Research proposal

Project Name: New mate allocation strategies to accelerate genetic gain in agricultural species.

Student Name: Chensong Chen

Principle supervisor: Prof Ben Hayes

Co-supervisor: Dr Elizabeth Ross, Dr Owen Powell, Dr Eric Dinglasan

Introduction

*Modern agricultural breeding strategy*

By the description of the classical complex quantitative traits model, the phenotype traits are formed based on an infinite number of infinitesimal genetic effect and the interaction of non-genetic factors such as environmental factor (Bulmer, 1980). The strategy that evaluating the estimated breeding value (EBV) for certain species by the predicted overall genetic effects has been tested to be effective and viable (Goddard, 2009). So far, due to the high cost of whole-genome sequencing, the EBV evaluation model is mostly rely on genotype markers.

*Quantitative trait locus (QTL)*

*high-density genetic marker*

*Genomic prediction*

*Genomic selection*

*Machine Learning*

Aim

Methods

Bulmer, M. G. (1980). The mathematical theory of quantitative genetics: Clarendon Press.).

Goddard, M. (2009). Genomic selection: prediction of accuracy and maximisation of long term response. Genetica *136*, 245-257.