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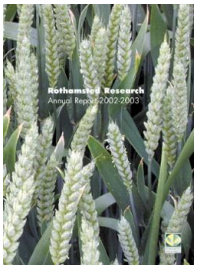
Rothamsted Research Annual Report 2002-2003



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Rothamsted Research

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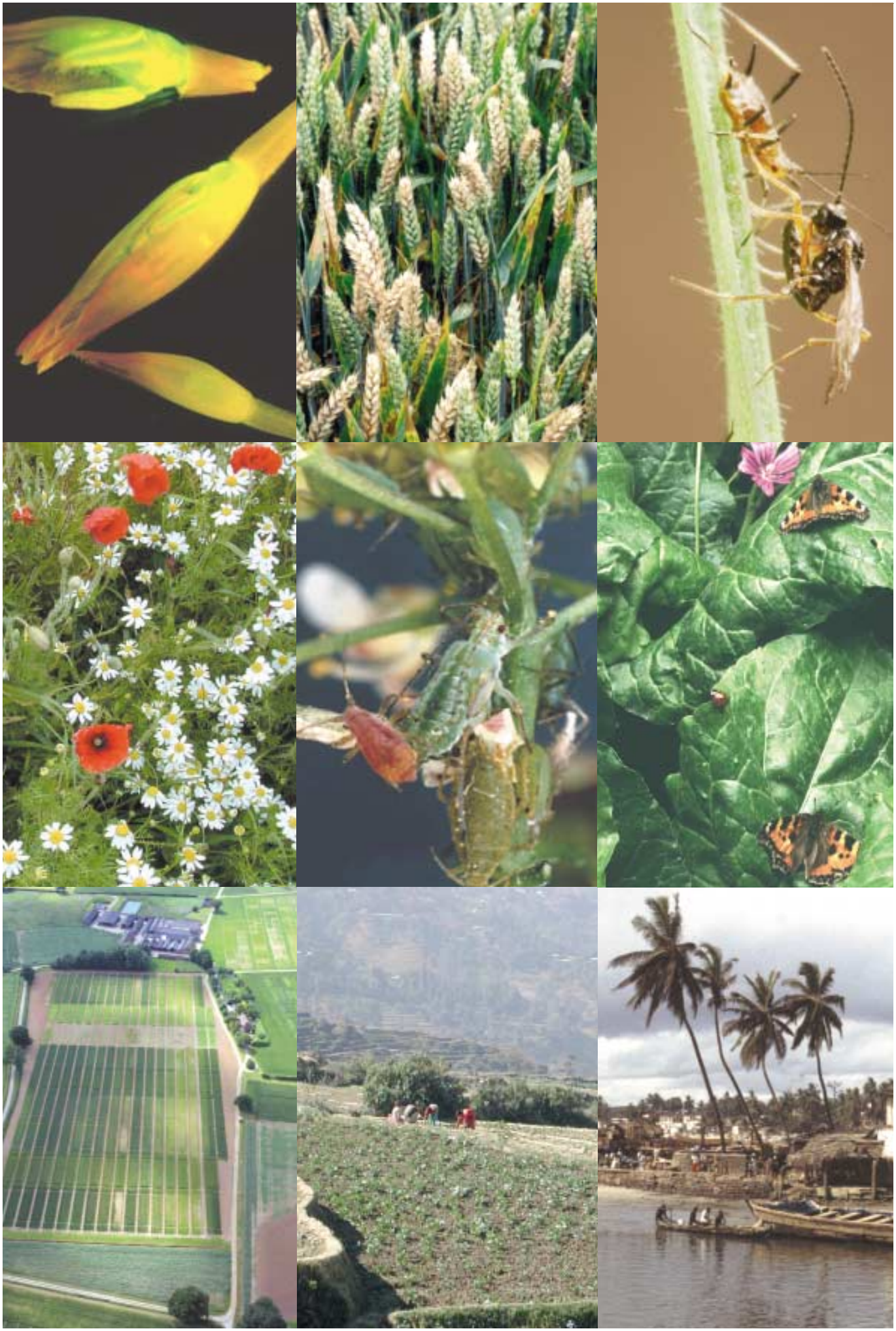

