions corresponding to flipping a fair coin and a biased coin that gives a head with probability 0.05, 0.01 and 0.001, respectively. Right-hand side: proportion (%) of markers that were classified as outliers, using the calibration based on pseudo-observed data (pod). For each dataset and each analysis, a rejection sampling algorithm (see File S2) is used to generate a pod from the joint posterior distribution of the model parameters. The quantiles of the KLD distribution from the pod analysis are then used to calibrate the KLD: the (1 - α)%-quantile of the KLD distribution from the pod analysis provides a α%-threshold KLD value, which is then used for model choice between selection and neutrality.