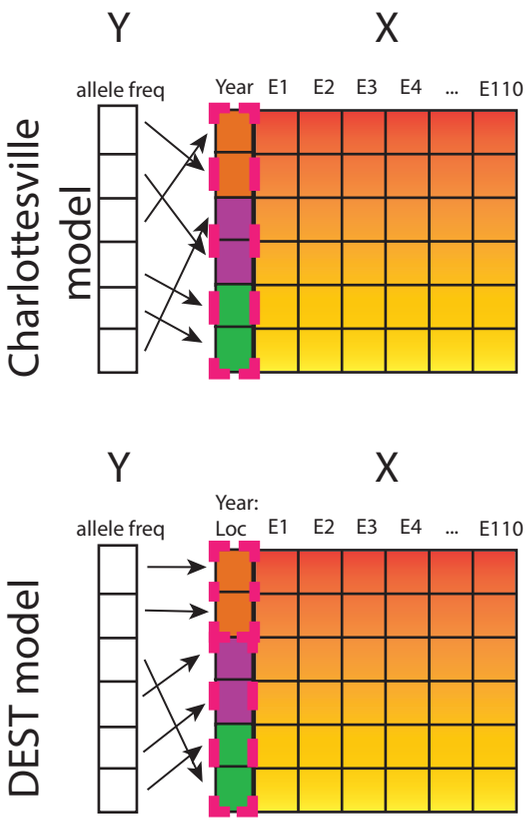
Old version



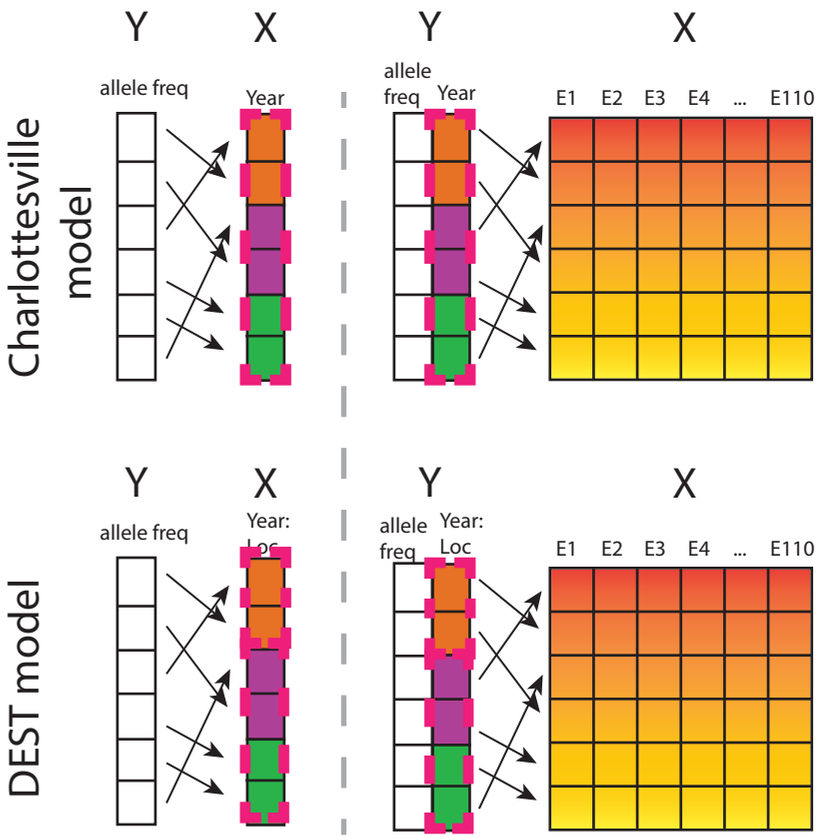
Real data:
- M0: y ~ 1
- M1.r: y ~ year
- M2.r: y ~ year + env

Permutations:
- M0: y ~ 1
- M1.p : y ~ yearPerm
- M2.p: y ~ yearPerm + envPerm

SNP p-value from Likelihood Ratio Test:
- M2.r vs M1.r
- M1.r vs M0.r
- M2.p vs M1.p
- M1.p vs M0.p

SNP Model selection (Lowest AIC:
- Real data: (M0, M1.r, M2.r{1-110})
- Perm: (M0, M1.p, M2.p{1-110})

New Version



Real data:
- M0.r : y ~ 1
- M1.r : y ~ year

Permutations:
- M0.p : y ~ 1
- M1.p : y ~ yearPerm

SNP p-value from LRT:
- M1.r vs M0.r
- M1.p vs M0.p

Real data:
- M1.r : y ~ year
- M2.r: y ~ year + env

Permutations:

M2.p: y ~ year + envPerm

SNP p-value from LRT:
- M2.r vs M1.r
- M2.p vs M1.r

SNP Model selection (Lowest AIC):
- Real data: (M0, M1.r, M2.r{1-110})
- Permtuation: Stage 1: (M0, M1.p),
  Stage 2: (M1.r, M2.p{1-110})

Figure legend: Each cartoon represents a single SNP (Y) as a vector of allele frequencies. The X variables are the Year (or Year:Loc) term, and the environmental variables 1-110. Only one environmental term was used for any model (e.g., M1.p or M2.p). For the Year or Year:Loc term, depicted above, identical years are represented by the same color and identical localities by the dashed line. For instance in the DEST model panels, there are two localities depicted. One locality has two samples collected in one year and the other locality has four samples collected over two years. In the New version, permutations happen in two stages. In the first stage, the Year (or Year:Locality) term is permuted and tested against the null model. Populations can be assigned to any new Year or (Year:Locality) value. In the second stage, the Year (or Year:Locality) term is the real value for that sample, and only the environmental values are permuted. During the environmental permutation, a sample can take any environmental value.