

### Biology 354 – Discussion Section 3

These exercises are to give you practice at analyzing data, determining the pattern of selection on traits, and interpreting those patterns. Two data sets are provided – you can pick the one you prefer to analyze. You are asked to make some plots (in Excel, or another package if you prefer). Then you are asked to answer some questions.

As always, your answers must be printed, handed in at the beginning of lab, and with your name (Last name, first name) at the top of the page.

#### 1. Selection on human birth weight

download “humanBirthWeight.xls”.

This table shows birth weights of babies born in London between 1935 to 1946, divided into half-pound intervals, and the percentage of babies that died early in life.

Using an Excel command, fill in the column  $\log(\% \text{mortality})$ . (C2 should = 1.8).

Plot a chart of % mortality (on vertical axis) vs. Birth\_weight

Plot  $\log(\% \text{mortality})$  vs. Birth\_weight

hand in your plots and answer the following questions (< 1 page total):

Q: what type of selection is apparent? (name it)

Q: is %mortality or  $\log(\% \text{mortality})$  more informative? Why?

Q: What factor(s) might be responsible for high mortality of certain size categories?

Q: Given the above fitness patterns, what do you think the average size of infants is?

Q: What do you think the “fitness curve” look like for data for a developed country from **recent decades**? Would the pattern of selection be the same, stronger, or weaker? Briefly justify your answer.

#### 2. Selection on coloration of male birds

download BirdColorSelection.xls

**Age** = age of male birds (either 1<sup>st</sup> year or older than 1 year)

**Color** = an index of bright coloration (range 16 – 35). For example 16 = dull, 28 = intermediate, 35 = bright

**N paired & N unpaired** = number of males *of a given age and color combination* that had a mate, or not. Note that for some age and color combinations, there were no birds (thus “0” in the table).

**% mated** = using an Excel command, compute the percentage of males of a given age and color combination that were mated. As above, some combinations of age and color had no birds at all, so “% mated” is not defined for these categories.

Q: how do young and old males compare in intensity of coloration? Compute average “color index” score for young and old males.

Q: what % of young and of old males were mated? Does youth and vigor outwit age and experience?

Q: plot % mated vs. the color index for young and then for old males

Q: what is the type of selection on young males?

Q: Speculate on what might account for the pattern of selection found for young males.