

PhD opportunity

New approaches to selection strategies to develop improved chickpea varieties for Australian environments

Question to address

Chickpea is a major Australian cropping industry in the northern grain growing region, being a highly profitable cash crop in its own right and an established rotational crop in a range of northern cropping systems. Despite this success, a number of challenges exist which have hindered further expansion of chickpea production in southern and western grain growing regions. Chickpea Breeding Australia (CBA) is focussed on improving yield in established areas and addressing key traits for expansion area. An improved selection strategy, which incorporates the use of genomic selection, to effectively prioritise, weigh and combine the necessary traits is required

Background

- CBA is a national breeding collaboration of NSW DPI and GRDC.
- The objectives of the breeding program are to deliver varieties with increase yield, grain quality and resistance to biotic and abiotic stresses.
- NSW DPI's chickpea breeding program has been running since the late 1970's and a number of major barriers to Australian chickpea production have been overcome through breeding (plant type for mechanical harvesting, improved grain quality and disease resistance).
- In CBA there is an increased focus on addressing key traits for expansion areas (e.g. chilling tolerance, low pH soils tolerance) whilst building on existing benchmarks for yield, grain quality and disease resistance.
- CBA is implementing genomic selection breeding methods and a selection strategy is required which will prioritise, weight and combine the necessary traits to an effective selection index.

Proposal objectives

1. Economic values for traits describing yield, quality and resistance/tolerance to biotic and abiotic stress of chickpeas
2. Evaluating economic models to consider chickpea variety by environment interactions
3. Estimation of genetic variation of yield, quality and resistance/tolerance to biotic and abiotic stress within and between chickpeas varieties and advanced breeding lines.

Application

Please send cover letter and CV to Susanne Hermes at Susanne.Hermesch@une.edu.au for further information. Other key researchers are Kristy Hobson, Ahsan Asif and Li Li at NSW DPI and AGBU.