

# BSPP News

The Newsletter of the British  
Society for Plant Pathology

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**Front Cover:** Recent cover images from *Molecular Plant Pathology* and top right that all important ISI impact factor (copyright ISI Journal Citation Report).

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## Editorial

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In this issue of the newsletter we celebrate the establishment of *Molecular Plant Pathology* as a major international journal (page 10). The launch, consolidation and success of MPP in such a competitive marketplace is an enormous achievement for the Society and especially for our members who have striven so hard in its cause.

More generally, the success of the BSPP journals *MPP, Plant Pathology and New Disease Reports* stands as testament of the scientific basis of the discipline, which goes from strength to strength. This growing knowledge base should provide a solid foundation for our efforts to ensure that Plant Pathology continues to have purpose and relevance. For me that means that it must deliver clear benefits to our sponsors and to society. We will have an opportunity to examine and measure how well we are achieving this at our presidents forthcoming meeting (see page 5).

The recent establishment of the discussion forum on the BSPP website provides us with new opportunities to communicate with one another on a less formal level. The forum is easily assessable via the BSPP website ([www.bspp.org.uk](http://www.bspp.org.uk)), requiring just a simple registration process when joining. From then on you can log-on to comment, discuss, rant or rail, as the mood takes you, on all topics plant pathological. The greatest challenge is to come-up with a witty or ingeniously cryptic moniker to maintain your anonymity!

**Steve Parker**

## From the President

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Plant pathology, or more specifically plant diseases, never ceases to amaze me. So much so that I often wonder if I am a pathological 'anorak'. My family have got used to me going into raptures of delight upon finding various diseases while on our travels or even in the garden. It is this latter location that can give me much food for thought. Where do the pathogens come from? When we moved to our present house the previous occupants grew no fruit, vegetables or salad crops. None were grown by any of our neighbours. I started to cultivate the garden and grow various crops including lettuce. Within two years I had attacks of *Bremia*. Where did it come from? The obvious answer, of course, is that the spores were carried to my garden on the wind. I had a similar experience with rust on Fuschia ... three years disease free and then one autumn it appeared from nowhere. Again the spores must have 'blown in'. All very plausible. But try thinking about the probability of a healthy spore finding a susceptible host in conditions suitable for infection and you begin to realise the magnitude of the task facing such pathogens. If you multiply the answer by all the possible airborne spores from different fungi it is a wonder we can see through the air. This was reinforced this summer when I visited a friend in Oslo. They have two blackcurrant bushes in the garden. Last year they were clean .. this year there was a healthy infection by rust (*Cronartium ribicola*). Maybe it had spread from a neighbour or from pine trees in the vicinity. I did not have time to investigate, but I began to wonder on the differences in infection probability between diseases of field crops where the inoculum produced is very high and the target area available for infection is measured in hectares and the garden situation where the inoculum production is much lower and the area available for infection, measured as ground space, could be less than a square metre. Maybe I should just rest and enjoy the sun on holiday.

I spent virtually all my professional life in industry as part of the process of new fungicide discovery and development. This has undoubtedly influenced the way I think about plant pathology and disease control by fungicides in that I have first hand experience of the processes involved from conception of the new molecule to its point of sale. During that time I gave many talks on the discovery process and the measures taken by industry to ensure their products are safe. Some times I was accused of only trying to sell toxic products and everything I said was treated with suspicion as I was a 'company man'. It was difficult to convince my accusers otherwise; even when I pointed out that my family and I were also consumers. When I joined industry in the late 1970's the fungicide revolution was in full swing as many chemical companies had started their pesticide synthesis research programmes some years earlier and the available markets were opening up, particularly cereals. Safety of new molecules to users, consumers and the environment was paramount within the industry even though 'regulation' was in its infancy. Much discussion ensued about possible hazards associated with various molecular structures. If any perceived risk was seen then the molecule was not made. In those days computer technology was just developing and structure-activity relationships were worked out 'longhand'. At the time we had a wonderful chemist who had such an intimate knowledge of chemical structures and sub-structures and their relationship to toxicity that he could look at a structure and give a well reasoned view on its likely hazard potential. Much later, when the time came for him to retire he was sat down with more chemists and computer programmers in order to transfer his knowledge to a computer programme capable of predicting toxicological hazard from molecular structure. The experts name was Derek, the resultant program became 'Electric Derek'. Of

course such computer aids are commonplace today, but another challenge still remains ... that of designing active fungicides.

Any competent chemist, particularly with the aid of computer programs, could design a triazole and be sure that it would be active in *in vitro* assay. To get it to have specific activity *in vivo* is another matter. Look at the activity spectra of azole fungicides or even the QoI fungicides. Why are there differences in activity spectra between the molecules in each group when all work at the same biochemical site? Why do some QoI fungicides control a very broad spectrum of fungi while others are primarily 'downy mildew' fungicides (I include *Phytophthora infestans* as a downy mildew here ...)? An obvious answer is that it has something to do with transport of molecules across membranes or various site specific properties. To date I have not heard a definitive answer, but the answer, if there is indeed a single answer, would be welcomed by the industry. I fear it is a case that afflicts most research and is beautifully captured in the song lyrics 'The more I learn the less I know'.

By the time you read this several matters affecting your society will be happening. The first involves contact with members. Such have been the advances in communication technology that BSPP feels it must move with the times. As such, it plans to communicate with members electronically in future, a process that is much easier to manage, ensures rapid dissemination of information and is more cost effective for the Society. But it can only do so if it has your correct details. Please ensure that your contact details are up to date ... you can check and correct them yourself on the BSPP web site. Rest assured that your details are not disclosed

to other societies or organisations. If electronic communication is not possible for you, the Society will ensure you are kept informed by other means.

Elections to the BSPP Board will have been held by the time you read this and I welcome the newcomers and am sure they will find their time as Board members to be an enjoyable experience. There were many more nominees for Board membership than available places this year and even though this means some were disappointed at not being elected, I feel it indicates a healthy state for the Society in that so many people are willing to serve. Long may it continue.

The Presidential Meeting also looms (more information on the web site). The meeting is being heavily subsidised by BSPP and as well as having eminent speakers in Prof. John Whipps (Warwick-HRI),<sup>1</sup> Prof Graham Jellis (HGCA) and Dr Wendy Matthews (FSA) we are hoping to attract many young plant pathologists to come and talk to us about their research in various areas. Post graduate researchers and young post docs are the life blood for our discipline and we also hope that many more established (older?) practitioners will also attend to pass on the benefits of their experience and to generate new networking opportunities.

I hope to see you there ... who knows?... you may realise I am not really an anorak after all.

**Phil Russell**



<sup>1</sup>. BSPP Presidential Meeting 2005: Garrett Memorial Lecture  
Unfortunately it is now not possible for Prof. Joe Klopper to present the Garrett Memorial Lecture but BSPP are delighted to announce that the lecture will be given by Prof. John Whipps of Warwick-HRI, UK

## New Vice President - Professor Graham Jellis



The Board of BSPP are delighted to announce that Professor Graham Jellis has accepted the invitation to be the Vice-President of BSPP in 2006, President Elect in 2007 and President in 2008.

Graham is Director of Research and Development at the Home-Grown Cereals Authority, responsible for directing and controlling the R&D function, managing research projects on cereals and oilseeds (including the Recommended Lists) and producing independent information based on this research. He is also currently Lead Technical Director for the Applied Research Forum for Farming and Food which brings together the agricultural levy bodies and other funders in agriculture and food. He is a Special Professor in applied plant pathology at the University of Nottingham and sits on a number of agricultural committees/boards, including the BBSRC

Sustainable Agriculture Strategy Panel and the Rothamsted Research Association. Board.

Graham was trained as a plant pathologist at Manchester University where he completed a PhD on silver scurf of potatoes supervised by George Taylor in John Colhoun's department. He was employed at the Plant Breeding Institute, Cambridge (later PBI Cambridge Ltd) for 27 years, initially as a potato pathologist, then as Head of the Plant Pathology Group and finally as Head of Plant Technology Group.

Graham has been active in the BSPP since its inception. He is a Founder Member and served as Publications Co-ordinator from 1984-91, co-editing four BSPP books resulting from Presidential Meetings. From 1985-93 he was a member of the Editorial Board of Plant Pathology. Graham was an elected Council Member (1989 -1993) and later served as Secretary (1994 -1998). With Nigel Hardwick (who was President at the time), he was instrumental in the establishment of BSPP as a company limited by guarantee.

I am sure you will all join me in wishing Graham a most enjoyable time during his return to the Board.

**Phil Russell**



## Plant Pathology Editorial Board

Two of the 36 members of the Editorial Board of *Plant Pathology* are retiring from editorial duties at the end of 2005.

Both Elaine Davison (Perth, Australia) and Andrew Entwistle (Leamington Spa, UK) joined the Board in 1996. Editors are expected to serve 5 years and so Elaine's and Andrew's contribution to the journal and BSPP is doubly appreciated.

### Richard Shattock

[plantpath@lilyrose.plus.com]



Elaine Davison



Andrew Entwistle & Richard Shattock

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## Opinion

### Needs of a Plant Pathologist?

Having just read Phil Russell's interesting article 'Plant Pathology in decline?' which appeared in the last issue (No.48) has prompted me to think about some of the issues that he raises about the profession. I have just retired after 33 years as an 'applied' plant pathologist, for the first part via the Overseas Development Administration (now called Department for International Development) in the cocoa orchards of Ecuador and then the banana fields of the Windward Islands, and for the second part in the agrochemical industry again returning to the banana plantations of south and middle America and later, back in Europe, monitoring for fungicide resistance.

This was for the most part an enjoyable career and I certainly always regarded myself as a 'plant pathologist' and put that down as my profession when filling out forms or, during my many travels, on those little immigration forms that they often hand out on aircraft. I first came into contact with term 'plant pathology' when it was one of the courses that were available in the final year of the very general B.Sc. degree in 'Biological Sciences' at the University of East Anglia back in 1970. If I had called it a day then, I would have presumably been a 'Biological Scientist' and as such eligible to apply for a huge number of jobs ranging from the local public

health department ( I did actually, and I got the job) to a large food manufacturer (I did actually, but I didn't get the job).

As it was I did not call it a day because the short course in plant pathology (with Brian Lewis) at East Anglia had caught my attention and I decided to take the one year M.Sc. course in 'Mycology and Plant Pathology' at Imperial College. This was an excellent course (run by Brian Wheeler and Ronald Wood), which was essentially of a hands-on applied nature and certainly confirmed my interest in the subject.

Even so, I was at that time enough of a realist to know that the number of job opportunities for a 'Mycologist & Plant Pathologist' were going to be fewer than for a 'Biological Scientist'. However, the fact that plant pathology came somewhere in the scope of agriculture, that people were not going to give up eating and the often presented figures of the rising global population and the need to provide enough food for it etc., kept my interest high and I decided to carry on and do a Ph.D. in a mainly physiological topic at Wye College. Certainly the laboratory skills learned combined well with the previous applied ones but at the end I came out with an applied bias and hence the direction my further career took.

