ISPP INTERNATIONAL SOCIETY FOR PLANT PATHOLOGY

PROMOTING WORLD-WIDE PLANT HEALTH AND FOOD SECURITY

INTERNATIONAL SOCIETY FOR PLANT PATHOLOGY

ISPP NEWSLETTER

ISSUE 52 (1) JANUARY 2022

Editor: Daniel Hüberli (**email**)

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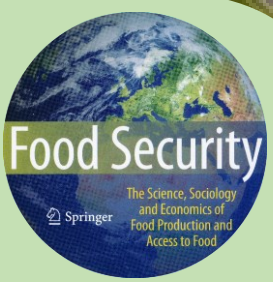


ISPP PRESIDENT'S GREETINGS FOR 2022

JAN LEACH, ISPP PRESIDENT

In many parts of the world, developing 'New Year's Resolutions' is a common tradition at the beginning of each year. Although more prevalent in the western world, the practice has parallels throughout the World, as demonstrated in an interesting use of Google's vast internet reach in 2012-2013. Google invited internet users worldwide to share their New Year's Resolutions in an interactive map called Zeitgeist 2012 (the map is still accessible, although the site is a bit wonky). After analysis, the contributor's goals were grouped into five categories: health, love, career, finance and education. The very non-scientific survey revealed interesting trends in resolution categories by geographic area, i.e., health (Egypt and the USA), love (Australia and Japan), education (Russia), and careers (India).

Collins English Dictionary defines a New Year's Resolution as 'a promise to yourself or decision to do something, especially to improve one's behavior or lifestyle in some way, during the year ahead'. The resolutions are usually very personal, focusing on things that are within one's control. For example, my past resolutions include to exercise more, eat a healthier diet, and read more. Alas, with the exception of 'reading more', I am one of the majority of people who, although well-intentioned, have not managed to keep resolutions active past February 1.

While writing what I had intended to be an up-beat message about including plant health into 2022 resolutions, I was abruptly reminded of more crushing local, regional, and global challenges. This week, my home state of Colorado again experienced devastating wildfires. The fires were in Boulder County, a nearby area that should be cold and snowy at this time of year. Yet, fueled by climate-change induced droughts, higher than normal temperatures, and hurricane-force wind gusts, wildfires destroyed over 900 homes in less than a day.

Compounding the climate-change driven disasters of wildfires, floods, droughts, and hurricanes of 2021, the COVID-19 pandemic catastrophically affected people's lives and livelihoods. WHO chief Tedros Adhanom Ghebreyesus noted "The COVID-19 pandemic has shone a light on the intimate and delicate links between humans, animals and our environment. The same unsustainable choices that are killing our planet are killing people" (https://news.un.org/en/story/2021/10/1102702). Overall, this past year highlighted a One Health crisis.

Back to New Year's resolutions. For 2022, let's resolve to 'up our game' for plant health solutions. Then, join us at ICPP2023 in Lyon, France, as plant pathologists from around the world convene on the topic of ONE HEALTH for all plants, crops and trees. This will be a perfect venue to explore the critical links of plant health to human, animal and environmental health, and to hear presentations and discussions of empirical data for solutions to plant disease issues that will ultimately help mitigate the One Health crisis!

Wishing you a healthy 2022,
and productive New Year's Resolutions!

Jan

PLANNING FOR ICPP2028 IN THE GOLD COAST, QUEENSLAND, AUSTRALIA IN AUGUST 2028

ANDREW GEERING, ANDRÉ DRENTH, TRACEY STEINRUCKEN, AND ROBERT MAGAREY; ICPP 2028 BID TEAM

As announced last month in the ISPP Newsletter, the 13th International Congress of Plant Pathology (ICPP 2028) will be hosted by the Australasian Plant Pathology Society (APPS) and held on the Gold Coast, Queensland, Australia. The location of Southeast Queensland represents the first time this Congress has been hosted in either a tropical or subtropical region. By 2050, half of the world's population will reside in the tropics due to rapid population growth in this region. At the same time, tropical climes will have expanded poleward due to global warming, with the concomitant spread of tropical pests and plant pathogens into new regions. Thus, it is timely to more broadly communicate the importance of plant diseases as they increasingly impact the livelihood of communities and the integrity of natural environments in the tropics and beyond.

