



# INTERNATIONAL NEWSLETTER ON PLANT PATHOLOGY

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## Important Notice to ISPP Councillors - ISPP Executive 2018-2023 Elections

The ISPP Nomination Committee for the shortlisting of nominees for the ISPP Executive Committee (EC) for 2018-2023 have completed candidate shortlisting. During June, the ISPP Councillors representing ISPP Associated Societies and the ISPP Executive will be invited to vote for their preferred candidates. If you are a Councillor, please look out for the Election information and remember to vote. The Executive for 2018-2023 will be announced by August 2017.

## Vale: Ronald Wood (1919-2017)

We regret to announce the death, on 26 April 2017, of Professor Ronald Karlake Starr Wood FRS, aged 98, one of the founders of the International Society for Plant Pathology. RKS Wood was the Chair of the organising committee of the first International Congress of Plant Pathology held in July 14-26 1968 at Imperial College in London, UK and also a Fellow of ISPP (elected 1998 in Kyoto). An obituary will appear in a future issue of this Newsletter.

## Challenge of Change Commission

The Association of Public and Land-grant Universities established the Challenge of Change Commission to examine food security challenges and make recommendations on the actions required by public research universities to meet global food needs by 2050. The Commission-comprised of prominent university, government, non-governmental organizations, and business leaders-unveiled their much-anticipated report and action plan, which centres on harnessing the vast academic, research, and leadership capabilities of public research universities to address the interdisciplinary challenges of food and nutrition security.

The Commission report defines seven challenges for solving global food and nutrition insecurity and details the steps that public research universities, along with partners, must take to address them:

Challenge 1: Increase yields, profitability, and environmental sustainability simultaneously

Challenge 2: Develop the varieties and breeds needed for sustainable food systems

Challenge 3: Decrease food loss and waste through more efficient distribution systems

Challenge 4: Create and share resources that serve all populations

Challenge 5: Ensure inclusive and equitable food systems

Challenge 6: Address the dual burdens of undernutrition and obesity to ensure full human potential

Challenge 7: Ensure a safe and secure food supply that protects and improves public health

Download PDF of [report](#).

[Read more](#)

([Association of Public and Land-grant Universities](#), 2017)

### **State of the World's Plants 2017 report**

A detailed knowledge of plants is fundamental to human life on Earth. This is the second annual State of the World's Plants report in which databases, published literature, policy documents, reports and satellite imagery were scrutinised to provide a synthesis of current knowledge on the world's plants. In this year's report, the rapidly accumulating discoveries and knowledge that provide important sign-posts to the next food crops, medicines, and timbers are highlighted. The section of Plant Health focuses on insect pests with last year's report focusing on viral, fungal and bacterial pathogens.

Download the [2016](#) and [2017](#) State of the World's Plants reports.

### **Springer celebrating the Fascination of Plants Day**

Springer is celebrating Fascination of Plants Day (18 May) with a collection of [featured articles](#). These are available until the end June, 2017 with open access articles freely available online on a permanent basis.

### **Global Seed Vault threatened by climate change**

The Global Seed Vault was designed as an impregnable deep-freeze to protect the world's most precious seeds from any global disaster and ensure humanity's food supply forever. But the Vault, buried in a mountain deep inside the Arctic Circle, has been breached after global warming produced extraordinary temperatures over the winter, sending meltwater gushing into the entrance tunnel. Fortunately, the meltwater did not reach the vault itself, the ice has been hacked out, and the precious seeds remain safe for now at the required storage temperature of -18C.

The vault managers are now taking precautions, including major work to waterproof the 100m-long tunnel into the mountain and digging trenches into the mountainside to channel meltwater and rain away. They have also removed electrical equipment from the tunnel that produced some heat and installed pumps in the vault itself in case of a future flood.

(Damian Carrington, [The Guardian](#), 20 May 2017)

### **Plant disease patterns offer clues about climate change**

General atmospheric models provide an indicator of climate change. More sensitive models are needed to understand what is happening on ground level, however. One way to do this, new research highlights, is by tracking the spread of plant pathogens.