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Research projects

Developmental Genetics
Holdsworth, M.J

Regulation and manipulation of gene expression during development and germination of cereal grains
Lenton, J.R
A transgenic approach to analyse susceptibility to pre-harvest sprouting and potential for improved resistance in wheat
Holdsworth, M.J
Analysis of cereal transplastomic technology for preventing the expression and spread of transgenes in pollen
Jones, H.D
Cereal community resources for investigating gene function
Holdsworth, M.J
Defining the genetic control of germination in Arabidopsis
Holdsworth, M.J
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
Holdsworth, M.J
Development of wheat allele (ASOS)
Holdsworth, M.J
Developmental cell biology of oilseed rape pods
Huttly, A.K
Do transgenes predictably alter the expression of the genome? Using wheat grain as a model
Holdsworth, M.J
Functional genomics of shoot meristem dormancy
Holdsworth, M.J
Molecular biology of embryo development and germination
Holdsworth, M.J
Monsanto Case Award
Jones, H.D
Regulatory gene initiative in Arabidopsis
Holdsworth, M.J
Structural and functional genomics for crop improvement
Holdsworth, M.J
The prevention of pod shatter in oilseed rape
Child, R.D
Tissue culture and transformation of diploid wheat species
Jones, H.D
To further develop, study, optimise and apply enabling cereal transformation technologies
Jones, H.D
Use of maize and rice Mar sequences to stabilise the expression of transgenes in wheat
Jones, H.D
ZEASTAR
Holdsworth, M.J

Signalling and Development
Hedden, P

Molecular cloning and characterisation of genes encoding cytochrome P450s of gibberellin biosynthesis
Hedden, P
Molecular cloning, function and structure of gibberellin-biosynthetic enzymes
Hedden, P
Molecular interactions between ethylene and gibberellin pathways in plants
Hedden, P
Putting insects off the scent; modifying plant semiochemistry to disrupt plant-insect interactions
Shewry, P.R
Regulation and genetic manipulation of gibberellin catabolism
Hedden, P
Regulation of gibberellin biosynthesis
Phillips, A.L
The physiological roles of gibberellin 20-oxidase isozymes in plant development
Hedden, P
The roles of gibberellin 3ß-hydroxylases in plant growth and development
Phillips, A.L

Stress Biology
Foyer, C

Detoxification of reactive oxygen species: Molecular strategies
Foyer, C
Increased nitrogen use efficiency in wheat: Towards a sustainable future (SUSTAIN)
Foyer, C
Integration of primary and intermediary metabolism for optimal resource use efficiency during stress
Foyer, C
Senescense and oxidative stress in plant systems
Foyer, C
The role of extracellular enzymes in xenobiotic metabolism and uptake in plants
Parry, M.A.J

Metabolic Signalling
Halford, N.G

Developing wheat genotypes with reduced nitrogen requirement by manipulation to decrease Rubisco content
Mitchell, R.A.C
Genetic regulation of sink strength in wheat and potato - GRiSSt
Halford, N.G
Improvement of Marama Bean an under-utilised grain and tuber producing legume for Southern Africa
Lawlor, D.W

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MARISCO - Improving arable production systems by expressing marine algal rubisco in crop plants
Parry, M.A.J
Metabolic signalling and the partitioning of resources in plants
Halford, N.G
Molecular basis of changes in resource allocation induced by antisense SNRKI gene expression and environmental stress
Halford, N.G
OPTIMISE
Parry, M.A.J
Regulation and manipulation of Rubisco activity in crop plants
Parry, M.A.J
Source/ sink interactions and resource allocation: the role of carbohydrates
Paul, M.J

