

DEPARTMENT OF STATISTICS

Paper 475.330

Assignment 4

Due: Thursday, 20 May 1999

The data for this assignment comes from a project conducted by the Zoology Department at The University of Adelaide that investigated the mortality (death) rates of snails under different conditions. Groups of 20 snails were held for periods of 1, 2, 3 or 4 weeks in carefully controlled conditions of temperature and relative humidity. There were two species of snail, A and B, and the experiment was designed as a 4 by 3 by 4 by 2 completely randomised design. At the end of the exposure time the snails were tested to see if they had survived; the process itself is fatal for the animals. The object of the exercise was to model the probability of death in terms of the explanatory variables, and in particular to test for differences between species.

A data frame called `snail.df` has been created in S-plus on the advanced lab server. This data frame contains the following variables:

Species: Snail species A or B

Exp: Exposure in weeks.

RH: Relative humidity (4 levels)

Temp: Temperature, in degrees Celsius (3 levels)

Deaths: Number of deaths

N: Number of snails exposed

Find a suitable model for estimating the probability of mortality of the snails. Clearly, explain the impact of the different explanatory variables.

As usual, your assignment should consist of two main components. The first part should be a report that is suitable for a non-statistician (biologist) who is interested in snail mortality. It should explain your results in non-technical terms. The second part will be a statistical appendix where you explain how you analysed the data and came to your conclusions.