http://www.wildcaughtseafoods.com/images/Sea_Urchins.jpg

Exercise 9. Nested and Block ANOVAs

Note:
E-mail a single Word document with your results. All analytical work needs to be done in R (unless otherwise noted). Scripts and output from R should be included in the Word document for full credit.

Please summarize your results in standard ANOVA table format. Failure to do so will result in an automatic loss of one point per ANOVA analysis.

1. Andrew & Underwood (1993) manipulated the density of sea urchins in the shallow sub-tidal region of a site near Sydney, Australia to test the effects of urchin density on the % cover of filamentous algae. There were 4 urchin treatments: No Urchins, 33% of Original Density, 66% of Original Density, and 100% of Original Density. The treatments were replicated in 4 distinct patches per treatment, and % cover of algae (the response variable) was measured in 5 random quadrats per patch. Analyze the results from this study as a nested ANOVA design. Also, average the sub-samples at the patch level and repeat the analysis as a one-way ANOVA. Discuss the biological relevance of your results (5 points).
2. Swearingen & Holt (1976) performed an experiment with 4 different varieties of barley to determine whether significant variation in yields existed among the varieties. Check their data for the existence of a strong gradient among the blocks, and indicate whether you think their block design was justified (NOTE: at this stage, use one or more exploratory data analysis tools other than ANOVA to support your argument). Based on your conclusion, calculate the appropriate ANOVA for the Swearingen & Holt data (5 points).

Due November 4, 2009