BBSRC Crop Improvement Research Club
Executive Summary

CIRC supports excellent quality research that is relevant to industry's needs. The research is focused on barley, oilseed rape and wheat for food uses and is conducted across 13 of the UK's world-leading research institutes, universities and independent research organisations. The club has supported research projects from a joint fund totalling £7.06M (£560k of which comes from industrial membership subscriptions, £500k from the Scottish Government and £6M from BBSRC).

Fourteen companies are members of CIRC and are representative of the breadth of innovation in the crop production and processing industry in the UK. In return for a financial contribution to CIRC, the member companies gain access to the outcomes of an exciting research portfolio of 15 projects. The projects bring together a community of 60 investigators to form multidisciplinary research teams focused upon innovative, industrially relevant research.

Introduction

Food security for the UK, and internationally, is an increasingly important issue and a major strategic priority for the BBSRC. An increasing global population combined with global climate change, the potential spread of newly emerging diseases of livestock and crops, and economic issues such as the volatility of oil prices threaten global food security and an urgent response is required. BBSRC is contributing to a joint UK Government and Research Councils partnership on food and food security to coordinate research efforts in this area. The Crop Improvement Research Club is part of that response.

CIRC Research Challenges

There is an urgent need to develop crop varieties with greater yield potential and the ability to deliver this sustainably with reduced inputs and without detrimental effects on the local ecosystem. Equally, new crop varieties are required that reliably and consistently produce high quality products that are safe, nutritious and meet end-user requirements. CIRC supports projects that engage with Research Challenges which have been identified by industry:

- Increasing nutrient use efficiency
- Combating pests and diseases
- Increasing yield potential
- Seed structure and composition
- Germination properties
- Spoilage factors

CIRC is managed by BBSRC in conjunction with an external coordinator and a steering group made up of industry and academic representatives.

Benefits of Interacting with BBSRC and the Research Community

BBSRC has a strong record in managing collaborative research programmes, including the Research Innovation Club mechanism. Companies report a range of significant benefits from their involvement with BBSRC:

- Capacity to influence research in important strategic areas
- Knowledge on the progress of relevant research projects and early access to results
- Opportunity to work with leading researchers and to build strong relationships with them
- Opportunity to identify the best potential industry recruits
- Guidance on other Research Council activities and funding opportunities
- Promotion of companies through relevant activities, objectives and outputs

CIRC research projects

Reference number	Principal Investigator	Research Organisation	Project Title
BB/J019623/1	Dr Stephen Hoad	Scottish Agricultural College	Causes and control of grain skinning in malting barley: Phenotyping and genetic analysis
BB/J019631/1	Dr Martin Broadley	University of Nottingham	Delivering low-cost, high-throughput root phenotyping screens for arable crops
BB/J019666/1	Dr Zoe Wilson	University of Nottingham	Developing a Cereal Fertility Pipeline (CerFip) for wheat and barley
BB/I017496/1	Prof Keith Edwards	University of Bristol	Development and validation of a flexible genotyping platform for wheat
BB/I017410/1	Dr John Walsh	University of Warwick	Exploiting sources of resistance to Turnip yellows virus for deployment in oilseed rape.
BB/I017232/1	Dr Lars Østergaard	John Innes Centre	Exploring knowledge of gene function to combat pod shatter in oilseed rape
BB/J019569/1	Dr Anna Avrova	The James Hutton Institute	Fungal effectors as activators of novel resistances in cereals
BB/I017291/1	Prof Alison Smith	John Innes Centre	Glucosidase inhibitors: new approaches to malting efficiency
BB/J019593/1	Dr William Thomas	The James Hutton Institute	Improving the processability of malting barley
BB/I017518/1	Prof Gareth Jenkins	University of Glasgow	Increased pest resistance in oilseed rape mediated by an enhanced UV-B response
BB/I017372/1	Prof Martin Parry	Rothamsted Research	Manipulation of photosynthetic carbon metabolism in wheat to improve yield
BB/J01950X/1	Dr Richard Whalley	Rothamsted Research	Phenotyping root function in wheat
BB/J019496/1	Prof Andy Greenland	NIAB	Production of wheat lacking B-type starch granules
BB/J019526/1	Prof Peter Shewry	Rothamsted Research	The role of lipids in determining gas bubble retention in wheat dough
BB/J019690/1	Dr Gary Bending	University of Warwick	Yield improvement of oilseed rape through genetic manipulation of rhizosphere exudation

Delivering Industrial Impact

CIRC has established a new capability for the crop production and processing sectors to address significant research challenges associated with food security. The projects have already generated useful outputs which are being used by the member companies:

- 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 Yellows Virus in oilseed rape
- Improved knowledge of how different crop varieties use photosynthesis to produce biomass which offers new opportunities to generate higher yields
- Insight into new gene combinations to reduce pod-shatter in oilseed rape

Further Details

For further information please visit CIRC's web pages at www.bbsrc.ac.uk/circ

BBSRC is the UK's principal funder of basic and strategic biological research