

Final Project Summary

Project title	Crop Improvement Research Club (CIRC)		
Project number	RD-2009-3476	Final Project Report	PR611
Start date	January 2010	End date	December 2015
AHDB Cereals & Oilseeds funding	£50,000	Total cost	£7,000,000

What was the challenge/demand for the work?

A rising global population, combined with global climate change, the potential spread of newly emerging diseases of livestock and crops, and the volatility of oil prices threaten global food security. There is an urgent need to develop sustainable new crop varieties with greater yield potential with reduced inputs. The challenge for industry will be to achieve high yielding, cereal varieties that consistently produce high quality products that are safe, nutritious and meet end-user requirements. Therefore, BBSRC and the Scottish Government have brought together industry and the research community to support research efforts on oilseed rape, barley and wheat and their uses in food production through the development of the Crop Improvement Research Club (CIRC).

How did the project address this?

The 15 CIRC projects brought together a community of 60 investigators to form multidisciplinary teams focused on challenges identified by industry:

Higher Yields

1. Flexible genotyping platform for wheat (Bristol University & John Innes Centre)
2. Manipulation of photosynthesis to improve yield (Rothamsted Research & Essex University)
3. Changing gene function to control pod shatter in oilseed rape (John Innes Centre)
4. Exploring genes controlling fertility in wheat and barley (Nottingham University)

Healthier Crops

5. Sources of genetic resistance to Turnip Yellow Virus for oilseed rape (Warwick University)
6. Increasing pest resistance by an enhanced UV-B response (Glasgow University)
7. Fungal effectors as activators of novel resistances in cereals (James Hutton Institute)

Better Quality

8. Controlling grain skinning in barley (SRUC & James Hutton Institute)
9. Processability of malting barley (James Hutton Institute)
10. Role of lipids in bread dough quality (Rothamsted Research & IFR)
11. Glucosidase inhibitors for malting barley (John Innes Institute)
12. Production of wheat lacking B-type starch granules (NIAB & John Innes Institute)

Improved Roots

13. Rhizosphere exudation and oilseed rape yield (Warwick University)
14. Phenotyping root function in wheat (Rothamsted Research & Lancaster University)
15. High throughput root phenotyping screens (Nottingham University & James Hutton Institute)

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What outputs has the project delivered?

CIRC has established a new capability for the sector to address significant research challenges associated with food security. The projects have already generated useful outputs which are being used in industry:

- 380,000 DNA markers and a 'breeders chip' for better wheat from elite varieties, landraces and wild relatives
- Standardised lab test for grain skinning in barley
- High throughput assessment of root growth and architecture for screening new crop varieties
- Novel EMI methods to measure root performance and soil moisture in the field
- New genes and markers to combat Turnip Yellow Virus in oilseed rape
- Improved knowledge of how different crop varieties use photosynthesis
- Insight into new gene combinations to reduce podshatter in oilseed rape

For further details, download the [Crop Improvement Club Impact Summary \(2016\)](#)

Who will benefit from this project and why?

In return for a financial contribution to CIRC, the fourteen member companies gained early access the outputs from the research portfolio. The initiative has increased investment in research activity that underpins the needs of the crop production and processing industry to address the challenge of maintaining food security. The programme also supported 10 four-year PhD studentships, aligned with the funded projects.

Lead partner	BBSRC
Scientific partners	JHI, JIC, NIAB, Rothamsted Research, SRUC, University of Bristol, University of Glasgow, University of Nottingham and University of Warwick
Industry partners	BASF, Campden Technology Limited, Elsoms Seeds, KWS UK, Limagrain UK, Monsanto UK, nabim, RAGT Seeds, SWRI, Secobra Recherches, Syngenta Seeds, United Oilseeds Marketing and Velcourt
Government sponsor	BBSRC and the Scottish Government

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