The Congress theme will be "the human face of plant pathology" asking us to explore the impacts plant diseases have on societies and the natural environment. The time has come to display fully all the aspects in which plant diseases touch people's lives, in addition to the well-known impacts on crop yield, food and fibre security and the profitability of agricultural industries. There are wide ranging food safety and public health concerns from the indiscriminate use of agrichemicals. Furthermore, exotic plant pathogens can seriously affect natural ecosystems and in turn First Nation communities, who rely upon and place cultural value on the plants in these ecosystems.

These topics all form part of the broad tapestry that makes up the science of plant pathology. COVID-19 has awakened people's interest in the spread and epidemiology of pathogens as well as the importance of face-to-face interactions. The ICPP 2028 held in Queensland will bring together delegates from many parts of the world in a socially stimulating environment to enhance collaborations and build a strong legacy of professional networks, particularly with and between scientists from developed and emerging economies.

Of course, a Congress in Queensland would also give emphasis to the important crops, commodities and systems relevant to more temperate regions with key involvement of global research leaders, the ISPP Subject Matter Committees and the ISPP Commission on Global Food Security.

Australia is a success story in multiculturalism. Peoples originating from more than 50 different nations live harmoniously together in Queensland. Diversity in its different forms, either gender, sexuality, culture, religion or age, is also highly valued by the APPS, as it enriches our life experience and drives new ideas. The conference hosts commit to deliver an international congress which champions access for all ethnicities, has balanced gender representation in the program and is founded on sustainable environmental and business practices.

To support the above commitments, the following practices will be followed:

- The committee will provide a bursary fund to the total value of AUD$100,000 to support attendance by delegates from developing countries (travel, accommodation and congress registration costs).
- The organisers will arrange letters of invitation for those needing visas to attend.
- The committee will invite equal numbers of male and female keynote and plenary speakers.
- The social program will include innovative events to enable Early Career Researchers and Students to meet and talk to respected luminaries in the Plant Pathology Community.
- The committee will provide complementary childcare within the conference venue for those with small children.
- The committee will host a symposium designed to explore how knowledge developed over many generations by indigenous communities can complement and offer alternate, sustainable approaches for plant protection.
- The venue will cater for those requesting special dietary needs.
- Prayer rooms will be provided at the venue.
- The Gold Coast Convention Centre has achieved platinum status with Earth Check based on its processes and practices to reduce the environmental footprint of events.
- The congress organisers will source local supplies and services and recyclable materials to reduce the environmental footprint.

The Gold Coast is central to some of the most fertile agricultural lands in all of Australia. There are a multitude of options to visit farms and research facilities representing the full diversity of agriculture in Australia, as well as outstanding natural environments. The following technical tours are proposed:

1. **Day tour to the nothern rivers region of New South Wales:** The Tweed Valley is just a short hop and a skip across the state border from the Gold Coast. This valley occupies the centre of an ancient shield volcano caldera, and is blessed by deep volcanic soils, high rainfall and spectacular scenery including Mt Warning. Due to the very favourable environment, the Tweed Valley is also a major centre of horticulture including avocado, macadamia, banana and coffee plantations. This tour will include farm visits, a stop at Tropical Fruit World, and inspections of some plant protection field sites.

2. **Overnight tour to the Darling Downs:** The Darling Downs contains the largest deposit of rich black agricultural soils in Australia and is a major broadacre cropping area, including sorghum, pulse legumes and cotton. During this tour, Hermitage Research Facility will be visited, where a major sorghum breeding program is located, which utilizes an integrated scientific approach that spans genomic prediction, physiological modelling and traditional field trials. Farm tours will also be provided so delegates can learn about the diverse cropping done in this area, and observe some of the major plant diseases that the farmers have to contend with. Due to the distances travelled on this tour, an overnight stay in a hotel will be required.
3. **Day tour of forest reserves surrounding the Gold Coast:** This tour is for plant pathologists interested in seeing eucalyptus trees in their centre of origin and marvel at 2000 year old Antarctic Beech trees. Several sites will be visited to look at the impact of endemic and exotic pathogens on natural stands as well as plantation forestry in the Gold Coast hinterland. Several sites will be inspected during this tour, and information provided in what strategies area being used to manage diseases in forestry and in natural ecosystems.
4. **Fungal foray in Lamington National Park:** This tour is for the field naturalists, who are interested in exploring the Gondwanan rainforests in greater depth. A group of experts will act as guides, who will not only be able to point out the fungi but also the birds, mammals, and reptiles in the park. Participants will get a quick-fire lesson of the natural history of the area and there is a chance to see a koala in the wild!
5. **Day tour to the Fassifern and Lockyer Valleys:** The Fassifern and Lockyer Valleys are the vegetable bowls for South East Queensland. In this region, a wide diversity of vegetables are grown, including brassicas, lettuce, beans, onions, sweet corn and pumpkins. Gatton is the major township in this region and is home to the agricultural and veterinary faculties of The University of Queensland, as well as a major research station run by the Queensland Department of Agriculture and Fisheries. In this tour, delegates will get the opportunity to visit a selection of vegetable farms and also tour the aforementioned research facilities to learn about how major plant diseases in the region are being tackled.