Metabolic Engineering
Beale, M.H

Cloning and characterisation of genes involved in xenobiotic metabolism
Theodoulou, F.L
Comparison of the metabolome and proteome of GM and non GM wheat
Beale, M.H
Diversification with crambe, an industrial oilseed crop
Glen, D.M
Engineering novel fatty acids desaturases
Napier, J.A
Expression patterns of gluten genes in transgenic wheat and their effect on grain processing properties
Jones, H.D
Fatty acid metabolism
Napier, J.A
Genetic enhancement of nutritional quality of grain sorghum
Shewry, P.R
Impact of water availability during development on the composition and functional properties of wheat
Shewry, P.R
Improved *Striga* control in maize
Beale, M.H
Isolation of DNAs for novel fatty acid desaturase enzymes and their use to manipulate fatty acid and triglycerol composition in transgenic plants
Napier, J.A
Managing late N applications to meet wheat protein market requirements using pre-harvest Near InfraRed (NIR) sensing
Shewry, P.R
Molecular biology of PUFAs
Napier, J.A
Molecular mechanisms of wheat protein elasticity
Halford, N.G / Shewry, P.R
Polyunsaturates fatty acid biosynthesis: Functional characterisation of novel elongase components
Napier, J.A
Structural and protein engineering studies of novel cereal and oilseed proteins with functional properties or biological activity
Shewry, P.R
The Arabidopsis functional genomics resource network: Metabolic profiling
Beale, M.H
The biochemical and molecular basis for grain texture in wheat
Shewry, P.R
The chemistry and molecular biology of plant signals hormones, defence and terpenoid secondary metabolites
Beale, M.H
The molecular basis for the emulsification properties of seed proteins
Shewry, P.R
Wheat gluten proteins: their characterisation and role in determining the functional properties and end use quality of wheat
Shewry, P.R
Wheat quality improvements through manipulation of storage proteins
Shewry, P.R

Nematode Interactions
Kerry, B.R

Biomanagement of root-knot nematodes in peri-urban agricultural systems
Kerry, B.R
Cultivar trial to assess reproductive rates and tolerance, Woburn 2002
Evans, K
Dupont Case award
Barker, A.D.P
Ecology of tritrophic nematode interactions (ECOTRAIN)
Davies, K.G
Impact of nematophagus fungi on potato cyst populations
Kerry, B.R
Integrated management strategies for potato cyst nematodes
Evans, K
Molecular genetics of interactions between plants and sedentary nematodes
Cabrera Y Poch, H.L
PCN Management Options - a desk study
Kerry, B.R
Potato cyst nematode control in Jersey
Kerry, B.R
Spatial distribution, dynamics and genetics of populations of potato cyst nematodes
Evans, K
Survey of South African soils for nematode destroying fungi
Kerry, B.R
The diversity of *Verticillium chlamydosporium* populations and its relevance to the regulation of nematode populations
Hirsch, P.R
The diversity, biology and dynamics of microbial agents that regulate nematode populations in the rhizosphere.
Hirsch, P.R / Kerry, B.R

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Pathogen Population Biology & Disease Management

Lucas, J.A

Analysis of infection processes in plant pathogenic fungi
Lucas, J.A
Ascospores, fungicides and epidemiology of Septoria diseases on winter wheat
Fitt, B.D.L
Case Award - Douglas Arkell
Fitt, B.D.L
Characterisation and diagnosis of viruses affecting tropical crops
Jones, P
Development of an optical detection system for diseases in field crops (OPTIDIS)
McCartney, H.A
Development of field testing of fungicide anti-resistance strategies with particular reference to the strobilurin (QoI) group of fungicides
Lucas, J.A
Development of immuno-diagnostic techniques for light leaf spot (*Pyrenopeziza brassicae*) on winter oilseed rape
Fitt, B.D.L
Epidemiology of *Rhynchosporium* to improve barley risk assessment
Lucas, J.A
Epidemiology of winter oilseed rape diseases
Fitt, B.D.L
Evaluation of root diseases of winter oilseed rape in the UK
Evans, N
Evolutionary ecology of fungal plant pathogen divergence
Van Den Bosch, F
Fundamental studies of the interaction between environmental factors, crop pathogens and pests, and crops
McCartney, H.A
Identification of fungicide resistance markers in *Rhynchosporium secalis* and the effect of fungicides on populations of barley leaf blotch
Fraaije, B.A
INCO Fellowship - Dr Zbigniew Karolewski
Fitt, B.D.L
Indo - UK collaboration on oilseed crops
Nashaat, N.I
Indo - UK collaboration on oilseed crops (visiting scientists)
Nashaat, N.I
Interactions between cropping systems and soil-borne cereal pathogens
Jenkyn, J.F
Investigation into the epidemiology of Kalimantan wilt of coconuts in Indonesia
Jones, P
Optimising control of stem canker on WOR
Fitt, B.D.L
Pest and disease management system for supporting winter oilseed rape decisions (PASSWORD)
Fitt, B.D.L
Quantitative comparative plant disease epidemiology
Fitt, B.D.L
SECURE - Stem canker of oilseed rape: Molecular tools and mathematical modelling to deploy resistance
Evans, N
The role of volatile signals in plant-fungal interactions
Lucas, J.A
Understanding the evolution and dynamics of fungicide resistance development in cereal pathogens
Fraaije, B.A
Weather/disease interactions influencing winter wheat leaf disease epidemics
Van Den Bosch, F