I think for an applied plant pathologist there is nothing more interesting than to be out in the field, plantation, orchard or wherever and to be assessing a disease, taking samples and then doing identification work with the aim of recommending the control measures. But, let's face it, the number of jobs for such an applied plant pathologist have never been many. They were mainly limited to the agricultural advisory services, the agrochemical industry, companies operating large plantations and some agricultural consultancies. Certainly the fusion and takeover spree in the agrochemical industry has reduced one source of jobs. Judging by the what

still seems to be an expanding number of research papers published on plant pathological topics, there must be still a lot of activity in the universities, but I suspect that many of the authors would not primarily consider themselves to be plant pathologists. This is easily understandable due to the increasing importance of molecular biological, plant physiological and biochemical techniques in plant pathology. On the other hand, cuts in the Institutes (e.g. Long Ashton) would indicate that also in the research arena jobs are fewer.

It seems logical that the demand for plant pathologists will determine the number of people wanting to take up the career and thus the need for training them. Phil Russell indicated in his article that after speaking with many potential employers in the public and private sectors there is still a need for field pathologists, but did not quantify the need. Plant pathology has always required a reasonable mix of knowledge of mycology, bacteriology, nematology, plant physiology, etc. Today the need for at least some laboratory experience with some of the molecular biological techniques must be added to the list. A degree course that combines these components with an adequate level of applied field work would produce a person well equipped to be a plant pathologist, even if the degree course was labelled something else e.g. 'Plant Sciences', and make the candidate more flexible in the job market. Phil Russell's proposal of a 'Standard Curriculum' for Plant Science courses is also along these lines. It would of course then need the consensus of existing plant pathologists to advise whether such a Standard Curriculum contains components with the potential of producing people able to meet the requirements expected of a contemporary plant pathologist.

**Keith Cronshaw**

## Cause for Celebration

Amazingly *Molecular Plant Pathology* is approaching the end of its sixth year, a time for celebration. While the sixth year may seem a strange one to mark as a champagne event, there are a number of reasons to pause and to pass on good news to BSPP members and readers of the journal.

*Molecular Plant Pathology* is now firmly established as a high quality journal and has achieved an excellent first impact factor. We are very pleased to announce our first ISI impact factor of 2.838 (Copyright ISI Journal Citation Report), which is very fantastic news. This ranks us 17th in the list of all plant science journals. Our Immediacy Index (a reflection of how current, up-to-date and 'hot' the journal is) is 0.709, ranking us as the 11th journal in plant sciences in this category.

A great deal of our success has been down to the commitment, enthusiasm and plain hard work of our Senior Editors and our Editorial Board. Between them they have provided a combination of high scientific editorial standards and a fair and friendly approach.

Part of the remit of MPP is to rotate half of the Senior Editors and Editorial Board every three years; to give people a well-earned break and also to bring new faces to the journal. It seems only a very short time since we made changes three years ago and amazingly we are at that stage again. So at the end of 2005, we are saying a fond farewell and a big thanks to the following Senior Editors - Andy Maule, Andy Jackson, Sarah Gurr, Richard Oliver, Ulla Bonas. We are pleased to say that we will still have their support as they join the main Editorial Board.

We are also thrilled to announce our new additions to the main Senior Editors will be Jari Valkonen, Olivier Voinnet, Thorsten Nuernberger, Barbara

Howlett and Mary Beth Mudgett. They will be joining the remaining Senior Editors who are staying on for the next period, namely Jim Alfano, Ralph Dean, Sophien Kamoun, Ken Shirasu, Jan van Kan and Vitaly Citovsky,

MPP has always been dedicated to minimizing the time between submission, review and publication and to providing a high quality forum for original research in molecular plant pathology. This has now been enhanced with the Editorial Office launching Manuscript Central v3.3 for electronic submission and reviewing of manuscripts. All of which is still underpinned by the wonderful support of the Editorial Office run by Dr. Diane Hird.

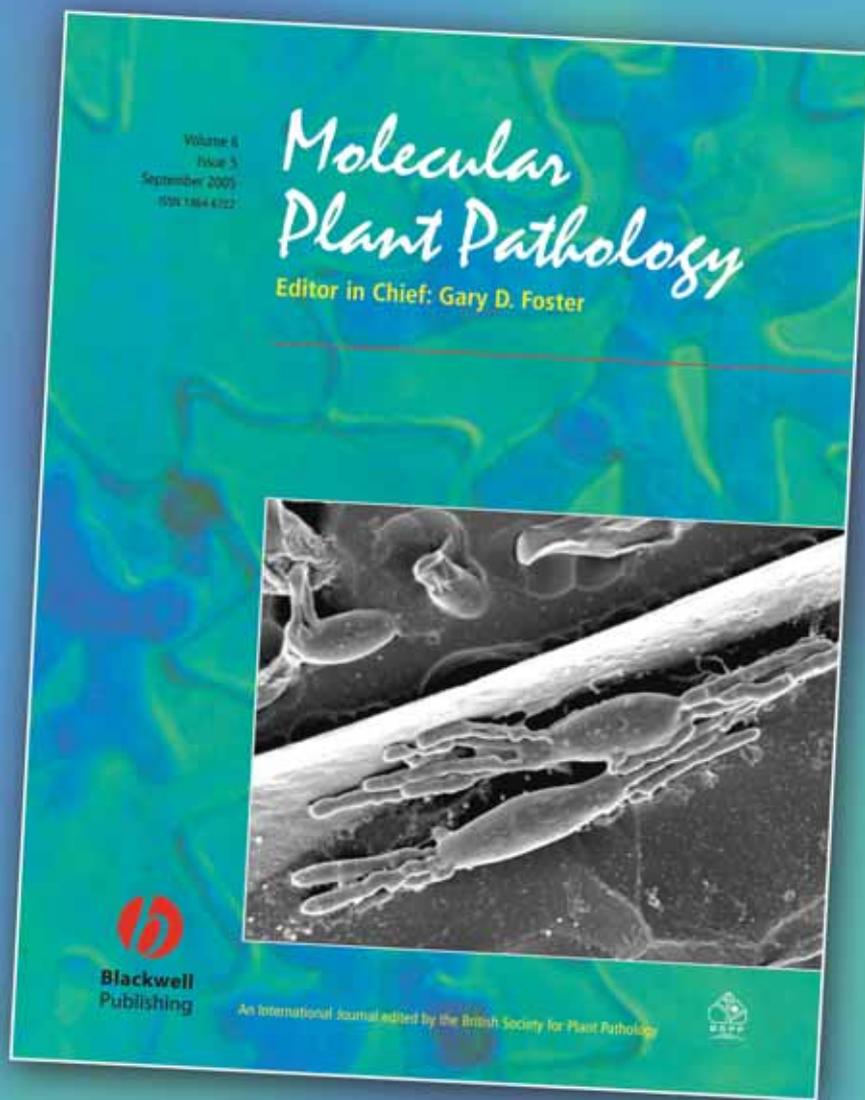
If you have not already done so, I would advise you to have a look at the quality of science that is published in *Molecular Plant Pathology* in the form of our Original Articles. Also take a glance at the informative Pathogen Profiles and our Major and MicroReviews, which are published on a diverse range of topics. These have fast become invaluable not only to the research areas of our readers, but also in the teaching of plant pathology.

So all-in-all a time to celebrate, not only for MPP, but also for BSPP who jointly launched the journal with Blackwells.

Drinks are on me.

**Professor Gary D. Foster**

Editor-in-Chief



# Molecular Plant Pathology

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# BSPP Student Bursary Reports

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## Detection and quantification of *Globodera rostochiensis* and *G. pallida* in Scottish Soil samples

The aim of this project was to assist in the development of a PCR based quantitative method for detection of two agriculturally important plant parasitic nematodes, *Globodera rostochiensis* and *G. pallida*. It is a statutory requirement, in accordance with the EU Control Directive (EU,1969), to conduct a pre-crop soil test to establish that land on which seed potatoes will be grown is free from contamination by potato cyst nematodes.

Agricultural staff of the Scottish Executive Environment and Rural Affairs Department (SEERAD) collect over 6000 samples annually and it is expected that this number will increase in the future when the new EU directive comes into force.

Samples are processed at the Scottish Agricultural Science Agency by visual inspection under a microscope which is both labour intensive and physically tedious. Land may be classified and a phytosanitary certificate issued where positive samples are found.

Real time quantitative PCR assays may provide a less labour intensive, higher throughput and less costly system than that currently used to examine soil samples for PCN. Soil samples of 500gm are taken for statutory examination. To assess an alternative PCR based assay, 500 gm mock PCN free soil samples were obtained and processed in two ways. A subsample of the soil to which known numbers of cysts were added was pulverised in a Retsch Mill. A DNA extraction was then performed. In the second method a "float" was prepared from a 500g soil sample following stirring in water. Cysts float to the surface and thus it is possible to collect a relatively small component of the entire soil sample for further processing. Known numbers of PCN cysts ranging from 1 -100 were added to the

float, pulverised using a bead beater and DNA extracted. The DNA samples were then tested with real time PCR assays for both species. With the second method it was possible to detect PCN in samples with 10 or more cysts but not with one cyst. Improving the sensitivity of the assay and determining if the assays can be used in multiplex format is still being investigated.

Another application of a real time quantitative PCR assay for PCN is to assess the effect of competition between the two species on different hosts. To examine this, I assisted in setting up an experiment to test competition between *G. rostochiensis* and *G. pallida*. The quantitative PCR assay will be used to determine the species ratios once this experiment is ready to harvest.

During the bursary period I also assisted with other glasshouse and laboratory work including the setting up a large screening experiment to test the genetic bases of new sources of resistance to *G. pallida* from the Commonwealth Potato Collection. I have also been extracting cysts and enumerating them from a test to determine the effectiveness of a new potato cultivar to control different populations of *G. pallida*. In addition I gave assistance with molecular techniques including PCR, cloning, plasmid preparation, sequencing, protein expression and Western blotting. This latter work has generated novel sequence information concerning the mitochondrial genome of *Globodera rostochiensis*.

**Rebecca Miller,**

Scottish Crop Research Institute, Plant pathogen Interactions Program, Invergowrie, Dundee

## An Investigation into Specific Identification of Phytoplasma Isolates

I remember being told from a very early age that 'if at first you don't succeed to try, try and try again' and this seems to apply in the world of research science far more than in any other! As much as I have enjoyed my bursary project the irregularities of PCR have become a familiar frustration and the failing of 'fabulous' ideas a worthy complaint. Albert Einstein once said that 'imagination is more important than knowledge' yet these ten weeks have enabled me to expand both knowledge and, seemingly more importantly, imagination, into investigating and attempting to resolve a significant problem.

Phytoplasmas (formerly called mycoplasma-like organisms) are members of the class *Mollicutes* that cause several hundred plant diseases. They are transmitted from plant to plant by insect vectors (mostly leafhoppers) and cause various symptoms, including stunting, yellowing, proliferation (witches' broom), virescence and phyllody. While in moderate climates phytoplasmas cause significant losses in crop production, in tropical climates, the consequences of infection are often disastrous.

Phytoplasmas cannot be cultured *in vitro* in cell-free media; their growth is limited to the insect vector body and plant phloem, presumably because of the absence of many genes required for amino acid, vitamin and fatty acid biosynthetic pathways from their genomes. Nowadays, methods based on PCR and restriction fragment length polymorphism (RFLP) are extensively used in their detection and characterisation, most often using the 16S rRNA gene and the 16/23S spacer region as targets, for their phylogenetic and taxonomic significance. There are several different groups (divided depending upon phylogenetic analysis) to which members of the phytoplasma species are divided into and as yet a diagnostic to distinguish between these groups is unavailable.

