Statistics 850 **yandell** **Spring 1995**

Homework # 5—Due Mon 6 Mar

1. Scientists in horticulture have been interested in how plants adapt to cold climates such as we find in Wisconsin. They have noticed that plants which have been previously "acclimatized" suffer less damage. Laurie Weiss examined this carefully in a controlled laboratory experiment.

She examined two species of potatoes (`p=1,2`), subjecting plants to one of two acclimatization regimes (`a=1`: kept in cold room, `a=0` kept at room temperature) for several days. Then plants were subjected to one of two cold temperature treatments (`t=1`: just below freezing `-4 C`, `t=2`: way below freezing `-8 C`). Two responses were measured, both being damage scores for `protein` loss or `lipid` (fatty acid) loss.

Initially there were 80 plants, but some were lost during the experiment. Your analysis should take care to address the imbalance due to unequal sample sizes per factor combinations.

Your job is to sort out the effects of species, acclimatization and cold treatment on protein and lipid loss. Be sure to (a) lay out models and assumptions; (b) justify your process of model selection; (c) state and perform appropriate formal tests, indicating briefly their value and limitation; (d) include both interaction and diagnostic plots, as needed; and last but not least, (e) interpret your results, with reference to relevant plots, tables and other summaries of analysis.

The data can be found in `hwk5.dat`, with some initial ideas on analysis shown in `hwk5.sas` and `hwk5.s`.