

Instructions: Test assumptions, and then compute the most appropriate statistical model to match each study. Present your R output, including any "Call:" model description that comes with "summary()". Also be sure to explain the results in your own words. Graphs are expected, especially for the model validation step.

1. [3 pts] Medley and Clements (1998 – see dataset called Medley.txt) studied the effects of zinc pollution on diatom diversity in various Rocky Mountain rivers. Zinc is a heavy metal that pollutes waters as a result of mining. Zinc levels were categorized as background (BACK), low, medium, and high. And different rivers have different levels of other complicating factors. Did zinc pollution levels reduce species diversity, after accounting for the potential effects of being in different rivers?. Present your R output, and briefly discuss the statistical and biological meaning of your findings (3 points).
2. [3 pts] Swearingen and Holt (1976 – see dataset called barley.txt) performed an experiment with 4 different varieties of barley to determine whether significant variation in yields existed among the varieties. barley was planted in random plots that were organized in blocks, where each block contained one replicate of each variety. Use a randomized-block ANOVA to test their hypothesis, present your results in a standard analysis of variance table, and discuss the statistical and biological meaning of your findings (3 points).
3. [4 pts] A study was conducted (possum.txt) to test the hypothesis that opossums that had invaded urban Victoria (British Columbia) were larger than opossums from other locations in their native range (e.g., SE US, and other locations). Let's focus on *both* skull width (skullW) and total length (totalL) as standard measures of size. After accounting for sex and age, are Victoria's opossums bigger than those elsewhere?