**HARDY-WEINBERG PROBLEM SET**

1. If q=0.2 and there are Hardy-Weinberg proportions, what is the most common genotype and what is its frequency? What is the least frequent genotype and its frequency?
2. Kelus (cited in Mourant et al., 1976) reports a study of 3100 Poles, of which 1101 were *MM*, 1496 were *MN* and 503 were *NN*. Calculate the allele frequencies of *M* and *N* (and) the expected numbers of the three genotypic classes.
3. Among African-Americans, the frequency of sickle-cell anemia (which is a homozygous recessive condition) is about 0.0036. What is the frequency of heterozygotes? When one African-American marries another, what is the probability that BOTH will be heterozygotes? If both are heterozygotes, what is the probability that their first child will have sickle-cell anemia?
4. If the frequency of the "green" form of red-green color blindness (due to an X-linked locus) is 5 percent among males, what fraction of females would be affected? What fraction of females would be heterozygous?
5. If mating is at random and red-green color blindness (which is sex/X linked) does not affect survival or fertility, what should be the proportion of color-blind women in a population at (Hardy-Weinberg) equilibrium in which 8 per cent of the men are color blind?
6. In Zurich, Switzerland, the allele frequencies of IA, IB, and IO are 0.27, 0.06, and 0.67, respectively. What are the expected frequencies of blood types A, B, AB, and O?
7. Levy and Levin (1975) used electrophoresis to study the phosphoglucose isomerase-2 locus in the evening primrose *Oenothera biennis*. They observed two alleles affecting electrophoretic mobility of the enzyme, PGI-2a and PGI-2b. In 57 strains, they observed 35 PGI-2a/PGI-2a, 19 PGI-2a/PGI-2b, and 3 PGI-2b/PGI-2b. . . Calculate the expected numbers of the three genotypes . . . assuming that the genotypes occur in Hardy-Weinberg proportions.
8. In our starting population, the frequencies of genotypes do not conform to Hardy-Weinberg: 60% of the plants are AA and 40% of the plants are Aa (at this point, there are no white flowers). Assuming that all conditions for the Hardy-Weinberg theorem are met, prove that genotypes will reach equilibrium in the next generation.