

## **Alternative legume crops for the southern region of Australia**

James Nuttall<sup>1</sup>

Audrey Delahunty<sup>1</sup>, Sally Norton<sup>1</sup>, Frank Henry<sup>1</sup>, Jason Brand<sup>1</sup>, Penny Riffkin<sup>1</sup>, Eileen Perry<sup>1</sup>, Garry O'Leary<sup>1</sup>, Brendan Christy<sup>1</sup>, Cassandra Walker<sup>1</sup>, Debra Partington<sup>1</sup> and Ashley Wallace<sup>1</sup>

<sup>1</sup> Agriculture Victoria

Grain legume crops constitute 10% of grain production across the south-east region of Australia, with potential to increase this through diversification of available legumes for summer and winter seasons. Grain legume production in the southern region is dominated by winter crops; lentil, chickpea, field pea and faba bean, with limited summer options. Alternative legume crop options could improve the efficiency and profitability of farming systems through access to higher-value markets, increased break crop and fodder options and by maximising resource capture within the system. Alternative legume species being tested include adzuki bean, black gram, black turtle bean, borlotti bean, burgundy bean, cowpea, fenugreek, kidney bean, lab lab, mungbean, narbon bean, navy bean, pigeon pea and soybean. Many of these crops are traditionally grown in sub-tropical growing regions; therefore, a key consideration is determining their suitability to the rainfall pattern, photoperiod and temperatures occurring across southern Australia.

To assess the agronomic suitability of alternative legume species across a range of agroecological zones (low, medium and high rainfall) in both winter and summer, five early sown winter field trials were established across the southern region. Key issues under investigation include optimal time of sowing, sensitivity to abiotic and biotic stresses, opportunities for grain and graze and management of weeds through herbicide options. Across all trials, good crop establishment (ca 90% at all sites) and early plant vigour was observed for the majority of species, and the effects of cold temperature on subsequent growth are being monitored. Initial observations indicate that the temperature and rainfall gradient has adversely affected plant growth, with greater crop growth occurring under the higher temperatures at the Mallee site.

This research program is also screening a broad range of legume crops from the Australian Grains Genebank (AGG) to identify potential germplasm suited to the southern farming region. This will help define the physiological and phenological traits suited to the southern region, providing opportunity to increase the adaptation of viable alternative legume crop options through breeding solutions. Remote and proximal sensing technologies are being used to monitor plant growth, vigour and canopy architecture and biophysical modelling used to identify potential growing environments across Victoria. Ultimately, this program aims to identify crops and management strategies that can expand the range of legume crops available to the grains industry for both winter and summer plantings. This will help growers to better manage pests and disease, build soil nitrogen, utilise out of season rainfall and improve farm profitability.