



**THE ECOLOGY AND EVOLUTION OF
EMERGING PLANT PESTS AND PATHOGENS:**
Challenges to Global Food Security
and Ecosystem Resilience

13 – 14 JULY, 2015

PENRYN CAMPUS, UNIVERSITY OF EXETER, CORNWALL



British Ecological Society

 #pestsym

FALMOUTH CAMPUS MAP

Penryn Campus
NOT TO SCALE

Penryn, Cornwall TR10 9FE Telephone: 01326 370400
 Email: penrynreception@fxplus.ac.uk www.falmouth.ac.uk and www.exeter.ac.uk

Legend:

- One Way Traffic
- Parking Pay Stations
- Disabled Parking
- Motorcycle Parking
- Cycle Park
- Cash Machine
- Post Box
- Bus Stop
- Barrier Locations
- No Entry
- Assembly Point
- First Aid Room
- Food Available
- Toilets
- Good WiFi Coverage
- Mixed WiFi Coverage

Accommodation:

- Tremough House - ASK
- Tremough House Annexe - Student Services, GP surgeries
- SoFT - School of Film & Television
- AR - Academy for Innovation & Research (Falmouth University)
- ESI - Environment and Sustainability Institute (University of Exeter)
- TIC - Tremough Innovation Centre (Cornwall Council)
- SESEF - Science and Engineering Research Support Facility (University of Exeter)

Parking:

- Main Car Parks
- Reserved Visitor Car Park
- Glasney Residents Long Stay Car Park
- Car Shavers / Electric Vehicle Car Park
- Assessment/employment AIR Visitor Car Park

Other:

- Additional parking pay zones in designated parking
- SENSE construction compound
- Additional parking pay zones in designated parking

CONTENTS

Falmouth map	02
Welcome from the Symposium Organisers	04
Welcome from the BES	06
Symposium Programme Overview	06
Presenter Guidelines & Programme Format	08
Keynote and Invited Speaker Biographies	09
Programme & Talks	12
Posters	14
Social Events	15
Delegate Information	16
Accommodation Map	18
Notes	22

Cover image courtesy of Dr Helen Fones

WELCOME TO THE ECOLOGY AND EVOLUTION OF EMERGING PLANT PESTS AND PATHOGENS

Welcome to the British Ecological Society Symposium, the Ecology and Evolution of Emerging Plant Pests and Pathogens.

Threats to agriculture and forestry, such as Panama Disease of bananas, Late Blight of potato, Maize Lethal Necrosis, Ash Dieback and Acute Oak Decline, suggest that global food security and ecosystem integrity are in danger. This Symposium will address the science behind the headlines.

We bring together experts in genetics, cell biology, ecology, evolution, plant pathology, epidemiology, microbiology, climate change, remote sensing, agriculture and forestry to synthesize recent research into emerging plant pests and pathogens (EPPPs) and share findings across disciplines.

Our aims are to describe the threat that EPPPs pose, the mechanisms by which they evolve and spread, the ecological and environmental factors that influence emergence, and the management strategies that can be used for control.

We are delighted to be joined not only by leading academics, but also by Government and NGO experts including Prof Nicola Spence, the UK Chief Plant Health Officer. We hope this diversity of knowledge and experience will lead to stimulating discussions on the role of research in plant protection policy and to new collaborative networks. In addition, we aim to publish a volume of Ecological Reviews that will report our discussions to the wider academic community and beyond.

We would like to thank all of our sponsors for supporting this event.



British Mycological Society
promoting fungal science



THE
ROYAL SOCIETY
PUBLISHING

ANNUAL REVIEWS
CONNECT WITH OUR EXPERTS

SYMPOSIUM ORGANISERS



Dr Daniel P. Bebber Senior Lecturer, Department of Biosciences, University of Exeter

Dan joined Exeter in January 2013 as a Senior Research Fellow, studying the global distributions

of crop pests and pathogens in collaboration with Prof. Sarah Gurr and the organization CABI. Before this he was Head of Climate Change Research at Earthwatch, based in Oxford. His doctorate considered the influence of El Nino-related droughts on forest regeneration in Borneo, and he has research experience in reduced-impact silviculture in Canada, sustainable harvesting of medicinal plants in India and Nepal, and the biology of woodland fungi in the UK.



Professor Sarah J. Gurr Chair in Food Security, Department of Biosciences, University of Exeter

Sarah Gurr was recently appointed to the Chair in Food Security, a post created by Exeter University

in association with BBSRC and Rothamsted Research. Sarah Gurr was previously Professor of Molecular Plant Pathology at Oxford and formerly President of The British Society of Plant Pathology. Her interests are in crop diseases (notably of rice and wheat), with particular emphasis on fungal infestations and their global movement and control. She is interested in fungal biotechnology. She has authored or co-authored over 100 publications, including a contribution to the recent Foresight report on "Biological Hazards".



Dr Britt Koskella NERC Senior Research Fellow, Department of Biosciences, University of Exeter

Britt is studying the coevolutionary interactions among bacteriophage viruses that infect and kill a bacterial host which is itself a pathogen that infects and kills plant hosts, including horse chestnut trees. She is both using this as a model system to test evolutionary theory and as an applied system to test whether phages are naturally acting as a sort of biological control of the plant disease, decreasing disease symptoms and helping the tree ward off infection.

