Biology 4605 / 7220   Name _____Key_____
Quiz #5b   15 October 2003

1. An agronomist measures defoliation in red maples, Norway maples, linden, and beech
trees attacked by the elm spanworm *Ennomos subsignaria*. The measurement are made
in the summer of 3 different years.

a) Write a symbol for defoliation, state a measurement protocol, and assign units
appropriate to your protocol.

--clear symbol
--measurement protocol can be repeated by another person
--units

b) Write a general linear model to analyze defoliation as it depends on tree species, taking
into account year to year differences.   Use the symbols
Xtree   and Xyear for your explanatory variables.

$$\%Defol = \beta_o + \beta_{tree} \cdot Xtree + \beta_{year} \cdot Xyear + \beta_{tree*year} \cdot Xtree * Xyear + error$$

b). Complete an ANOVA table for the analysis, assuming n = 4*3*5 = 60 trees,
SS_{total} = 100, SS_{year} = 20, SS_{tree} = 18, and $SS_{year*tree}$ = 30.

Source	df	SS	MS	F
tree	3	18	6	9
year	2	20	10	15
tree*year	6	30	5	7.5
error	48	32	0.66667	
total	59	100		