A paper published in the journal *Phytobiomes* titled "[Conflicting effects of climate and vector behavior on the spread of a plant pathogen](#)" focuses on understanding climate change on agroecosystems. This is achieved through charting the effects of temperature change on the leafhopper vector behavior, which relates to the spread of Pierce's disease, caused by a bacterium called *Xylella fastidiosa*, on grapevines. The main finding from the research is that global warming exacerbates the disease

symptoms seen with infected grapevines.

The new connections have been made based on a mix of biology field work together with a mathematical model. The study has been led by University of California, Riverside entomologist Dr. Matthew Daugherty. The factors considered in the research included the type of disease, the insect vector, and temperature. The research shows how rising temperatures led to variable effects in relation to vectors of diseases (in this case, insects spreading plant diseases).

The data indicates while global warming increases the types of disease symptoms seen with infected grapevines there could also be a limit to the extent that the insects that spread the disease will function under the higher temperatures. This is because the insects do not like feeding on vines that show extensive signs of the disease. In other words, the infections that grape vines contract might become worse but the rate of infection may slowdown.

(Tim Sandle, [Digital Journal](#), 20 May 2017)

### **Online Pest Risk Atlas for Africa to combat climate change effects on pest management**

The International Potato Center (CIP) recently launched its free online mobile accessible Pest Risk Atlas for Africa that assesses potential pest risks under current and potential future climate conditions for a number of important pests that effect African agricultural and horticultural crops like potato, sweetpotato, vegetables, and maize. Climate change will exacerbate existing vulnerabilities of resource-constrained farmers who depend on agriculture for a living. CIP launched the Pest Risk Atlas for Africa to benefit researchers and extension workers involved in pest risk analysis and pest management. Ultimately, this information will create better awareness of current and future pest risks under climate change and promote the inclusion of pest risk adaptation plans at country level. Consequently, it may lead to the adaptation of sustainable pest control methods that are not overly dependent on pesticides and therefore are best suited for farmers in Africa to improve their food security and daily lives under future climates.

On average, 30-50% of the yield losses in agricultural crops are caused by pests, despite the application of pesticides to control them. Climate, especially temperature, has a strong and direct influence on the development and growth of insect pest populations. A rise in temperature due to climate change may both increase or decrease pest development rates. Hence, an increase in temperature can potentially affect range expansion and outbreaks of many insect pests. Therefore, if adequate integrated pest management (IPM) strategies are not developed and made available to farmers, greater losses in crop yield and quality could ultimately result.

The Pest Risk Atlas for Africa is available online at <http://cipotato.org/riskatlasforafrica/> and will be periodically updated and enriched with new pest chapters. All individual pest and biocontrol agent chapters can be downloaded for free. It also contains interactivity that allows users to zoom into maps, and do quick searches for specific information.

([Eureka Alert](#), 6 February 2017)

### **Australia leads international efforts to protect vital domestic industries from deadly plant pest**

Experts from across the globe came together during 17-19 May 2017 to share knowledge and strengthen Australia's defences against one of the world's most devastating plant pests, *Xylella fastidiosa*. Australian Chief Plant Protection Officer Dr Kim Ritman, said diagnostics, management, control, research and collaboration were on the agenda at the 2017 International Symposium on *Xylella fastidiosa* hosted by the Department of Agriculture and Water Resources in Brisbane, followed by a Surveillance and Diagnostics Workshop.

"Originating in the Americas, and now present in Europe, China and Iran, *Xylella fastidiosa* is a deadly and highly invasive plant pest that has wreaked havoc for Californian grape growers and wiped out more than a million ancient olive trees in southern Italy," Dr Ritman said. While the quickly spreading bacterium is not yet present in Australia, last year *Xylella* came in at number one in Australia's Top 40 National Priority Plant Pests. The exotic bacterium has the potential to severely impact Australia's citrus, grape, olive, peach, plum and forestry industries.