WELCOME FROM THE BRITISH ECOLOGICAL SOCIETY



I am delighted to welcome you all to the BES Symposium 2015 “The Ecology and Evolution of Emerging Plant Pests and Pathogens: Challenges to Global Food Security and Ecosystem Resilience”,

University of Exeter, Cornwall, UK. The BES supports a wide range of meetings each year, from small field-based meetings looking at particular habitats to our large Annual Meeting where hundreds of ecologists come together

to discuss advances in ecology across the spectrum of research areas but our Symposium series allows ecologists to focus on specific ecological topics where new research is rapidly changing our understanding.

Recent events like the spread of Ash Dieback in the UK demonstrate the importance of a greater understanding of EPPPs (Emerging Plant Pests and Pathogens), both in terms of their impact on natural systems as well as economic consequences. As food security and sustainable intensification continue to rise up the political agenda across the world,

understanding how to minimise the impact of EPPPs will become even more important and therefore this meeting is a very timely opportunity to review the current knowledge base and advance our understanding.

This type of meeting, bringing together experts from many different fields, is very much in line with the BES’s new strategic plan, where we have recognized the importance of working across disciplines and have increased support for such activities.

The BES is very proud proud to host such an exceptional team of speakers and participants and I wish you a productive and enjoyable Symposium.

Hazel Norman
Executive Director at
British Ecological Society

PROGRAMME OVERVIEW

	08:00	09:00	10:00	11:00	12:00	13:00	14:00	15:00	16:00	17:00	18:00	19:00	20:00	
MONDAY	Theme I: Threats to Agriculture		Coffee break in the Photo Gallery	Theme II: Novel Detection Methods	Theme III: Threats to Forests	Lunch, served in the Photo Gallery		Theme III: Threats to Forests	Theme IV: Plant Biosecurity Policy	Cream Tea in the Photo Gallery	Theme IV: Plant Biosecurity Policy	Is plant biosecurity research addressing the needs of policy?	Poster Session in the Photo Gallery	Conference Dinner
TUESDAY	Theme V: Evolution of Emerging Pests and Pathogens		Coffee break in the Photo Gallery	Theme VI: Mathematical Modelling and Epidemiology		Lunch, served in the Photo Gallery		Theme VII: Host Selection and Virulence	Cream Tea in the Photo Gallery	Theme VIII: Climate Change	Closing Remark	All talks are in Lecture Theatre 4, Peter Lanyon Building		

PRESENTER GUIDELINES AND PROGRAMME FORMAT

Oral Presentations, Lecture Theatre 4, Peter Lanyon Building

All presentations will be held in Lecture Theatre 4, Peter Lanyon Building. Each day will begin with a keynote lecture, the first from Prof. Charles Godfray FRS on the contribution of research into emerging pests and pathogens to global food security, the second from Prof. Nick Talbot FRS on the evolution of fungal plant pathogens. Invited speakers will speak for 20 minutes with 5 minutes for questions. Please ensure presentations are loaded onto the laptop well in advance of your session. There will be BES staff to assist if required.

Discussion: Is plant biosecurity research meeting the needs of policy?

We will hold a short discussion on the role of research in plant biosecurity policy at the end of talks on Monday 13th, lead by Dr. Melanie Tuffen of DEFRA. A chance to make your opinions heard on how academic research can, or should, lead to impact.

Poster Presentations, Photo Gallery, Peter Lanyon Building

Posters will be on display throughout the symposium. There will be an official poster session with refreshments after the policy discussion on Monday 13th.

Please ensure your poster is up by the beginning of the first coffee break. All posters must be removed by 17:00 on the final day of the meeting. Velcro will be provided.

KEYNOTE SPEAKERS

Charles Godfray, FRS

Charles Godfray has diverse research interests in the ecology and evolution of insects. He is a Hope Professor of Zoology at Oxford University and was elected a Fellow of the Royal Society in 2001. He chaired the Lead Expert Group for the Department of Business, Innovation and Skill's Foresight project on Global Food and Farming Futures which reported in 2011. In 2011-2 he was a member of the High Level Panel of Experts Project Team on Climate Change and Food Security set up by the UN's Committee on World Food Security. Currently he is Director of the Oxford Martin programme on the Future of Food which works to bring together research on any aspect of food throughout the University. He is also a member of the Strategy Advisory Board for UK Global Food Security Programme, the International Advisory Board of the Sustainable Consumption Institute at the University of Manchester, chair of the Duchy Originals Future Farming Programme Steering Group and a member of the Steering Group of the UK Government's Green Food Project. He has recently joined the board of Rothamsted Research.

Nick Talbot, FRS

Professor Talbot's research is focused on the biology of plant diseases. He utilises a range of cell biology, genetics and genomics approaches in his research which has been supported by the BBSRC continuously since 1994. Professor Talbot has authored more than 120 scientific papers and reviews and received research fellowships from EMBO and the Nuffield Foundation. Professor Talbot is currently an ERC Advanced Investigator and also holds grants from BBSRC, The Bill and Melinda Gates Foundation and the Halpin Trust. He was elected a Fellow of the Society of Biology (FSB) in 2010, a member of EMBO in 2013, a member of the Academia Europaea in 2014 and a Fellow of The Royal Society (FRS) in 2014. Professor Talbot served as Chair of the Board of Directors of Rothamsted Research (2009 – 14) and is currently Chair of the Council of the Sainsbury Laboratory. He is also a Gatsby Plant Science Advisor and has served on numerous editorial boards, grant panels and advisory boards.

