ISPP INTERNATIONAL SOCIETY FOR PLANT PATHOLOGY

PROMOTING WORLD-WIDE PLANT HEALTH AND FOOD SECURITY

INTERNATIONAL SOCIETY FOR PLANT PATHOLOGY

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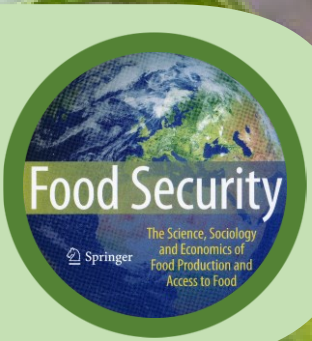

STOPPING PLANTS FROM PASSING VIRUSES TO THEIR PROGENY

JULES BERNSTEIN, UNIVERSITY OF CALIFORNIA (UC) RIVERSIDE NEWS, 19 SEPTEMBER 2024

Scientists have learned how plants keep viruses from being passed to their offspring, a finding that could ensure healthier crops. The discovery could also help reduce the transmission of diseases from mothers to human children. Plant viruses are often able to spread from one country to another through the seed trade. As a result, parent-to-progeny disease transmission is of global concern.

"Viruses can hide in seeds for years, making this one of the most important issues in agriculture," said UC Riverside distinguished professor Shou-Wei Ding in the Department of Microbiology and Plant Pathology. Ding is corresponding author of a new paper about the discovery in the journal *Cell Host & Microbe*.

When a mother plant with a virus makes, for example, 100 seeds, only between 0 and 5% of the seedlings are likely to become infected. For a century, scientists have wondered how the mothers are able to stop the virus from spreading to all or most of the young plants.

The UCR-led team wanted to solve this mystery by pinpointing the immune pathway that prevents virus transmission from parent to progeny, also called vertical transmission. The team succeeded. The strategy they used, and the pathway they identified, are detailed in the paper.

Hundreds of varieties of *Arabidopsis*, a small plant in the mustard family, were inoculated with cucumber mosaic virus. Despite its name, the virus can infect more than 1,000 plant species, and cause yellowing, ring-shaped spots, and the appearance of patterns on leaf and fruit surfaces. Then, the researchers analysed the plants to learn which genes make them, and their progeny, more resistant to the virus.

Two genes, both of which are only known to be functional during the early stages of seed development, appear to be most important for this purpose. These genes operate in what's called the RNA interference pathway.

Genetic information in cells is converted from DNA into RNA, and then into proteins. Sometimes, double-stranded RNA is cut into smaller fragments called small interfering RNA, or siRNA. These fragments are used to block the production of proteins, some of which may come from an invading virus.

"Many organisms produce siRNAs to control and inhibit viral infections," Ding explained. "We believe the reason these plants can prevent seed infections is because the antiviral RNA interference pathway is active when seeds are being developed within mother plants."

To examine their hypothesis, the researchers made mutant plants in which two key RNA interference pathway genes were deleted. These genes create enzymes called dicer-like 2 and dicer-like 4.

"Without these two enzymes, the plant cannot make siRNAs to inhibit viral infections. And without the siRNAs, the antiviral immune pathways are not functional," Ding said.

The mutant plants both grew and produced seeds normally. However, when the plants lacking these two enzymes were infected with cucumber mosaic virus, they developed very severe symptoms. They made fewer seeds, and more importantly, there was a tenfold increase in the rate of transmission to the seeds. Up to 40% of the new seedlings were infected.

"We got really excited by this result," Ding said. "This is the first time anybody has seen this major change in seed transmission after an immune pathway is eliminated."

The next question the researchers set out to answer was how, despite the strong immune suppression in non-mutant plants, can viruses still infect a small percentage of seeds? They learned that it's because the virus expresses a protein to block the RNA interference pathway in mother plants.

Moving forward, the research team is testing whether they can further decrease virus transmission rates by strengthening the immune pathway they identified in the seeds.

Because this pathway is widely conserved across a variety of organisms, including invertebrates, fungi, and mammals, the discovery could have broad implications for animal as well as human disease prevention.

