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, <u>John Mathews</u>
- 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

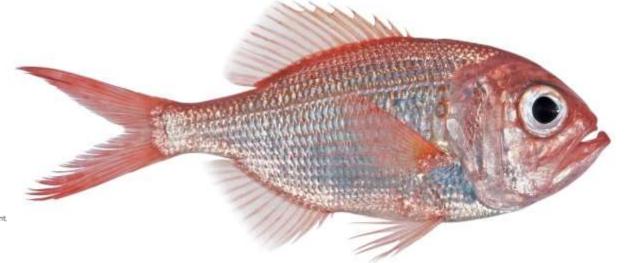
 physiology and genetics related to plant and animal bioactives and health



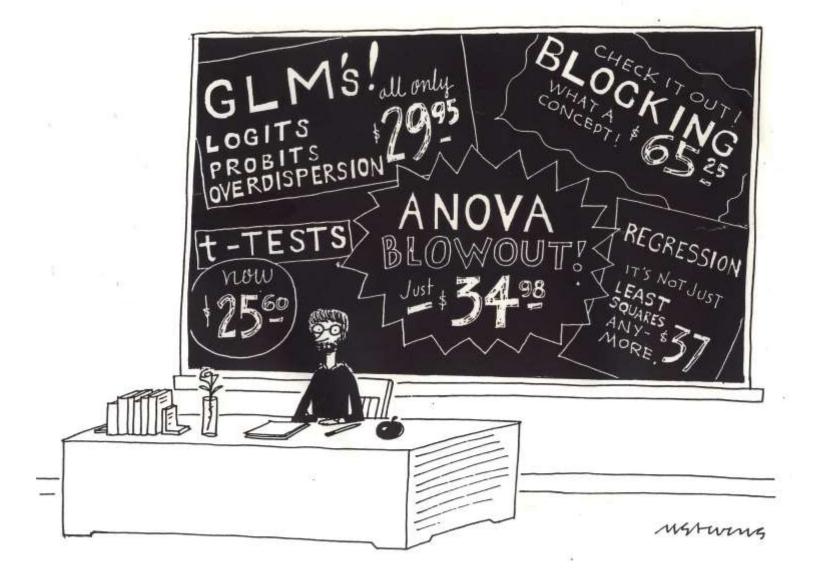
Fisheries Victoria

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









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.