INVITED SPEAKERS

Nina Alphey

Dr Alphey is a researcher in the Mathematical Ecology Research Group at the Department of Zoology, University of Oxford. She is/was Researcher Co-Investigator on BBSRC-LINK awards (with project partner Oxitec Ltd) "Agricultural insect pest control: combining genetics, resistance management and dynamics" (also in collaboration with Imperial College), and "Integrating Ecology and Genetics for Genetic Pest Control". Nina's research focus is on novel genetics-based methods of controlling pest populations, particularly insect vectors of human or animal diseases and agricultural pest insects.

Andrea Campisano

Dr Campisano is in Saint Michele all'Adige (Trento, Italy) as Marie Curie COFUND Fellow, leading a small team (as a Junior PI) working on plant microorganisms metagenomics and climate change effects thereon.

Santiago Elena

Professor Elena's scientific interests are related with the evolutionary biology of microbes. More concretely, this interest is focused in the study, within the framework of Populations Genetics, of the mechanisms that generate and maintain the genetic variability of RNA viruses. Model systems used are the RNA viruses Tobacco etch potyvirus (TEV) and Turnip mosaic potyvirus (TuMV), the para-retrovirus Cauliflower mosaic caulimovirus (CaMV), and the viroids. He has also been exploring the endless potential of digital organisms as model systems for evolutionary studies.

INVITED SPEAKERS

Julie Flood

Julie Flood is Global Director of Commodities at CABI. She has long experience working with diseases of perennial crops, with a particular focus on cocoa, oil palm coffee, coconut and cassava. Her role includes institutional development and capacity building, particularly in SE Asia, the Pacific and Africa. She also has experience of working in and collaboration with national agricultural research institutes, international research institutes and private industry.

Chris Gilligan

Chris Gilligan is Head of the Epidemiology and Modelling Group at the Department of Plant Sciences, University of Cambridge. Among many appointments he has been Chair of the UK Tree Health and Plant Biosecurity Taskforce, Chair of the BBSRC Council Review of Crop Science Research, and Chair of the INRA (Institut National de la Recherche Agronomique) Commission d'Evaluation National Research on Plant Health and Environment. His current research is focused on establishing and testing a theoretical framework that identifies the mechanisms that control invasion, persistence, scaling and variability of epidemics within changing agricultural and natural landscapes.

Sarah Gurr

Sarah Gurr was recently appointed to the Chair in Food Security, a post created by Exeter University in association with BBSRC and Rothamsted Research. Sarah Gurr was previously Professor of Molecular Plant Pathology at Oxford and formerly President of The British Society of Plant Pathology. Her interests are in crop diseases (notably of rice and wheat), with particular emphasis on fungal infestations and their global movement and control. She is interested in fungal biotechnology. She has authored or co-authored over 100 publications, including a contribution to the recent Foresight report on "Biological Hazards".

Anne-Katrin Mahlein

Dr Mahlein is Junior research group leader in the Institute of Crop Science and Resource Conservation (INRES) at the University of Bonn. She specializes in detection of plant stress and disease status using hyperspectral remote sensing.

Michael Shaw

Michael Shaw is Professor of Plant Pathology in the School of Agriculture, Policy and Development at the University of Reading. His research interests include plant disease epidemiology and ecology, studied by modelling and experiment: foliar disease forecasting and dynamics in natural and agricultural ecosystems; spatial pattern and dispersal of pathogens; development of fungicide resistance; host-pathogen adaptation and ecology of *Zymoseptoria tritici* and *Botrytis cinerea*.

Julian Smith

Julian Smith is Lead for International Development at FERA. Dedicated to forging partnerships in crop health between northern and southern hemisphere institutions that build towards one-world outcomes, Julian Smith has 20 years experience in agriculture and international development. Trained as a plant bacteriologist and molecular biologist, Julian has worked with crops as varied as potato to banana to coconut and cassava, and in countries of East Africa, South America and Asia. A particular interest has been in promoting investment in 'crop pest outbreak prevention, better than cure' research and policy interventions.

INVITED SPEAKERS

Nicola Spence

Professor Spence is the UK Chief Plant Health Officer. She joined Defra from Science City York, a consortium of City of York Council, the University of York and York St John University set up to develop a strong knowledge-based local economy for whom she is CEO. She is an expert in plant health and international plant trade and was previously the Chief Scientist at the Food and Environment Research Agency, where she is a Fellow. Professor Spence is a Special Professor in the Department of Biosciences at Nottingham University, a member of Court at the University of York and a Trustee of Royal Botanic Gardens, Kew.

Eva Stukenbrock

Professor Stukenbrock is interested in population biology and evolutionary processes in fungi. Her initial research focused on population genetic structure of arbuscular mycorrhizal fungi. Since her PhD in the lab of Bruce McDonald, she has worked with plant pathogenic fungi. A main goal is to understand the factors that drive speciation and specialization in pathogenic fungi. Her model system allows her to address this in an ecological context where she compares evolutionary processes in very different environments (agro-ecosystems versus natural environments).