The 2017 International Symposium on *Xylella fastidiosa* is a critical forum for addressing Australia's ability to detect the disease, and if detected, Australia's preparedness to respond quickly and implement effective management processes. Australia's biosecurity system is built on a partnership approach involving government, industry, scientists, experts and the general public all working together to protect Australia's agricultural industries which have a projected gross value of \$64 billion, and unique

environment free from pests and diseases present in many other parts of the world.

“Producers need to be taking proactive measures to identify and report any unusual pest or disease symptoms, minimising the likelihood of disease coming onto their farms. Similarly, the general public has a role to play. By not bringing plants or seeds into Australia through the airport or mail, we can work together to keep Australia *Xylella*-free.”

([International Plant Protection Convention News](#), 16 May 2017)

### Popular articles in the Journal of General Plant Pathology

Some of the most popular articles published in Journal of General Plant Pathology, which is the official journal of the Phytopathological Society of Japan, are free to read until 31 May 2017, with all open access articles free indefinitely.

Highly downloaded:

- [Phytophthora infestans: a review of past and current studies on potato late blight](#)
- [Various species of Pyricularia constitute a robust clade distinct from Magnaporthe salvinii and its relatives in Magnaporthaceae](#)
- [Virulence factors of Botrytis cinerea](#)

Recent review articles:

- [Proteases from phytopathogenic fungi and their importance in phytopathogenicity](#)
- [Banana bunchy top virus and the bunchy top disease](#)
- [Insights into epidemiology and control of diseases of annual plants caused by the Pseudomonas syringae species complex](#)

### Plants help out their neighbours

A mentorship on a research project between Harsh Bais, a botanist at the University of Delaware, and Connor Sweeney, a keen high school student, produced a new discovery on plant communication published recently in [Frontiers in Plant Science](#) - a rare achievement for a high school student. Sweeney delved into research in Bais's lab at the Delaware Biotechnology Institute after school, on weekends and during summer breaks, culturing an estimated thousand *Arabidopsis thaliana* plants for experiments. One day in the lab, Sweeney put two plants a few centimetres apart on the same Petri plate and made two small cuts on the leaf of one to simulate an insect's attack. What happened next, as Sweeney says, was "an unexpected surprise." The next day, the roots on the uninjured neighbour plant had grown noticeably longer and more robust-with more lateral roots poking out from the primary root.

Sweeney measured auxin, a key plant growth hormone, and found more of this gene expressed in neighbouring plants when an injured plant was around. He also confirmed that neighbour plants of injured plants express a gene that corresponds to a malate transporter (ALMT-1). Malate attracts beneficial soil microbes, including *Bacillus subtilis*, which Bais and his colleagues discovered several years ago. Apparently, uninjured plants that are in close proximity to injured ones and that have increased malate transporter associate more with these microbes. These beneficials bond with the roots of the uninjured plants to boost their defences. "So the injured plant is sending signals through the air. It's not releasing these chemicals to help itself, but to alert its plant neighbours," Bais said.

Bais credits Sweeney for the discovery, praising his hard work and willingness to learn, on top of his other high school studies and swimming. "I'm interested in looking at the agricultural side of science," Sweeney says. "It may not sound sexy, but everybody needs to eat. So if you can use cutting-edge technologies in genomics that feed more people while lessening the environmental footprint, that's where I want to be."

[Read more](#), with part two to come in the not too distant future!

(Phys.org, 16 May 2017)

### Mushroom Max: Meet the 11-year-old budding mycologist

Autumn is mushroom season and picking mushrooms requires not only patience but expertise, as one young boy from central

Victoria, Australia explains. Max Ward loves mushrooms. The 11-year-old from Castlemaine in central Victoria has been foraging for mushrooms from the age of five. The budding mycologist not only likes eating mushrooms, such as the bountiful, edible *Lactarius deliciosus* or saffron milk caps as they are known, but enjoys the added challenge of learning the scientific names. So enthusiastic is Max about his beloved mushrooms that he wants to share it with the rest of the world and recently started his own YouTube channel called [Journey Into the Forest](#) under the name Frowning Sparrow.