The researchers have certain human viruses, like Zika, in mind as they continue their work. Zika infection during pregnancy can cause serious birth defects, including microcephaly and other brain abnormalities. The researchers hope to use what they learn to reduce the rate of vertical Zika transmission.

XVII Meeting of the Working Group 'Biological and integrated control of plant pathogens'

DAVIDE SPADARO AND MONICA MEZZALAMA, CONFERENCE CHAIRS

The XVII Meeting of the Working Group 'Biological and integrated control of plant pathogens' "From single microbes to microbiomes targeting One Health" (www.iobctorino2025.org) will take place from 11-14 June 2025 in the heart of Torino, Italy, (www.italia.it/en/piedmont/turin/guide-history-facts) at the Complesso Aldo Moro of the University of Torino.

The meeting will focus on the holistic framework of One Health, by discussing on how biocontrol of plant diseases, beside improving plant health, favours also soil, animal, and human health. Understanding the concept of pathobiome and plant-microbiome interactions will help to foster new biocontrol solutions. Biocontrol agents can be used to develop microbe-based products, but are also a rich source of natural plant protection products, useful in crop protection in association to biostimulants, biofertilisers, and plant strengtheners.

Students, experts, researchers, and other stakeholders interested in exploring potential enhancements in biological control and its application are warmly invited to take part. The conference aim is also to encourage attendees to create new networks with a vision to develop future collaborations.

For more information and important dates vist the conference website.

NEW SPECIES OF FUNGUS NAMED AFTER PLANT PATHOLOGIST

DEPARTMENT OF AGRICULTURE, FISHERIES AND FORESTRY (DAFF) NEWS, 24 SEPTEMBER 2024

Senior Plant Pathologist Jenny Morrison has been given a remarkable accolade: a newly discovered species of fungus has been named after her. It all started in north Queensland in 2019, when Jenny was one of 26 scientists from around Australia who took part in the 'Pathoblitz' workshop on plant disease.

The workshop gave participants the opportunity to observe, collect and identify diseased plant samples from the Atherton Tablelands—a unique environment with savannah, rainforest, horticulture and agricultural ecosystems, all within a 50 km radius.

The various plant disease samples that Jenny collected included leaves from *Freycinetia scandens*, a species of climbing plant. Jenny noticed that some of the leaves had spots on them, which were grey in the centre and pale brown towards the margins and then made isolations.

Hundreds of samples were collected by the workshop participants, (which included several of Jenny's plant pathology colleagues in DAFF) and lodged with the Queensland Plant Pathology Herbarium for further examination.

Five years later, Jenny was surprised to hear from the Principal Scientist at the Queensland pathology herbarium. She learned that her isolations from *Freycinetia scandens* had led to the discovery of a new *Zasmidium* fungus species, confirmed by molecular sequencing and phylogenetic analysis. They named the species in her honour.

Jenny, who has worked for DAFF for the past 17 years, has now been immortalised in mycology with an entry on *Zasmidium morrisoniae* appearing in the Index of Australian Fungi. Finally her children are taking an interest in her career, thanks to the ability to claim this fungus was named after them too.

CROP DISEASES, SPOILAGE CAN HURT THE FOOD SUPPLY. COULD PLANT PREBIOTICS HELP?

RA SMITH, DUKE TODAY, 13 SEPTEMBER 2024

When we talk about the microbiome, most of us think of the trillions of microorganisms that live in our bodies, supporting everything from digestion to mental health.

But plants have a world of microbes living on and inside them too. And evidence is beginning to emerge that these hidden residents play a key role in promoting plant health, in part by helping their immune system identify which bacteria to attack and which ones to tolerate.

In a new study, researchers find that disruptions to the community of microbes that live inside the leaves of a spindly plant called *Arabidopsis* can compromise a plant's ability to tell harmless invaders from harmful ones -- effectively turning the plant's defensive arsenal against itself.

The findings could eventually lead to new ways to help safeguard our food supply, said Sheng Yang He, professor of biology at Duke University and senior author of the study.

Indeed, the Food and Agriculture Organization of the United Nations estimates that crop pathogens cost the global economy some $220 billion each year.

In the study, He and colleagues, including lead author Yu Ti Cheng, a postdoctoral researcher in the He lab, were looking for genes involved in keeping the plant microbiome in balance when they noticed something odd.