Andreas von Tiedemann

Professor von Tiedemann is Professor of plant pathology and plant protection at the Georg-August University Göttingen, and is Editor of the Journal of Phytopathology. He has diverse research interests in plant pathology, particularly the potential impacts of climate change on crop protection.

Joan Webber

Dr Webber is Principal Pathologist and Head of Tree Health Research Group at Forest Research. She is responsible for leading and managing research into the health of trees, with particular emphasis on recently arrived pests and pathogens. She is programme manager for Forestry Commission funded research which underpins advice on tree health issues, and includes national and international collaborative research with universities and other research agencies and institutes.

PROGRAMME

All talks will take place in Lecture Theatre 4, Peter Lanyon Building

MONDAY 13th JULY

Theme I: Threats to Agriculture

- 08:30 Dan Bebber (University of Exeter): Welcome
- 08:40 Keynote: Charles Godfray (University of Oxford): Challenges for global food security
- 09:20 Michael Shaw (University of Reading): Impacts of emerging disease on agricultural cropping systems
- 09:45 Sean Murphy (CABI): The dispersal and spread of *Liriomyza leafminers*: the perpetuation and generation of new threats to global horticulture
- 10:00 Vivian Blok (The James Hutton Institute): Future environmental and geographic risks of key crop pests and pathogens in Scotland
- 10:15 COFFEE

Theme II: Novel Detection Methods

- 10:45 Anne-Katrin Mahlein (University of Bonn): Remote and proximal sensing for the detection of plant diseases – concepts, sensors and applications
- 11:10 Diane Saunders Charting the galaxy to supercharge the radars for pathogen surveillance.

Theme III: Threats to Forests

- 11:25 Joan Webber (Forest Research): Emerging pathogens - current distributions and impacts on forests
- 11:50 Katy Reed (Forest Research and Harper Adams University): What is the role of *Agrilus biguttatus* in Acute Oak Decline?
- 12:05 April Armstrong (Forest Research): The epidemiology and distribution of *Phytophthora austrocedri* in Britain

- 12:20 LUNCH
- 13:40 Benoit Marçais (INRA-Nancy): Long term impact of *Phytophthora xalni* on an alder riparian stand
- 13:55 Sean Meaden (University of Exeter): Compositional shifts in the microbiome during bacterial infection in horse chestnut tree hosts

Theme IV: Plant Biosecurity Policy

- 14:10 Marco Pautasso (Animal & Plant Health Unit, EFSA): Can media monitoring help identify emerging plant health threats?
- 14:25 Glyn Jones (FERA): Press portrayal of *P. ramorum* and *Chalara* and the social amplification of risk
- 14:40 Julie Flood (CABI): Emerging plant pests and pathogens in tropical agriculture

15:05 CREAM TEA

- 15:50 Julian Smith (FERA): Promoting a global ambition for crop and plant biosecurity
- 16:15 Nicola Spence (DEFRA): The Plant Biosecurity Strategy for Great Britain
- 16:40 DISCUSSION: Is plant biosecurity research addressing the needs of policy? Chair: Melanie Tuffen (DEFRA)

17:10 POSTER SESSION

19:00 DINNER – THE STANNARY

PROGRAMME

All talks will take place in Lecture Theatre 4, Peter Lanyon Building

TUESDAY 14th JULY

Theme V: Evolution of Emerging Pests and Pathogens

- 08:30 Keynote: Nick Talbot (University of Exeter): How to evolve a fungal pathogen
- 09:10 Eva Stukenbrock (University of Marburg): Adaptive evolution of fungal plant pathogens in managed and natural ecosystems
- 09:35 Andrea Campisano (Fondazione Edmund Mach): Tales from the vineyard: of plants, endophytes and insects, and how they can help us understanding complex interactions
- 10:00 Ville-Petri Friman (University of York): Applying eco-evolutionary theory to increase soil rhizosphere resistance to *Ralstonia solanacearum* plant pathogen invasion
- 10:15 David J. Studholme (University of Exeter): What has genome sequencing told us about emerging *Xanthomonas* pathogens?
- 10:30 COFFEE

Theme VI: Mathematical Modelling and Epidemiology

- 11:00 Chris Gilligan (University of Cambridge): Roles of biological and environmental factors in dispersal
- 11:25 Nina Alpey (University of Oxford): Modelling genetics-based methods of crop pest control
- 11:50 Stephen Parnell (University of Salford): Determining optimal disease surveillance programmes using epidemiological models
- 12:05 Nik J. Cunniffe (University of Cambridge): Optimizing control of an established plant disease epidemic using a landscape-scale mathematical model: sudden oak death in California
- 12:20 Marc Delêtre (National University of Ireland Galway): Tracking down the pandemics: a graph theoretical approach for exploring the social dynamics of the Cassava Mosaic Virus pandemics in Central Africa