[Read more.](#)

(Larissa Romensky, ABC News, 15 May 2017)

### **Deciphering plant immunity against nematodes**

Until now, little was known about the general innate immune response of plants against nematodes. A team of researchers at the University of Bonn in Germany, in cooperation with scientists from the Sainsbury Laboratory in Norwich, UK, has now identified a gene in *Arabidopsis thaliana*, called NILR1, that helps plants sense nematodes. "The NILR1 is the genetic code for a receptor protein that is localised to the surface of plant cells and is able to bind and recognise other molecules," says Prof. Florian Grundler, chair at the Department of Molecular Phytomedicine at the University of Bonn. "NILR1 most probably recognises a molecule from nematodes, upon which, it becomes activated and immune responses of plants are unleashed."

"The nice thing about NILR1 is that it seems to be conserved among various crop plants and that it provides protection against many nematode species," says group leader Dr. Shahid Siddique. "The discovery of NILR1 also raises questions about the nematode derived molecule, whose recognition is thought to be integral to this process." Now that an important receptor is discovered, the scientists are working to find the molecule which binds to NILR1 to switch on the immune responses.

These findings open new perspectives in making crops more resistant against nematodes. They could already show that important crop plants such as tomato and sugar beet also possess a functional homologue of NILR1 - an excellent basis for further specific breeding. Once the nematode signal is characterised, a new generation of natural compounds will be available that is able to induce defence responses in plants thus paving the way for safe and sustainable nematode control.

[Read journal paper.](#)

([Phys.org](#), 13 April 2017)

### **New disease resistant banana varieties to Black Sigatoka**

One of the world largest banana tissue companies Rahan Meristem is trialling banana varieties showing "true resistance" to Black Sigatoka, but the research has been enveloped by an air of secrecy. The major breeding group has been collaborating with leading bioinformatic company Evogene to develop banana varieties showing tolerance to the devastating leaf-spot disease.

Black Sigatoka affects more than 50% of the global US\$2.5 billion banana crop, according to Evogene. It has the capacity to reduce yields by 35-50%, causing tremendous impact to growers in major producing countries of Central America, the Caribbean Islands, Africa and the Far East.

Rahan scientific director Dr. Eli Khayat indicated that they had used genes from *Musa acuminata* a species that have resistance. The approach showed success and we have engineered plants that have resistance to the disease. Khayat said the goal was to commercialise the varieties, but he highlighted consumer perceptions of genetically modified organisms (GMOs) could prove a challenge.

([Fresh Fruit Portal News](#), 3 April 2017)

### **Change the world, one article at a time**

Editors-in-Chief of Springer Nature journals across disciplines each nominated one article published in 2016 that could help humanity and protect and preserve our planet. Springer presents over 180 articles that have the potential to change the world.

[Access articles.](#)

## **How the sense of smell works in bacteria**

Scientists from the Moscow Institute of Physics and Technology (MIPT), in collaboration with their colleagues from the Forschungszentrum Jülich, the Institut de Biologie Structurale (IBaS) and European Synchrotron Radiation Facility (ESRF) in Grenoble, have proposed a universal mechanism for the "sense of smell" in bacteria. This was done by obtaining the structure of the NarQ protein from *Escherichia coli* which belongs to a universal class of sensory histidine kinases that are responsible for transmitting signals to bacteria about their environment. The paper published in [Science](#) will help us understand how bacteria "communicate" with one another and form biofilms on sterile surfaces or inside the human body.

[Read more.](#)

(Eurek Alert, 19 May 2017)

## **Journals that publish whatever you want**

As research organisations face budget cuts and research faces interference from governments, many scientists have taken to the streets in protest to remind the community of the importance of scientific research. That message usually cuts through as scientists are largely considered to be trustworthy-with their published research generally peer reviewed. But not always-some new scientific journals have emerged which will publish whatever you want, for the right price.

[Listen to this short radio conversation.](#)

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