Purpose:

Apply concepts of Disequilibrium at single and pairs of loci.

Keywords:

Disequilibrium, Gametic Disequilibrium, Linkage Disequilibrium

References:

Chapter 2: Linkage

Bernardo Chapter 2

ALA: Application of disequilibrium at a locus or pair of loci

Consider a set of 105 Sorghum R lines in a hybrid breeding program. These lines were assayed with DaRT markers, M1 and M2. The DaRT assay is a dominant marker system in which the allele is either present or absent. For the following data set determine if alleles at two loci are in equilibrium. If the alleles are not in equilibrium, estimate the disequilibrium values for the pair of loci.

Assay	Observed
M1M2	66
M1m2	11
M1M2	10
M1m2	18
Total	

a. What is the expected number under the assumption that the loci are segregating independently? What are the observed? Hint: first you need to estimate the frequencies of each allele.

b. Next decide if the alleles are in coupling or repulsion phase. Hint what is the expected frequency of m1m2, if in coupling phase?

c. Estimate the recombination frequency between the two loci, conditional on the coupling phase.

d. Estimate the joint disequilibrium Dm1m2. Hint: you must first prove that there is no disequilibrium at individual loci, i.e., Dm1 and Dm2 = 0.