12:35 LUNCH

Theme VII: Host Selection and Virulence

- 13:55 Santiago Elena (IBMCP-CSIC): Trade-off between virulence and host specificity in experimental potyvirus-plant pathosystems
- 14:20 Agathe Jouet (The Sainsbury Laboratory): Host immunosuppression, hybridization and clonal reproduction enable the broad host range of the plant pathogen *Albugo candida*
- 14:45 Ivana Gudelj (University of Exeter): Harboring low virulence cheats within a pathogen population increases both fitness and virulence
- 15:00 Talia Karasov (University of Chicago): Natural selection for genetic variation in plant host resistance
- 15:15 Jean Beagle Ristaino (North Carolina State University): Evolutionary origins of US and famine-era lineages of *Phytophthora infestans*, a reemerging threat to global food security

15:40 CREAM TEA

Theme VIII: Climate Change

- 16:25 Andreas von Tiedemann (Georg-August-University Göttingen): Climate change impacts on agricultural pests and pathogens
- 16:50 Vivian Blok (The James Hutton Institute): Future environmental and geographic risks of key crop pests and pathogens in Scotland
- 17:05 CLOSING REMARKS

POSTERS

Posters will be displayed in the Photo Gallery throughout the Symposium, with a poster session on Monday evening.

1. Clare Trivedi (Royal Botanic Gardens, Kew): Seed Bank Collections: Facilitating Research into Emerging Plant Pests and Pathogens
2. Anna Platoni (The Royal Horticultural Society): Emerging pests and diseases detected in UK gardens
3. Ellie Barham (Botanic Gardens Conservation International): The International Plant Sentinel Network
4. Benjamin Watkinson-Powell (Imperial College): Modelling the effect of spatial dynamics on the evolution of resistance to genetic insect population control
5. Stewart Jennings (University of Leeds): Crops and climate change: the combined impact of biotic and abiotic stresses
6. Greig Cahill (Scottish Government): Are new *Pectobacterium atrosepticum* strains responsible for the growing incidence of blackleg of potato?
7. Julien P. Ponchart (Université Laval): Defining the baseline of the diversity of the balsam fir endomycobiome
8. Jessica Needham (University of Oxford): The effect of ash dieback on forest dynamics
9. Louise Hill (University of Oxford): Mapping the resilience of UK forests to potential loss of common ash (*Fraxinus excelsior*)
10. Barbara Tigar (Liverpool Hope University): It's elementary. Using biogeochemical markers to track insect pests
11. Dominic Henri (University of Hull): Managing habitat elements to enhance pest control ecosystem services in South Africa
12. Matthew Elliot (Forest Research): Detecting and identifying *Phytophthora* species in soil using Illumina next generation sequencing techniques
13. Melanie Tuffen (DEFRA): The UK Plant Health Risk Register: a tool to rate risks and prioritise actions against emerging plant pests and pathogens
14. Angela Delgado Castillo (University of Exeter): Did weather trigger the recent outbreak of coffee leaf rust in Latin America?
15. Jennifer Sjölund (Science and Advice for Scottish Agriculture): Developing an RT-PCR assay for the identification of morphologically similar psyllid species
16. Finn McQuaid (Rothamsted Research): The dispersal of diseased and disease-free planting material through trade networks
16. Mike Bonsall (University of Oxford): Genetic control of insect populations

SOCIAL EVENTS

Welcome Mixer, Sunday 12th July
5 Degrees West, 7 Grove Place,
Falmouth TR11 4AU, England

We will gather from 6pm at 5 Degrees West for drinks and nibbles, located in Falmouth, by the Maritime Museum. There will be a live acoustic band, with a lovely outside area for you to mingle and network. We have booked a space in the restaurant – where you may also stay for dinner - fine cider (a Westcountry speciality) and delicious food await in this well reviewed pub!

Please feel free to make your own way into Falmouth and join us there. (See page 16 for bus route information). Alternatively, please meet Amelia Simpson (BES Events manager) in the Accommodation Reception at 5pm for instructions on how to travel to the venue.

Conference Dinner, Monday 13th July
The Stannary, Daphne Du Maurier Building,
Penryn Campus

Our conference dinner will be held on Penryn Campus in the Stannary. Named after the ancient Cornish industry of tin mining – *Stannum* in latin – the building also houses a popular music venue and late bar.



DELEGATE INFORMATION

TRAVEL

Rail

The nearest train station to the campus is Penryn, which is 15 minute walk away. Those arriving by train must change in Truro and take the smaller, branch line South to Penryn. Falmouth Town and Falmouth Docks are 2 stops further on this line. Those with heavy luggage may wish to call a taxi: Abacus (01326 212141), A 2 B Cars (01326 378262) or Able Cabs (01326 373007).

Road

Delegates arriving by road should follow the A30 west from Exeter until you reach the A39 signposted Truro. Drive through Truro, following the signs A39 to Falmouth. Follow the A39 towards Falmouth until you come to the Treliever roundabout, where you will see signs to the Penryn Campus. The campus is approximately 2 hours from Exeter.

Bus

Travel into Falmouth is very regular at every 15 minutes- nearly all buses from the second bus stop (i.e. the one heading away from Truro) go to the Moor, the main bus station in town,

You can find a map of the University bus routes here: <http://www.fxplus.ac.uk/find/travel-transport/bus-travel>

Timetables are here:

http://www.firstgroup.com/ukbus/devon_cornwall/assets/pdfs/tickets/u1-u3.pdf

http://www.firstgroup.com/ukbus/devon_cornwall/assets/pdfs/tickets/u2.pdf

Air

The nearest airport is Newquay. Flights arrive here from Birmingham, Dublin, London Gatwick, London Stansted and Manchester. Newquay airport is around 45 minutes away from the campus by car. A taxi will cost around £60.

