*Chapter Five notes* ***for Agri-food research***

Summary from page 141

*Regression models provide a mathematical representation between a set of explanatory variables and a response variable.*

The simplest “regression” model we will deal with is a so-called ANOVA, in which the explanatory variable is a category (like treatment or variety). This is just a special case of linear regression.

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*The coefficients in a regression model indicate how much we expect the response to change when the explanatory variable is observed to change.*

In the model above each group’s theta(Θ) represents that group’s average y value. What we are interested in is comparing the thetas for different groups. For example, is the average CBDA for the high nitrogen cannabis plants lower the CBDA for the low nitrogen plants?

*Regression-to-the-mean occurs when more extreme responses revert to nearer the long-term average, since a contribution to their previous extremeness was pure chance.*

See the text-book examples of parent height to offspring height. Part of a parent’s height is random chance – and an offspring’s height is partly determined by its parent and partly by chance, too.

Field and greenhouse experiments in agriculture are significantly influenced by randomness. This means regression to the mean is in play a lot.

One way to ensure your interesting-looking results are not due to regression-to-the-mean is to repeat your experiments in a new season (and/or ensure that you have enough “replications” in each group to average away the noise/random chance adequately).

*Regression models can incorporate different types of response variable, explanatory variables and non-linear relationships.*

This is coming up in our course – see slide snippets below.

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*Caution is required in interpreting models, which should not be taken too literally: ‘All models are wrong, but some are useful.’*

**Indeed!**