Wheat Pathogenesis

Hammond-Kosack, K

A functional genomics approach to the identification of genes determining fungal pathogenesis of cereals
Hargreaves, J.A
Characterisation of plant virus transmission by fungi
Adams, M.J
Characterisation of resistance to the barley mosaic virus
Adams, M.J
Consortium for the functional genomics of microbial eukaryotes
Hargreaves, J.A
Effects of fungicides on take-all in wheat
Jenkyn, J.F
Epidemiology and control of fungally transmitted cereal viruses
Adams, M.J
Epidemiology of cereal stem base and ear blight pathogens
Bateman, G.L
Fungicides for controlling take-all in cereals
Bateman, G.L
Hazard analysis control of food contamination: Preventation of Fusarium mycotoxins entering the human and animal food chain
Bateman, G.L
Isolation and characterisation of pathogenicity genes
Bowyer, P
Maximising disease resistance escape and tolerance in wheat through genetic analysis and agronomy
Jordan, V.W.L / Lovell, D.J
Optimising the performance and benefits of take-all chemicals
Bateman, G.L
Pathogenicity of non-biotrophic fungi infecting cereals
Hammond-Kosack, K
Population biology and molecular ecology of plant pathogenic fungi
Bateman, G.L
Response of winter barley cultivars to barley mild mosaic and barley yellow mosaic virus
Adams, M.J
Strategies for the integrated control of take-all
Bateman, G.L

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Plant Population Biology and Genetics
Karp, A

A weed management support system (WMSS) for weed control in winter wheat
Lutman, P.J.W
Bayesian inference of the genealogy of a predominantly selfing population from multi locus genotype data
Dawson, K.J
Determine effectiveness of AEF6102-04H alone and in tank mixture for control of herbicide resistant strains of black-grass and rye-grass
Moss, S.R
Developing and disseminating decision support tools to the arable sector
Mayes, J.A
Development of population genetic models and statistical methods for inferring parameters
Dawson, K.J
Evolution and characterisation of resistance to ALS inhibiting herbicides in weeds
Moss, S.R
Herbicide resistance management: evaluation of strategies (HeRMES)
Moss, S.R
Herbicide Studies
Glen, D.M
Improving crop profitability by using minimum cultivation and exploiting grass/weed ecology
Moss, S.R
Improving willow breeding efficiency for biomass through the implementation of molecular marker technologies
Karp, A
Integrated control of fungal diseases in willows and poplars for bioenergy
Pei, M.H
Integrated non-fungicidal control of Melampsora rusts in renewable energy willow plantations
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Management of emergent aquatic and riparian vegetation
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Methods to diversify field margin plant communities
Marshall, E.J.P
Modelling weed crop dynamics and competition to improve long-term weed management
Cussans, J.W
Novel methods of controlling submerged aquatic vegetation and algae
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Parameterising the biology and population dynamics of weeds in arable crops to support more targeted weed management
Lutman, P.J.W
Partnership willow breeding
Karp, A
Pest population behaviour in relation to the biological chemistry of willows: towards optimisation of non-chemical control
Karp, A
Population genetics of herbicide resistance in grass-weeds
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Provision of best practice advice on aquatic and riparian vegetation management
Newman, J.R
Sustainable weed management: development of techniques to balance biodiversity benefits with retention of yields
Lutman, P.J.W
The dynamic nature of introgressive hybridisation in natural and introduced polyploid plants from agricultural and riparian landscapes: An evaluation of molecular tools in willows
Barker, J.H.A
The effects of different crop stubbles and cereal straw disposal methods on wintering birds and arable plants
Marshall, E.J.P
Use of molecular genetics in understanding population biology of key species in arable systems
Karp, A