The APPS has a strong organisational structure, with branches in all Australian States and the North and South Islands of New Zealand, underpinned by members representing all aspects of plant pathology. The APPS will work closely with the ISPP to organise the logistical and scientific components of the program and satellite workshops, to ensure a highly successful ICPP 2028.



THE JAKOB ERIKSSON PRIZE FOR PLANT PATHOLOGY - CALL FOR NOMINATIONS

JAKOB ERIKSSON PRIZE COMMISSION

The premier award for achievement in plant pathology, the Jakob Eriksson Prize, was established in 1923 to honor the memory of Jakob Eriksson, a prominent Swedish mycologist and plant pathologist who died in 1931. He was also a dedicated internationalist who espoused the cause of international cooperation in plant pathology. The Prize will be awarded at the International Congress of Plant Pathology held in Lyon, France from 20-23 August 2023. The Royal Swedish Academy of Sciences administers the Jakob Eriksson Prize Fund which provides for a gold medal award at Congresses of the International Society for Plant Pathology.

Nominations are solicited for a candidate of distinction in recognition of research in mycology, in plant pathology, or in virus diseases, or of a particular publication dealing with such subjects, with the understanding that the work being recognised is of a distinct international value and merit.

The following rules apply to those making nominations:

i. Nominators must provide a short statement (2 pages or 500 words) justifying the selection of the nominee plus a short CV maximum three pages, and a publication list of the most relevant papers/publications or reports – maximum 20 references. Do not send a detailed Curriculum Vitae. More detail than these requirements will be sought by the Commission if required.
ii. Names of all nominees must be strictly confidential,
iii. Individuals cannot nominate themselves and nominators should declare any professional affiliation with the nominee.
iv. No correspondence concerning unsuccessful nominations will be entered into.

All nominations are to be sent to the Chair of the Prize Commission, in an email headed "Jakob Eriksson Prize Nomination 2023". Send the email to ErikssonPrize@ISPPweb.org with a c.c. to the ISPP Business Manager (andrea.masino@unito.it). The call for nominations will close on 15 March 2022.

Prize Selection

i. The Jakob Eriksson Prize Commission, in consultation with the Executive of ISPP, will independently undertake the selection processes to enable a recommendation of the Jakob Eriksson Prize recipient at least one year before each International Congress of Plant Pathology.
ii. The Chair of the Commission will advise the ISPP President of the Commission's recommendation, and after appropriate deliberation, the President of the ISPP will invite the successful nominee to accept the award.

iii. The Prize Ceremony
iv. The participation of the Jakob Eriksson Prize recipient in the International Congress of Plant Pathology will be facilitated by the ISPP and the Congress Organisers. Normally this will include complementary Congress registration and attendance at Congress social functions, return economy travel to the Congress and some support for accommodation and reasonable expenses for the duration of the Congress.
v. The Prize Ceremony will be planned by the ISPP in consultation with the Prize recipient, the Commission Chair and the Congress Organisers.
vi. As part of the Prize Ceremony, the Prize recipient will also be invited to briefly present their work at the Congress as The Jakob Eriksson Oration with scope and coverage in a style suitable for a more general audience.

The Royal Swedish Academy of Sciences will provide the Jakob Eriksson gold medal.

Information about the selection process is available here.

