RD 2.1.1: Genetic diversity of crops

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LEADING IDEAS FOR BETTER LIVES

Aim:
To develop characterised germplasm resources for the generation of crops which are better suited to future climatic conditions and are profitable and sustainable for Scottish crop production.

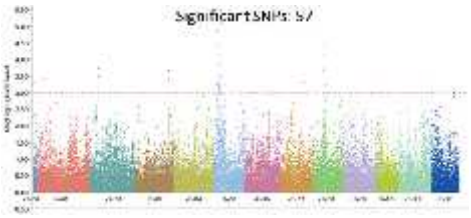
An ongoing challenge is the threat of future widespread unfavourable stress conditions that will cause annual losses in both yield and crop quality.

Work focuses on the acquisition and phenotypic and genotypic characterisation of diverse germplasm and the development of genetic tools to facilitate its use.

Key areas of science are relevant to UK stakeholders/industry and globally (climate change, new pathogen threats, water stress, food security).

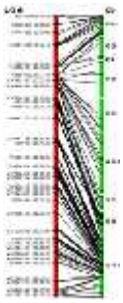
Research Objectives

- **Develop and acquire improved germplasm resources for our major crops.**
- **Phenotyping of diverse germplasm**
- **Development of genomic resources for assessing and managing diversity**



Development of novel potato populations for trait dissection and pre-breeding

- **Novel potato populations are being generated using Commonwealth Potato Collection (CPC) and other potato germplasm resources.**
- **These populations are being developed using newly acquired 'self-compatible' diploid genotypes that will make analysing and manipulating potato traits much more straightforward.**
- **Crosses with material derived from the CPC are being made to allow identification of genomic regions associated with traits such as disease resistance, tuber quality and root architecture.**
- **Genome sequence data is used to design bespoke genetic markers to assist with the introgression of selected traits into pre-breeding potato germplasm. This will facilitate genetic analysis as well as produce lines.**



Impact

- **The recent availability of novel potato material carrying genes which suppress 'self-incompatibility' mechanisms in diploid potato that can be a burden to genetic analysis will make genetics and breeding at the diploid level far easier than was possible previously.**
- **The identification of genes underlying strategically important traits, as well as their introgression into both diploid and tetraploid pre-breeding germplasm, has been greatly accelerated.**
- **These novel approaches should have direct downstream effects on potato breeding that will impact on farmers' ability to grow potato crops sustainably.**

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