They found that plants with a mutation in a gene called TIP1 had an excess of otherwise harmless bacteria inside their leaves. But these plants also had other perplexing symptoms, Cheng said.

For one, they were small and stunted compared with their wild counterparts. And they had dead patches on their leaves that normally occur when plants are fighting infection, even though no "bad" bacteria were present.

Cheng recognised these symptoms as signs of an errant immune system, when a plant's defenses kick into gear even though there's no real threat and attack healthy tissues instead of protecting them.

Plants carrying the tip1 mutation had multiple defense genes turned up in their cells even though they weren't under attack, the researchers found -- a sign that their immune system is in overdrive.

"The plants still have the ability to defend themselves," Cheng said. They've just lost the ability to distinguish between microbial friends and foes, she added.

When this process goes wrong, previously "good" bacteria can cause the immune system to overreact in a way that is counterproductive.

"The host mistakes itself as the enemy," Cheng said.

At first the researchers weren't sure what was causing the plants' immune systems to malfunction. But they wondered if the out-of-balance leaf microbiome was part of the answer.

To test the idea, they grew *Arabidopsis* seedlings with and without microorganisms, using a germ-free growth system He's lab developed.

Sure enough, when tip1 mutant plants were grown to be devoid of microorganisms, their mysterious autoimmune issues nearly vanished.

"That was our eureka moment," the researchers said.

The health problems that arise when the body's microbiome is out of balance are well-studied in humans. For example, changes in the community of microbes in our intestines have been linked to autoimmune disorders such as Crohn's disease, type 1 diabetes and multiple sclerosis.

But the new findings, together with two previous studies from the He lab published in 2020 and 2023, represent the first time a link between unbalanced microbiomes and autoimmunity has been shown in plants, Cheng said.

The molecular mechanism behind the link remains unclear. The TIP1 gene encodes an enzyme called S-acyltransferase, whose genetic code has remained largely unchanged as new species have branched off from old ones in the tree of life -- which means it may play a role in keeping microbiomes in balance for other species as well.

As a next step, the researchers are trying to identify the molecule or substance that the S-acyltransferase enzyme binds to and how it functions.

The details could ultimately pave the way to prebiotics that support or reset the microbiome to "help plants maintain a better balance" and reduce losses in food crops caused by pathogens or spoilage, Cheng said.

"The more knowledge we have, the more tools we can use," she said.

MARPLE DIAGNOSTICS – MONITORING RECENT SHIFTS IN WHEAT STEM RUST IN NEPAL

JOHN INNES CENTRE NEWS, 13 SEPTEMBER 2024

Recent discovery of the Ug99 wheat stem rust strain in Nepal has once again emphasised the need for vigilance to protect Nepal's third most important food crop from any large-scale outbreaks of this devastating wheat disease.

Nepal already contends with frequent large-scale outbreaks caused by the related yellow rust pathogen, that can cause severe grain yield losses of 30 – 80% if not effectively controlled. A key component in guiding the correct control measures is to understand the precise strain of the pathogen present in a farmer's field.

For yellow rust, the deployment of MARPLE diagnostics in Nepal since 2022 has helped provide this capacity. The MARPLE diagnostics methodology developed at the John Innes Centre in collaboration with CIMMYT, uses a handheld MinION nanopore sequencer, built by Oxford Nanopore, to analyse samples of wheat infected with yellow rust. Reading the pieces of the pathogen's genome which define the different strains of the wheat rust pathogen, this method can provide near real-time information about which strains are present in a region.

This mobile genotyping approach enables the identification of individual strains of the pathogen rapidly in situ, without the need for high-tech facilities. It can also provide strain-level information within 48 hours of collecting samples, making it ideal for responding to disease emergencies.

Through support from the USAID-funded Feed the Future Innovation Lab for Current and Emerging Threats to Crops, led by Penn State University, the team at JIC has also recently expanded this method so it can be used to identify and track strains of the stem rust pathogen. The recent deployment of this method in Nepal, will ensure strains such as Ug99 can be effectively monitored in near real-time.

Suraj Baidya, senior scientist and chief of the National Plant Pathology Research Centre at NARC where MARPLE diagnostics has been adopted, noted: "It is fantastic to have this capacity available at our research station. MARPLE diagnostics is giving us the rapid diagnostics needed to help identify and manage changes in the rust pathogen population diversity."

