



Quantifying the genetic diversity of phosphorus use efficiency in *Brassica napus*

Defra Project WQ0119

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Background

Phosphorus (P) is an essential macro-nutrient

UK OSR crop receives over 21,000 t of P fertilisers annually (BSFP, 2006)

Diffuse P losses from agriculture arise from

- 1) excess use of soluble inorganic P fertilisers
- 2) secondary losses occur via processing of crops by animals

These losses impact on **water quality**, reducing aquatic biodiversity

P fertilisers are made from non-renewable resources, which require **energy** for mining, production and transport, impacting on **climate change**

Breeding crops that use their P more efficiently will help reduce our reliance on P fertilisers, improve water quality and reduce our impact on the global environment



Project plan

- Objective 01 To determine the extent of genetic variation in PUE and P response of current commercial OSR varieties under field conditions (48 months).
- Objective 02 To determine assay conditions for characterising the genetic variation in PUE and P response of OSR to external soil P concentrations under glasshouse conditions (12 months).
- Objective 03 To characterise the genetic variation in PUE of *Brassica napus* (AC genome) using reference experimental materials and commercial OSR varieties grown under glasshouse conditions. The contribution of previously identified candidate C-genome and Arabidopsis loci on PUE and P response traits will be determined using comparative genomics approaches (48 months).
- Objective 04 To confirm results from genetic screens under field conditions using a subset of lines from Objective 03 (48 months).



Outputs

- Objective 01 Deliver information on variation of PUE within current commercial varieties and enable the selection of appropriate varieties for growth in low input agriculture.
- Objective 02 Deliver information on the appropriate growth conditions, representative tissues etc. for use in Objective 03
- Objective 03 Deliver information on the variation of PUE within *Brassica napus* germplasm and identify genetic loci that are impacting on these traits. This information can be used in crop improvement programmes.
- Objective 04 Confirmation of data obtained under glasshouse conditions are robust and relevant to field conditions.

All information will be made available to the Brassica Research Community through appropriate channels – including trade press, OREGIN, and scientific publications.

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