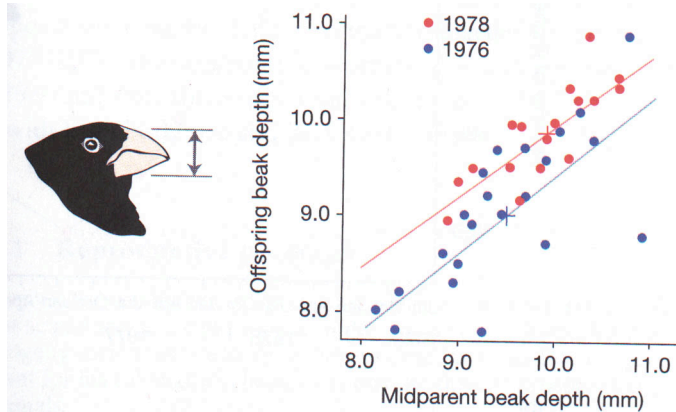


Quiz 1

1. Explain why Darwin needed a concept of “struggle for existence” for his mechanism of natural selection. What types of arguments/examples did he use to convince his readers that there was such a struggle? (20 pts.)
2. Examine the figure below from your textbook.



- a. The two lines are referred to as “best fit” relationships between x and y variables, given each set of points. Explain **in words** what is meant by a “best-fit” line in a regression analysis. (10 pts.)
 - b. What is the biological significance of the slope of the lines for the two data sets? (10 pts.)
 - c. Notice that the intercepts appear to be different for the 1976 and 1978 lines. How can you explain this difference? (Remember that the finch population experienced a drought in 1977) (10 pts.)
3. Describe the possible outcomes for evolutionary changes in genes following gene duplication events. In your answer, make it clear how evolutionary geneticists distinguish between these outcomes. (20 pts.)

4. A population geneticist studying a natural population of a beetle species has discovered variation in the exoskeleton structure. In a survey, she finds a 3:1 ratio of dull to shiny exoskeletons. Assuming that this phenotypic variation is caused by two alleles at a single locus, can the geneticist conclude that the *dull* allele is dominant to the shiny allele. Explain your answer. (20 pts.)

5. Explain in words why it takes a deleterious recessive allele a very long time to be eliminated by selection from a large population. (10 pts.)