Jacob Eriksson Prize - 1993-2018

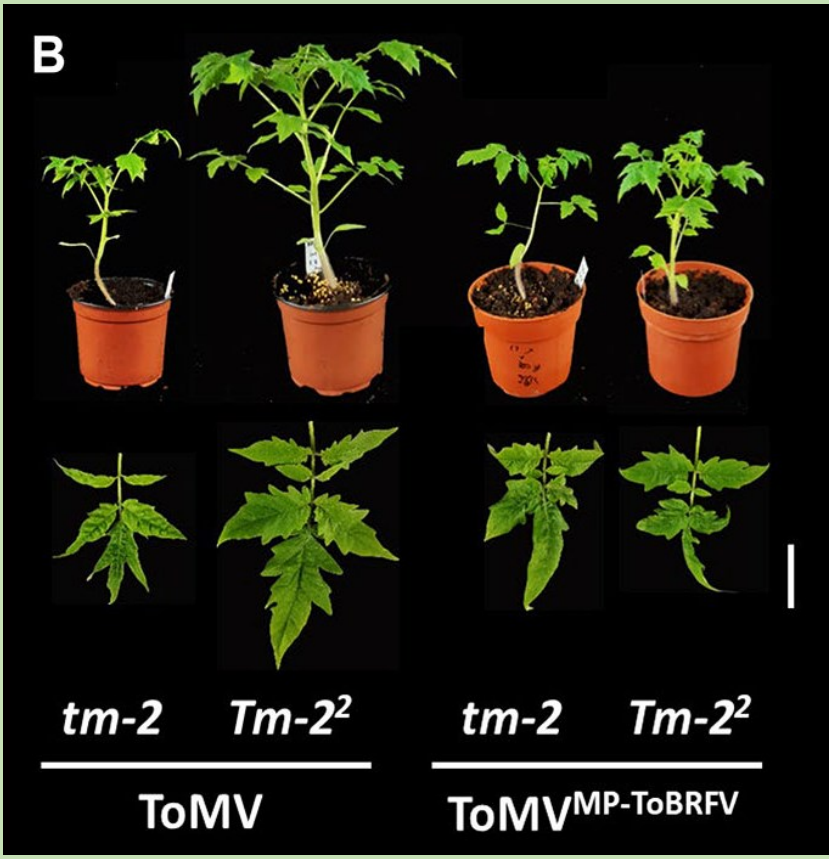
Past recipients of the Prize have included:

- 1993. 7th Recipient - Prof Dr Ir Ariena H.C. van Bruggen, Professor Biological Farming Systems at Wageningen University, at the 6th International Congress of Plant Pathology.
- 1998. 8th Recipient - Dr Richard Frederiksen, Professor of Plant Pathology at Texas A&M University, at the 7th International Congress of Plant Pathology in Edinburgh.
- 2003. 9th Recipient - Dr. Jaccov Katan of the Hebrew University, Jerusalem, at the 8th International Congress of Plant Pathology in Christchurch, New Zealand.
- 2008. 10th Recipient - Dr. Laurence V. Madden of the Ohio State University, at the 9th International Congress of Plant Pathology in Torino, Italy.
- 2013. 11th Recipient - Professor Jeffrey B. Jones of the University of Florida at the 10th International Congress of Plant Pathology in Beijing, China.
- 2018. 12th Recipient – Emeritus Professor Pierre JGM de Wit of the Laboratory of Phytopathology, Wageningen University, the Netherlands, at the 11th International Congress of Plant Pathology in Boston, USA.

A SEQUENCE CHANGE IN A SINGLE PROTEIN ALLOWED A TOMATO VIRUS TO BECOME A GLOBAL CROP PANDEMIC

AMERICAN PHYTOPATHOLOGICAL SOCIETY NEWS RELEASES, 12 NOVEMBER 2021

In the last years, a new viral tomato disease has emerged, threatening tomato production worldwide. This is caused by the Tomato brown rugose fruit virus (ToBRFV), a member of a devastating group of plant viruses called tobamoviruses. ToBRFV overcomes all known tobamovirus resistance in tomato, including the one conferred by *Tm-2²*, a resistance gene responsible for the stable resistance to these viruses for more than 60 years. In a study recently published in the *Molecular Plant-Microbe Interactions* (MPMI) journal, Dr. Ziv Spiegelman and Dr. Hagit Hak explored the molecular mechanism by which this emerging virus was able to successfully break this resistance and become a devastating global crop pandemic.



