Chapter 3 Class Notes – 4 classes

Class 1

- **One-way versus Two-way ANOVA**
- **Using MCP's/software to determine which means differ**
- **Understanding and visualizing interaction (Ex. 3.2 vs 3.3)**
- **ANOCOV, confounding and sums of squares (Ex. 3.4)**
- **SLR may be a good alternative to a paired t-test analysis (Ex. 3.5 and Hwk 2, Ex. 2)**

Class 2

- **Discussion of twins studies and pairing**
- **Grouping EU's of larger groups is called 'blocking' and can be extremely helpful**
- **Ex. 3.6 gives an excellent illustration of the importance of blocking (since the results change)**
- **Gives another illustration of using the SNK and Tukey HSD MCP's to "separate the means" and conclude which treatment is best**

Class 3

- **Need for IBD's and what's good about balance**
- **Illustration – Ex 3.7 on p.13, and understanding λ**
- **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 p.15**

- **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.20 – is there a significant carryover effect? Read p.20 and see Outputs 3.12a&b**

<u>Class 4 – several error terms and choosing the right one</u>

- **Mixed models (Ex. 3.11) pp.21-23**
- **Nested models (Ex. 3.12) pp.23-4**
- **Split plot experiments (Ex. 3.13) pp. 24-28**
- **A wrinkle (and transformation) on p.27; are blocks significant here?**
- **In Output 3.15b, how are the F values obtained? Need to consult "EMS" 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 dlin, dquad and dcub in**

Output 3.15c in relation to the density SS in Output 3.15b?

- **Section 3.6.1 underscores that the usual LOF test in SLR is just a Full-and-Reduced F test with the one-way ANOVA (or highest order polynomial) as the FULL model and the SLR as the REDUCED model. Ex. 3.16 on p.32 extends this LOF test to unequal variances.**
- **One way ANOVA with unequal variances – see Ex. 3.17 on p.33; wrong analysis is on p.33 ($p = 0.061$) – why is this wrong? Right analysis is on pp. 36-7. Test statistic is $\chi_2^2 = 16.7157$, $p = 0.0002$; conclusion?**