Hardy-Weinberg Lab

Genetic Traits of LHS

- Complete poster using the criteria on the rubric

Population Genetics and Evolution

Case 1:

1. What does the Hardy-Weinberg equation predict for the new p and q?
2. Did the results you obtained in this simulation agree with your prediction? If not, why?
3. Which of the 5 conditions were not strictly followed in this simulation?
4. Explain the purpose of this simulation in terms of Hardy-Weinberg equilibrium and the equation.

Case 2:

1. How do the new frequencies of p and q compare to the initial frequencies?
2. Which of the 5 conditions were not strictly followed in this simulation?
3. Predict what would happen to the frequencies of p and q if you simulated another 5 generations?
4. In a large population would it be possible to completely eliminate a deleterious recessive allele? Explain
5. Explain the purpose of this simulation in terms of Hardy-Weinberg equilibrium and the equation. Also include why the homozygous recessive trait was lethal

Case 3:

1. Explain how the changes in p and q frequencies in Case 3 compare with Case 1 and 2.
2. What is the importance of heterozygotes (the heterozygote advantage) in maintaining genetic variation in populations?
3. Explain the purpose of this simulation in terms of Hardy-Weinberg equilibrium and the equation. Also include why the homozygous dominant trait could have been lethal.
4. Overall, what did you learn from this lab about how populations evolve? (Summary statement)

Hardy-Weinberg Problems

1. In Drosophila the allele for normal-length wings is dominant over the allele for vestigial wings (vestigial wings are stubby little curls that cannot be used for flight). In a population of 1,000 individuals, 360 show the recessive phenotype. How many individuals would you expect to be homozygous dominant and heterozygous for this trait?

2. The allele for unattached earlobes is dominant over the allele for attached earlobes. In a population of 500 individuals, 25% show the recessive phenotype. How many individuals would you expect to be homozygous dominant and heterozygous for this trait?

3. The allele for the hair pattern called “widow’s peak” is dominant over the allele for no “widow’s peak”. In a population of 1,000 individuals, 510 show the dominant phenotype. How many individuals would you expect of each of the possible three genotypes for this trait?

4. In the United States about 16% of the population is Rh negative. The allele for Rh negative is recessive to the allele for Rh positive. If the student population of a high school in the U.S. is 2,000, how many students would you expect for each of the three possible genotypes?

5. In certain African countries 4% of the newborn babies have sickle-cell anemia, which is a recessive trait. Out of a random population of 1,000 newborn babies, how many would you expect for each of the three possible genotypes?

6. In a certain population, the dominant phenotype of a certain trait occurs 91% of the time. What is the frequency of the dominant allele?