

# **Class Notes – Thursday 31<sup>st</sup> January 2008**

## **Last Thursday's Class**

- One-way versus Two-way ANOVA;
- Using MCP's/software to determine which means differ;
- Understanding and visualizing interaction;
- SLR as a sensible alternative to a paired t-test analysis.

## **Last Tuesday's Class**

- Review of above;
- Another detailed example illustrating interaction; see link: <http://www.math.luc.edu/~tobrien/courses/estat/drosophila.pdf>
- Discussion of twins studies and pairing;
- Grouping EU's of larger groups is called 'blocking' and is extremely helpful;
- Example 3.6 gives an excellent illustration of the importance of blocking;
- Another illustration of using the SNK MCP to separate the means and conclude which treatment is best.

## **Today's Class**

- Need for IBD's and what's good about balance;
- Illustration – Ex 3.7 on p.13, and understanding  $\lambda$ ;
- Another illustration – Ex 3.8; use Block Type I SS when block is first & use Type III SS for Treatments; unadjusted means and SNK are wrong here, LSMeans are right
- Weird: the order of means change in Means vs. LSMeans
- COD first e.g. is Ex. 3.9, data on p.16, format on p.17 is helpful

- Proper error term for SEQ is Sub(Seq) here due to something called EMS (expected mean squares) – it doesn't look to be significant ( $p = 0.0973$ ): meaning?
- Time or period is significant ( $p < 0.0001$ ): meaning?
- There is a significant carryover effect here ( $p = 0.0114$ ): meaning?
- Treatment (formulation) means differ ( $p = 0.0050$ ), and we can write our conclusion using the underline method and Output 3.11c (p.19). Do so!
- A second COD example on p.19 – is there a significant carryover effect? Read p.20 and see Outputs 3.12a&b.

### **Next Class**

- Mixed models (Ex. 3.11) pp.20-22.
- Nested models (Ex. 3.12) p.23.
- Split plot experiments (Ex. 3.13) pp. 23-25.
- A wrinkle (and transformation) on p.25; are blocks significant here?
- In Output 3.15b, how are the F values obtained? EMS to the rescue again.
- Output 3.15c and graph go one step further here with the (quantitative) density factor which has levels: 10,15,25,40 plants per meter of row. What do we obtain when we add up the SS for da, das and dac in Output 3.15c in relation to the density SS in Output 3.15b?
- One way ANOVA with unequal variances – see Ex. 3.17 on p.31; wrong analysis is on p.31 ( $p = 0.061$ ) – why is this wrong? Right analysis is on pp. 34-5. Test statistic is  $\chi^2_2 = 16.7157$ ,  $p = 0.0002$ ; conclusion?