Successful trials of the stem rust MARPLE platform were completed at NARC by Dr Ram Khadka in July 2024, with support from CIMMYT and the John Innes Centre. Samples from Khumaltar were successfully identified as Clade IV, another new stem rust strain in Nepal, matching results obtained at the Global Rust Reference Centre in Denmark. Dr Ram Khadka commented: "This represents the first application of MARPLE to stem rust in South Asia and provides a useful new tool for rapid diagnostics on this latest threat to wheat production in Nepal."

Professor Diane Saunders, project co-lead and group leader at the John Innes Centre, commented: "Given the recent shifts in the stem rust population in Nepal, it is vital that this capacity is available to our colleagues in Nepal. We are providing them with access to the latest innovations in plant disease diagnostics where it is needed most, in the hands of researchers in the field who are working tirelessly to combat these devastating diseases."

Professor David Hughes, Director of the Feed the Future Innovation Lab for Current and Emerging Threats to Crops commented: "This is an incredibly exciting demonstration of the potential of what happens when we focus on building capacity at the national level. With excellent and rapid genetic tests such as MARPLE that can build on the PlantVillage platform with its phenotypic diagnostics via AI we can get to the situation of rapid Surveillance which enables Solutions to be deployed."

Dr Dave Hodson, project co-lead, said: "In the months ahead MARPLE diagnostics will be used to monitor any spread of the Ug99 strain and rapidly identify any other notable strains to help combat the ever-evolving threat of the wheat rusts in Nepal."

MARPLE diagnostics is currently supported by the Bill & Melinda Gates Foundation and the Foreign, Commonwealth and Development Office (UK), with additional support from the Feed the Future Innovation Lab for Current and Emerging Threats to Crops funded by the United States Agency for International Development (USAID), the UK Biotechnology and Biological Sciences Research Council (BBSRC) Innovator of the Year Award, and the CGIAR Big Data Platform Inspire Challenge.

HOW TOXIC ARE THEY? RESEARCHERS INVESTIGATE THE ENVIRONMENTAL CONSEQUENCES OF NEW BIOTECHNOLOGICAL PESTICIDES

UNIVERSITY OF COPENHAGEN NEWS, 11 SEPTEMBER 2024

Biotechnological pesticides are a promising alternative to traditional chemical pesticides. But we have limited knowledge of how toxic they are to other organisms in the environment beyond regulatory assessments. A new research centre will now work to provide this knowledge – especially to ensure the EU has a chance of joining the growing market for biotechnological pesticides. As for now, Europe has failed to keep up.

"If a thing kills something, we need to know how it kills, and who and what else it may kill," says Professor Nina Cedergreen of the University of Copenhagen's Department of Plant and Environmental Sciences.

She is referring to biotechnological pesticides, or more specifically, pesticides that consist of all-natural RNA and peptide molecules designed to combat diseases and pests in agricultural crops which make use of cutting-edge biotechnologies. In some countries, they are classified as biopesticides and are believed to be less of a threat to the environment and public health than conventional chemical pesticides, which there is a political ambition to cut back on.

No RNA or peptide products have yet been approved in the EU, however, they are gaining traction in the rest of the world.

"Biotechnological pesticides show promise to make ever-increasing global food production less dependent on chemical pesticides. Manufacturers claim that biotechnological pesticides are environmentally safe because they are based on natural biology. The fact is that these are toxic substances that kill pests and diseases, none-the-less we are only starting evaluating their environmental impact. That's what we'll be trying to move forward," says the professor.

Cedergreen heads ENSAFE, a large new research centre that the Novo Nordisk Foundation has funded with DKK 60 million (€8 million). In addition to Cedergreen, the research consortium consists of Jan Gorodkin from the Faculty of Health Science at the University of Copenhagen, Jeppe Lund Nielsen from Aalborg University, and David Spurgeon and Helen Hesketh from UK Centre for Ecology & Hydrology. Together they will provide evidence-based knowledge about the risks of both RNA and peptide-based biopesticides.

A THREAT TO LADYBUGS AND POSSIBLE ALLERGENS?

