PROMOTING WORLD-WIDE PLANT HEALTH AND FOOD SECURITY

INTERNATIONAL SOCIETY FOR PLANT PATHOLOGY

ISPP NEWSLETTER

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The International Society for Plant Pathology promotes the world-wide development of plant pathology and the dissemination of knowledge about plant diseases and plant health management

IN THIS ISSUE:

CALL FOR BIDS TO HOST THE 13TH INTERNATIONAL CONGRESS OF PLANT PATHOLOGY, ICPP2028

Associated Societies of ISPP are invited to present bids to host the 13th International Congress of Plant Pathology in 2028. Traditionally the ICPP is held in August.

ISPP councillors are urged to consider and discuss this opportunity with their Society.

The deadline for receipt of bids is 31 August, 2021. They should be sent to the Business Manager of ISPP, with c.c. to the Secretary ISPP, as e-mail attachments and/or Web addresses.

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If a Society is considering a bid for the 13th International Congress of Plant Pathology, 2028, please read the bid and congress guidelines and requirements carefully. They can be accessed here.

INTERNATIONAL YEAR OF PLANT HEALTH WEBINARS

To pave the way towards the first International Plant Health Conference to take place possibly in the week of 12 May 2022, the IYPH International Steering Committee decided to organise a series of thematic webinars. A virtual launch of the study report on the impacts of climate change on plant health on 1 June 2021 will kick-start the series. The launch will be followed by webinars on 29 and 30 June 2021 focusing on food systems and climate change. Two more webinars are planned for October and December, the latter focusing on synergies between plant health and fruit and vegetables, at the occasion of the International Year of Fruits and Vegetables 2021.

WORLD'S FIRST ORGANIC TREATMENT FOR PIERCE'S DISEASE IN GRAPEVINES

AGRILIFE TODAY, TEXAS A&M AGRILIFE RESEARCH, 28 MAY 2021

A Texas A&M AgriLife Research study has led to the discovery of the first curative and preventive bacteriophage treatment against the pathogen *Xylella fastidiosa*, which causes the deadly Pierce's disease in grapevines.

A bacteriophage therapy is a precision treatment of bacterial infections that use viruses that only infect and kill the bacterium. Bacteriophages are considered a promising alternative to antibiotics for treating infections in humans, animals and plants.

The Texas A&M AgriLife Research team at the Center of Phage Technology in College Station includes, left to right, Mei Liu, Ry Young, Carlos Gonzalez and Jason Gill (Photo credit: Texas A&M AgriLife).

The work to develop a bacteriophage treatment for Pierce's disease was led by Carlos Gonzalez, Ph.D., Texas A&M College of Agriculture and Life Sciences Department of Plant Pathology and Microbiology professor, and member of the Texas A&M AgriLife Center for Phage Technology in collaboration with Otsuka Pharmaceutical Co., Ltd.

The treatment has been approved by the U.S. Environmental Protection Agency, EPA, with the commercial name XylPhi-PD, is registered with the California Department of Pesticide Regulation, CDPR, and is approved for use in organic production by the Organic Materials Review Institute, OMRI. The product is now marketed in the U.S. by Otsuka subsidiary A&P Inphatec, LLC.

Pierce's disease is a problem in vineyards across the U.S. and parts of Europe. Insects such as sharpshooters, which feed on the sap of grapevines, infect the plant with the pathogen and spread the disease vine-to-vine. In warm and arid climates in places like California, Pierce's disease spreads efficiently, causing large-scale damage.

XylPhi-PD is an injectable treatment that targets the disease from within the plant's vascular system, helping to cure the infected grapevine and stopping the spread to surrounding vines.

"Developing a bacteriophage treatment was ideal because it's an organic remedy that works to cure the plant from within — rather than a pesticide that's meant to kill insects that vector the pathogen," Gonzalez said. Although insecticides can be used to control the insect vectors that spread the disease, these substances can have deleterious effects on non-target beneficial insects such as honeybees.

The Texas A&M Center of Phage Technology is researching bacteriophage therapies for foodborne illnesses and antibiotic resistant infections, in animals and humans. "As humans are faced with antibiotic resistance, we're looking for alternative therapies, and phages are among the most promising emerging technologies in medicine," Gonzalez said. "Bacteriophage therapies will also have a major impact on agricultural sustainability, as they'll allow us to implement more ethical practices and growing techniques that are good for the plant and the environment."

