**Improving chickpea productivity by enhancing resistance to soil acidity**

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Acidic soils pose significant challenges to crop production globally, particularly due to the toxicities of Al3+ and H+. Soils with a pH below 5.5 are deemed acidic and can hinder growth and development of certain crop species, decreasing productivity.

Chickpea is an important legume worldwide, but highly sensitive to acidic soils. Farmers can apply lime to increase topsoil pH, but this approach is expensive and often takes years to correct subsoil acidity. In Australia, chickpea cultivation is primarily centred in the northern grain-growing region with high pH soil (above 6.0). There is a growing interest in expanding chickpea cultivation to Southern New South Wales and Western Australia, particularly due to the scarcity of non-cereal break crop in these regions and the prevalence of acidic soils.

The genetic bottleneck in chickpea resulting from domestication impedes breeding efforts to combat abiotic and biotic stresses. Utilizing the genetic diversity in chickpea wild progenitors through genomics-assisted breeding offers a promising approach for developing acid-soil-resistant varieties. A genome-wide association studies panel comprising 350 wild *Cicer* lines will be assessed for H+ and Al3+ resistance on the bases of the length of the longest root, dry root and shoot weights. DNA samples from each line will be sequenced and mapped to the reference genome. Integration of high-confidence SNPs with phenotypic data will identify significant loci associated with Al3+ and H+ resistance. The putative candidate genes will be functionally characterised for marker development in the chickpea breeding program and to understand the mechanism of acid resistance.