RNA-based pesticides work by switching off identifiable genes in specific insect pests, viral or fungal diseases, which causes them to die or become unviable.

"Today, we don't know whether RNA pesticides only kill the pests we target, as there is little public data available on how they affect beneficial insects and other helpful critters. For example, how can we know if a toxin only affects Colorado beetles and not ladybugs? Our hypothesis is that there must be related animals that are sensitive to RNA agents as well. This is a hypothesis that we'll be setting out to test," says Nina Cedergreen.

Peptide-based pesticides work by mitigating specific enzymes in pests or microorganisms that cause plant diseases. Peptides can for example be hormones or defense compounds. Insulin in humans and spider venom are examples of peptides.

"While peptides are natural compounds, we know that most human allergies are actually triggered by peptides, including pollen and soy allergies. So what and how much does it take for peptides to trigger the immune system of other organisms than humans? These are among the questions that we'll need to answer," says Nina Cedergreen.

The researchers aim to answer two overarching questions: To what extent can humans and organisms be exposed to biotechnological pesticides when they are used as directed for agriculture? And, to what degree are these amounts toxic?

"By acquiring this knowledge, we'll be able to assess the overall risk of a pesticide. If a toxin disappears quickly from the environment, the risk to both humans and the environment tends to be relatively limited, as we won't be exposed to it. However, it is well known that peptides, for example, can take quite a long time to break down. So will any toxins from the field remain in our foodstuffs when they reach the supermarket? This is what we need to know," says the professor.

EUROPE LAGS FAR BEHIND

Authorities in many countries have adapted their approach to biopesticides, where several products are already in use, including in the United States, South America and Asia. The situation is different in the European Union.

Regardless of whether a plant protection product is natural or a synthetic chemical, pesticides must go through the same restrictive approval process in the EU; a process that typically takes 5-10 years and costs applicants roughly €45 million. However, the problem isn't just that the approval system in the EU is slow and expensive – it is also not geared to the new biotechnological pesticides.

Professor Cedergreen explains "The European approval system is tailored specifically for chemical pesticides, leading to some odd contradictions. For instance, the system may require you to provide a boiling point for a substance made up of living microbes, which clearly doesn't apply. This highlights how certain aspects of the current approval process simply don't make sense. She points to the time horizon as another critical obstacle:

"Many companies are currently developing biotechnological pesticides. Start-ups, however, cannot afford to wait a long time before they know if they have a market and can begin making money. That's why they look beyond Europe, which leaves us behind," says Nina Cedergreen, continuing: "This is the dilemma Europe is facing. We want to be careful about what we spray onto our food and feed. But it is unwise if we are so restrictive that we miss out on the biotechnological development booming around the world. Such developments can potentially produce better and less environmentally harmful plant protection products which ultimately will replace chemical pesticides."

The ambition of the new research center is therefore to develop the tools necessary for the EU to efficiently assess the environmental risks of various biopesticides.

"We need to create the knowledge we lack to regulate new biotechnological plant protection products in a safe way, as well as in a way that is smarter and faster than the process that chemicals currently need to go through in the EU," concludes Professor Cedergreen.

IMAGE-BASED CROP DISEASE DETECTION USING MACHINE LEARNING

A review paper by Aria Dolatabadian *et al.* titled "Image-based crop disease detection using machine learning" was published on 27 September 2024 by *Plant Pathology*. The abstract is as follows:-

Crop disease detection is important due to its significant impact on agricultural productivity and global food security. Traditional disease detection methods often rely on labour-intensive field surveys and manual inspection, which are time-consuming and prone to human error. In recent years, the advent of imaging technologies coupled with machine learning (ML) algorithms has offered a promising solution to this problem, enabling rapid and accurate identification of crop diseases. Previous studies have demonstrated the potential of image-based techniques in detecting various crop diseases, showcasing their ability to capture subtle visual cues indicative of pathogen infection or physiological stress. However, the field is rapidly evolving, with advancements in sensor technology, data analytics and artificial intelligence (AI) algorithms continually expanding the capabilities of these systems. This review paper consolidates the existing literature on image-based crop disease detection using ML, providing a comprehensive overview of cutting-edge techniques and methodologies. Synthesizing findings from diverse studies offers insights into the effectiveness of different imaging platforms, contextual data integration and the applicability of ML algorithms across various crop types and environmental conditions. The importance of this review lies in its ability to bridge the gap between research and practice, offering valuable guidance to researchers and agricultural practitioners.