Travel between Penryn and Falmouth

Trains run a couple of times per hour from Penryn to Penmere, Falmouth Town and Falmouth Docks. Bars and restaurants are closest to the Falmouth town stop.

There is a regular bus service between Falmouth and Penryn Campus. Services run from The Moor in Falmouth, through Penryn Town and up to the campus roughly every 15 minutes.

A taxi will cost around £10 so is usually the cheapest option if you're in a group. Local taxi companies are Abacus (01326 212141) and Able Cabs (01326 373007).



DELEGATE INFORMATION

Social Media

All attendees are encouraged to join the discussion via Twitter. Use #pestsym and follow @BritishEcolSoc to ensure you're part of the conversation.

Speakers reserve the right to ask delegates not to disseminate their research via the internet, so please respect this request if made.

Photography

Photographs taken at our event may be used for promotional purposes; if you have any concerns or queries regarding this, please come and see us at the Registration Desk.

Internet

Complementary Wi-Fi is provided throughout University. A password will be provided on registration.

Food and Refreshments

Your registration includes tea/coffee and lunch on Monday and Tuesday. All catering will be available in the Photo Gallery during the designated refreshment breaks.

Badges

For security and regulation purposes, please ensure you wear your registration badge at all times throughout the venue.

Mobile Phones

As a courtesy to speakers and other delegates, we ask that all mobile phones and electronic devices be changed to silent mode before entering into any session.

Lost Property

Please hand in lost property to the registration area where it will be made available for collection.

Smoking Policy

Please note that smoking is not permitted inside the university.

First Aid

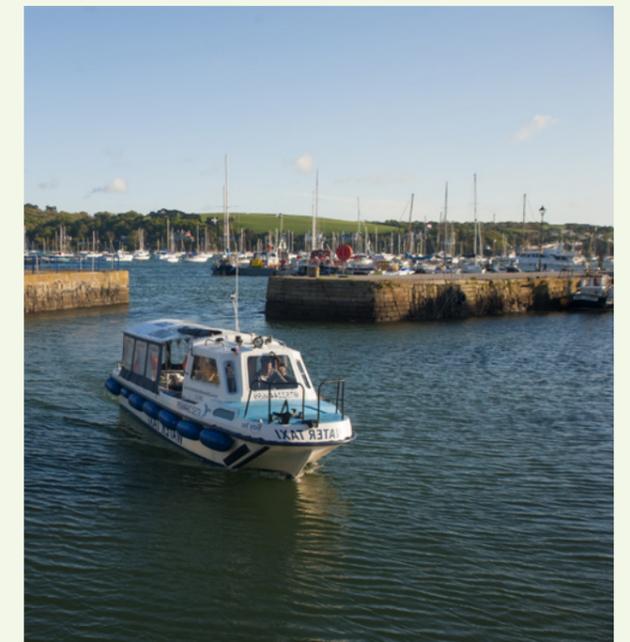
Should you require first aid assistance during the Symposium, please contact a BES team member who will be able to guide you to the appointed first aider.

Venue Security and Drills

In the event of an emergency, security and University staff will guide you to safety. There will not be any fire alarm tests during our Symposium and therefore any alarm should be considered the real thing.

Insurance and Liability

The Symposia organisers will not accept liability for personal injury or loss/damage to property/belongings of participants or accompanying persons, before, during or following the Symposium, tours or their stay in Cornwall. It is therefore recommended that participants arrange their own personal health, accident and travel insurance.



ACCOMMODATION MAP



DELEGATE INFORMATION

ACCOMMODATION SEE MAP LEFT

Our accommodation, known as Glasney Village, is situated on Penryn Campus. Our friendly reception team are on duty 24 hours a day and can be contacted on telephone number 01326 253503. Check-in is from 4pm onwards. It may be possible to leave luggage at reception prior to 4pm subject to limited availability. Guests are requested to check-out before 10am on the day of their departure. Once again, luggage may be left at reception if you so require, but this is limited by the space available. Rooms are accessed with a key or card. Please keep these in a safe place as a charge will be levied for lost keys or keys not returned on departure. Please refer to the Terms and Conditions.

There are a number of amenities and facilities on campus for delegates to use:

- Koofi licensed coffee shop Monday to Friday 8am – 10pm
- Fitness Centre Monday – Friday 7.30am until 9.30pm
Saturday & Sunday 9am until 6pm

Day and weekly passes available for purchase at the fitness centre:

1 Day Guest Pass	1 Day	£5.00
1 Week Guest Pass	1 Week	£15.00
2 Week Guest Pass	2 Week	£25.00
1 Month Guest Pass	1 Month	£35.00

- Essentials Shop based at Glasney Lodge 24/7
- Stannary Bar 10am until 5.30pm

Breakfast is served from 7.30am – 8.15am, in the Stannary.

Parking

Unfortunately parking is not permitted in Glasney Village itself. Glasney Lodge Reception will allow cars through to drop off and collect luggage however cars should then be parked at one of the campus car parks situated 30 – 100 metres from the accommodation.

