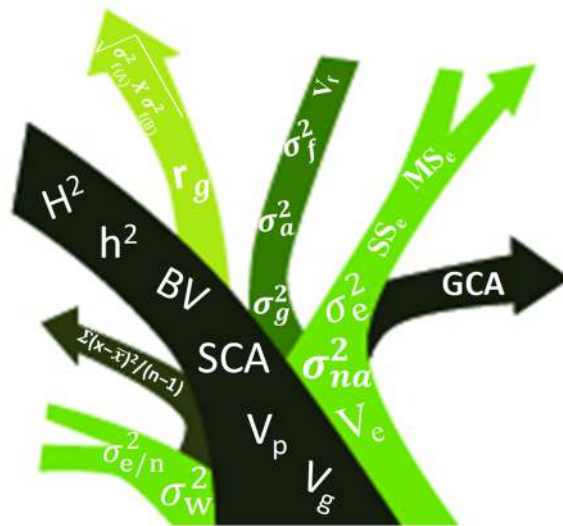




# An Introduction to Quantitative Genetics

3 – 7 August 2020

Pretoria, South Africa





We are pleased to announce that, following requests received for further training on quantitative genetics, we will be hosting a new and tailor-made course in this field. The basic concepts and skills are not widely taught, yet the fundamental quantitative genetic principles are very important for breeders to understand and be able to apply. Although the context will be forest tree breeding, the principles are applicable to other domains and central to all successful breeding programmes.

The focus of this course will be on building competence in fundamental quantitative genetic principles and capabilities, competence that will lay a foundation for advanced genetic analysis.

This course will enable participants to

- Edit and explore data
- Do analysis of variance (ANOVA) and interpret
- Calculation of and use of variance components
- Estimate & interpret heritabilities
- Calculation of & interpret correlations
- Evaluation of varietal/clonal performance
- Interpretation (not analysis) of breeding values (BLUP)

## Background



Dr Steve Verryn has championed many tree breeding courses over the years, both in South Africa and abroad. These courses have drawn people from over 130 countries. The courses have ranged from general introductory courses to specialist tree breeding management, BLUP and genetic gains modelling courses.

Steve is a specialist in Quantitative Genetics, Classical Breeding and Tree Breeding. He has over 35 years of experience in the field. He consults both locally and abroad in his field and also supervises post-graduate students.

## This course

This course will be one week long introductory course in quantitative genetics.

The course will not only leave participants with an understanding of the fundamental theoretical concepts and their application, but will also build competence through desktop practical exercises. The course will enable participants to calculate and interpret quantitative genetic measures and relevant statistical parameters.

Approximately 50% of the time will be dedicated to practical exercises.



The course will cover the following content:

- Data exploration & characterisation
- Introduction to variances and variance components
- Heritabilities
  - Types of heritabilities
  - Estimation
  - Interpretation
- Correlations
  - Types of correlations
    - phenotypic
    - genotypic
  - Calculation of correlations
  - Interpretation
- Types of selection
  - Forward
  - Backwards
  - Clonal
  - Breeding
  - Selection for roguing
- Smith-Hazel selection index
- Estimated marginal means & Least square means
- BLUE (Best Linear Unbiased Estimate)
- Introduction to BLP (Best Linear Prediction) principals
- Introduction to BLUP (Best Linear Unbiased Prediction) principals & the concept of instability
- Introduction to Multi-trait & Multi-site selection
- Independent culling
- Practical considerations

Please note: BLUP and the associated multi-trait, multi-site selection will only be introductory, and more detailed training on this will be presented in a future more advanced course.

This course will not cover practical training in BLUP and BLP due to the intense nature of training required in this domain. This is envisaged for a future advanced course, although the theoretical introduction will be included in the introductory course to Quantitative Genetics.

The course will use R for statistical analysis. Participants need to bring their own laptops and have R-studio installed when they arrive. Instructions will be forwarded to registered course participants on how to install R & R-studio, prior to the course

We will simultaneously demonstrate the use of R and TreePlasm©. TreePlasm© is an application that stores and manages the complex data associated with a breeding programme in order to improve efficiencies and productivity of the breeding programme. [TreePlasm is proprietary software and will only be used in demonstration.]

## Manual

Participants will be provided with a course manual.



## Course Logistics & Inclusions

The venue for the course is the beautiful Future Africa campus at the University of Pretoria in Pretoria, South Africa (<https://www.futureafrica.science/>).

The course will start at 10h00 on Monday 3<sup>rd</sup> August and end at 15h00 on Friday 7<sup>th</sup> August.

Lunches and teas during the course, are included in the registration. The course dinner on the Tuesday evening is also included.

## Accommodation & Exclusions

Accommodation, breakfasts and dinners, as well as transport and all other incidental expenses, are for the participants own account.

Accommodation is conveniently available on the Future Africa campus within close and secure walking distance of the course venue. (<https://www.futureafrica.science/>)

We can also suggest a Bed & Breakfast located nearby in Hatfield (<https://www.bandbhatfield.co.za/>)

Please make your own accommodation bookings.

Transport to and from the course venue is for the participants own account. We can suggest shuttle companies who specialise in local and airport transfers. Local taxi and Uber services also operate in the area.

## Registration

Due to the nature of the course, limited spaces are available and early registration is recommended in order to secure your place. Registration will only be confirmed on receipt of payment. We cannot guarantee your place until payment is received.

A special **discounted early bird rate** is payable provided registration and payment is received by 31 May 2020. Payment after 31 May 2020 will incur the undiscounted course fee and participants will be invoiced for the difference.

South African: R 18 700(Vat inclusive)

[*Early bird*: R 16 800 if registration and payment by 31 May 2020]

Other nationalities: US\$ 1 300

[*Early bird*: \$ 1 170 if registration and payment by 31 May 2020]

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