Invertebrate Population Genetics and Ecology
Denholm, A.I

A review of research into the effects on farmland biodiversity of the management associated with genetically modified cropping systems
Perry, J.N
Agricultural implications of insect population dynamics and the conservation of biodiversity
Woiwod, I.P
An harmonic radar investigation of the navigational performance of honey bees
Woiwod, I.P
Aphid ecology and population dynamics
Harrington, R
Dissemination and exploitation of aphid monitoring data
Harrington, R
Ecological genetics and management of insecticide resistance
Denholm, A.I
Exploitation of aphid monitoring in Europe (EXAMINE)
Harrington, R
Factors influencing resistance proneness and development in aphids
Denholm, A.I
Farm scale studies of GM winter oilseed rape and farmland wildlife
Woiwod, I.P
Field-scale evaluation of GM crops
Marshall, E.J.P
Forces driving changes in spatio-temporal dynamics in the garden tiger moth (*Arctia caja*) over the UK
Perry, J.N
Individual-based spatio-temporal predator-prey dynamics
Perry, J.N
Integrated control of slugs in arable crops
Bohan, D.A
Integrated control of slugs in horticulture
Glen, D.M
Long term trends in insect biomass
Harrington, R
Management of insect pests and viruses of tobacco using ecologically compatible technologies
Denholm, A.I
Modelling the effects on farmland webs of herbicide and insecticide management in the agricultural ecosystem

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Perry, J.N
Modelling the spatio-temporal distributions of slugs for scenarios of climate change
Bohan, D.A
Monitoring and management of resistance to neonicotinoids and other insecticides in *Myzus persicae*
Denholm, A.I
Monitoring movement of herbicide resistance genes from farm scale evaluation field sites to populations of wild crop relatives
Woiwod, I.P
Monitoring the response of European populations of *Myzus persicae* to Decamethrin
Denholm, A.I
Natural enemies of arable pests - study of movement and host preferences using molecular markers
Loxdale, H.D
Outdoor lettuce: the control of aphids resistant to insecticides
Denholm, A.I
Population and insecticide resistance dynamics in aphid vectors of beet viruses
Harrington, R
Population genetics of knockdown resistance (kdr) to pyrethroid insecticides in the aphid, *Myzus persicae*
Denholm, A.I
Pyrethroid / OP mixtures for the control of *Helicoverpa armigera*
Devine, G.J
Radar studies on the high altitude movement of aphid predators
Woiwod, I.P
Research into spatio-temporal dynamics for ecological and agricultural populations
Perry, J.N
Sea lice resistance to chemotherapeutants
Denholm, A.I / Devine, G.J
Sustainable control of the cotton bollworm, *Helicoverpa armigera*, in small-scale production systems
Devine, G.J

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Behavioural ecology of pollinators
Williams, I.H
Ecological and behavioural side-effects affecting the evolution of insecticide resistance in the aphid *Myzus persicae*
Powell, W
Factors affecting cross-pollination in oilseed rape varieties, particularly low fertility, growing under typical UK conditions
Osborne, J.L
Fungal control of *Varroa destructor*
Ball, B.V
Increasing beneficial insect numbers and diversity in field margins for aphid control
Powell, W
Integrated management of pest and beneficial insects on oilseed rape
Williams, I.H
Integrated pest management strategies incorporating bio-control for European oilseed rape pests (MASTER)
Williams, I.H
MiCo SPA - Microbial control in sustainable peri-urban agriculture in Latin America (Cuba and Mexico)
Pell, J.K
Multitrophic interactions on transgenic plants: Quantifying the risk and determining potential ecological consequences
Pell, J.K
New approaches to studying tritrophic interactions involving resistant transgenic plants
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Pickett, J.A
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Pell, J.K
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Powell, W
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Ball, B.V / Pell, J.K
Spatial modelling of *Bombus terrestris* and *B. pascuorum* populations in agricultural landscapes
Osborne, J.L
The control of exotic bee diseases
Ball, B.V
Utilising populations of natural enemies for control of cereal aphids
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A strategic approach to the effects of pest and disease management on the dynamics of the species complexes of *Bemisia tabaci* transmitted Begomovirus
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Armoured bush cricket investigations
Wadhams, L.J
Biocontrol approaches to aphid control
Wadhams, L.J
Chemistry of rhizosphere interactions bewteen the legume *Desmodium uncinatum* and the parasitic weed *Striga hermonthica*
Pickett, J.A
Development of effective control methods for the chicken mite (CHIMICO)
Wadhams, L.J
Exploiting knowledge of western flower thrips behaviour to improve the efficacy of biological control measures
Wadhams, L.J
Field studies: semiochemicals and pest/natural enemy dynamics
Pickett, J.A
Identification of semiochemicals of insect pests with potential for minimising use of pesticides in UK crops
Pickett, J.A
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Wadhams, L.J
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Wadhams, L.J
Insect chemical ecology: identification and production of chemical signals (semiochemicals)