Using DNA extracted from infected plant material (some samples obtained from Rothamsted and others by Dr Matt Dickinson) the first stage in the investigation was to determine how well nested PCR amplification of the 16S rRNA gene and restriction digest allowed for the identification of a specific phytoplasma group. Although this is the common method used the amplification and digestion using enzymes *AluI* and *RsaI* did not provide significant variation between groups, due to the highly conserved nature of this gene. However DNA sequencing (requiring the prior step of sub-cloning) provided reassurance that named samples were the correct isolates.

Interest was soon turned towards finding more varied regions of the phytoplasma genome to amplify in the hope that these genes will allow distinction to be made from one group to the next. Following on from suggestions made by Streten and Gibb, two genes, *ftsH* and peptide chain release factor (*pep*), were looked at for increased variation, the later providing more promising results. The *pep* gene would be excellent to use for separation of some groups, although a second diagnostic test would be required to determine between several seemingly paired groups. This second diagnostic could be RFLP or the use of group specific ribosomal primers, as used by Anfoka and Fattash to identify Aster Yellows in Peach trees in Jordan, 2004. However, inconsistencies regarding the PCR amplification of the *pep* gene add it to the growing list of 'unsuitable candidates' for specific diagnosis. The potential to design better primers or PCR conditions may serve to improve the reliability of a test using the *pep* gene, work on which is being continued, but there are additional angles from which to approach the problem of simple and accurate diagnosis.

Examination of the Onion Yellow's genome in the publicly available database (NCBI) has indicated several genes showing some homology with DNA sequences in other phytoplasma and bacterial species. Sequences appearing to have suitable regions of conserved DNA to be used as universal primer sites in these examples mask areas that may potentially have enough variation present to distinguish between phytoplasma groups. This highlights an area for further investigation and the potential of genes, such as *secY* (coding for the SecY preprotein translocase subunit) and *pheS* (Phenylalanyl-tRNA synthetase alpha subunit) in the Onion Yellow's genome, as regions enabling specific diagnosis.

Analysis of the sequences for eighty-four phytoplasma 16S genes (available on the NCBI database) did restore faith regarding the use of this gene for diagnosis. It can easily be amplified using primers P1 and P7 followed by 16S fwd and 16S rev and digestion with either *Mbo1*, *Tru9I* or a combination of both enzymes does offer a reasonable differentiation between phytoplasma groups. Having two copies of a gene is an advantage with PCR and hence the most obvious choice of gene to investigate further is the 23S rRNA gene, known to be more varied than the 16S. Little work has been conducted into this gene and few sequences can be found on the NCBI database, however its amplification and digestion using *MboI*, *Tru9I* and *HaeIII* suggests great potential as a more specific method of phytoplasma detection.

My time in the lab has opened my eyes to several misconceptions I had as a second year undergraduate. It sounds silly now (and shouldn't be used to judge teaching standards at the University of Nottingham), but I always envisaged a PCR machine to look like an early computer, perhaps filling a small room and involving a vast array of complicated dials and necessary points of data input. Understandably I was happy to learn that in fact PCR programme input is easier than setting a

VCR to record and several will fit comfortably along one length of bench! The amount that I have learned far exceeds the appearance and use of a PCR machine and to be honest far exceeds all that I hoped I would learn. The opportunity to attend a BSPP regional meeting was invaluable. I was introduced to a large variation of potential career paths involving plant pathology, one of which I eventually hope to take (preferably one leading to the tropical climates I talked of earlier!) All that remains to say is a very big thank you to Dr Matt Dickinson for all of his help and to the BSPP for giving me the opportunity to work alongside accomplished scientists while expanding my skills and understanding.



Images from the annual lab walk in the Peak District, this year in Manifold Valley



The devastation caused to Coconut trees by St Paul's Wilt in Ghana.

## Quantifying *Podosphaera aphanis* by Real Time PCR

My summer BSPP undergraduate bursary job has been joyful, challenging, exciting and successful. My placement started with a visit to Cereals 2005, the biggest show for arable agriculture in the UK. I was amazed by the number of people working on agricultural research and the variety of products and service available- machines, fertilisers, pesticides, new technologies, training and consultancy services, and finally, but not least, the dedicated researchers. It is hard to describe the scale of the event; you need to see it yourself!

After a full training in University of Hertfordshire's Molecular Biology laboratory, I became a member of the team working on the Epidemiology and Control of Strawberry Powdery Mildew. In the UK polythene tunnel covers are used by the strawberry industry to create more favourable conditions for fruit production. Unfortunately, they also create ideal conditions for the growth of *Podosphaera aphanis*, the cause of strawberry powdery mildew. Jolyon Dodgson's ongoing PhD research suggests that strawberry plants are infected with *P. aphanis* before the propagators deliver them to the growers. But the exact level and significance of this primary infection to crop production isn't yet understood.

To help me to get the first hand knowledge of disease symptoms and their impact on production, I was offered the opportunity to work at the field experiments in Lincolnshire and Kent. My job was to tag the leaves infected with *P. aphanis* at the early stage. I met the growers in Lincolnshire and realised how hard they have been working to develop better control methods for powdery mildew. Their environmental awareness really impressed me. I think they provide a perfect model for modern British farmers: not just focused on the yield, but spending time and energy on researching plant diseases as well! Now whenever I eat a strawberry I will always remind myself of how many people had been working tremendously hard to get it fresh and tasty!

My first job in the Molecular biology laboratory was to extract DNA from strawberry leaves infected with the pathogen. The objective of the extraction was to use Real Time PCR (RT-PCR) to quantify the amount of *Podosphaera aphanis* DNA associated with strawberry leaves with levels of symptom. Unfortunately the CTAB method available did not work well with both strawberry DNA and powdery mildew DNA. The RT-PCR proved that CTAB method could not extract both DNAs. No pains no gains! Under the instruction from Dr Avice Hall, together with the help from all the technical staff from UH Molecular biology laboratory and Jacky Chan from Cambridge University, a new protocol was finally created after almost 6 weeks non-stop effort ! This protocol works very well for both strawberry DNA and Powdery Mildew *Podosphaera aphanis* on young leaves!

Time flies. I finished my ten weeks BSPP vacation bursary with great pleasure and the feeling of achievement! I only wished there could be were another ten weeks ahead of me! I learnt a tremendous amount of molecular biology techniques and laboratory skills. I gained valuable knowledge on how to do a research, had my first taste of plant pathology and realised its importance to food production. I also shared tears and sweat with the whole research team. Many thanks to Avice, Jolyon, Jacky and BSPP, you made my summer a joyful, fruitful and unforgettable one! I will take all the possible opportunities from BSPP to fulfil my ambition of making contributions for the development of the world agriculture!

**Xiaoqiang Zhang**

University of Hertfordshire



# Fellowship Report

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## Resistance against *Fusarium* head blight

Breeding for resistance against *Fusarium* head blight (FHB) has high priority in many breeding programmes but progress has been slow due to complex polygenic nature of disease resistance, the diversity of resistance sources and poorly understood interactions when combining these diverse resistance sources. This BSPP Fellowship was to study cultivar resistance against FHB and comprised of two parts the firstly visiting the FHB research and breeding programme at CIMMYT, Mexico and secondly conducting experiments at the Swiss Federal research centre Agroscope RAC Changins.

Using the detached leaf assay and resistance against *Fusarium* spp. in the seed germination assays we have previously identified important components of partial disease resistance (PDR) in European wheat, although it is clear that many other components of partial disease resistance are not detected in either assay including factors such as heading date. Nevertheless evaluating FHB resistance as the sum of individual components of partial disease resistance allows the possibility of a more directed breeding strategy by pyramiding genes from complimentary resistance sources. One of the important components of partial disease resistance in European wheat includes the ability of a cultivar to delay sporulation measured using a *Microdochium nivale* detached leaf assay and which has been most closely related to resistance to FHB disease spread.

Specific objectives of this Fellowship were to begin to evaluate application and validation of resistance breeding incorporating selection based on components of partial disease resistance. In addition we evaluated over 100 genotypes derived

from wide crosses and synthetic wheat, provided by Maarten Van Ginkel, CIMMYT, to investigate if novel sources of specific components of partial disease resistance from wide crosses could be identified to provide sustainable resistance in wheat of utility for breeding purposes.

Experiments were conducted at Agroscope RAC Changins in Fabio Mascher's Laboratory with the technical support of Stefan Kellenberger, Matthieu Canales, Eveline Martin, and Celia Bequain. Within the Swiss spring wheat disease resistance breeding programme, we evaluated a range of genotypes using the detached leaf and seed germination assays. Utilising multivariate analysis we identified additional components of partial disease resistance that could form part of pre-screening for FHB resistance in addition to marker assisted selection and whole plant evaluation of disease resistance. Among the CIMMYT genotypes derived from wide crosses and synthetic wheat we identified genotypes as potential sources for enhancing the PDR component latent period (ability to delay sporulation measured using the detached leaf assay).

We have previously found latent periods in related Gramineae well in excess of those found in commercial wheat cultivars. The present findings suggest that synthetic wheat and wide crosses may be a source of enhanced resistance for this PDR component in wheat and warrants further screening of a wider range of material using the detached leaf assay to identify the best potential sources for enhancing this PDR component.

The Fellowship from the BSPP provided a valuable and very productive opportunity for me to meet with international scientists and plant breeders and

conduct collaborative research. I am particularly grateful to the wheat breeders at CIMMYT for the discussions and providing material from their breeding programmes to conduct experiments in Switzerland. My thanks to Carmen Velaquez and both Mari and Moni in the Phytopathology laboratory at CIMMYT for introducing me to Mexican cuisine and the traditional fiesta and to all those in Switzerland for great evenings enjoying the famous Swiss cheese dishes: large pots of Fondue and loafs of Raclette.

I wish to thank the BSPP and Agroscope RAC Changins, for their support which enabled me to undertake this Fellowship to begin to put research findings to practical use within wheat breeding programmes.

**Roy Browne**

University of Cambridge



From left to right Fabio Mascher, Matthieu Canales and Stefan Kellenberger Agroscope RAC Changins, Switzerland.



From Left to right Carmen Velaquez CIMMYT, Heather, myself and Daisy (Visiting Scientists at CIMMYT) enjoying a day at the pyramids close to Mexico City.



## MBPP Ambleside 19 - 21 September 2005

Leighton Pritchard, Sonia Humphris, Lucy Moleleki, Christelle Robert, Eleanor Gilroy, and Michael Ravensdale

The Molecular Biology of Plant Pathogens conference was held this year from 19th to 21 September 2005 in Ambleside, Cumbria and is partly sponsored by BSPP. The MBPP meeting provides a forum for young scientists, generally PhD students and first-term postdoctoral researchers, to present their work in a supportive but formal environment. The meeting is popular for its uniquely collegiate atmosphere, which is designed to encourage communication and collaboration between research groups, from principal investigators to postgraduate students. Traditionally, this meeting has been held in rural towns that are not associated with any particular research centre, in part to foster this kind of interaction.

This year's conference saw the coverage of plant pathogens extended from fungi to bacteria and nematodes for the first time, and the correspondingly increased interest produced the largest ever attendance, at over 100. Organisations with a presence at the meeting stretched across the entire country, as fifty speakers represented universities from Aberdeen to Exeter, and institutes from Dundee to Rothamsted. The host-pathogen systems were diverse, taking in bacterial pathogens of solanaceae such as *Erwinia carotovora* subsp. *atroseptica*, *Pseudomonas syringae* and *Ralstonia solanacearum*, barley and *Arabidopsis* mildews, *Ganoderma* rots on oil palms, nematodes feeding on potatoes, a range of fungal and oomycete crop pathogens, and even *Verticillium fungicola*, a fungal pathogen of a fungus. Although these systems were diverse, many common themes were identifiable, both in the actions of the pathogens themselves, and in the experimental and investigative methods used.

