

# Week 2 Summary

Elijah Luo

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## Monday

### Morning

#### Talk with Pete

##### gg plots

Today, Peter provided us with Information of gg plots. It is a an effective tool with multipul functions to clean show data in organized and logical ways.

### Afternoon

#### Hot desk Meeting with Julian and Annie

In the afternoon, we attended a consultant meeting

- Aim of experiment
- Determine tolerance to aluminium toxicity
- Different rates of Al with various low pH
- Design for pilot experiment- hydroponics
- Rates of Al- find one to go forward with
- 5 rates + control, 4 varieties
- Find treatment combinations that work
- Statistical difference doesn't matter
- Add aluminium at 1 rate to rate of pH soils, plus controls
  - 10 tubs- 300 hundred in each tub
  - Replications in time?
  - 70 varieties
  - Need a lot of varieties for QTL analysis
  - Each tub has 1 treatment=split plot
  - Whole plot= tub- al
  - Sub plot= pot- variety
- Need to replicate whole plots
  - No replicates means confounding

## Tuesday

### Monring

#### Meeting with every member of the biometry hub

- The experiment they talked about in the meeting is about two phased design conducted in 2003
- Around “block-treatment interaction”. If the treatment effects depend on block, the results would get altered.
- Make ai random effect to make prediction for the future
- Any block treatment interaction is included in the “error” term
- The appropriate analysis
  - Split-plot with 2 reps of 2 moistures
  - How many of each treatment survived? – simple split-plot
- 3 degrees of freedom is for how treats differ between 2 plots with 20% SM
- For each treatment in each main plot, there is a variance on 11 df
- It is important because if the difference is significant, the treatment effects depend on “which mean plot”, so this needs to be random effect
- The treatment effects depend on “which mean plot”, so need to be random effect
- This two Two phase experiment is about:
  - Phase 1
    - 8 patients, 4 for each level, 2 videos for 1 patient, 1 for each level of movement. 16 units, split-plot
  - Phase 2
    - 74 raters, randomised at 2 levels of training
- F&H
  - Top half is based on the 592 units\*patient averages
  - Bottom half is the same.
- How to test the effect?
  1. Combine observed MS to get the “right” error variance.
  2. Put the “right” model into ASREML
- The Full model
  - The previous analysis is repeated with 5 more variance components and a repeat of all terms in ANOVA

- The issue with the design is more patients are needed and less raters are needed
- Treatment mean
  - Are created from the “effects”
  - Independent variances are combined to get the variance of the means
- What I have learnt
  - Understand the design structure
  - Use simplified examples
  - Analyse in different ways and check consistency
  - Look at the subsets of the data
  - For two-phase designs, look each phase separately
  - Use ANOVA to develop formal model
  - Use ASREML for final analysis

## Afternoon

### Wendy’s Talk

#### Exact Permutation Test

- Taking every possible combination of responses to experimental units, calculating a test statistic for each permutation then create a distribution from these permutations

## Wednesday

### Morning

#### Talk with Mario

#### Bioinformatics

- The link between genetics and statistics
  - Multi-dimensional scaling analysis
  - Regulatory-Network Analysis
  - Software thresholding
  - Topological Overlap Matrix
  - Cluster-One modules
  - Variable selection
  - Machine learning

## Afternoon

### Talk with Meixuan

#### Honours Project

- Skills she acquired while doing Honour's Project:
  - Analytic skills
    1. Basic data analysis and graphics by R
    2. Curve fitting in genstat
  - Minitab
- The reason why she did her project is because:
  - Canola One of the largest exported crops
- The biggest challenge she faced
  - Sensitive to environment
  - Inconsistent seedling emergency
  - High seedling mortality

## Thursday

### Monring

#### Talk with Pete

##### Drone flying

- This morning, Pete demonstrated his project to us, which involves drone piloting and image taking. The main project Pete is doing is to combine the images taken by the drone to produce the whole graph of the area covered by the drone for various purposes, such as estimating seedling emergence or weed percentage.
- Machine Learning

## Afternoon

### Talk with Enqi

#### Honours Project

- In the afternoon, we had a zoom meeting with Enqi, regarding to his Honour's Project experience and career pathways. Some of the questions below were asked and answered:
  1. How has the Honours project helped you? Confidence, communication skills, experimental design skills, which helps you understand the experiment
  2. What was the biggest challenge during the honours project? Collecting data, hard to find resources from paper

3. What were the most important skills you learnt? R studio, program in R is important
4. Why did you decide to do an honours? No enough skills, learn more. Integration of all knowledge
5. What was your favourite part about the honours project? Canola
6. What has been you biggest challenge in the workforce? Loneliness
7. What is the best part about your job? Learning experience. Apply knowledge in real world

## **Friday**

### **Morning**

#### **Talk with Sam**

##### **Blogdown, Netlify, Web creating**

Sam talked to us about how to create our own website using R, Blogdown and Nextfly. As well as using R to create resume. And some tips about interviews.