TO PRESERVE GLOBAL FOOD SECURITY, NEW TOOLS NEEDED TO PREVENT PLANT DISEASE PANDEMICS

MICK KULIKOWSKI, NORTH CAROLINA STATE UNIVERSITY NEWS, 17 MAY 2021

Plant diseases don't stop at a nation's borders and miles of oceans don't prevent their spread, either. That's why plant disease surveillance, improved plant disease detection systems and predictive plant disease modeling – integrated at the global scale – are necessary to mitigate future plant disease outbreaks and protect the global food supply, according to a team of researchers in a new commentary published in *Proceedings of the National Academy of Sciences*. The idea is to "detect these plant disease outbreak sources early and stop the spread before it becomes a pandemic," says Jean Ristaino, William Neal Reynolds Distinguished Professor of Plant Pathology at North Carolina State University and the paper's corresponding author. Once an epidemic occurs it is difficult to control, Ristaino said, likening the effort to the one undertaken to stop the spread of COVID-19.

While some diseases are already under some sort of global surveillance – Ristaino mentioned wheat rust and late blight, an important pathogen that affects potatoes and caused the Irish famine – other crop diseases are not routinely monitored. "There are a few existing surveillance networks, but they need to be connected and funded by intergovernmental agencies and expanded to global surveillance systems," Ristaino said. "We can improve disease monitoring using electronic sensors that can help rapidly detect and then track emerging plant pathogens."

Ristaino said that the efforts from a wide range of scholars – so-called convergence science – are needed to prevent plant disease pandemics. The GRIP4PSI Plant Science Initiative is helping to fund such a team at NC State.

Research is underway to model the risk of plant pathogen spread and help predict and then prevent outbreaks, the researchers report in the paper. Modeling and forecasting disease spread can help mobilise mitigation strategies more precisely to stop pandemics.

Global plant disease outbreaks are increasing in frequency and threaten the global food supply, the researchers say. Mean losses to major food crops such as wheat, rice and maize ranged from 21% to 30% due to plant pests and diseases, according to a paper published in 2019. Or take the case of bananas, specifically the Cavendish variety, which has no resistance to a specific pathogen called *Fusarium odoratissimum* Tropical race 4, which causes Panama disease of banana. That pathogen spread rapidly from Asia to Africa, the Middle East and recently into South America, where it affects Cavendish bananas – the main type of banana grown in the Americas for export.

Climate change will likely exacerbate these outbreaks, Ristaino said. In Africa, for example, climate change and drought in Saharan Africa affects the population and range of locusts, which devastate crops further south in sub-Saharan Africa. Climate data can help drive disease forecasting and spread models.

Further, the global nature of the food trade is driving some plant disease pandemics. The emergence of new harmful plant pathogens adds other risks to the food supply, which is already strained by growing world populations.

"There is a need to link human global health and plant global health researchers to work together," Ristaino said. "Food security and livelihoods are linked to agriculture and human health is linked to the food we consume."

THE PERSISTENT THREAT OF EMERGING PLANT DISEASE PANDEMICS TO GLOBAL FOOD SECURITY

A paper by Jean Ristaino *et al.* titled "The persistent threat of emerging plant disease pandemics to global food security" was published on 8 June 2021 by *Proceedings of the National Academy of Sciences of the United States of America* (vol. 118 (23), e2022239118). The abstract is as follows:-

Plant disease outbreaks are increasing and threaten food security for the vulnerable in many areas of the world. Now a global human pandemic is threatening the health of millions on our planet. A stable, nutritious food supply will be needed to lift people out of poverty and improve health outcomes. Plant diseases, both endemic and recently emerging, are spreading and exacerbated by climate change, transmission with global food trade networks, pathogen spillover, and evolution of new pathogen lineages. In order to tackle these grand challenges, a new set of tools that include disease surveillance and improved detection technologies including pathogen sensors and predictive modeling and data analytics are needed to prevent future outbreaks. Herein, we describe an integrated research agenda that could help mitigate future plant disease pandemics.

Read paper.

NEW TESTING METHOD COULD ENABLE EARLIER DIAGNOSIS OF HUANGLONGBING

CHUCK GILL, PENN STATE NEWS, 10 MAY 2021

Penn State and U.S. Department of Agriculture scientists have used CRISPR/Cas technology to develop a diagnostic test that could enable early diagnosis of citrus greening, or Huanglongbing, a serious disease that threatens worldwide citrus production, which is valued at roughly $17 billion from the sale of fresh fruit and juices.

In a study published in the journal *Phytopathology*, the researchers demonstrated that the new assay can detect the presence of the disease's causal agent — the bacterium Candidatus Liberibacter asiaticus, abbreviated as CLas — at a sensitivity level 100 to 1,000 times greater than a commonly used diagnostic test, quantitative polymerase chain reaction, or qPCR.