Read paper.

ASPERGILLUS CVJETKOVICII PROTECTS AGAINST PHYTOPATHOGENS THROUGH INTERSPECIES CHEMICAL SIGNALLING IN THE PHYLLOSPHERE

A paper by Seonghan Jang *et al.* titled "*Aspergillus cvjetkovicii* protects against phytopathogens through interspecies chemical signalling in the phyllosphere" was published on 5 August 2024 by *Nature Microbiology*. The abstract is as follows:-

Resident microbiota produces small molecules that influence the chemical microenvironments on leaves, but its signalling roles in pathogen defence are not yet well understood. Here we show that *Aspergillus cvjetkovicii*, enriched in rice leaf microbiota, subverts *Rhizoctonia solani* infections via small-molecule-mediated interspecies signalling. 2,4-Di-tert-butylphenol (2,4-DTBP), identified as a key signalling molecule within the *Aspergillus*-enriched microbiota, effectively neutralizes reactive oxygen species-dependent pathogenicity by switching off bZIP-activated AMT1 transcription in *R. solani*. Exogenous application of *A. cvjetkovicii* and 2,4-DTBP demonstrated varying degrees of protective effects against *R. solani* infection in diverse crops, including cucumber, maize, soybean and tomato. In rice field experiments, they reduced the *R. solani*-caused disease index to 19.7–32.2%, compared with 67.2–82.6% in the control group. Moreover, 2,4-DTBP showed activity against other rice phytopathogens, such as *Fusarium fujikuroi*. These findings reveal a defensive strategy against phytopathogens in the phyllosphere, highlighting the potential of symbiotic microbiota-driven neutralization of pathogenicity.

Read paper.

CHLOROPLAST MANIPULATION: A NEW STRATEGY IN PATHOGEN WARFARE UNCOVERED

NANJING AGRICULTURAL UNIVERSITY, PHYS.ORG NEWS, 28 AUGUST 2024

A recent study published in the journal *Horticulture Research* has unveiled the sophisticated methods pathogens use to weaken plant defenses. It shows how a pathogen's effector protein targets the chloroplast protein StFC-II, increasing its levels in chloroplasts and reducing the plant's ability to generate reactive oxygen species (ROS). This manipulation significantly compromises the plant's immune response, offering new insights into potential strategies for enhancing plant resistance to infections.

The ongoing battle between plants and pathogens is shaped by millions of years of co-evolution. While plants have developed complex immune systems to fend off invaders, pathogens continuously evolve strategies to bypass these defenses. One of these strategies involves targeting chloroplast proteins, which are crucial for both photosynthesis and immunity. Understanding how pathogens exploit these proteins is essential for developing new approaches to strengthen plant resistance.

The research, led by scientists from Huazhong Agricultural University, explores how the *Phytophthora infestans* effector Pi22922 targets the chloroplast protein StFC-II in potatoes. The study reveals that Pi22922 interacts with StFC-II in the cytoplasm, preventing its degradation and promoting its accumulation in chloroplasts. This process disrupts the chloroplast's role in immune responses, making the plant more susceptible to infection.

The study highlights the critical role of the chloroplast protein StFC-II in plant immunity and how its manipulation by the Pi22922 effector undermines plant defenses. Researchers discovered that Pi22922 stabilises StFC-II in the cytoplasm, leading to its excessive accumulation in chloroplasts. This imbalance disrupts chlorophyll and heme biosynthesis, resulting in a significant reduction in reactive oxygen species (ROS) production—a key element of the plant's immune response. The overexpression of StFC-II in transgenic potatoes further demonstrated increased susceptibility to infection, highlighting a sophisticated mechanism by which pathogens compromise plant immunity.

"Understanding the interaction between pathogen effectors and host proteins is crucial for developing more effective disease-resistant crops. This study reveals a previously unknown mechanism by which a pathogen manipulates a chloroplast protein to suppress plant immunity," said Professor Zhendong Tian, the study's corresponding author.

