This work is licensed under a Creative Commons Attribution 4.0 International License.

Thank you for using eradoc, a platform to publish electronic copies of the Rothamsted Documents. Your requested document has been scanned from original documents. If you find this document is not readible, or you suspect there are some problems, please let us know and we will correct that.

Iacr Report for 1998

Full Table of Content

Review of the Year

Rothamsted Research

Rothamsted Research (1998) *Review of the Year ;* Iacr Report For 1998, pp 4 - 8

This work is licensed under a Creative Commons Attribution 4.0 International License.

Review of the Year

RESEARCH

The evolution of the focus of the Institute's research and its organisation into themes has continued during the year. Fortunately, the new Director Ian Crute was appointed in July and was able to take part in most of the discussions. The revisions take into account the way different programmes have evolved over the last four years and the new and exciting possibilities for research that have opened up in that period. The revised themes are:

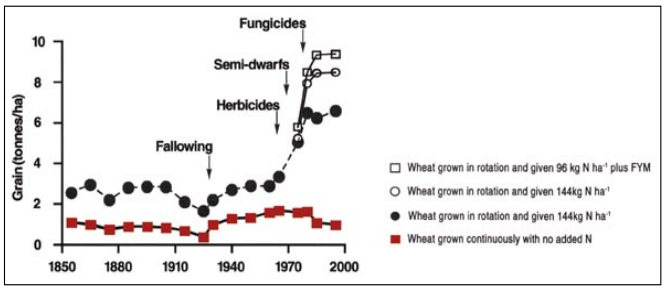


Fig. 1 *Yields of wheat in the classical Broadbalk experiment at Rothamsted. The introduction of new technologies is indicated by the arrows. All plots received P and K, the additional fertiliser treatments for different plots are shown in the legend (Figure adapted from Rasmussen, P.E. et al. (1998).* Science ***282****, 893.)*

- **Inherent Plant Productivity**

To improve crop productivity and quality by understanding and manipulating genetic and biochemical factors regulating metabolism, growth and development.

- **Environment and Nutrients**

To optimise crop yield and quality while protecting soils, water, the food chain and the global environment through an understanding of nutrient acquisition, nutrient transformations, soil ecology and remediation.

- **Host and Pest Interactions**

To identify and exploit targets for intervention in the control of invertebrate and microbial parasites through an understanding of chemical signalling, insect behaviour, plant defence, pathogenesis and mechanisms to overcome insensitivity to established toxophores.

- **Agricultural Systems**

To provide robust tools for the economically competitive and environmentally benign management of agricultural systems and associated natural habitats through understanding of new crops and management techniques and the population genetics and dynamics of pests, pathogens and weeds.

Amongst other priorities, these programmes will make use of advances in molecular biology to underpin the studies of populations of important organisms in the agricultural environment, to understand plant function and the interactions between pests (in the broad sense of the word) and host, and to transform crop plants. The details and individual projects will continue to evolve over the coming year.

FINANCE AND THE FUTURE

The longer-term support the Institute receives from the BBSRC in terms of the Competitive Strategic Grant (CSG) and from MAFF under the 'Umbrella Contract' continues to decrease. Hopefully, the new Comprehensive Spending Review (CSR) settlement announced by the Government in September, will ensure that at least the CSG is inflated. However, as a result of the Review, the MAFF research budget will be reduced in real terms over the next three years. To counteract this shortfall, the Institute has been reviewing its activities to reduce its expenses and maximise its efficiency. In addition, staff have been very active in competing for external funds (for example in participating in the European Research programmes in FPIV - see box). As a result, we have been able to weather the cuts and also free up resources for new posts to underpin some of the opportunities and priorities that the research review identified.

However, the future is still clouded. Agriculture in the UK both as an industry and a research activity is going through tough times. Although the priorities identified in the CSR include life sciences and genomics, these seem to be primarily interpreted as related to the human genome and health. To my mind, these aims are too narrow and short-term. Analyses of future population trends, the effects of climate change on crop performance and the need to protect biodiversity and the environment, all suggest

This work is licensed under a Creative Commons Attribution 4.0 International License.

IACR SUCCESS IN THE FOURTH FRAMEWORK PROGRAMME AND GOOD SIGNS FOR THE FIFTH

Success in the European Framework Programmes is important to IACR. It enables researchers to collaborate with the best scientists across Europe and helps to ensure that IACR research remains at the cutting edge. It is also important to share complementary expertise in addressing European issues and maximise the value of the research that is being carried out in many different countries.