Scientists say the best hope of reducing the spread of citrus greening is to eliminate diseased trees quickly. As a result, early detection of the pathogen is crucial because infected trees can act as a disease reservoir for months or years before showing visible symptoms.

The researchers adapted the CRISPR/Cas system to develop an assay based on a platform known as DETECTR. In this assay, a Cas variant called Cas12a is mixed with CRISPR RNA designed to seek out CLas DNA, and a synthetic molecule known as a fluorescent reporter oligonucleotide. If CLas DNA is present, the Cas12a cleaves both the pathogen's DNA and the reporter oligonucleotide, enabling the generation of a fluorescent signal for detection.

Read more.

PROTECTING AUSTRALIA'S CITRUS INDUSTRY AGAINST ANTHRACNOSE

WEIXIA WANG AND PROFESSOR PAUL TAYLOR, UNIVERSITY OF MELBOURNE, 10 MAY 2021

Citrus fruit, leaf and stem with anthracnose symptoms (Photo credit: Weixia Wang, University of Melbourne).

A dark, tear-shaped mark is often a sign of the fungal disease anthracnose, which is a a major issue for international citrus producers, having been reported from citrus production areas in 22 countries. The disease affects citrus in the pre-harvest stage by reducing tree health and yield in the orchards while post-harvest anthracnose affects fruit quality, reducing the marketability of the fruit as a result of dark markings. *Colletotrichum gloeosporioides* is the most important pathogen causing citrus anthracnose and has been found in over 15 countries. Globally, over 26 other species are associated with the disease.

A research group at the University of Melbourne analysed *Colletotrichum* collected from samples of anthracnose lesions on citrus leaves, twigs and fruit from Victoria and New South Wales, as well as from State fungaria (the Victorian Plant Pathology Herbarium (VPRI), the Queensland Plant Pathology Herbarium (BRIP) and the NSW Plant Pathology Collection (DAR). The study identified six Colletotrichum species infecting Australian citrus. One of these is a new species – *Colletotrichum australianum* – named after the country where the pathogen was first identified.

The results revise current thought about the diversity of *Colletotrichum* species that cause anthracnose of citrus in Australia. Among the four species that have been previously reported as pathogens associated with citrus anthracnose in Australia, only *C. fructicola* and *C. gloeosporioides* were found in this study. The other three *Colletotrichum* species, *C. theobromicola*, *C. karstii* and *C. siamense*, have been recorded as pathogens of a broad range of plants in Australia (including coffee, jackfruit and fig) but never previously associated with citrus anthracnose. It is also the first time that *C. theobromicola* has been reported anywhere in the world as a pathogen of citrus.

In addition to anthracnose, many exotic pests and diseases found in countries outside of Australia pose a biosecurity threat to the Australian citrus industry. For example Huanglongbing, which is caused by a bacterium that lives in the vascular system of citrus trees, is devastating the citrus industries in many countries in Asia and the USA. Bacterial canker which in South East Asia is a major disease in oranges, mandarins and limes was recently discovered in citrus in northern Australia but has fortunately now been eradicated from Australia.

Strict quarantine procedures are required to prevent the incursion of diseased fruit and citrus plant cuttings into Australia, or the exporting of endemic diseases to other countries. By gaining a better understanding of the Colletotrichum species that cause anthracnose, both within Australia and overseas, an efficient control plan such as development of advanced molecular diagnostic tools (qPCR) for detecting small traces of pathogens in plant material, can be applied to mitigate the risk of disease and therefore better protect Australis's citrus industry.

Read more.

NUCLEAR TECHNIQUES HELP TO REVIVE GINGER PRODUCTION IN JAMAICA

CARLEY WILLIS, INTERNATIONAL ATOMIC ENERGY AGENCY, 11 MAY 2021

Jamaica, once known as the world's leading producer of ginger, has fallen from the ranks and become a victim of widespread diseases affecting ginger cultivation. Ginger production has steadily declined on the Caribbean island over the last 20 years, affecting farmers' income and livelihood.

Irradiated ginger mutant lines are under development and observation in the growth room, which was upgraded with support from the IAEA and FAO (Photo credit: Scientific Research Council of Jamaica).

The main disease affecting ginger production in Jamaica is Ginger Rhizome Rot (GRR), which kills the plants it infects. Caused by fungi, bacteria and worms, the disease leads to rot inside the plant and turns its leaves yellow, as they wilt and die. The prevalence of GRR disease has resulted in over 60 per cent of yield losses in major ginger producing areas of Jamaica.