A very strong theme in this year's meeting was the perturbation of the host-pathogen system by gene knockout and, particularly this year, gene knockdown. Gene silencing, by RNA interference (RNAi), Virus-Induced Gene Silencing (VIGS) and microRNAs (miRNAs) all featured, revealing intriguing facets of infection from both the host and pathogen sides of the pathological divide. Eleanor Gilroy (SCRI) opened the meeting with a discussion of the plant hypersensitive response (HR), and an investigation of the role of cathepsin B, involving VIGS. She was followed by Claire Walker (U. Aberdeen), who described the role of an RNA helicase involved with *Phytophthora infestans* sporulation, the function of which was clarified by RNAi gene knockdown. Gene silencing played a major role in investigations into dry bubble in *Agaricus bisporus* (Ana Costa, HRI Warwick), characterising hydrophobins in *Cladosporium fulvum* (Helene Lacroix, Imperial College), and the actions of laccase and superoxide dismutase in *Botrytis cinerea* (Risha Patel, U. Bristol), and an overview of gene silencing technologies in basidiomycetes was provided by Mary Heneghan of the University of Bristol.

Investigations into the molecular control of the host's biochemistry as part of the pathogen's action of infection were also a uniting thread for many talks. We heard from Dagmar Hann of the Sainsbury Laboratory how *P.syringae* flagellins and the Type III Secretion System (T3SS) direct infection on *N. benthamiana*. There was much interest in the T3SS in bacteria, which introduces effector proteins into host cells, particularly from Sonia Humphris and Lucy Moleleki of SCRI (*E. carotovora* subsp. *atroseptica*), Peter Burlinson of the University of Oxford (*Pseudomonas* species), and Adam Brandon

of the University of Nottingham (*P. syringae*). Robert Jackson of the University of Bath described the modulation of host responses to infection by the production of extracellular polysaccharides by pathogenic bacteria, Lizzie Pirie of Rothamsted Research Institute presented the microscopic visualisation of host-pathogen molecular interactions by Green Fluorescent Protein labelling in the *Leptosphaeria maculans* infection of *Brassica napus*, while Lisa Gow at the University of Bristol gave an account of the interactions between potato and Potato Virus Y strain NTN.

Integration of the large amounts of information generated by modern biological methods is a key issue, and several bioinformatics resources and approaches were described. June Petty from the University of Manchester spoke about COGEME, a combined bioinformatic, proteomics and transcriptomics resource provided by the Universities of Manchester, Exeter and Aberdeen, and described case studies using these facilities. Christelle Robert of SCRI described bioinformatic identification of regulatory sequences in bacterial plant pathogens, and Laura Baxter of HRI Warwick demonstrated the utility of cross-species bioinformatic and sequence analyses in her presentation on conserved pathogenicity regions in four oomycetes. Integration and access to the relevant primary literature is key to research and Thomas Baldwin of Rothamsted RI described a publicly-available database of research papers associated with pathogenicity and virulence provided at RRI.

Some institutions provided several speakers at the meeting, and this allowed some groups to present a number of perspectives on their work. The eight speakers from the Scottish Crop Research Institute covered mechanisms of infection by *Erwinia carotovora* subsp. *atroseptica*, interactions between nematodes and the host plant, and the plant

hypersensitive response on infection by oomycetes. Oomycete infections of potato and *Arabidopsis thaliana* by *Phytophthora infestans* and *Hyaloperonospora parasitica* and fungal pathogens were the main focus of the eight speakers from HRI Warwick. A large proportion of talks involved collaborations between more than one organisation, and the integrative approach to the study of plant pathology was evident throughout.

Michael Csukai from Syngenta, one of the sponsors of the meeting, gave a talk on the importance of research into the mode of action of their crop protection product range, and the economic and environmental importance of crop protection. This was reflected by several speakers, including Sally Gilbert of Rothamsted RI, who described investigations into the mode of action of a novel fungicide, and the fitness costs of resistance to fungicides in pathogens (Rebecca Wyand and Marion Atkinson, John Innes Centre).

In addition to the many high quality talks given at the meeting, social interaction between all attendees was encouraged, not just at the conference banquet but throughout. On the traditional 'free afternoon', many delegates took the chance to explore the picturesque setting of Ambleside, and in some cases Lake Windermere itself. Meals provided at the conference centre were of a high standard, and following the evening meals many people remained behind to chat about current and potential collaborations, while others did this in nearby pubs. On the last evening of the meeting Nick Talbot gave a very entertaining talk on rice alcohol, where (amongst some rice-related information) he described the existence of a webcam for spotting people with mullet haircuts – you'd be surprised how many are still around! The talk segued into a rice wine (sake) tasting session before the conference banquet, and following dinner the students held a well-deserved party to get to know each other and

relax after many excellent talks.

In conclusion, the MBPP meeting yet again successfully delivered a collegiate forum for young scientists in the plant pathogen community to present their work, to gain an overview of the current work in the field, and to foster collaborations that will help maintain the prominence of UK research into plant pathogens well into the next generation of research leaders. If you've missed out so far, please come along to the next meeting.

**Below are some comments by the students and early post docs:**

**Sonia Humphris (Post doc)**

The meeting environment was very relaxed and informal as only PhD students and first year post docs gave oral presentations. All attendees of the meeting stayed in nearby student accommodation and ate all meals together at the college, meaning delegates could meet in a relaxed and casual environment encouraging interaction between different groups. The free session on the Tuesday gave everyone a break from the talks and the opportunity to take a walk in either the beautiful surrounding countryside or to the numerous shops in Ambleside village.

All talks were of an exceptionally high standard and of particular interest to me, were the two talks given by individuals from Sainsbury laboratory in Norwich. Dagmar Hann found that bacterial mutants defective in the TTSS were non-pathogenic and that two effector proteins (named AvrPto and AvrPto) produced by *P. syringae* suppress plant defences. I also learned from this talk that plants can detect bacterial flagellin and subsequently activate plant defences. Tatiana Mucyn found a gene in tomato plants, Prf that encodes a protein required for resistance against *P. syringae* strains producing the AvrPto effector proteins. This seemed relevant to

me as I work on the T3SS and will be helping to develop plant response microarrays in the near future.

**Lucy Moleleki (PhD student)**

In previous years, this conference focused mainly on fungal research. However, for the first time this year, research on other pathogens such as bacteria and nematodes were included. For me, working on bacteria, this was a great opportunity as it meant that I could present my work in this conference and enjoy a wide array of talks.

There were over 100 delegates from well renowned institutes in Britain such as SCRI, Rothamsted, Sainsbury (JIC) and universities such as Oxford and Warwick just to mention a few. Since only PhD and first year post docs were given the opportunity to discuss their work, it was less intimidating for me as a PhD student to present. Generally the atmosphere of the conference was very friendly. There were plenty of opportunities for delegates to interact, as we all had our breakfast, lunch and dinner at the same venue. This afforded me a chance to speak to many different people from different institutes.

The questions and suggestions that were given to me will be seriously considered as I progress with my PhD. I also enjoyed listening to talks in other disciplines, but mostly I enjoyed two talks from the Sainsbury lab as these were closely related to my work.

For me as a foreign student, it was also an opportunity to see a different and really beautiful part of Britain that I might not have had an opportunity to visit otherwise. The organizers of the conference had also arranged a two-hour slot for a walk around a lovely lake. That allowed us a chance to enjoy spectacular views and to breathe in the freshness of this area.

### **Christelle Robert (PhD student)**

The different sessions scheduled in Ambleside were really relevant in terms of exploration of the main areas related to plant-pathogen interaction and disease development. These three days were very well organised showing the work of PhD students and post docs in these main areas. The plenary sessions enabled me to have a better understanding of the background to each subject. These conferences are also a good opportunity to meet people from other main bio-centres. I also enjoyed all the events scheduled around the meeting, such as the walk around the lake near Ambleside.

The Molecular Biology of Plant Pathogen meeting is a real challenge in terms of the various topics to be addressed in all the sessions. It would be of great interest to reinforce and enhance the key role of computational biology approaches that have been shown to be of major interest when combined with biological expertise. This meeting would benefit a lot from encouraging more computer scientists to come along and promote strong interactions from both sides, i.e. computational approaches and experimental validations.

### **Eleanor Gilroy (Post doc)**

The picturesque town of Ambleside with quaint slate-built houses and shops was an ideal setting for the conference, small enough to walk around the charming streets with ease and just large enough to absorb all the conference attendees in the evenings. The atmosphere was tense at first with the prospect of speaking, at perhaps one's first ever conference. The mood gradually lightened as each young scientist in turn took their place behind the podium to address the 101 people in the audience, finishing with a sense of satisfaction and relief. Immediately, the benefits of 10-20 minutes of fame became apparent, acting as a lubricant for initiating conversations between other previously anonymous speakers and their renowned supervisors/group

leaders in a way that no poster session at larger conferences could ever rival.

The subjects presented, although all related to pathology, were diverse, giving each young speaker confidence that they might actually be the most well-informed person in the room regarding their particular research topic. The talks I found most enjoyable and relevant to my own work was given by Tatiana Mucyn from the John Rathjen lab on the role of Prf in signal transduction by tomato Pto and by Mary Coates from Jim Beynon's group describing pathogenicity factors in *Hyaloperonospora parasitica*. In terms of new and interesting areas of research I enjoyed the seminar presented by D. J. I Thomas from HRI on the characterisation of *Agaricus bisporus* responses to *Verticillium fungicola* infection and by Neil Horner from Pieter van West's group who described the potential use of the oomycete *Pythium oligandrum* to control *Botrytis cinerea*, *Fusarium* spp and *Phytophthora* spp infections in crop plants.

By the end of the meeting, most people were no longer strangers but friends united as representatives of UK plant and fungal pathology that will look forward to meet again at future national and international conferences.

### **Michael Ravensdale (PhD student)**

My experience at the Ambleside conference was very positive and has benefited me in a number of ways. Firstly, I was able to spend time with my colleagues away from the workplace, which facilitated the formation of closer personal bonds. Secondly, I feel much more aware of the current state of molecular phytopathological research in the UK. More specifically, I have gained a deeper understanding of where the major contributors to our discipline are located, who the lead scientists are, and the direction of their research. Finally, I

was able to observe a variety of presentation styles, given by speakers of various levels of experience. Through this I was able to gauge my progress in this faculty and to set new goals for my continued development.

Some of the more interesting talks were the ones about fungal, bacterial and viral pathogens of Basidiomycetes, as this subject matter was not familiar to me.

The venue of the conference was marvellous, and I intend to visit Ambleside again.



Paul Birch (second right) from SCRI looking very tired after walking for only 10 minutes!

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## Forthcoming Meeting

### Symposium on Diversity for Breeding 14–15 December 2005 NIAB, Huntingdon Road, Cambridge, UK

This two day symposium will investigate new opportunities to exploit crop genomes as a source of novel alleles for plant breeding. It will provide a timely opportunity to inspire and stimulate renewed interest in this topic that will underpin both national and international initiatives and imperatives.