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Pickett, J.A
Insect chemical ecology: understanding the roles and underlying mechanisms of chemical signals (semiochemicals)
Wadhams, L.J
INSENSE prototypes - Bee sensing systems for volatile indicator molecules
Wadhams, L.J
Integrated control of wheat blossom midge
Wadhams, L.J
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Pickett, J.A
New semiochemical opportunities from *Nepeta spp.* as a non-food crop
Pickett, J.A
Researching strategies for the control of *Culex spp.* mosquitos
Pickett, J.A
Role of wild habitat in the invasion of cereal crops by stem-borers, *Chilo partellus*, *Busseola fusca*, in Africa
Wadhams, L.J

Insect Molecular Biology
Field, L.M

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Moores, G.D
Investigations on the molecular mechanisms of flea resistance to insecticides
Williamson, M.S
Molecular analysis of insect nicotinic acetylcholine receptors
Williamson, M.S
Studies of acetylcholinesterase in *Myzus persicae*
Moores, G.D
The molecular basis of responses by insects to semiochemicals
Field, L.M
The molecular basis of target site and metabolic insecticide resistance
Field, L.M

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Bromilow, R.H

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Bromilow, R.H
Circumventing pesticide resistance through chemistry-led approaches
Khambay, B.P.S
Laboratory column investigation of preferential flow of pesticides; particularly the loading and unloading of macropores
Bromilow, R.H

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Goulding, K.W.T
Assessment of P leaching losses from arable land
Brookes, P.C
Atmospheric deposition and its impact on ecosystems
Goulding, K.W.T
Carbon and nitrogen transformations in soils
Goulding, K.W.T
Development of a prototype soil nitrogen supply calculator
Goulding, K.W.T
Environmental benchmarks of arable farming
Goulding, K.W.T
Framework to evaluate farm practices to meet multiple environmental objectives
Goulding, K.W.T
Harnessing tillage x nutrient management interactions using participatory approaches to improve rice wheat systems productivity and sustainability
Gaunt, J.L
How far will medium term weather forecasts improve assessment of risks?
Glendining, M.J
Improving the physiological and agronomic basis of UK lupin production
Shield, I.F
Increasing the efficiency of phosphate fertiliser use
Brookes, P.C
LIFE - The effect of ploughing after non-inversion tillage
Donaldson, G
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Gaunt, J.L
Long-term experiments in nutrient cycling research
Powlson, D.S
Long-term sustainability of cereal yields
Goulding, K.W.T
Modelling nitrogen fluxes in tundra ecosystems on Svalbard
Poulton, P.R
Paradigms for modelling environmental systems
Whitmore, A
Soil microbial, organic matter and nutrient interactions
Brookes, P.C
Strengthening rural services for improved livelihoods in Bangladesh
White, S.K
Sulphur dynamics in the soil/crop/atmosphere system
Zhao, F.J
Technology transfer: effective nutrient use for arable crops
Goulding, K.W.T
The Coates Farm Study II - Nitrogen flows in a changed mixed farming study
Goulding, K.W.T
The impact of land management practice on the global warming potential (GWP) of UK agriculture
Goulding, K.W.T
Using long-term experiments to study the sustainability of agroecological systems

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Poulton, P.R
Using the PSALM model to interpret the phosphate change point and its relation with iron in the soil
Addiscott, T.M