"Rhizome rot is spread unintentionally using infected seeds from the previous crop, which may appear normal and healthy," said Ryan Francis, Team Leader in the Biotechnology Department at the Scientific Research Council (SRC) in the capital Kingston. "It may be spread also through soil, irrigation water and rain splash to adjacent plants." Rhizome rot can survive in the soil for an extended period of time and can easily be transferred from one location to another, he added.

The IAEA, in partnership with the Food and Agriculture Organization of the United Nations (FAO), is supporting Jamaica by developing new ginger varieties, tolerant to prevailing diseases. While the IAEA and FAO have supported experts all over the world in breeding over two dozen different crops, it is the first time that nuclear techniques are used to improve ginger. With these techniques, high-quality ginger varieties are being developed to increase the prices farmers can fetch locally and for their exports on the international market.

Experts from the Joint FAO/IAEA Centre of Nuclear Techniques in Food and Agriculture have been working with scientists at the SRC to develop high-quality ginger varieties tolerant to GRR disease. To date, over 120 lines of ginger plantlets – young or small plants – have been developed and are under screening for improved traits. New ginger varieties developed from irradiated plant material in tissue culture have shown high levels of tolerance to the disease in a laboratory-based screening protocol that was applied with technical guidance from the Joint FAO/IAEA.

Read more.

New technology enables rapid sequencing of entire genomes of plant pathogens

AMERICAN PHYTOPATHOLOGICAL SOCIETY, 14 MAY 2021

Next-generation sequencing technology has made it easier than ever for quick diagnosis of plant diseases. "It's really exciting to see how sequencing technologies have evolved and how this new technology facilitates sequencing of entire genomes in such a short amount of time," said Yazmín Rivera, a plant pathologist with the United States Department of Agriculture's Plant Protection and Quarantine program, who recently published a research paper in *Plant Health Progress* on "Comparison of Nanopore Sequencing Protocols and Real-Time Analysis for Phytopathogen Diagnostics".

"We wanted to provide an unbiased assessment of the technology and protocols available for long read sequencing," Rivera explained. Along with other plant pathologists, Rivera used the company's protocols to prepare RNA and DNA libraries from virus-infected plant material and from a plant pathogenic bacterium, respectively. After one hour of data sequencing, scientists had enough data to assemble small genomes.

"Diagnosticians will welcome an objective review of this technology," Rivera said. Rivera and her colleagues published their findings in *Plant Health Progress*, presenting a side-by-side comparison of the protocols that will allow the reader to identify which library preparation kit is best suited for their needs.

Quantum Science Concepts in Enhancing Sensing and Imaging Technologies: Applications for Biology Workshop

During the virtual workshop that took place on 8-10 March 2021, experts explored state-of-the-art quantum-enabled technologies that are increasingly being used to advance biological systems. Through talks, panels, and discussions, the workshop facilitated a better understanding of the current and future biological applications of quantum-enabled technologies on fields such as microbiology, molecular biology, cell biology, plant science, mycology, and many others.

The presentations and discussion panels are now online and available to view, together with other useful resources including an information packet, terminology definitions, and the archived posters.

Watch the recordings now.

12th INTERNATIONAL CONGRESS ON PLANT PATHOLOGY

ICPP 2023

ONE HEALTH for all plants, crops and trees

LYON

20-25 August, France

ISPP INTERNATIONAL SOCIETY FOR PLANT PATHOLOGY

www.icpp2023.org

SFP Société Française de Phytopathologie

The International Society for Plant Pathology & the French Phytopathological Society

CURRENT VACANCIES

No current vacancies.

ACKNOWLEDGEMENTS

Thanks to Greg Johnson and Jan Leach for contributions.

COMING EVENTS

16th Congress of the Mediterranean Phytopathological Union
Postponed – the conference will be rescheduled either for Autumn 2021 or Summer 2022
Limassol, Cyprus

BotrySclero Webinar
8 June - 10 June, 2021
Avignon, France
Website: colloque.inra.fr/botrytis-sclerotinia-2020

IYPH Webinar on Food Systems and Plant Health
29 June, 2021
Registration:
fao.zoom.us/webinar/register/WN_89NXC79BRdOR2s-8A2QsnA

IYPH Webinar on Climate Change, Plant Health and Biodiversity
30 June, 2021
Registration:
fao.zoom.us/webinar/register/WN_WCSjFyXkRWCPUO1YrFmoYw

7th International Conference of Pakistan Phytopathological Society
17 October - 20 October, 2021
University of Agriculture Faisalabad and Ayub Agricultural Research Institute, Faisalabad, Pakistan
Website: 7icpps.pakps.com