Competition for European funding for research is very great and in many of the programmes of the Fourth Framework Programme (1994-1998), well under 20% of all proposals submitted were successful. However, the success rate for IACR proposals has been around 35% and since April 1995, over 60 EU contracts, with a value to IACR of about £7 million, have been signed. The Fifth Framework Programme will run from 1999 to 2002. From the details of the work programme available at present, it is confidently expected that IACR's success will be at least as great as it has been for Framework IV.

Since the development of the Common Agricultural Policy (CAP), the productivity and success of the agricultural industry has been a European issue. Now, with European enlargement on the horizon and the imminent implementation of the reforms of the CAP outlined in Agenda 2000, agriculture is facing many new challenges. IACR participation in the Agriculture, Fisheries and Agro-Industrial Programme (FAIR) of Framework IV is aimed at addressing these challenges, so that farmers and policy makers throughout the UK and Europe have the best technology available to respond to new developments. Research can provide solutions to many of the new problems that farmers face, by improving the efficiency of production, in the light of falling subsidies, by providing alternative, marketable crops and by reducing the impacts of agriculture on the environment and biodiversity. Examples of FAIR projects with IACR involvement include the following:

- European Miscanthus improvement: broadening the genetic base, testing genotypes & development of breeding methods
- Creation of varieties and technologies for increasing production and utilisation of high quality protein from the white lupin in Europe
- Environmental impact of transgenic plants on beneficial insects
- Integrated strategies for the management of stem canker in oilseed rape in Europe
- Development of a sustainable strategy for the management of root-knot nematodes in vegetable crops in Southern Europe - alternatives to methyl bromide
- Novel techniques for integrated control of slug damage
- Switchgrass as an alternative energy crop in Europe - initiation of a productivity network
- Improving the quality of EU wheats for use in the food industry
- Engineering shatter resistance into oilseed rape
- Optimising biological control of a dominant weed in major crops

that there will be an increasing need for efficient and productive crop agriculture in the future. In addition, long-term experiments such as Broadbalk are suggesting that the rate of increase in crop yields under good standard conditions is declining (Fig.1). The opportunities to address these problems and to improve plant performance by exploiting current advances in genetic knowledge, are immense. In such circumstances, it would seem prudent to invest in crop research. This should bring direct benefits to the UK for, although the ability of the UK to grow large amounts of food is limited by land availability, the wider agriculture industry is very strong. For example, there have been significant investments in the UK in the last year by large multinationals which are likely to make the UK a major centre for commercial wheat breeding. There should be a tremendous opportunity for IACR to contribute to the future but patience may be needed before investment is made available for this to happen.

GMOS AND THE PUBLIC

No review of the year would be complete without reference to the issues surrounding GM crops. This year we had our first major field tests of transgenic wheats with trials at both Rothamsted and Long Ashton, and public demonstrations at Cereals '98 and the Royal Show. In addition, Broom's Barn had transgenic sugar beet and its scientists were also involved with GMO sites on farmers' land.

The approval by ACNFP for the release for consumption of oil and other products from transgenic soybeans led to the import of these products from the USA. For various reasons Monsanto, which had developed the 'Roundup Ready' (glyphosate-tolerant) crop, decided that the imported beans and products derived from them would not be

This work is licensed under a Creative Commons Attribution 4.0 International License.

Professor Ben Miflin and His Royal Highness the Duke of York discussing wheat, genetically modified to improve the gluten content and thus bread-making quality, at The Royal Show in July. This demonstration of pot-grown GM wheat attracted considerable media attention and public interest - as well as 'eco-warriors' who trashed the material at the end of the Show

labelled. This sparked off numerous protests to add to the already fairly widespread unease about GM crops and led to the formation of 'eco-terrorist' groups. Many field trials around the UK were destroyed and both our public presentations were affected. Disappointing as this was in undermining open discussion, we were nevertheless able to make our points to a wide public, including the Duke of York at the Royal Show. Staff were also widely involved in public fora on the issue. These ranged from the informal, involving local politicians and residents, through to broader public debates involving the national news media. These efforts will need to continue.

The major purpose of our transgenic field trials is assessment of the potential benefits and risks of growing GM crops; experiments that reasonable critics say must be done before general release of the crops. The responsible use of GM technology is one of the ways crop scientists can directly meet the challenges of the future. It is also crucial in research towards understanding the genetic basis of crop performance.

