Project title: – Identification of novel salinity tolerance mechanisms in wheat

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By 2050, the area of Australian agricultural land classified as saline is likely to triple (NLWRA, 2000). Currently it is estimated that 4.6 million hectares of Australian farmland is affected by salinity (448,000 hectares); however, it has been shown that up to 50% of South Australian farms (1.12 million hectares) could be affected by transient salinity.

Salinity affected crops grow more slowly and die faster than non-stressed plants resulting in substantially lower yields. This project will work towards understanding what mechanisms are involved in the tissue tolerance of wheat to salt affected soils. A new wheat variety has been identified as having substantially higher salinity tolerance which is able to accumulate significantly greater amounts of salt in its leaves compared to current elite Australian varieties whilst still maintaining its growth. The aim of this project is to determine what mechanisms allow this wheat to grow and survive, and the genes underpinning these mechanisms so these traits can be bred into new elite varieties of wheat. A wheat RIL population was developed crossing the salt tolerant wheat plant with an elite Australian variety to develop a large population where its salinity tolerance can be studied. These wheat plants will be tested in the field, used to identify candidate genes and to develop molecular markers for creating new wheat lines in breeding programs.

Skills that will be learnt during project:

- Field and glasshouse analysis
- Plant physiology
- QTL mapping
- Genotyping of mapping populations
- Candidate gene identification and analysis