Parking for our group guests is charged at £3.25 per day Mon-Fri, free at the weekend. If you are a blue badge holder, please speak to the staff at Glasney Lodge Reception who will direct you to the disabled parking bays within the accommodation grounds.

Guests with Special Needs

If you have special requirements, please let us know at the time of booking. We will do our best to meet these requirements but they cannot always be guaranteed. We have a limited number of fully adapted accommodation units, which may be suitable for guests with disabilities. We may also be able to allocate a ground floor room if you have limited mobility.

Places to Eat

In Penryn, The Wharf serves great tapas and the Thirsty Scholar serves traditional Pub food and local ales. There are many more options in Falmouth, which is a short bus ride away, including Wildebeest, which serves excellent vegan food. Head to Events Square or the High Street for a range of choices including lots of locally caught seafood.

Things to do in Falmouth

Falmouth has a long Maritime history. Exploring the seafront, taking a boat trip to St Mawes or visiting the Maritime Museum are all enjoyable ways to spend an afternoon in the town.

There are a number of beaches in Falmouth, notably Gyllyngvase Beach and Swanpool Beach. Both are a short walk from the town and have great cafes, kayak hire and are good for swimming and snorkelling (provided you have a wetsuit).

In the evening, there is an abundance of good pubs that serve beers from the many local breweries. Some of the better ones are The Front, located on Custom House Quay and Beerwolf, just off the High Street.

St Ives, Land's End and the Minack Theatre are also all less than an hour from Falmouth.



British Ecological Society

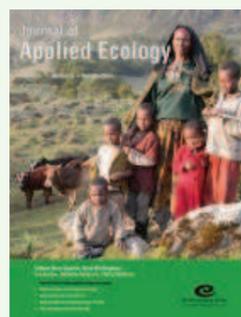
Journal of Ecology



By publishing broad-reaching and original papers on all aspects of plant ecology, **Journal of Ecology** brings the most important papers in our area to an international audience, a role it has developed since its foundation in 1913.

www.journalofecology.org
@JEcology

Journal of Applied Ecology



Journal of Applied Ecology publishes novel, high-impact papers on the interface between ecological science and the management of biological resources.

www.journalofappliedecology.org
@JAppliedEcol

Methods in Ecology & Evolution



Methods in Ecology and Evolution promotes the development of new methods in ecology and evolution, and facilitates their dissemination and uptake by the research community.

www.methodsinecologyandevolution.org
@MethodsEcolEvol

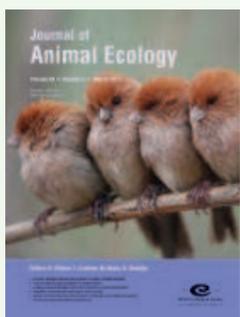
Functional Ecology



Functional Ecology publishes high-impact papers that enable a mechanistic understanding of ecological pattern and process from the organismic to the ecosystem scale. **Functional Ecology** is going online only from 2015.

www.functionalecology.org
@FunEcology

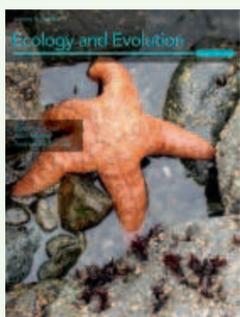
Journal of Animal Ecology



Journal of Animal Ecology publishes the best original research on all aspects of animal ecology, ranging from the molecular to the ecosystem level.

www.journalofanimalecology.org
@AnimalEcology

Ecology and Evolution



Ecology and Evolution is a peer reviewed, open access journal providing rapid publication of high-quality research in all areas of ecology, evolution and conservation science.

www.EcolEvol.org
@WileyOpenAccess

www.BritishEcologicalSociety.org
info@BritishEcologicalSociety.org
@BritishEcolSoc

ANNUAL REVIEWS ✨ SPARK A CONNECTION

Annual Review of Phytopathology

phyto.annualreviews.org • Volume 53 • August 2015

Editor: Neal K. Van Alfen, *University of California, Davis*

The *Annual Review of Phytopathology*, in publication since 1963, covers the significant developments in the field of plant pathology, including plant disease diagnosis, pathogens, host-pathogen interactions, epidemiology and ecology, breeding for resistance and plant disease management, and includes a special section on the development of concepts.

Access all Annual Reviews journals via your institution at www.annualreviews.org.

Institutional site license options available. Contact Annual Reviews for details.

TABLE OF CONTENTS:

