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Iacr Report for 1998

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Rothamsted Research

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To assess pesticidal activity of extracts of natural flora and fauna and of synthetic analogues
Denholm A.I.

To explore the potential of peptidic natural products, and their synthetic analogues, for pest control
Khambay B.P.S.

To identify antipest agents for the development of pest control especially against resistant organisms
Khambay B.P.S.

Analysis of bioactive plant extracts
Khambay B.P.S.

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Evolutionary response of insects to environmental stress *Devonshire A.L.*

Help overcome or avoid resistance by understanding its biochemistry and molecular genetics
Devonshire A.L.

Multidisciplinary study of acetylcholinesterase structure and function
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Implications of pesticide resistance for pest management in horticultural crops
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Monitoring and management of insecticide resistance in *Myzus persicae*
Denholm A.I.

A systems approach to sustainable insect pest management in irrigated cotton in India
Denholm A.I.

Management of insect pests and viruses of tobacco using ecologically compatible technologies
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Combating insecticide resistance in peach potato aphids in the UK
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The chemical ecology of pests and beneficial species *Pickett J.A.*

Insect behaviour control using semiochemicals
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Semiochemical-based control of pests and diseases of oilseed rape
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Identification, biosynthesis and associated molecular genetics of semiochemicals for a new basis of pest and disease regulation
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Understanding the chemical ecology of pests and beneficial organisms
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Role of wild habitat in the invasion of cereal crops by stem-borers, *Chilo partellus, Busseola fusca*, in Africa
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Improving biological control of thrips and aphids on protected ornamentals
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The chemical ecology of pests and beneficial organisms in agricultural and semi-natural ecosystems
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Integrated pest management of aphids on outdoor lettuce crops
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Environmental impact of transgenic plants on beneficial insects
Wadhams L.J.

Outdoor lettuce: methodologies to develop plant volatiles to manipulate aphid numbers in the field
Wadhams L.J.

Nepeta species as a non-food, crop-derived feedstock for the production of semiochemicals for aphid control
Wadhams L. J.

Production of mosquito oviposition attractant pheromones from the plant *Kochia scoparia*
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The molecular basis of interactions between plant pathogens and their hosts *Lucas J.A.*

Isolation and characterisation of pathogenicity genes from the downy mildew *Peronospora parasitica* using phage display and phage antibody approaches
Bowyer P.

Isolation and characterisation of pathogenicity genes from the wheat pathogen *Pseudocercosporella herpotrichoides* using signature and tagged insertional mutagenesis
Bowyer P.

Molecular genetic tools for manipulating pathogenicity/avirulence genes in the cereal fungal pathogens, *Stagonospora nodorum* and *Mycosphaerella graminicola*
Hargreaves J.A.

To characterise the molecular nature of adhesion and differentiation of infection structures of fungal pathogens
O'Connell R.J.

Rational design of novel fungicides effective against plant pathogens
Bowyer P.

Molecular characterisation of appressorium morphogenesis on *Peronospora parasitica* using display antibodies
Bowyer P.

Antisense RNA technology for validating fungicide targets in plant pathogenic fungi
Lucas J.A.

Isolation and characterisation of fungal genes involved in biotrophy and plant-fungal recognition in the *Colletotrichum lindemuthianum*-bean interaction
O'Connell R.J.

Genetic variation in foliar and stem base cereal pathogens
Lucas J.A.

Determinants of pathogenicity and host range in plant pathogenic fungi
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Proteins and enzymes implicated in fungal pathogenicity to plants
Lucas J.A.

Genome diversity *Karp A.*

Investigation of the molecular basis of somaclonal variation in oil palm tissue cultures and regenerants with a view to identifying markers for specific phenotypic abnormalities
Karp A.

Development, optimisation and validation of molecular techniques for the measurement, characterisation, evaluation and accessing of biodiversity
Karp A.

Molecular markers for genebanks: application of marker technology for the improvement of *ex situ* germplasm conservation methodology
Karp A.

Use of molecular genetics in understanding the population biology of key species in arable systems
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Decision systems technologies and development *Verrier P.J.*

Design and develop a software framework suitable for the construction of arable crop decision support systems
Verrier P.J.

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Enabling technologies for decision support systems
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Decision support systems shell with specific DSS for fungicide application to winter wheat
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Animated simulation of wheat growth
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ERA database of cereal pathology data
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The development, structure and composition of seeds and other plant storage organs in relation to end use quality *Shewry P.R.*

Wheat gluten proteins: their characterisation and role in determining the functional properties and end use quality of wheat
Tatham A.S.

Mechanisms of protein synthesis, processing, targeting and deposition in plant cells
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Analysis and manipulation of the protein and oil compositions of oilseeds
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Exploring and improving the functional properties of wheat gluten using protein engineering and transgenic wheat plants
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The structure, targeting and molecular interactions of sunflower oleosins in relation to oil body structure and biogenesis
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Structural and biochemical components of barley endosperm which influence malting quality
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The rheology and structure of wheat gluten protein
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Monoclonal antibody tests for wheat quality
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Improving the quality of EU wheats for use in the food industry
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Improving the functional properties of durum wheat by transformation
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Structural and rheological determinants of gas cell expansion in baked product doughs
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Structural and biochemical components of barley endosperm which influence its raw quality for malting
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A generalised system for the rapid and inexpensive determination of the genetic function of ESTs: use in the analysis of maize embryogenesis
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Map based cloning of agronomically important genes directly from *Zea mays*
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Analysing the function of existing and novel genetic promoters for tissue specific expression of transgenes in *Zea mays* (ZEROPA)
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Development of the tools required to dissect large plant genomes and their application to a complex region of the maize genome linked to a disease resistant super locus
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Determining the genetic function of conserved plant expressed sequence tags using a maize mutator grid
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Development of a non-gel-based high throughput genotyping assay using previously characterised single locus microsatellite markers
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Root development and responses to environmental stress *Barlow P.W.*

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Molecular analysis of *TIP2*: a gene that controls cell shape in root hairs and pollen tubes of *Arabidopsis*
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Rice for life: seeking a physiological and molecular basis for improving submergence in rainfed lowland rice
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Wood formation processes: the key to improvement of the raw material
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Integration of cellular responses *Hooley R.*

Biomolecular design and perception of plant signalling compounds
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Characterisation of genes controlling pre-harvest sprouting in wheat and their manipulation in transgenic plants
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Engineering shatter resistance into oilseed rape
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Genetic improvement of oilseed rape for increased resistance to pod shatter
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Genetic improvement of oilseed rape pods to reduce susceptibility to shatter
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Regulation and genetic manipulation of pre- and post-harvest sprouting in cereals
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Regulation of plant development through gibberellin biosynthesis *Hedden P.*

Structure and function of gibberellin-biosynthetic enzymes
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