

Biometrics in Ag Vic

Murray Hannah

My Background

- 1975-78 Math Stats, La Trobe University,
 - The Likelihood Principle, Neils Becker.
- 1979 La Trobe University
 - Tutor/Demonstrator, Math/Stat, La Trobe Uni.
- 1980-81 M.Sc., UoM, RMH
 - HLA & Disease, [John Mathews](#)
- 1982-85 GRA, UoM Epidemiology Unit
 - Genetic epidemiology ...
- 1985-87 Tutor in Stats, La Trobe Uni

My background in Agriculture Victoria

- 1987-95 Foundation Biometrician, Horsham.



- 1995-2016 Foundation Biometrician, Ellinbank.



Biometrics?

- Statistics in the biological sciences
 - Google “IBS Biometrics”
<http://www.biometricsociety.org/about/definition-of-biometrics/>
- In Agriculture Victoria ...
 - Consultant/collaborating statistician
 - Group of 6
 - Agriculture & Fisheries research projects
 - Sponsored by industry levies, governments, special funds

Agriculture Victoria; the work

8 research centres

- Horsham
 - Designed trials
 - Field
 - Glass house
 - Lab
 - Early generation variety trials
 - Agronomy
 - Plant pathology
 - Long term crop rotations
 - Mouse control
 - Climate change



- Ellinbank
 - Dairy
 - Feed & production
 - Milk component measurement
 - Milk harvesting technology/practice
 - Animal welfare
 - Soils
 - Nutrient distribution
 - Nutrient management
 - Soil chemistry
 - Pasture response
 - Environment
 - Water quality
 - Biodiversity
 - CH₄ emissions mitigation
 - CH₄ measurement technology
 - Pine scale
 - Farmer surveys
 - Animal epidemiology



- Hamilton
 - Sheep/lamb production
 - Pasture agronomy
 - Pasture variety
 - P Fertiliser x Stocking rate
 - Lab
 - Vet
 - Agri-forestry
 - High rainfall cropping
 - Carbon sequestration
 - Satellite imagery



- Mildura
 - Viticulture
 - Citrus
 - Stone fruit
 - Salinity
 - Irrigation
 - Wine quality
 - Smoke taint
 - Almonds
- Rutherglen
 - Landscape modelling
 - Vine disease
 - Farm practice
- Tatura
 - Entomology
 - Horticulture
 - Irrigation
- Bendigo
 - Hydrology
 - Soil mapping



AgriBio, at La Trobe

- gene discovery and functional genomics
- molecular breeding for disease resistance, drought tolerance, bioenergy and health
- molecular diagnostics, biological control and other management strategies for weeds and plant and animal pests
- physiology and genetics related to plant and animal bioactives and health



Fisheries Victoria

- Freshwater stocking
- Sustainability
- Aquaculture
- Fishing management
- Modelling



GLM's! all only \$29⁹⁵-
LOGITS
PROBITS
OVERDISPERSION

CHECK IT OUT!
WHAT A CONCEPT! \$65²⁵-

BLOCKING

ANOVA BLOWOUT!
Just \$34⁹⁸-

t-TESTS
NOW \$25⁶⁰-

REGRESSION
IT'S NOT JUST
LEAST SQUARES
ANY - \$37
MORE.



WSTWINS

Statistical methods

- Design
 - Experimental
 - Survey
 - Sampling
- Data analysis
 - Lattice graphics
 - Linear models, GLM, HGLM,
 - Covariance structures
 - Geostats
 - Non-linear ...
 - Multivariate
 - Bootstrap
 - Randomisation tests
 - Random forests
 - Classification
 - Survival ...
- Bayesian inference
- Variance components
- Concordance, Calibration
- Errors in variables
- Meta analysis
- ... anything
- Presentation
 - Scientific writing
 - Graphical
 - Tabular
- Maths
 - DEs
 - Induction
 - Simulation
 - ...
- learn/adapt

What we look for in a graduate

- M.Sc. or Ph.D. in statistics
- An ability to identify key statistical issues in a given situation
- Problem solving
- Competence with statistical software
- Good written and oral communication skills.
- Integrity
- Ability to work/consult/collaborate with people
- Ability to work alone.
- Drivers license

General consulting role

strength

- Lots of variety
- Most of it interesting
- Never out of a job
- Great value to the organisation
- Appreciated by most scientists.

weakness

- Non-specialist
- Pressure to dumb down
- Difficult to develop a career path

Specialist role

A science discipline
+
Statistics.