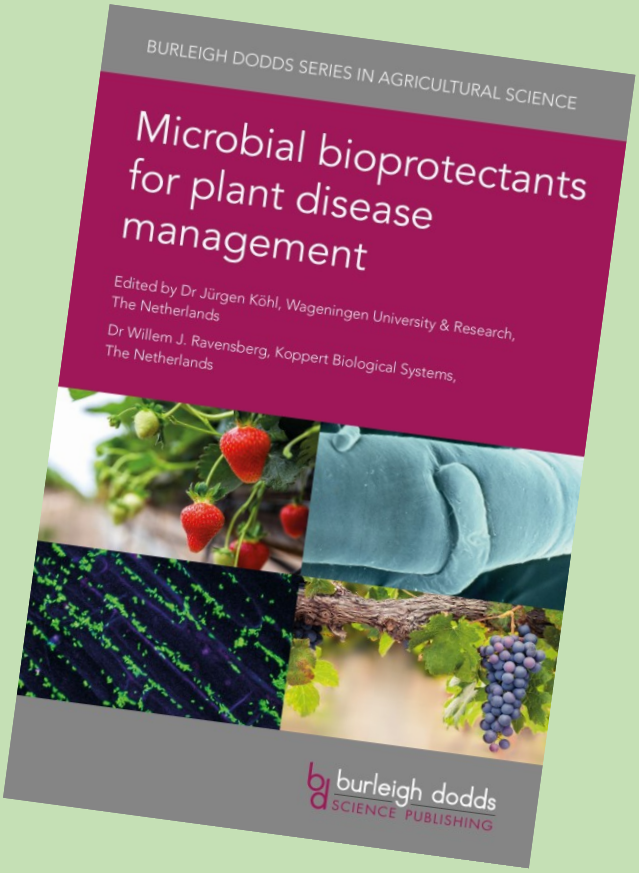
Tomato plants (cv. Moneymaker) (upper panel) and leaves (lower panel) homozygous to the *tm-2* or *Tm-2²* allele infected with ToMV and ToMVMP-ToBRFV (Photo credit: Hagit Hak and Ziv Spiegelman).

"*Tm-2²* encodes a plant immune receptor protein, which recognizes a viral-encoded protein named movement protein, triggering an immune response against a wide range of tobamoviruses. ToBRFV is the first virus that was able to overcome the durable *Tm-2²* resistance gene," said Spiegelman. "We found that the ToBRFV movement protein harbored sequence changes that allow it to evade *Tm-2²*. We confirmed this by introducing this new sequence to another virus (the tomato mosaic virus) that normally cannot infect plants harboring *Tm-2²*, which resulted in a virulent virus."

Furthermore, they came up with an interesting observation from an evolutionary point of view. "Viral movement proteins allow the virus to spread from cell to cell and infect the entire plant. We found that the elements that enabled the movement protein to avoid *Tm-2²* recognition likely resulted in reduced viral movement. This suggests that the virus pays a penalty for evading host resistance, which is a reduced cell-to-cell transport. This finding may explain the high durability of *Tm-2²* resistance, which had remained unbroken for over half a century," stated Spiegelman.

MICROBIAL BIOPROTECTANTS FOR PLANT DISEASE MANAGEMENT – NEW BOOK

Jürgen Köhl and Willem J. Ravensberg, Editors (2021). Microbial bioprotectants for plant disease management, Burleigh Dodds Science Publishing, UK. 734 pp.



Burleigh Dodds Science Publishing are delighted to announce the publication of their exciting new title, Microbial bioprotectants for plant disease management, edited by Dr Jürgen Köhl, Wageningen University & Research, The Netherlands and Dr Willem J. Ravensberg, Koppert Biological Systems, The Netherlands.

The book provides comprehensive coverage of the recent advances in the development of more ecologically balanced biological methods to control plant diseases. It offers a focussed review on the availability and use of bacterial, fungal and viral bioprotectants, as well as the issues that arise with their development and use.

Find out more about the new title here.

Exclusive Discount for ISPP Members

Receive 20% off your purchase of the book using code **ISPP20** via the BDS Website. Discount code expires 31st January 2022.

