**Multiple choice questions:**

You are examining a population of snails in Mendon Ponds. You notice some are dark brown and some are grey, the brown color is dominant to the gray color. The allele frequencies are p=0.7, q=0.3.

If you sampled 300 individuals from the pond, how many would be brown?

1. 27
2. 126
3. 147
4. 273

You are surveying population genetics of snails while studying abroad in New Zealand. At your locus of interest, you have AA: 32 Aa:45 aa: 23. Assuming HWE, which of the following statements is true when you go back to survey the population the *next year*?

1. The frequency of the a allele would be 0.545.
2. If you surveyed 100 snails you would expect 30 snails to be AA.
3. The genotype frequency of heterozygotes would be 0.45.
4. Homozygous recessive genotypic frequencies would be the same as last year.

**Short answer questions:**

You are examining Widow’s peak in our class. It is controlled by a single locus and exhibits dominant inheritance. The allele frequency for the dominant allele in our class is p=0.16.

What is the fraction of our class that will not have a Widow’s peak?

**Longer short answer questions:**

|  |  |
| --- | --- |
| Genotype | Count |
| LL | 165 |
| Ll | 60 |
| ll | 25 |

You are investigating a wild population of *Heliconia spp.* (flower) in Costa Rica. The length of the nectary (L\_: long, ll: short) correlates with the length of the beak of the hummingbird pollinator. A new hummingbird species has moved into the area, and their beaks are much shorter than the resident pollinators. **Given your survey results to the right, do you think evolution has occurred at this locus in this population of plants?**

a. Allele frequencies of your population: fL: \_\_\_\_\_\_\_\_\_ fl: \_\_\_\_\_\_\_\_\_

b. Expected genotype frequencies: LL: \_\_\_\_\_\_\_\_\_ Ll: \_\_\_\_\_\_\_\_\_ ll: \_\_\_\_\_\_\_\_\_

c. Expected genotype counts (out of 250): LL: \_\_\_\_\_\_\_\_\_ Ll: \_\_\_\_\_\_\_\_\_ ll: \_\_\_\_\_\_\_\_\_

d. Chi-square value: \_\_\_\_\_\_\_\_\_ d.f.=n-1-1

e. Conclusion: With respect to this locus, the population is considered to be…. (circle one)

**in Hardy-Weinberg Equilibrium (HWE), not in Hardy-Weinberg Equilibrium (HWE),**

and therefore, evolution is… (circle one)

**likely not occurring at this locus. likely is occurring at this locus.**

f. Justify your answer to part e.:

**Chi-square table (**[**http://ib.bioninja.com.au/higher-level/topic-10-genetics-and-evolu/102-inheritance/chi-squared-table.html**](http://ib.bioninja.com.au/higher-level/topic-10-genetics-and-evolu/102-inheritance/chi-squared-table.html)**)**

