LAST NAME, FIRST NAME ___Sam, Y_____ TA NAME __Ronny Fisher_____

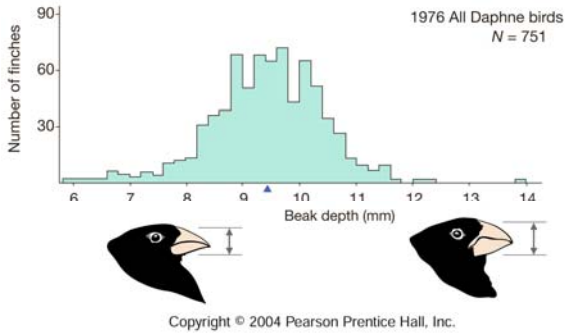
BIOL 354 FOUNDATIONS IN EVOLUTION AND SYSTEMATICS

Quiz 1

11 January 2006

Answer all questions completely but succinctly. Complete sentences are not necessary.

1. One of Darwin's postulates is being tested in the graph on the right. Write this postulate below. (1pt)



phenotypic variation exists in the population

2. Suppose that you are starting a long-term study of a population of annual, flowering plants isolated on a small island. Reading some recent papers has convinced you that global warming is real and will lead to significant, long-term changes in the amount of rain the island receives. Outline observations and experiments you would need to do in order to document whether natural selection occurs in your study population over the course of your research. (2pt)

Lots of options here, as long as Darwin's postulates are satisfied. For instance: Is there variation among the plants in root mass, which may be important for water uptake? Measure root mass (perhaps as a ratio to shoot mass) and look for differences among plants. Is any of this variation heritable? See if the parent-offspring regression for root mass (or root:shoot mass ratio) has a significantly positive slope. Is there variation in fitness? Measure seed production and look for differences among plants. Is variation in seed production (fitness) correlated with variation in root mass? Prediction: plants with high root mass will have higher fitness (greater seed production) than the average plant in dry years. The seeds produced in dry years will grow into plants that have, on average, higher root mass than the previous generation. That's evolution!

3. What traits would you measure, and why? (1pt)

Any trait that might have a *functional* connection with water uptake or use – root mass, leaf thickness, stomatal density, concentration of solutes in the leaves, leaf hairiness …