ERWINIA AMYLOVORA VECTORED BY HONEYBEES

A paper by Hyun Ju Choi *et al.* titled "Extended longevity of *Erwinia amylovora* vectored by honeybees under in vitro conditions and its capacity for dissemination" was published on 9 October 2021 by *Plant Pathology* (early view). The abstract is as follows:-

Fire blight outbreaks in Korea were first reported in 2015. Regular outbreaks have occurred since, indicating a continuous cycle of the fire blight pathogen in Korea. We determined the role of *Apis mellifera* (honeybee) as a vector of *Erwinia amylovora* by verifying the following: (a) *E. amylovora* longevity in/on honeybees; (b) the most common body parts that carry the bacteria; (c) the rate of bacterial spread to healthy host organs; and (d) the relationship between dispersal of viable but nonculturable (VBNC) and virulent bacterial cells. *E. amylovora* survived for 15 days on the exterior of honeybee bodies and was most abundant on the abdomen in comparison to other areas such as the labellum, wings, and hind legs. In the digestive system of honeybees, *E. amylovora* survived for 7 days, and bacteria were found in faeces for 3 days after exposure. The bacteria are likely to be VBNC on honeybees. Honeybees that were contaminated with bacteria transferred *E. amylovora* to healthy immature apple fruit, shoots, and flowers for 10 days after exposure. *E. amylovora* was also transferred from inoculated plant parts to uncontaminated honeybees. In addition, bacteria moved from inoculated plant tissues to unexposed honeybees and then from these honeybees to healthy plant tissues. Therefore, *E. amylovora* can survive in/on honeybees for extended amounts of time, which contradicts previous reports. The bacteria moved to host tissues via honeybees, suggesting that honeybees are the vectors of *E. amylovora* and play a role in the development of new outbreaks of fire blight disease in the central regions of Korea.

Read paper.

A CONCEPTUAL FRAMEWORK TO ASSESS CLIMATE CONTROLS OF FOREST TREE DISEASES

A review by Paul E. Hennon *et al.* titled "Applications of a conceptual framework to assess climate controls of forest tree diseases" was published on 15 October 2021 by *Forest Pathology* (early view). The abstract is as follows:-

A conceptual framework for climate involvement in forest tree diseases was applied to seven examples to demonstrate its suitability for different disease types: cases where climate favours pathogen biology which then leads to tree mortality or where diseases are caused primarily by climate-driven physiological injury or stress to trees. Hypotheses for climate involvement are derived from detection and monitoring data to express associations of weather or climate factors with disease development at several spatial and temporal scales. Research findings contribute to an understanding of temperature, precipitation and related climate variables that influence biotic and abiotic diseases. To demonstrate use of the framework, we accessed information from the literature which exposed data and information gaps. Among various simulated approaches to test associations of climate and disease, we found disease risk factor models that use climate inputs derived from monitoring and research provide the best understanding of climate–disease relationships. These model outputs project future disease scenarios that can be used to inform climate adaptation strategies. Conservation and management implications for current and likely future climatic conditions are provided for each disease example. The most common guidance in managed landscapes is to move the imperilled tree species to areas of lower projected climate risk and to favour non-host, climate-adapted tree species where the disease is occurring.

Read paper.

PLANT PATHOGEN EVADES IMMUNE SYSTEM BY TARGETING THE MICROBIOME

UNIVERSITY OF COLOGNE PRESS RELEASES, 2 DECEMBER 2021

A team of biologists has identified that the pathogenic fungus *Verticillium dahliae*, responsible for wilt disease in many crops, secretes an 'effector' molecule to target the microbiome of plants to promote infection. The research was performed by the team of Alexander von Humboldt Professor Dr Bart Thomma at the University of Cologne (UoC) within the framework of the Cluster of Excellence on Plant Sciences (CEPLAS) in collaboration with the team of Dr Michael Seidl at the Theoretical Biology and Bioinformatics group of Utrecht University in the Netherlands. The study 'An ancient antimicrobial protein co-opted by a fungal plant pathogen for *in planta* mycobiome manipulation' has appeared in the Proceedings of the National Academy of Sciences (PNAS).

At the UoC, together with Dr Nick Snelders lead author of the study Dr Thomma hypothesized that if plants can 'recruit' beneficial microbes from their environment, perhaps some pathogens have 'learned' to perturb this 'cry for help' and disturb the plant's microbiome in order to promote invasion. Thus, in addition to the direct suppression of the plant host's immune responses, these pathogens can suppress immunity indirectly by affecting the plant's healthy microbiome.

Verticillium dahliae is a well-known pathogen of many plants, including greenhouse crops like tomatoes and lettuce, but also olive trees, ornamental trees and flowers, cotton, potatoes, and others. The current study shows that the fungus secretes the antimicrobial protein VdAMP3 in order to manipulate the plant's microbiome as an effector.