The meeting will start on Wednesday 14th Dec at 13:00 with Dani Zamir from the Hebrew University of Jerusalem, speaking on how unused natural variation can lift yield barriers in plant breeding. Day 2 will begin with Prof Susan McCouch from Cornell University speaking on seed banks and genomics: natural partners.

#### Background

Recent developments in plant science are spectacular and have the potential to address many of the nutritional, health and environmental challenges facing mankind. Although it is widely recognised that plant-based processes can offer truly sustainable solutions, the complete spectrum of genetic variability available to plant breeders is not always fully exploited.

Pre-existing natural sources of biodiversity, coupled with accurate phenotyping, can enrich the genetic basis of cultivated crops with novel alleles that have the potential to improve productivity and adaptation to a range of environments.

'Diversity for Breeding' will provide case studies of how novel sources of alleles have been discovered and efficiently introgressed into adapted germplasm based on 'genomic knowledge' of crops and their wild relatives. The Symposium will also address how the UK's public investment in plant and crop genomics can be used to unleash the genetic potential of our wild and cultivated germplasm resources for the benefit of society.

Further details can be found at <http://www.niab.com/>

## Other Meetings

February 2006

### **Dundee Conference: Crop Protection In Northern Britain.**

Mailto: [S.murray@ed.sac.ac.uk](mailto:S.murray@ed.sac.ac.uk)

28 Feb - 1 March, Dundee, Scotland

May 2006

### **58th International Symposium On Crop Protection**

Mailto: [Kris.DeJonghe@ugent.be](mailto:Kris.DeJonghe@ugent.be)

9 May, Ghent, Belgium

### **20th International Symposium On Virus And Virus-Like Diseases Of Temperate Fruit Crops, And 11th International Symposium Of Small Fruit Virus Diseases.**

Mailto: [Caglayan@mku.edu.tr](mailto:Caglayan@mku.edu.tr)

22 - 26 May, Antalya, Turkey

June 2006

### **15th Biennial Workshop On The Smut Fungi**

Mailto: [blazkova@vurv.cz](mailto:blazkova@vurv.cz)

11 - 14 June Prague, Czech Republic

July 2006

### **16th International Congress - International Organization For Mycoplasmaology (IOM)**

[www.defra.gov.uk/corporate/vla/aboutus/aboutus-iom-page1.htm](http://www.defra.gov.uk/corporate/vla/aboutus/aboutus-iom-page1.htm)

9 - 14 July, Cambridge, England

### **The 11th International Conference On Plant Pathogenic Bacteria**

[www.csl.gov.uk/Contact/lcppb.Cfm](http://www.csl.gov.uk/Contact/lcppb.Cfm)

10 - 14 July, Edinburgh, Scotland

### **The 4th International Bacterial Wilt Symposium**

[www.sasa.gov.uk/about\\_sasa/internationalconferences.cfm](http://www.sasa.gov.uk/about_sasa/internationalconferences.cfm)

17 - 21 July, York, England

August

### **8th Conference Of The European Foundation For Plant Pathology & British Society Of Plant Pathology Presidential Meeting**

[www.EFPP06.kvl.dk](http://www.EFPP06.kvl.dk)

13 - 17 Aug, Copenhagen, Denmark

### **8th International Mycological Congress**

[www.australasianplantpathologysociety.org.au](http://www.australasianplantpathologysociety.org.au)

20 - 25 Aug, Cairns, Australia

September

### **Bms Annual Conference - Stress In Yeasts And Filamentous Fungi**

Mailto: [bmsmeetings@tiscali.co.uk](mailto:bmsmeetings@tiscali.co.uk)

4 - 7 Sept, Birmingham, England

October

### **16th International Plant Protection Congress**

Mailto: [md@bcpc.org](mailto:md@bcpc.org), Web: [www.bcpc.org](http://www.bcpc.org)

15 - 18 Oct, Glasgow, Scotland

## International Conferences & Meetings

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### 13th International Sclerotinia Workshop, Monterey, California, USA, 12 - 16 June 2005

The 13th International Sclerotinia Workshop was held at the Asilomar Conference Grounds on a scenic part of the Californian coastline near Monterey to discuss and present new developments in Sclerotinia research. The delegates represented most research groups working on Sclerotinia with the majority coming from the USA and Canada. Five formal sessions covered 1) genetic variation in populations; 2) pathogenesis/pathogen development; 3) development of resistance; 4) biological control; 5) epidemiology and disease forecasting. There was also a poster session and a field trip to examine diseases (including Sclerotinia!) associated with vegetable and fruit production in the nearby Salinas valley.

John Whipps presented an invited talk entitled "Pathogenicity genes in the sclerotial mycoparasite *Coniothyrium minitans*" and together, John Clarkson, John Whipps and Caroline Young (ADAS) co-presented three posters from a collaborative project covering different aspects of forecasting Sclerotinia disease in field-grown lettuce involving work on effects of soil temperature, water potential and conditioning on carpogenic germination of sclerotia and validation of a predictive model.

Research on molecular aspects of Sclerotinia has expanded since the last meeting, particularly in the search for an understanding of clonal populations and recombination events in the pathogen as well as gene expression during pathogenesis. This work is driven by the recent sequencing of the *Sclerotinia sclerotiorum* genome announced at the workshop and such a genetic resource will undoubtedly promote further work in the future on this area. The other research topic where considerable progress

has been made is in disease forecasting. Besides the work done by ourselves at Warwick HRI in collaboration with ADAS on lettuce, forecasting work in Canada and the USA on carrots and peanuts has also gained impetus and some new predictive models may soon be available for growers. Few new chemicals appear to be available for control of the pathogen although Boscalid appears to be an exception.

The field trip provided an insight into the all-year-round production system available in the Salinas valley. Specific environmental conditions and soils enable at least three crops of vegetables a year. Unfortunately, with such intense cropping systems, soil-borne diseases such as Sclerotinia continue to build up. The current exemption for use of methyl bromide on strawberry will eventually have to cease and this will cause a major problem in the area along with increasing soil salinity and nitrates in the water. A potential time bomb waiting to explode!

In conclusion, irrespective of much research, Sclerotinia continues to be a major plant pathogen worldwide infecting over 400 plant species and more studies will be needed to develop long-lasting and sustainable control strategies for this pathogen.

The trip provided an excellent opportunity to catch up with developments in Sclerotinia research, to make new and reaffirm contacts at the international level, and to promote our work. We would like to thank the BSPP for financial support.

**John Clarkson and John Whipps**  
HRI- Warwick



John Clarkson, John Whipps (Warwick HRI) and Caroline Young (ADAS) at the Asilomar conference grounds on the Californian coast.



The workshop delegates looking for Sclerotinia in a Salinas valley lettuce field. Can you spot the infected plant?

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## The First International Conference of the Metabolomics Society Tsuroka City, Japan, June 20-23, 2005

Functional genomic approaches have led to the assessment of transcriptomic and proteomic changes in a wide range of biological situations. Considerable effort is now being made to develop a third 'omic level, the metabolome. The metabolome is represented by all low molecular weight metabolites in a cell, organ or organisms at specified time and situation. This conference discussed the various platform technologies through which metabolites can be measured and the data mining approaches through which key changes could be revealed.

The conference was hosted by the Institute of advanced biosciences at the Keio University. This university is based in the city of Tsuroka, located in the Shonai region on the North West coast of Japan.



Tsuroka city



Keio University library and conference centre

The conference was a four day meeting and had a particular emphasis on the development of Mass Spectrometry (MS), Nuclear Magnetic Resonance (NMR), and Chemometric statistical analysis, based methods applied to various metabolomic systems. Most of the meeting was based on medical research, pre-clinical trials, pharmaceutical toxicology, and microbial metabolomics. Nevertheless, there was a specific Plant Metabolomics session, reflecting the fact that this is an area which is now developing rapidly. As yet, metabolomic research in plant pathology is still limited mostly likely, due to the technical difficulty of sampling metabolites from highly heterogeneous pathogen-challenged tissue.

A total of 37 prestigious scientists were invited to talk over several programs including; Metabolomics Technologies (chair R. Goodacre); Plant Metabolomics (chairs L.W. Sumner & O. Fiehn); Metabolomics in Health Care (chair, R. Kaddurah-Daouk); Models and Pre-clinical Studies in Metabolomics (chair G. Harrigan). Approximately 200 posters were presented on metabolomic analysis over a diverse array of biological fields, 12 of which were selected to give short seminars.

I was invited to give a full presentation in the plant Metabolomics session and was the only plant pathologist presenting their work. My research is based upon several model pathogenic systems. The one producing the most-heterogeneous samples is based on the interaction of *Magnaporthe oryzae* interacting with its alternative grass host *Brachypodium distachyon* (Allwood et al., submitted). My metabolomic work in *Arabidopsis* has involved the use of transgenic lines expressing avirulence (*avr*) genes which are not recognised by plant resistance genes and therefore may function as virulence determinants. Expression of the avirulence genes is regulated by a chemically induced promoter. Activation of the transgene results in systemic disease-like chlorotic symptoms, thereby reducing problems associated with heterogeneous tissue. My conference talk was based on the metabolomic analysis of *A. thaliana* cell cultures inoculated with various *Pseudomonas syringae* p.v. *tomato* DC3000 genotypes. Such an approach further reduces problems due to cell heterogeneity and also allows the metabolome of the pathogen to be assessed. Such dual metabolomic research involving the modeling of two organisms is novel within any field of metabolomics. The bacterial lines that were used gave rise to, virulent, avirulent and non-pathogenic outcomes. Key signaling and defence molecules were found in both plant and bacteria which had alternate and consistent responses in each of the three infection scenarios.

I was the only PhD student giving a talk and I received many useful suggestions.

Many informative and thought provoking seminars were given which were extremely relevant to my research, and provided excellent networking opportunities for future research. Of particular relevance to my work were talks from; Jeremy Nicholson (Imperial College, UK) on metabolite cross-talk between animal models and gut microflora which involved the simultaneous study of two organisms and that of Edward Dennis (University of California, San Diego, US) on lipidomics given that lipid-derived signals are of particular importance in defence signaling. Roy Goodacre & Doug Kell (Manchester, UK) gave an overview of the state of art chemometric (statistical data mining) and plant metabolomic methods. A particular focus of their talks was the potential of genetic programming. This is a computational methodology inspired by biological evolution where data sets are manipulated (equivalent to mutation and recombination) to outputs which best explain (i.e. having the best "fitness") to explain the experimental observations. Other talks by Robert Hall (Wageningen, Netherlands) and John Ryals (Metabolon Co. US) (the well known plant pathologist who has previously worked on systemic acquired resistance) were critical reviews of various detection technologies particularly GC-MS analysis of flavor traits in tomato; and also the role of biomarker discovery in drug development.

Work on metabolite flux was a hot topic, although it is a targeted approach (important metabolite pathways are uncovered and then targeted for flux analysis). Presentations given by H. Brunengraber (Case Western Reserve University, US) on MS detection of radiolabeled TCA intermediate flux in animals, and R.G. Ratcliffe (Cambridge, UK) on NMR detection of plant metabolite flux were also of great bearing on my own research.

All work and no play makes scientists dull boys/girls; I therefore took the opportunity to visit Tsuroka. Tsuroka is a small city set in a picturesque area of coastal plateau surrounded by mountains. The conference included a sight seeing visit to a Buddhist temple and an ancient forest. Many opportunities including the conference reception arose to try the local delicacies, largely consisting of fish and/or large snail and rice dishes, with plenty of Sachi to wash it down with.