- *A Moving View: Subcellular Transport Processes in Pattern Recognition Receptor-Triggered Plant Immunity*, Sara Ben Khaled, Jelle Postma, Silke Robatzek
- *Citrus Tristeza Virus: Making an Ally from an Enemy*, William O. Dawson, Moshe Bar-Joseph, Stephen M. Garnsey, Pedro Moreno
- *Dissecting the Molecular Network of Virus-Plant Interactions: The Complex Roles of Host Factors*, Aiming Wang
- *Durable Resistance of Crops to Disease: A Darwinian Perspective*, James K.M. Brown
- *Epidemiology and Population Biology of Pseudoperonospora cubensis: A Model System for Management of Downy Mildews*, Peter S. Ojiambo, David H. Gent, Lina M. Quesada-Ocampo, Mary K. Hausbeck, Gerald J. Holmes
- *Evolution of Plant Parasitism in the Phylum Nematoda*, Caspar W. Quist, Geert Smant, Johannes Helder
- *Genome-Enabled Analysis of Plant-Pathogen Migration*, Erica M. Goss
- *Genomics Spurs Rapid Advances in our Understanding of the Biology of Vascular Wilt Pathogens in the Genus Verticillium*, Anna Klimes, Katherine F. Dobinson, Steven J. Klosterman, Bart P.H.J. Thomma
- *Grapevine Leafroll Disease and Associated Viruses: A Unique Pathosystem*, Rayapati A. Naidu, Hans J. Maree, Johan Burger
- *Highways in the Sky: Scales of Atmospheric Transport of Plant Pathogens*, David G. Schmale, Shane D. Ross
- *Identification of Viruses and Viroids by Next-Generation Sequencing and Homology-Dependent and Homology-Independent Algorithms*, Qingfa Wu, Shou-Wei Ding, Yongjiang Zhang, Shuifang Zhu
- *Identifying and Naming Plant-Pathogenic Fungi: Past, Present, and Future*, Pedro W. Crous, David L. Hawksworth, Michael J. Wingfield
- *Impact of Diseases on Export and Smallholder Production of Banana*, Randy C. Ploetz, Gert H.J. Kema, Li-Jun Ma
- *Landscape-Scale Disease Risk Quantification and Prediction*, Jonathan Yuen, Asimina Mila
- *Leaf Rust of Cultivated Barley: Pathology and Control*, Robert F. Park, Prashant G. Golegaonkar, Lida Derevnina, Karanjeet S. Sandhu, Haydar Karaoglu, Huda M. Elmansour, Peter M. Dracatos, Davinder Singh
- *Lipochitooligosaccharides Modulate Plant Host Immunity to Enable Endosymbioses*, Erik Limpens, Arjen van Zeijl, Rene Geurts
- *Molecular Mechanisms of Nematode-Nematophagous Microbe Interactions: Basis for Biological Control of Plant-Parasitic Nematodes*, Juan Li, Chenggang Zou, Jianping Xu, Xinglai Ji, Xuemei Niu, Jinkui Yang, Xiaowei Huang, Ke-Qin Zhang
- *Playing on a Pathogen's Weakness: Using Evolution to Guide Sustainable Plant Disease Control Strategies*, Jiasui Zhan, Peter H. Thrall, Julien Papaix, Lianhui Xie, Jeremy J. Burdon
- *Practical Benefits of Knowing the Enemy: Modern Molecular Tools for Diagnosing the Etiology of Bacterial Diseases and Understanding the Taxonomy and Diversity of Plant-Pathogenic Bacteria*, Carolee Bull, Steven T. Koike
- *Priming for Enhanced Defense*, Uwe Conrath, Gerold J.M. Beckers, Caspar J.G. Langenbach, Michal R. Jaskiewicz
- *Quantitative Resistance to Biotrophic Filamentous Plant Pathogens: Concepts, Misconceptions, and Mechanisms*, Rients Niks, Xiaoquan Qi, Thierry C. Marcel
- *Range-Expanding Pests and Pathogens in a Warming World*, Daniel Patrick Bebber
- *Roots Shaping Their Microbiome: Global Hot Spots for Microbial Activity*, Barbara Reinhold-Hurek, Wiebke Büniger, Claudia Sofia Burbano, Mugdha Sabale, Thomas Hurek
- *Sharka Epidemiology and Worldwide Management Strategies: Learning Lessons to Optimize Disease Control in Perennial Plants*, Loup Rimbaud, Sylvie Dallot, Timothy R. Gottwald, Véronique Decroocq, Emmanuel Jacquot, Sameul Soubeyrand, Gaël Thébaud
- *Soil Health Paradigms and Implications for Disease Management*, Robert P. Larkin
- *The Wayward Hawaiian Boy Returns Home*, Dennis Gonsalves
- *Torradoviruses*, Rene A.A. van der Vlugt, Martin Verbeek, Annette Dullemans, William M. Wintermantel, Wilmer J. Cuellar, Adrian Fox, Jeremy R. Thompson
- *Understanding Plant Immunity as a Surveillance System to Detect Invasion*, David E. Cook, Carl H. Mesarich, Bart P.H.J. Thomma



ANNUAL REVIEWS | Connect With Our Experts

T: 650.493.4400/800.523.8635 (US/CAN)

E: service@annualreviews.org



British Ecological Society

Annual Meeting

Faàilte

13 – 16 December 2015 • EICC, Edinburgh, UK

www.BritishEcologicalSociety.org/AM2015

We are thrilled to announce that our plenary speakers will be Luigi Boitani (University of Rome), Josephine Pemberton (University of Edinburgh) and Bill Sutherland (University of Cambridge).

Abstract submission and registration will open in April – keep an eye on our website for the most up to date information and follow the conversation with **#BES2015**.

Edinburgh is the political capital of Scotland and one of the most popular British centres for culture and architecture – both New and Old Towns are listed as UNESCO World Heritage Sites. It is also a hub for international travel.

Expect the same high calibre science, workshops, networking and social programmes – but with a distinctive Scottish flavour.

Registration
and Abstract
submission
is now live!

