STATISTICAL METHODS II
ASSIGNMENT 05
DUE: 15 FEBRUARY 2011

This homework assignment deals with problems concerning comparing means of multiple groups using more than one predictor variable and with making predictions using your model. Please make sure you read the questions thoroughly and think about them *before* you begin your answer. The question uses pseudo-data, data that I created from my computer. As always, you will need to use `R` to answer it. Download the data from the web site (or link to them in your script). The filenames are given in the individual problems.

Your answers to the questions must be nicely typed. The answer should be *several* paragraphs in length and should follow the same pattern in what information is included.

- State the problem.
- State the null and alternative hypotheses in words.
- State the test you will use, its assumptions, and why you chose this test.
- In your answer, include the value of the test statistic, the degrees of freedom (if applicable), and the calculated p-value.
- Clearly draw the appropriate conclusion.

Think of this as a report to your client. As such, this assignment also has you create reports that look better—presentation counts more here than previously.

When you hand in this assignment, attach your `R` script to the back of the pages as an appendix. The graphs need to be woven in your narrative; that is, meaningfully refer to them in the text, explain what the graph tells us, and number the graphs. You can still include them all at the end of the homework if you wish, or you can put them in the body of your assignment.

If you have any questions or issues, let me know as soon as possible.

Good luck!

Problem [[10]]

My client, with our suggestions, re-ran the wheat experiment. He made two changes. First, he switched to a different species of wheat, *Triticum polonicum*. Second, he arranged the fertilizer and the distance to the road so that each fertilizer type was represented on each strip of land (Strip A is closest to the road, while Strip C is farthest). The goal is the same, to determine if there is a fertilizer effect on the height of the *Triticum polonicum* plants.

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In answering this question, I want the following integrated into your report (in addition to the things from the front page):

- Boxplots of height vs. fertilizer; height v. strip; and height vs. strip and fertilizer. These boxplots need to look good and be properly labelled.
- Determination of the correct test to use, including an explanation of the assumption tests you had to run (and their results) to determine the usability of that test.
- Determination if there is an interaction effect of strip *and* fertilizer.
- The level of effect of each fertilizer and of each strip on the height of *Triticum polonicum* plants.
- A prediction of how much the height of a *Triticum polonicum* plant will change if it is planted in Strip C and fertilized with N18-P51-K20 instead of being planted in Strip A and fertilized with N18-P18-K18.