Shonai region Buddhist temple and ancient forest

I, and my supervisors (Dr. Luis Mur, UW Aberystwyth; Dr. Royston Goodacre, Manchester) would like to take this opportunity to thank the British Society of Plant Pathology for their more than generous travel grant which allowed me to take up this excellent opportunity to present to a very prestigious audience of experts in the field of metabolomics.



**Will Allwood,**  
Institute of Biological  
Science,  
University of Wales  
Aberystwyth,  
UK

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## The 2nd Asian Congress on Plant Pathology Singapore, June 25-28, 2005

Two hundred and forty delegates from 29 countries attended this congress. Singapore was really a delightful congress venue and the wonderful city, food and great weather made a favorable impression. The scientific programme was very busy: 134 oral presentations in 3 days, plus nearly 116 posters.

The inaugural talk was on the resistance to infection and counter defense responses by cucumber mosaic virus (CMV) presented by Prof. Peter Paulikaitis of Scottish Crop Research institute, UK. He emphasized that most of pathogen-derived resistances are due to an RNA-silencing mechanism. CMV has developed a counter-defense strategy, in which one or more proteins inhibit specific stages of

the RNA silencing mechanisms. These counter defense molecules may provide new targets for novel defense strategies.

There was ten different sessions on host pathogen interaction, fungal diseases, virus and viral diseases, biological control, integrated pest management, resistance of plant and resistance breeding, prokaryotic disease, epidemiology and crop loss assessment, post harvest disease and mycotoxins, and nematode disease. Since I have been working on characterization and management of plant viruses in India, I mostly attended the session of virus and viral diseases, which was grouped in three technical sessions each day. The morning session of the first day had five presentations on molecular

diagnosis and sequencing information of watermelon mosaic, tobamovirus, TMV and pepper viruses. The second session included presentations about potyviruses from Freesia, banana streak virus, a new important disease of mealybug associated closteroviruses in pineapple and begomoviruses.

On 27 June, the virus session started with lecture of Prof. C. Hiruki of Canada who described a DNA heteroduplex mobility assay for diagnosing phytoplasma at the subgroup level. The other lectures in this session were on sugarcane mosaic, papaya ring spot and Zucchini mosaic virus on cucurbitaceous crops from India and China. In evening there was poster session during which 116 posters were displayed on many different pathological topics. I also presented my poster on 'Identification of a virus causing mosaic disease in sorghum crops of eastern Uttar Pradesh', which was appreciated by many plant pathologists. The poster session was very interactive and attended by nearly all the participants.

On the final day, I attended other technical sessions: of Prokaryotic diseases on management of phytoplasma diseases, transmission of phytoplasmas and fungal biocontrol of root knot nematodes on tomato. The congress was ended with

closing ceremony on 28th, June 2005 followed by lunch and farewell.

Overall, I very much benefited by meeting experienced plant pathologists from other Asian and western countries. I have been exposed for new methods on characterization of plant pathogen and newly developed management strategies towards plant disease control.

I am really thankful to BSPP for providing the Travel Award to assist me in attending this important meeting, which provided a great opportunity to meet senior experienced plant pathologists for very productive discussions. The experience will be helpful in my future research career. I am proud to be a member of BSPP.

Those who would like more information about the 2nd ACPP congress can visit the website: <http://www.2ndacpp.org>.

#### **Ashutosh Singh**

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UP, INDIA

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## **XIIIth International Congress on Molecular Plant Microbe Interactions Cancun, Mexico 17-21 July.**

### **Life's a beach**

This biennial, usually dynamic meeting was to be held in a vast beach-based hotel in the unashamedly Americanised Mexican resort of Cancun. Thirteen of us all from different groups or institutes were partly sponsored by BSPP to attend. Unfortunately, those that arrived early enough to recover from travelling before the meeting began, missed the late decision (Friday afternoon/evening July 15 BST) by IS-MPMI

to cancel the meeting. This unusual turn of events resulted from the imminent arrival of hurricane Emily category 4 approaching 5 (the maximum<sup>1</sup> that was achieved by the infamous hurricanes Katrina and Rita).

At the time it was hard to accept the cancellation after so much time, work and expense; but at the meeting held that Saturday evening at the conference hotel (I would estimate ca. 150 confused

conferees attended) the reasons were made chillingly clear. The live satellite image of the enormous weather system shown at the front left us in little doubt. The previous experience of Cancun with hurricane Gilbert in 1988 meant they were taking no chances. The sea and lagoon became one then, immersing the narrow beach strip with the inevitable, all too familiar destruction. The options offered were either to take a bus from the hotel to Mexico City, or stay and be part of the enforced evacuation. Many took the buses even though it was a 24 hour journey. There were a few BSPP faces in the forlorn bus queue. I left them to it as I could not face yet more travelling and naively thought that being part of a hurricane might be interesting.

The following morning with most windows in town taped over or covered with plywood, we were instructed to take a pillow, a sheet, a day pack and herded onto buses for the nearest town of Ciudad Cancun. It was stiflingly hot and humid and the packed refuge hotels were of a charming block house architecture with tiny windows. A tropical Wormwood Scrubs came to mind. Imagine also that when hurricanes arrive power is turned off, for obvious reasons, so forget fans let alone air-con. I was in luck because two colleagues Rob Jackson (Bath) and Dawn Arnold (UWE) were ending a vacation with a hire car and 'phoned to rescue me; this was in spite of a trip of several hundred miles across the tediously flat Yucatan peninsula. After a weak fight I gladly accepted their generosity and we ended up in the colonial western town of Merida out of Emily's main path. I'm very grateful to them and there was the bonus of seeing some remarkable Mayan cities in that area. Also I must complement the organisers and hoteliers for the controlled evacuation. We have now seen from New Orleans what happens when things are not tightly managed. Some experiences of some other BSPP fundees are

now given.

George Salmond (Cambridge) and Rebecca Allen (HRI Warwick) heard after 10 pm the night before projected morning flights and just managed to cancel. Chris Ridout (John Innes Centre) had set off from Downham Market train station, and heard the message 'Chris Ridout phone home' over the tannoy when he arrived at Kings Cross to change for Gatwick. Then followed some frantic ringing around to check the conference was cancelled before going straight back to Downham market in time for breakfast! Hang Cui (and I) never received a cancellation message from the conference. Pietro Spanu (Imperial London) heard only once he had reached Cancun airport. He stayed one night and was back to work by Monday 9 am; as he put it " it just shows what you can do in one weekend, but who would want to?" Risha Patel (Bristol) tried to leave Cancun but flights were grounded on Sunday so she stayed in a shelter then the hotel grand ballroom! At 1 a.m. some glass doors imploded into the lobby, but it had been cleared of people.

In fact Emily hit further south and Cancun escaped lightly, but we saw a vast swathe of damage, perhaps over 100 kms wide, to the forest as we returned east. Andrew Howden, Susie Lee (Oxford) and others were south of Cancun and had to go further south to escape (more from these later).

Having returned to the coast I heard that my mother in law had suffered a heart attack, so I had to be repatriated instead of taking a vacation with my family in that part of the world. It seemed par for the course for this bizarre week.

Two questions that have been asked frequently are, why hold the meeting there in July and did it need to be cancelled? It seems that July should not be hurricane season and the organiser stated that this

<sup>1</sup> The Saffir-Simpson Scale category 4 indicates wind speeds of 131-154 mph, 5 in excess of 155 mph

had been the case for over 100 years. However, it happens that the area has succumbed to a series of early hurricanes and storms this year perhaps because sea temperatures are elevated (hurricane formation is dependent on high sea temperatures as major depressions cross). Current damage to the Gulf States after hurricane Katrina answers the second question. As I'm writing this, imminent Hurricane Rita is the 17th named storm in the region this season.

About half of those sponsored by BSPP will be attending the postponed meeting to be held 14 to 18 December. Hopefully after that, there will be scientific, rather than anecdotal reports. I'm not sure if I can face it all again!

Some of us offer a few images to prove that we have not made all this up.

Here's Susie Lee's (Oxford) version of events

**We'll weather the weather, whatever the weather, whether we like it or not!**

Saturday 16th July, and a beautiful day dawned in Tulum, a small town in the Yucatan Peninsula, Mexico. Eight of us, post grad students and post docs from the Oxford University Plant Science Department, were happily floating down a mangrove river in the remote Si'an Khan National Park, relaxing before our planned journey back to Cancun for the XIIIth International Congress on Molecular Plant Microbe Interactions. We drifted lazily along on life-jackets, listening to the sounds of birds, the water flowing, and occasional anxieties about water-borne parasites. This was the life to which we would like to become accustomed.

As all good things must, the river trip came to an end. We had planned to stay another night in our beach huts at the reserve, but the news coming in made us change our mind – Hurricane Emily, a force 5 gale, was heading straight for the east coast of

the Yucatan Peninsula and due to hit Sunday night. Cancun was being evacuated and the conference was cancelled. The relaxed mood of the morning began to ebb away as we packed up and headed into Tulum, advised by the locals to find transport away from the east coast as soon as possible – easier said than done, as all the bus seats for the next 24 hours were fully booked. A strange mood pervaded the town; many people were frantic to get out at once, others seemed to wonder what all the fuss was about. A three hour tour of every car rental place in Tulum managed to secure us the very last two cars in town – those brave or foolhardy souls who planned to stay or with no way to leave prepared to sit tight in concrete houses until it was all over. We gathered food and water supplies and thankfully piled into the cars to drive in convoy down south to Chetumal, capital of the state, and our refuge from the tempest.

The drive to Chetumal was a tense one. The four hour drive was mostly through jungle – not a good time to run low on petrol. Fortunately a town equipped with petrol station appeared in the nick of time, and we managed to make it to Chetumal by 11pm, minutes before the only hotel we'd found with rooms available closed. We piled in, 4 to a room, and slept soundly for the night. The next day was spent waiting in some trepidation for the hurricane to hit, gathering supplies, and taping up the windows. Sunday evening, and the hurricane at last arrived ...and not even a breeze stirred the streets of Chetumal whilst we slept. The storm had moved north and been downgraded at the last minute, robbing us of the dramatic Aeolian fury we had envisaged.

Tulum, it turned out, had not got off so lightly. Driving the hire cars back on Tuesday we saw the storm evidence for ourselves. Trees and power lines were down, the straw huts of the locals were no more, and Tulum when we got there was still without

water and electricity. Cancun fared better – water and power had been restored more quickly, as befitted such a large tourist resort.

We spent the remainder of our time in Cancun, a much needed respite after the emotional trauma wrought by Emily. All in all, whilst a world away from the trip we had planned and many times more stressful, the whole adventure provided much entertainment and allowed us to see the beautiful and diverse Yucatan Peninsula. All of us are agreed that the trying circumstances have created a bond amongst us that even the return to the mundane reality of pipettes and greenhouses has yet to completely erode.

Jacqueline Heilbronn (SCRI Dundee) escaped by other means:

### **Refusing refuge, boarding buses**

Having arrived with colleagues from SCRI in Cancun at midnight local time, exhausted from 24 hours of travelling, we were told that the meeting had been postponed until December due to the incoming Hurricane Emily, which was expected to land near Cancun. We could hardly believe our ears, and we thought at first that we were being teased, but sadly it was all too true. After a few hours sleep and a few hours relaxation by the hotel pool, we went along to a meeting at the Hotel Fiesta Americana, where the Conference had been due to be held, to be given our options: staying in Cancun with 30,000 others in refuge centres, or joining an exodus of 70 – 80,000 people heading inland.