Nutrient Acquisition
Hawkesford, M.J

A novel method for diagnosis of S deficiency and its development as a practical tool for routine testing
BlakeKalff, M.M.A
Does soil mechanical impedance cause changes in plant gene expression?
Hawkesford, M.J
Dynamics of nutrient pools in plants and their relationship to crop growth, yield and quality
Barraclough, P.B
Effects of nitrogen supply on the wheat endosperm transcriptome
Hawkesford, M.J
Establishing the potassium requirements of modern, high yielding sugar beet crops for yield and beet quality
Barraclough, P.B
Optimising nutritional quality of crops
Hawkesford, M.J
P diagnostics for oilseed rape crops
Barraclough, P.B
Plant use of nitrogen (PLUS N) research training network
Miller, A.J
Regulation of sulphate transporter gene expression and sulphur metabolism in cereals, source-sink interactions and sulphur supply to grain tissues
Hawkesford, M.J
Smart plant technology for sensing crop nutritional status
Hawkesford, M.J
Soil sensors for nitrogen availability
Miller, A.J
The cell biology of nitrogen acquisition and allocation
Miller, A.J

Soil Protection and Remediation
McGrath, S.P

Development of a predictive model of bioavailability and toxicity of copper in soils
McGrath, S.P
Development of a predictive model of bioavailability and toxicity of nickel in soils
McGrath, S.P
Effects of inorganic metal salts on soil microbial activity
McGrath, S.P
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Chaudri, A.M
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Chaudri, A.M
Effects of sewage sludge applications to agricultural soils on soil microbial activity-implications for agricultural productivity and long term soil fertility - Phase II
Chaudri, A.M
Effects of sewage sludge on long term soil fertility: Phase III
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Zhao, F.J
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Hawkesford, M.J
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McGrath, S.P
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McGrath, S.P
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McGrath, S.P
Research on assessment of polluted soils and phytoremediation
McGrath, S.P
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McGrath, S.P
Selection of plant genotypes from Kazakhstan flora contributing to alleviation of heavy metal hazard to human and animal health
McGrath, S.P
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McGrath, S.P

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Powlson, D.S

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Christian, D.G
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Powlson, D.S
Enviros composting project
Brookes, P.C
Evaluating grasses as a long term energy resource
Christian, D.G
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Hirsch, P.R
Governing a trial of the suitability of switchgrass and reed canary grass as a bio-fuel crop under UK conditions
Christian, D.G
Microbial function in nitrogen and carbon transformations
Gaunt, J.L / Powlson, D.S
Provision of information on crops with potential use as a biofuel
Powlson, D.S
Soil carbon fluxes and land use change: modelling component for national carbon dioxide inventory
Falloon, P.D
Soil microbe diversity and activity
Hirsch, P.R
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Richter, G.M
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crop production in the UK
Christian, D.G
To develop a robust indicator of soil organic matter status
Gaunt, J.L
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Falloon, P.D / Smith, P
Understanding the paradox of organic matter mineralization
Brookes, P.C

Biomathematics
Thompson, R

A rational design basis for design of wheat canopy ideotypes for UK environments
Semenov, M.A
A strategic approach to the effects of pest and disease management on the dynamics of the species complexes of *Bemisia tabaci* transmitted Begomovirus
Van Den Bosch, F
Analysis of transient weed dynamics in environments with periodic change and its application to weed population dynamics in crop rotations
Van Den Bosch, F
Application of non-linear mathematics and stochastic modelling to biological systems
Semenov, M.A
Appropriate dose network: new fungicide performance information for wheat growers
Verrier, P.J
Assessing predictive skills of crop models to optimise crop management in the UK
Semenov, M.A
Communicating variety recommendations in the 21st century
Thompson, R
Development of algorithms for the design and analysis of biological experimentation
Payne, R.W
Extension of systems of genetic improvement
Thompson, R
INTEREST (Interaction between the environment, society and technology)
Riley, J
Investigate and develop different modelling approaches in extending understanding and quantification of biological systems
Van Den Bosch, F
Modelling approaches with applications to modelling dispersal and gene flow in populations
Thompson, R / Van Den Bosch, F
Modelling life-history / dispersal-strategy interactions to predict persistence and diversity in agricultural landscapes
Thompson, R
Monte Carlo methods for detecting and using interacting quantitative trait genes
Thompson, R
Representative Soil Survey Scheme
Thompson, R
Research in statistics relevant to biological processes
Thompson, R
Risk assessment for biological control of pest slugs using a slug parasitic nematode
Semenov, M.A
Transgene induced life history changes and the ecology of GMO crops
Van Den Bosch, F
VSN - Visualisation, Statistics and Numerics
Payne, R.W