13th Arab Congress of Plant Protection
31 October - 5 November, 2021
Le Royal Hotel, Hammamat, Tunisia
Contact: Dr. Asma Jajar, Chairperson of Organising Committee info@acpp-aspp.com
Website: acpp-aspp.com

Australasian Plant Pathology Society Conference – Staying Connected for Plant Health
23 November - 26 November, 2021
Online conference
Website: appsconference.com.au/home

International Plant & Animal Genome XXIX
8 January -12 January, 2022
San Diego, California, USA
Website: www.intlpag.org/2021/

10th International IPM Symposium
28 February - 3 March, 2022
Denver, Colorado, USA
Website: ipmsymposium.org/2021

7th International Congress of Nematology
1 May - 6 May, 2022
Antibes Juan-les-Pins, France
Website: www.alphavisa.com/icn/2020/index.php

International Plant Health Conference "Protecting Plant Health in a Changing World"
Week of 12 May 2022
Location to be advised
Website: www.fao.org/plant-health-2020/events/events-detail/en/c/1250609/

4th International *Erwinia* Workshop
2 July - 3 July, 2022
Assisi, Italy
Website: www.icppb2020.com

14th International Conference on Plant Pathogenic Bacteria
3 July - 8 July, 2022
Assisi, Italy
Website: www.icppb2020.com

12th International Workshop on Grapevine Trunk Diseases (ICGTD12)
7 July - 12 July, 2022
Mikulov, Czech Republic
Website: ucanr.edu/sites/ICGTD/Workshops_559/

International Phytobiomes Conference 2022
13 September - 15 September, 2022
Denver, Colorado, USA
Website: phytobiomesconference.org/

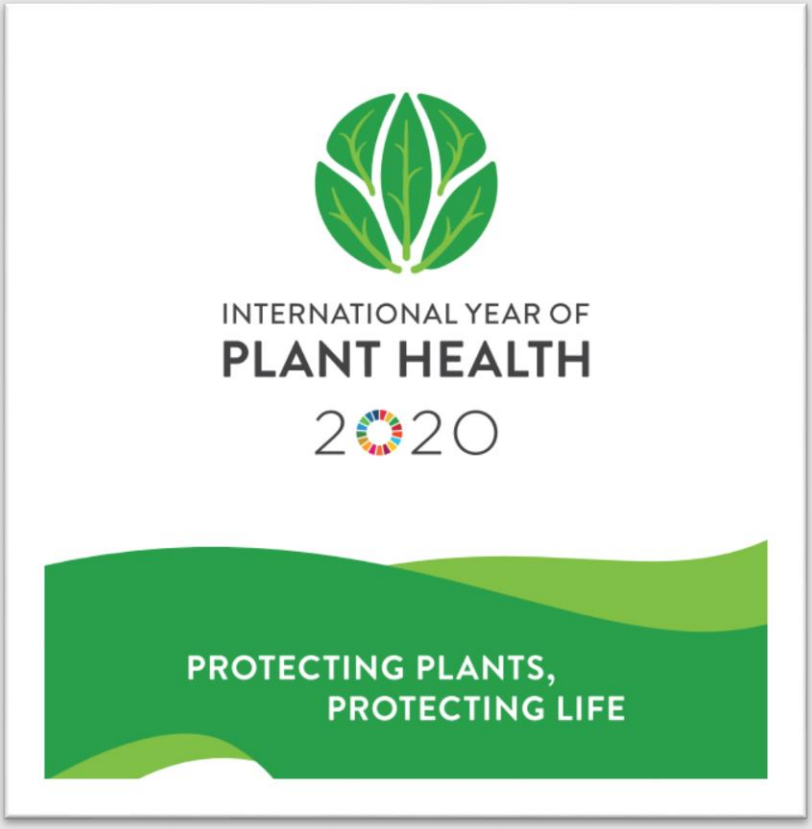
11th Australasian Soilborne Diseases Symposium
Mid-late 2022
Cairns, Queensland, Australia
Website: asds2020.w.yrd.currinda.com

XX International Plant Protection Congress
10 June - 15 June, 2023
Athens, Greece
Website: www.ippcathens2023.gr

12th International Congress of Plant Pathology (ICPP2023)
20 August - 25 August, 2023
Lyon, France
Website: www.icpp2023.org

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

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.

In accordance with the guidelines and recommendations established by the new EU General Data Protection Regulation 679/2016 (GDPR), the International Society for Plant Pathology has created a Privacy Information Notice containing all the information you need to know about how we collect, use and protect your personal data.

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.

Should you need further information please contact business.manager@issppweb.org

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