

HOMEWORK #11

DUE NOV 17

Using the carrots.txt data set on the course web site:

Six carrot plants (ID 1-6) were grown from seed hydroponically, with fertilizer. Another six carrot plants were grown identically but without fertilizer (controls, total $N = 12$). Roots of each plant were measured (cm) for length every two weeks for 10 weeks (thus $12 \times 5 = 60$ rows of data), when the experiment ended.

1. Analyze this simple repeated-measures experiment and tell us: [3 pts]
 - a) Did fertilizer clearly increase carrot root length?
 - b) If so, *how much* did fertilizer increase carrot root length after accounting for repeated measures?
 - c) Show us that model assumptions were OK.
2. Now analyze the carrot experiment (*incorrectly!*) as if every week's measurements were independent samples of different plants (i.e., pretend this was not a repeated-measures analysis). How would your answers to #1 above change? Why the difference? [2 pts]

Using the farms.txt data set on the course web site:

Soil nitrogen (N) and size of an ear of corn (size) were measured once at the end of the growing season in 5 locations within each of 24 farms.

3. Analyze this experiment and tell us: [4 pts]
 - a. Did N clearly increase corn size?
 - b. If so, *how much* did N increase corn size?
 - c. And how important was the among-farms effect in the analysis?
 - d. Show us that model assumptions were OK.
4. Graph your results so you could show them in a talk. [1 pt.]