Sugar Beet Improvement and Production
Pidgeon, J.D

A drought tolerance screen for existing beet varieties: adding value to NIAB variety trial results
Pidgeon, J.D
A novel approach to achieve tissue specific transgene expression in plants
Mutasa-Göttgens, E.S
Assessing drought risks for UK crops under climate change
Mitchell, R.A.C
Biotechnological approach to improved control of quality, pest and disease traits in sugar beet
Mutasa-Göttgens, E.S
Botanical and Rotational Implications of Genetically modified Herbicide Tolerance (BRIGHT)
Lutman, P.J.W / May, M.J
Competition review: Recent progress in sugarcane research, breeding and production practice by majoy sugar exporters
Pidgeon, J.D
Demonstration of headland management options to enhance the environment around UK sugar beet fields - 2002/2003
May, M.J
Effect of weed management on crop yield, weed growth and seed production and invertebrate presence in glyphosate tolerant sugar beet
Dewar, A.M / May, M.J
Energy and environment impact assessment for sugar beet production systems
Jaggard, K.W
Forecasting the yield of the sugar beet crop
Jaggard, K.W
Frost protection for beet in the field
Jaggard, K.W
High resolution meteorological data to support improved decision making and increased profitability in sugar beet production
Jaggard, K.W
Improving the drought tolerance of sugar beet
Ober, E
Nitrogen nutrition of the sugar beet crop
Jaggard, K.W
Physiology of beet growth during autumn
Jaggard, K.W
Predicting changes in the sugar content of delivered beet during the processing campaign
Jaggard, K.W
Production of growers advisory guide and information database
May, M.J
To assess the effect of direct drilling on invertebrate diversity (soil microfauna, earthworms and carabid beetles) in glyphosate-tolerant sugar beet treated with conventional herbicides and glyphosate applied overall or in a band over the rows
Dewar, A.M

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Sugar Beet Protection
Asher, M.J.C

Addressing the need for disease resistant sugar beet seed
Asher, M.J.C
Assess the effect of late control of weeds in glufosinate-tolerant sugar beet on arthropod diversity
Dewar, A.M
Biological control of seedling diseases
Asher, M.J.C
Co-ordination of the BBRO education programme
May, M.J
Comparative analysis of genes induced by Polymyxa in incompatible and non-host interactions
Asher, M.J.C
Mutasa-Göttgens, E.S
Control of late season foliar diseases
Asher, M.J.C
Drought stress in *Beta spp.*
Pidgeon, J.D
Ecology and control of sporadic pests of sugar beet
Dewar, A.M
Efficacy and environmental impact of neonicotinoid seed treatments
Dewar, A.M
Evaluation of sugar beet resistance to beet mild yellowing luteovirus
Smith, H.G
Evaluation of sugar beet resistance to beet yellows closterovirus and beet mild yellowing luteovirus
Stevens, M
Horizontal gene transfer - a role for Plasmodiophoromycete root parasites
Mutasa-Göttgens, E.S
Investigate effects of glyphosate tolerant beet on biodiversity
Dewar, A.M
Molecular Luteovirology: Understanding cell-to-cell movement
Stevens, M
New sources of disease resistance from Beta germplasm
Asher, M.J.C
New sources of rhizomania resistance
Asher, M.J.C
The development of rhizomania resistance for the UK
Asher, M.J.C
The monitoring and control of rhizomania in the UK
Asher, M.J.C
The plant clinic at Broom's Barn
May, M.J
Virus yellows control: Characterisation of virus strains
Stevens, M
Virus yellows control: diagnostic methods
Stevens, M
Virus yellows control: forecasting and spray warning scheme
Stevens, M
Virus yellows control: Transgenic resistance to yellowing
Stevens, M