Some refuges were situated within the well-protected hotels, whilst others were situated in downtown Cancun, in the Government schools and gymnasium halls. As an alternative, the IMPMI committee had organised an evacuation for 130 Delegates to Mexico City, a 24 hour journey by bus, 1812 Km/1132 miles, or the equivalent of travelling from John O'Groats to Lands End and half way back again in one go! I, along with the rest of my colleagues from SCRI, opted for the bus journey, as

having lived in Hong Kong for a few years as a child I did not fancy living through another hurricane or a tropical storm of any description. Meanwhile, Richard Cooper, who felt he had done far too much travelling already, opted to stay. We agreed to compare notes in due course as to who had made the best decision!

It was a long, exhausting journey through the Yucatan Peninsula to Merida, then along the Gulf of Mexico coastline to Veracruz and up the winding mountain road to Mexico City, the third largest city in the World, situated 2,255m/ 7,400 ft above sea level at the southern edge of the central plateau, with a population of 22 million in 5000 sq km. The Service Stations and facilities en route left a lot to be desired, and I shall never ever again complain about any British Motorway equivalents!

It was fascinating to discover that the Yucatan peninsula was only linked to the rest of Mexico by rail and road comparatively recently, during the 1950's and 60's, and this is why its culture and food are quite different from the rest of Mexico. The views of hundreds of pelicans sitting aloft the break water logs and diving for fish along the Gulf of Mexico coastline was tremendous, and also being able to see a small part of the real Mexico, rather than just a tourist resort full of hotels such as Cancun, was very special.

Finally, I would like to thank Federico Sanchez and the volunteer committee for all their hard work, initially by sending out an e-mail notice of the postponement of the conference, which unfortunately many of us Europeans did not receive before travelling due to the time difference and also for organising a very efficient evacuation of us would-be attendees from Cancun at such short notice.

**Collated and partly written by Richard Cooper**  
Bath



Cancun on a normal day  
(photo Risha Patel)



A sign of things to come



Battening the hatches doesn't help Andy Howden to feel relaxed about events  
(photo Susie Lee)



Hotel meeting Saturday night made it clear that conferees were to become refugees or long distance travellers.



This image thoughtfully supplied as a large and live image by the organisers, reinforced the notion that this was not a place to stay. A nearby hotel was showing videos from a website of how destructive hurricanes can be! Any semblance of calm evaporated at this stage.



Local tv message is unequivocal



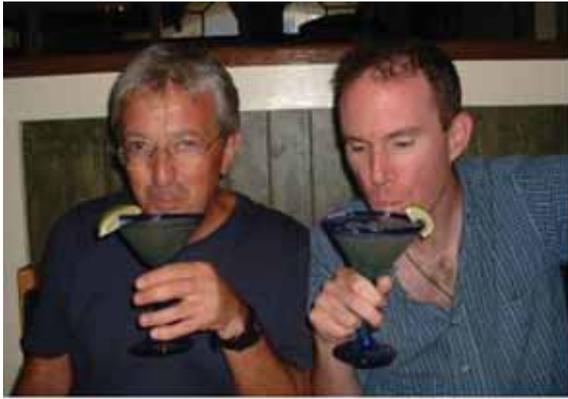
Emily's path is pretty clear and Cancun is second point from the right.



A refuge (photo Risha Patel).



Petrol prices going down? Surely not (photo Susie Lee).



Safe on the other side of the Yucatan. Margeritas to calm the nerves of the author and one of his rescuers, Rob Jackson.



Whilst East and unable to return to Cancun, it was a bonus to see some remarkable Mayan cities (yes, your vice president is perspiring).



Hurricane, what hurricane? The locals decide Tequila is the answer.



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## The 16th Triennial Conference of the European Association for Potato Research Bilbao, Spain 17-22 July 2005

The EAPR 2005 conference took place in northern Spain, in the largest city of the Basque country, Bilbao, bringing together worldwide potato experts. Interestingly, not only scientists were among the nearly 400 conference participants from 45 countries. Surprisingly many representatives of private potato processing, breeding and seed potato production companies from around Europe were present to hear the latest advances of the many fields of potato research. Thus the conference truly provided a platform where scientists and industrial partners could meet and discuss problems and possible solutions in the current potato industry.

Nine keynote talks were presented on the first day of the conference. The topic of these talks ranged from environmental and food chain issues of potato

production to genomics, and challenges of organic potato farming. The new role of CIP (the International Potato Center, Lima, Peru) in poverty alleviation based on the UN Millennium Development Target was emphasised by the director general, Pamela Anderson. The most futuristic keynote talk was given by Raymond Wheeler from the NASA Kennedy Space Center on the role of potatoes as a food supply for future space explorations. So far the outlook is encouraging: high tuber yields can be achieved in recirculating hydroponic cultures that mimic controlled growth conditions in space crafts. Experiments show that tuber forming is also possible in reduced gravity.

Overall, there were twelve major themes of the conference, including genomics, agronomy,

physiology, organic farming, storage and processing. Most of the potato diseases (both in the field and storage) were covered in the Pathology section, but a lengthy separate section was reserved for potato late blight, which is recognised still as the most threatening disease to high yields in potato production, especially under organic farming. Possible alternative approaches to copper fungicide sprays (prohibited within the EU by 2008) in reducing disease spread were introduced by Maria Finckh who discussed the effect of field geometry, neighbouring fields and prevailing wind direction on the spread of late blight in organic farming. Smaller fields in the form of strip intercropping that are planted perpendicular to the main wind direction can reduce late blight pressure significantly.

Latest progress made in getting an insight into the potato genome especially for breeding purposes was presented in many talks and posters. For example, the use of retrotransposon-based fingerprinting and AFLPs in evaluating genetic diversity in potato landraces was discussed in several posters.

In addition to oral and poster presentations, four workshops were organised during the conference. These covered topics on genomics, money and ethics in genetics, the impact of EU on potato market, and the challenge of coexistence between organic, integrated and conventional potato farming. In the latter workshop, common goals of organic and conventional farming in plant health were recognised: the need for developing new cultivars

with improved nutrient uptake and durable disease resistance, especially towards late blight. Therefore, research efforts towards reaching these goals should be joined.

One of the conference days was reserved for scientific excursions around the Basque Country and northern Spain. The participants could choose from seven different excursions that covered either sightseeing, culture and history, and brief introductions to local potato production and processing companies, as well as research facilities of the local conference organiser, NEIKER (Basque Institute for Agriculture Research and Development). Naturally, a visit to the Rioja wine production region was among the most popular options of the excursion programme! The sunniest weather of the week and the friendliness and hospitality of the Spanish hosts made the day very enjoyable.

Unfortunately, the last conference day was cut short for many participants due to a sudden taxi strike in Bilbao, leaving many to seek alternative, and not so quick transport to the Bilbao airport. During the conference, the newly-elected president of the EAPR, Dr S. Chiru announced that next the EAPR conference will take place in Romania in 2008. Finally, I would like to thank the BSPP Travel Fund for financial support towards attending this conference.

**Paula Wilson,**  
University of Helsinki, Finland

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The 16th triennial conference of the association of potato research was held in Bilbao, in the Basque country. This is a city that has re-invented itself from a run-down industrial town into a very 'cool' city, with the Guggenheim art gallery at its heart.

The Spanish potato industry supplies much of northern Europe during the winter months when fresh material is limited. Much of this is produced in the south of Spain and in the Balearic and Canary Islands. In the Basque country much of the potato

crop is grown for seed, particularly around Vittoria, which is a high plateau surrounded by mountains over 1000 metres in height. Due to the cooler climate at this altitude the aphid threat is reduced so much of the crop is grown for seed. Potatoes are also grown for the pre-pack market and one of the excursions visited the packing company UDAPA, which supplies 22,000 tonnes per annum.

The host organisation for the conference was NEIKER, which is run as a government agency for agricultural research. Much of its potato work focuses on breeding new varieties and virus detection and epidemiology. The president of the EAPR, Enrique Ritter, from NEIKER ensured that the content of the conference was interesting and took charge of the Rioja at the welcome party.

At the conference the key-note speakers focused on potato production in the future. Professor Askew, from CSL, discussed environmental issues associated with potato production. He suggested that the potato crop could have a number of damaging environmental impacts. Ware potatoes need large amounts of water and nitrogen and phosphorus fertilisers, whilst a large number of sprays are required to control late blight and aphids. It is also clear that use of heavy machinery at both planting and harvest can result in soil compaction. He predicted a premium for potato production of potatoes grown with little damage. He pointed to progress made in Holland where total number of pesticide sprays have been reduced. The challenge for the future will be to produce potatoes of high quality but with a decreased risk to the environment and with fewer pesticide options.

On the second day the attention turned to the scientific presentations. One of my main interests is a disease called black dot, caused by *Colletotrichum coccodes*, which causes blemishing on tubers, which reduces quality. Since the last EAPR

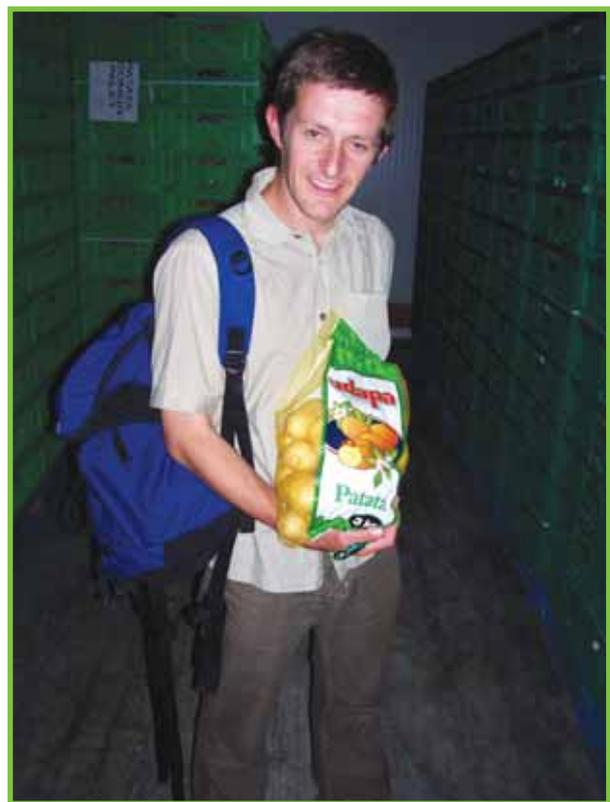
conference in Hamburg, 3 years ago, black dot has become an increasingly important problem in many countries in Europe. In Bilbao, there were 5 papers featuring black dot, 1 from Australia, 1 from Israel, 1 from USA and 2 from UK. In contrast, to the UK where inoculum of black dot is soil-borne, in both Israel and Australia infected seed is the main source. In Israel, where they are concerned about contaminating their 'virgin' soils with soil-borne pathogens they have done a lot of work surveying potato seed stocks from around Europe. Dr Leah Tsrer, from the Agricultural Research Institute showed that the incidence of black dot on seed tubers was high on Dutch stocks and lowest on Scottish material. The opposite was found for powdery scab, where the incidence was highest on Scottish seed stocks. Dr Tsrer has assessed a number of fungicides as seed and in-furrow treatments at planting. Products that reduced black dot included, prochloraz-Zn, azoxystrobin, chlorothalinal and fludioxonil. She has also found that treating the foliage with prochloraz and azoxystrobin both reduced the incidence of black dot. This is a practice that would not be recommended in the UK. Dr Neil Gudmestad, from North Dakota State University, USA, reported that yield losses could occur where potato foliage becomes infected with *C. coccodes*. In the Mid-West foliar infection occurs where storms blow sand and soil covered in inoculum from the soil into the foliar tissue. The result are symptoms which look similar to Early Blight, caused by *Alternaria solani*. He claims that if you look at these lesions on the leaves then you can find the characteristic microsclerotia within the lesion. However, no such symptoms have been reported in the UK.