Generally, effector molecules target components of the host immune system, leading to immune suppression. The authors have now shown that these targets extend to inhabitants of the host's microbiome: during host colonisation, the VdAMP3 molecule suppresses beneficial organisms in the microbiome of the plant, leading to microbiome disturbance or 'dysbiosis', so that the fungus can complete its life cycle and produce progeny that can spread and start new infections.

'In terms of evolution, the molecule that is secreted is very old. Homologs also occur in organisms that are not pathogenic on plants,' said Thomma. 'It looks like *Verticillium* "used" the molecule to "exploit" it during the process of disease development on the host. Interestingly, the molecule does not act like a broad-spectrum antibiotic that targets any microbe, but specifically against "competitor" fungi that have abilities to hinder *Verticillium*.'

In future studies, the authors aim to find further effector proteins with selective antimicrobial activity – from Verticillium, but also from other pathogens that have other infection strategies. 'Unravelling how these molecules work, and how they can inhibit the one microbe while not affecting the other is important to discover novel mechanisms to target microbes, which may ultimately even lead to the development of novel antibiotics,' Snelders concluded.

Read more.

NOVEL RAMAN SPECTROSCOPY-BASED METHOD FOR EARLY DETECTION OF BACTERIAL INFECTION IN CROPS

SMART NEWS, 18 NOVEMBER 2021

Researchers from the Disruptive & Sustainable Technologies for Agricultural Precision (DiSTAP) Interdisciplinary Research Group (IRG) of Singapore-MIT Alliance for Research and Technology (SMART), MIT's research enterprise in Singapore and their local collaborators from Temasek Life Sciences Laboratory (TLL), have developed a rapid Raman spectroscopy-based method for the detection and quantification of early bacterial infection in crops. The Raman spectral biomarkers and diagnostic algorithm enable the non-invasive and early diagnosis of bacterial infections in crop plants, which can be critical for the progress of plant disease management and agricultural productivity. The breakthrough by SMART and TLL researchers offers a faster and more accurate method to detect bacterial infection in crop plants at an earlier stage, as compared to existing techniques. The team explained their research in a paper titled "Rapid detection and quantification of plant innate immunity response using Raman spectroscopy" published in the journal *Frontiers in Plant Science*.

Traditionally, plant diseases diagnosis involves a simple visual inspection of plants for disease symptoms and severity. "Visual inspection methods are often ineffective as disease symptoms usually manifest only at relatively later stages of infection when the pathogen load is already high, and reparative measures are limited. Hence, new methods are required for rapid and early detection of bacterial infection. The idea would be akin to having medical tests to identify human diseases at an early stage, instead of waiting for visual symptoms to show so that early intervention or treatment can be applied," says DiSTAP Principal Investigator, MIT Professor, and co-corresponding author, Rajeev Ram.

"At DiSTAP, we have developed a quantitative Raman spectroscopy-based algorithm that can help farmers to identify bacterial infection rapidly. The developed diagnostic algorithm makes use of Raman spectral biomarkers and can be easily implemented in cloud-based computing and prediction platforms. It is more effective than existing techniques as it enables accurate identification and early detection of bacterial infection, both of which are crucial to saving crop plants that would otherwise be destroyed," explained Dr Gajendra Pratap Singh, Scientific Director and Principal Investigator at DiSTAP, and co-lead author.

A portable Raman system can be used in agricultural farms and provides farmers with an accurate and simple yes or no response when used to test for the presence of bacterial infections in crop plants. The development of this rapid and non-invasive method will improve plant disease management and have a transformative impact on agricultural farms by efficiently reducing agricultural yield loss and increasing productivity.

"Using the diagnostic algorithm method, we experimented on several edible plants such as Choy Sum," says DiSTAP and TLL Principal Investigator and co-corresponding author Dr Rajani Sarojam. "The results showed that the Raman spectroscopy-based method can swiftly detect and quantify innate immunity response in plants infected with bacterial pathogens. We believe that this technology will be beneficial for agricultural farms to increase their productivity by reducing their yield loss due to plant diseases."

Read more.