The findings from this research could greatly impact agricultural practices. By targeting the pathways that regulate chloroplast proteins like StFC-II, it may be possible to engineer crops with enhanced resistance to pathogens like *P. infestans*. Future research could explore gene-editing technologies to safeguard these vital proteins from pathogen manipulation, paving the way for more resilient crop varieties.

CURRENT VACANCIES

There are no vacancies.

ACKNOWLEDGEMENTS

Thanks to Grahame Jackson, Greg Johnson, and Davide Spadaro for contributions.

COMING EVENTS

International Phytobiomes Conference 2024
8 October – 10 October, 2024
St. Louis, MO, USA
Website: phytobiomesconference.org

Australasian plant virology workshop (APVW) 2024
29 October – 31 October, 2024
Crowne Plaza, Surfers Paradise, Gold Coast, Queensland, Australia
Email: apvw@kamevents.com.au
Website: www.apvw2024.com.au

9th ISHS International Postharvest Symposium
11 November – 15 November, 2024
Rotorua, New Zealand
Website: scienceevents.co.nz/postharvest2024

16th International *Trichoderma* & *Gliocladium* Workshop
12 November – 14 November, 2024
Lincoln University, Canterbury, New Zealand
Website: www.tg2024.org

International Organization of Citrus Virologists (IOCV) XXIII Conference
16 March – 20 March, 2025
Mildura, Victoria, Australia
Website: www.iocvaustralia2025.org.au

International Symposium on Plant Pathogenic Sclerotiniaceae - BotryScleroMoni 2025. Joint meetings of XIX International *Botrytis* Symposium, XVII International *Sclerotinia* Workshop, and II International *Monilinia* Workshop
25 May – 30 May, 2025
Thessaloniki, Greece
Website: botryscleromoni.com

Australasian Plant Pathology Society Conference
26 May – 28 May, 2025
International Convention Centre at Darling Harbour, Sydney, Australia
Website: under construction

14th Conference of the European Foundation for Plant Pathology (EFPP)
2 June – 5 June, 2025
Uppsala, Sweden
Website: www.efpp2025.com

XVII Working Group "Biological and integrated control of plant pathogens." From single microbes to microbiome targeting One Health.
11 June – 14 June, 2025
University of Torino, Torino, Italy
Contacts: Davide Spadaro and Monica Mezzalama
Email: iobc2025@symposium.it
Website: www.iobctorino2025.org

17th Congress of the Mediterranean Phytopathological Union - New phytopathology frontiers of research and education for plant health and food safety
7 July – 10 July, 2025
Ciheam-Bari, Italy
Contact and Email: Anna Maria D'Onghia,e-mail: mpu2025@iamb.it
Website: www.mpunion.org

13th International Workshop on Grapevine Trunk Diseases
21 July – 25 July, 2025
Ensenada, Baja California, México
Contact and Email: Rufina Hernández 13iwgtd@cicese.mx
Website (under construction): 13iwgtd.cicese.mx

14th Arab Congress of Plant Protection Sciences
3 November – 7 November, 2025
Algeria
Contact and Email: hou.boureghda@gmail.com
Website will be developed soon.

8th International Bacterial Wilt Symposium (IBWS)
22 March – 26 March, 2026
Wageningen, the Netherlands
Website: event.wur.nl/ibws2026

13th International Congress of Plant Pathology 2028
19 August – 25 August, 2028
Gold Coast, Queensland, Australia
Website: www.icpp2028.org


ICPP2028
13th International Congress of Plant Pathology
19-25 August, Gold Coast Convention & Exhibition Centre, Queensland, Australia

INTERNATIONAL SOCIETY FOR PLANT PATHOLOGY (ISPP)

WWW.ISPPWEB.ORG

The ISPP List is an e-mail list server which broadcasts messages and announcements to its subscribers. Its goal is to facilitate communication among members of the International Society for Plant Pathology and its Associated Societies. Advertised vacancies in plant pathology and ISPP Newsletter alerts are also sent to members of the ISPP List.

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This policy explains when and why we collect personal information about our users, how we use it, the conditions under which we may disclose it to third parties, how we keep it safe and secure and your rights and choices in relation to your personal information.

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