

## Exploiting wild germplasm to expand the genetic diversity and enhance the adaptive potential of domesticated chickpea

Lars Kamphuis<sup>1</sup>

Toby Newman<sup>1</sup>, Silke Jacques<sup>1</sup>, Christy Grime<sup>1</sup>, Fiona Kamphuis<sup>1</sup>, Rob Syme<sup>1</sup>, Yuphin Khentry<sup>1</sup>, Kristy Hobson<sup>2</sup> and Robert Lee<sup>1</sup>

<sup>1</sup> Centre for Crop and Disease Management - Curtin University

<sup>2</sup> NSW Department of Primary Industries

Chickpea (*Cicer arietinum* L.) is an important legume crop, which is produced and consumed worldwide, with Australia being the second largest producer and the largest exporter of chickpea [1]. However, chickpea production is constrained by several biotic and abiotic stresses, as well as its particularly narrow genetic base [2].

In order to overcome these limitations and, ultimately, improve the currently stagnant yields of chickpea for Australian growers, wild relatives can be exploited. To this end, we are utilising a collection of wild *Cicer reticulatum* and *Cicer echinospermum* accessions, which are the direct progenitor and a sister species of chickpea, respectively [3].

With a view to expand the genetic diversity of chickpea, diverse wild genotypes have been crossed with an elite Australian chickpea variety, namely PBA HatTrick. Segregating populations derived from these crosses have been assessed in the field for various agronomically important traits, such as flowering time and growth habit. Genotyping of these populations will enable us to investigate the genetic basis of these valuable traits.

In addition to this, we have taken a more targeted approach to improving resistance to ascochyta blight, a devastating fungal disease caused by *Ascochyta rabiei*. Screening of the collection has revealed some promising accessions that displayed resistance against a diverse set of isolates, hinting at possible sources of durable ascochyta blight resistance. Mapping populations are being generated to elucidate the underlying QTLs associated with resistance.

### References:

- [1] FAOSTAT data, 2017, <http://www.fao.org/faostat/en/#data>
- [2] Abbo S. et al., 2003, *Funct Plant Biol* 30, 1081-1087.
- [3] von Wettberg E.J.B. et al., 2018, *Nature Comm*, 9, 649.