There were also a number of papers on common scab, caused mainly by *Streptomyces scabies*. In the UK, this disease is a major blemish disease, which causes unsightly scabs on tubers. In the UK, this disease has traditionally been controlled by

applying irrigation, providing conditions which do not favour disease development. However, as licenses are now required for water extraction this method of control is likely to have a diminished role in future. Research in Finland, presented by Dr Hiltunen, showed that under glasshouse conditions, the application of non-pathogenic *Streptomyces* spp to the soil could reduce the incidence and severity of common scab where soil was artificially inoculated with *S. turgidiscabies*. In the experiment potato boxes (1 x 1m) were filled with compost. Treatments including Mycostop (*S. griseoviridis*), applied twice to the soil, and an unidentified *Streptomyces* strain, applied 3 times to the soil, were compared with an untreated control. Although, these treatments were effective where low inoculum levels of *S. turgidiscabies* they were ineffective at higher concentrations.

Researchers from the ARVALIS-Intstitut du végétal, France, reported on Midi-LIS® an on-line decision support system for blight control. This system is based on a model for French conditions. It was interesting to see that this package is widely used and in 2005 some 20,000 ha were treated based on this system. The system is set up on a website and weather and crop data are inserted. For a rapid response growers are alerted of blight risks by text messaging. It is claimed that this system reduced the number of sprays by 2 in a ware crop situation. Other decision support systems (DSS) for late blight have been compared in Ireland. Dr Dowley, from Teagasc, compared a number of DSS, including NegFry, SimPhyt, ProPhy and Plant-Plus with plots, which received a 7-day routine spray programme, over a 3 year period. They found that number of sprays were reduced with the use of a DSS (NegFry – 54%, ProPhy – 10%, SimPhyt – 44% and Plant-Plus – 25%) compared with the plots which received the standard programme. However, despite the reduction in sprays there were no increases in foliar blight or yield losses reported with the DSS.

In organic potato production the big debate at present is the use of Copper based products to control late blight. While copper fungicides are still being used in many countries, these products are toxic to soil and aquatic organisms. However, these products are likely to be prohibited by 2008, within the EU. So what are the options? Field trials done in France, by Dr Dubois, from the plant protection service, showed that dropping copper concentrations from 8kg to 4kg per hectare of product could be done without an increasing risk of late blight. However, none of the other reagents, including various plant extracts had any effect on disease development. It appears that our search for an alternative to copper continues, but time is running out.



**Alex examines a very healthy sample of cv. Mona Lisa at the UDAPA packing plant near Vittoria**

**Alex Hilton**

SAC

Craibstone Estate, Bucksburn

Aberdeen

## Microbes in a Changing World, San Francisco 2005

The IUMS 2005 Congress "Microbes in a Changing World" was held in San Francisco between 23 and 28 July 2005. This was a joint congress incorporating the XIIIth International Congress of Virology (my chief interest) and conferences on Mycology and Bacteriology/Applied Microbiology. In total, rather less than 3000 people registered, of whom 1200 were virologists. This was felt to be a somewhat disappointing attendance and at times we certainly seemed a little lost within the vast and splendid Moscone Center. Nonetheless, a great deal of interest was packed into the 5 main days of the conference and I was kept busy with the usual mixture of plenary, poster and specialist sessions.

San Francisco is a good venue for a conference, with good international connections and efficient, cheap, local transport including the famous cable cars. The summer weather (dry but with cooling sea breezes) was very comfortable and the city centre abounds with varied places to eat. The local speciality, clam chowder in a sourbread bowl, is certainly to be recommended!

Plant virologists are in a minority at the International Congresses and in this instance, the scheduling of the APS annual meeting in the following week probably discouraged a number of US plant virologists from attending. However, there was enough of interest for a plant virologist during most of the sessions. It would be difficult to extract highlights of general interest from the varied menu of presentations that I attended. The most useful part of such conferences is often the personal contacts made and the conversations around the posters. It was therefore a little frustrating that the vast hall with the posters was only open from 10am until 3pm each day, which rather limited the opportunities to review the posters at leisure. A bonus of attending a wide-ranging conference is that you can sometimes pick up interesting pieces of

information from areas quite unrelated to your own research. Did you know, for example, that the virus causing myxomatosis, which is normally restricted to rabbits, infects and kills human cancer cells and is being investigated as a possible therapy?

I now have a substantial interest in plant virus taxonomy and the International Committee on the Taxonomy of Viruses (ICTV) had a strong presence, with a series of posters outlining various proposals under consideration. Having accepted the principle of families, genera and species for viruses some years ago, plant virologists will be interested in ideas to create several orders to group together more distantly related families and genera. Peter Mertens (IAH Pirbright) gave an excellent talk in which he argued the case for an order to include most, or all, of the dsRNA viruses on the basis of structural similarities. Such an order (possibly named Reovirales or Diplornavirales) would include some plant-infecting members. Another idea is to create a family Picornavirales that would group a number of plant viruses (including those in the families *Comoviridae* and *Sequiviridae*) with a number of vertebrate viruses. The current suggestion is to include only those viruses with isometric particles. This would exclude species in the family *Potyviridae*, which have filamentous particles and a slightly different genome organisation but which have often been considered members of a picorna-like "superfamily". A third possible order, proposed by Roger Hull, would group all the reverse-transcribing viruses (including the plant-infecting pararetroviruses classified in the family *Caulimoviridae*) into the Retrovirales. All these proposals are open for public discussion on the ICTVnet web site and it is hoped that they will be discussed carefully by the whole community.

Tools for examining and analysing virus sequences are of great importance as the amount of data

continues to grow exponentially. Several presentations addressed these issues directly or indirectly. Apart from our own plant virus efforts at [www.DPVweb.net](http://www.DPVweb.net), there were also presentations of the latest tools available from NCBI. Their web site is rather complicated but is continually changing and is worth exploring from time to time. Some great tools are also available at the Viral Bioinformatics Resource Centre ([www.biovirus.org](http://www.biovirus.org)); this site is devoted to important human pathogens but the tools

are transferable and are well worth a look.

I am grateful to the BSPP for a travel grant that helped me attend this conference. The next one in the series is scheduled for Istanbul, 11-15 August 2008.

**Mike Adams**

Rothamsted Research

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## XI International Congress of Bacteriology and Applied Microbiology

In July 2005 I attended the XI International Congress of Bacteriology and Applied Microbiology at the Joint Meeting of the 3 Divisions of the International Union of Microbiological Societies 2005. The conference was held over four days in San Francisco, California, USA. The conference brought together microbiologists ranging from Virologists to Mycologists with the Bacteriology congress providing a variety of interesting and diverse sessions.

My interest in bacterial gene regulation, in particular the control of plant cell wall degrading exoenzyme, antibiotic and pigment production in *Serratia*, prompted me to attend sessions focused on regulation of pathogenic processes. Some sessions and talks of particular interest are discussed below.

**Two-component systems** are known to be very important regulatory systems in bacteria, where they control numerous cellular processes. In this session, Igor Zhulin introduced the interesting idea that one-component systems may in fact be more widespread, diverse and evolutionarily older than their two-component counterparts. One-component systems contain both the sensor and output domains (as also found in two-component systems) fused in one protein, where the "signal transduction" occurs within the protein. Evolution of two-component systems via domain shuffling has allowed the transduction of extracellular signals into the cell where they can exert an intracellular response.

**Horizontal gene transfer (HGT) in the environment** is known to provide increased genetic diversity and aid in the increase of antibiotic resistance – relevant to biocontrol strategies. However, estimates of the frequency of HGT is often debated and limited by techniques that rely on cultivating bacteria. A particularly fascinating talk by S. Sørensen, from Denmark, revealed an inventive strategy that utilised fluorescence activated cell sorting (FACS) to detect GFP expression in recipient cells following conjugation of an IncP plasmid from *E. coli* or *Pseudomonas* sp. donors. GFP expression occurred only in recipient bacteria due to the presence of a repressor protein in the donor strains. Recipients could be quantified and also phylogenetic information garnered by sequencing the 16S rDNA. Using this technique they demonstrated that conjugation frequencies in the Rhizosphere were commonly underestimated by 100-1000-fold and that the taxonomic variability of recipients was much greater than previously known.

**The importance of small regulatory RNA's** in the control of numerous phenotypes was the focus of one session. Here, Deiter Haas discussed the complex regulatory circuit that controls secondary metabolite production in the biocontrol strain *Pseudomonas fluorescens* CHA0. This system involves at least two small proteins (RsmA and RsmE) that repress target mRNA's post-transcriptionally in the absence of three small RNA's (RsmX, RsmY and RsmZ). Furthermore, this system

is controlled by a GacAS two-component system in response to an extracellular signal. Bonnie Bassler demonstrated that a similar GacAS/Rsm system was involved in the already complex small RNA containing quorum sensing system of *Vibrio cholerae*. Discovery and understanding of these "new" regulatory modes requires novel genetic and bioinformatic approaches and is often hindered by redundancy in the systems.

To be able to understand bacterial pathogenesis or symbiosis it is essential to have a good knowledge of the regulatory mechanisms employed under different environmental conditions. This conference covered a range topics including bacterial strategies

of gene regulation (only a few of which were discussed here), highlighting the diverse ways that microbial communities can adjust their behaviours.

Finally, the wonderful surrounds of San Francisco and the Bay area enabled a few conference participants the opportunity to visit the Golden Gate Bridge, Nappa Valley and the stunning Yosemite National Park. I am extremely grateful to the BSPP for the travel fund that supported my trip to IUMS 2005.

**Peter Fineran**  
University of Cambridge

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## Active Learning

This is an announcement for a free, online symposium on Active Learning in Plant Pathology sponsored by the International Society for Plant Pathology Teaching Committee. This symposium provides a unique opportunity for anyone involved in teaching plant pathology to share ideas with colleagues from all over the world without incurring the hefty expense of conference fees or travel. Please contribute your ideas and experience!

The symposium will be held from May 15 to June 4, 2006. Papers are invited in several categories to be accompanied by moderated online discussions. Papers must be submitted by February 15, 2006. There also will be online discussions on more general topics.

(i) Submitted Papers

**General themes include...**

- Tools and techniques
- Learning Theory
- Distance Education

Sub-themes may be developed from these general ones once submissions are compiled. Papers within these sub-themes will be featured weekly, together with a discussion area so authors can answer questions. Links to related pages for downloads, demos and further information on a presentation will also be available.

All papers and discussion will be archived on the conference site for later reference.

(ii) Forums

A weekly discussion forum will be introduced during the symposium. Hosted by a moderator with a specific interest in the topic, these should provide stimulating discussion on topical issues.

**Topics will include...**

- What should every plant pathologist be taught?
- Challenges in teaching plant pathology and how to meet them?
- Practical work. How much can "virtual" replace "actual"? Pros and cons?

We invite you now to register an interest and be placed on the mailing list, and/or to submit a paper. For more information, visit our website: <http://www.ispp-teaching-symposium.org>

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