IACR FELLOWS

The Institute has been very successful in building up international contacts through our collaborations in the EU, through work for DFID and through Rothamsted International. As a result we appear to have a very strong international reputation. In some ways, however, even though individual scientists have a wide network of UK collaborators, we have not managed to build up as strong a reputation in the UK. We have therefore decided to start an IACR Fellowship scheme. The aim is to invite distinguished scientists to become associated with a specific Department within the Institute, and to visit and learn more about our research. We hope that this will encourage joint research projects and bring us the benefit of their advice in mapping out our future priorities. During the year we invited 18 UK scientists to become IACR Fellows and I am delighted that they all accepted.

GOODBYE

I will retire early in 1999, having completed five years as Director. When I accepted the post and came back from Switzerland I had hoped that the 1993 White Paper Realising our Potential would signify an upturn in the fortunes of UK research. This turned out not to be the case and there has been a series of scrutinies and reviews accompanied by a steady decrease in core funding. Despite this, the Institute has responded magnificently to these challenges and maintained its income, albeit with short-term funds which generally make long-term field research more difficult to sustain. I have been continually fascinated and excited by the research that staff are doing and am pleased that this has been gaining wider recognition over the years. I have also been encouraged and impressed by the support we have received from the industry, particularly ARIA. As someone who was brought up on a farm, and whose parents came from a long line of farmers, I feel privileged to have been Director of IACR and hope I have been able to make a difference.

Ben Miflin

This work is licensed under a Creative Commons Attribution 4.0 International License.

The Earl of Selborne officially opening a special BioScience Network exhibit in the House of Commons in November. The display emphasised the strengths of the scientific expertise within BBSRC-supported Institutes and HRI. Professor Ben Miflin, Chairman of the Network, also spoke

Dr Diane Smiley (Biological and Ecological Chemistry) and Mr Ray Marriott, MD of English Hop Products Ltd, who are collaborators in a LINK programme aimed at producing aphid sex pheromones for use in novel crop protection programmes

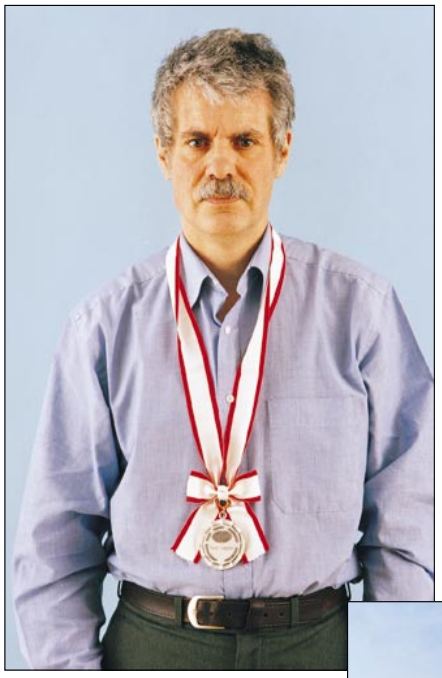
Sarah Cooper (right) from Roundwood Park School worked with Dr Tanya Schuler (Entomology and Nematology) on a Nuffield Science Bursary project aimed at optimising the cultural conditions for rearing an aphid parasitoid

Professor John Pickett FRS (Biological and Ecological Chemistry) discussing the role of chemical signals in insect/plant interactions with visitors to the IACR exhibit 'Plants Talking' at the Royal Society's New Frontiers in Science exhibition and soirée in June

This work is licensed under a Creative Commons Attribution 4.0 International License.

*Part of the new biological imaging facility at IACR-Long Ashton showing the Leica confocal scanning microscope purchased with a grant awarded through the BBSRC Joint Research Equipment Initiative. The image on screen shows a spore-bearing structure of **Peronospora parasitica**, one of the plant pathogens being investigated in the Molecular Pathology Group*

An exhibit on 'Bees and Pollination', jointly organised by IACR-Rothamsted and the British Beekeepers' Association, was awarded a Royal Horticultural Society Silver Medal at the Chelsea Flower Show in June



Dr Peter Hedden (Plant Sciences) was awarded the International Plant Growth Substance Association's Silver Medal at the 16th IPGSA Conference in Chiba, Japan in August in recognition of his outstanding achievements in the field of plant growth substances

An extension to the Fowden Conference Hall, costing £1.2 million, was started in mid-August 1998 and is scheduled for completion in mid-Summer 1999. The new building will be named after Professor Trevor Lewis CBE, Director of IACR and of Rothamsted 1989-93. This major new facility will enable Rothamsted to host more international scientific conferences and will also provide an important local and regional venue for commercial seminars, training courses and trade exhibitions