GENOMICS- AND MACHINE LEARNING-ACCELERATED DISCOVERY OF BIOCONTROL BACTERIA

A paper by Matthew B. Biggs *et al.* titled "Genomics- and machine learning-accelerated discovery of biocontrol bacteria" was published on 23 November 2021 by *Phytobiomes* (Vol. 5 (4), e-ISSN: 2471-2906). The abstract is as follows:-

Microorganisms with antimicrobial activity have been used to successfully control various plant pathogens. The discovery of organisms with protective activity depends on empirical screenings to assess microbial activity against pathogens of interest. Machine learning can accelerate the discovery process by making screening and, thus, discovery more efficient. We developed a novel machine-learning workflow to identify genomic features associated with fungicidal activity of bacteria, and leveraged those genomic features to discover additional bacteria with the desired activity. We applied our workflow to discover solutions to two problematic fungal diseases: sorghum anthracnose and black sigatoka of banana. These diseases are problematic worldwide, with a particularly devastating impact on small-holder farmers in Sub-Saharan Africa. We screened a total of 1,227 bacterial isolates for antifungal activity against these pathogens using detached-leaf methods and identified 72 taxonomically diverse isolates with robust activity against one or both of these pathogens. We identified biosynthetic gene clusters associated with activity against each pathogen. Machine learning improved the discovery rate of our screen by threefold, and led to the discovery of a taxonomic group in which fungicidal activity has never been reported. This work highlights the wealth of biocontrol mechanisms available in the microbial world for management of fungal pathogens, generates opportunities for future characterization of novel fungicidal mechanisms, and provides a set of genomic features and models for discovering additional bacterial isolates with activity against these two pathogens. Finally, our workflow generalizes to any discovery effort where genomic information is available to guide candidate selection.

Read paper.

SPECIAL ISSUE: ON THE TOPIC OF PLANT HEALTH IN A ONE HEALTH CONTEXT

To mark the Internatioanl Year of Plant Health, the journal *Plant Pathology*, has relased in January 2022 a Special Issue on "Plant Health in a One Health context."

This issue encompasses how the health of plants influences wider elements of ecosystems, including our own food and health, while at the same time being affected by broad factors such as climate, pollution, and agricultural practices. The Special issue is edited by Richard P. Oliver and Jonathan S. West.

All content is avialable as either "free to read" or "free access."

The Special Issue can be accessed here.

CURRENT VACANCIES

The Department of Plant Pathology and Environmental Microbiology at Penn State is seeking an Assistant Professor in Global Change Pathology. This is a full-time 12-month, tenure-track position with 70% research and 30% teaching appointment, focused on plant diseases in the context of global change. The successful applicant is expected to develop an externally funded, high impact research program on modeling, adaptation, and mitigation of diseases altered by large-scale changes including and in the context of global climate change. We will begin reviewing applications on 14 February 2022. Apply online at https://psu.wd1.myworkdayjobs.com/en-US/PSU_Academic/job/University-Park-Campus/Assistant-Professor-of-Global-Change-Pathology_REQ_0000023792-1 and see more from the PDF.

The Department of Plant Pathology and Crop Physiology, Baton Rouge, Louisiana State University is seeking an Assistant/Associate Professor in Plant Pathology. This is a full-time 12-month, tenure-track position with 80% research and 20% teaching appointment, focused on etiology and management of sweetpotato diseases. The successful candidate is expected to develop a strong and innovative research program of applied research related to managing sweetpotato diseases. The application deadline is 15 February 2022 or until a suitable candidate is identified. Apply online by attaching cover letter with resume, research and teaching statements, university transcripts, and three letters of reference. More details about the position is available in the PDF.

The Department of Plant Pathology and Crop Physiology, Baton Rouge, Louisiana State University is seeking an Assistant/Associate Professor in Plant Virology. This is a full-time 12-month, tenure-track position with 90% research and 10% teaching appointment focused on viral diseases of economically important plants in Louisiana. The successful candidate will possess the requisite technical skills to build an innovative program at the forefront of plant virology research and train the next generation of plant virologists. The application deadline is 15 January 2022 or until a suitable candidate is identified. Apply online by attaching a cover letter with resume, a research and teaching statement (one page each), university transcripts, and three letters of reference. More details about the position is available in the PDF.

ACKNOWLEDGEMENTS

Thanks to Grahame Jackson, Greg Johnson and Jan Leach for contributions.

COMING EVENTS

International Plant & Animal Genome XXIX
CANCELLED due to the current pandemic circumstances. Planning a virtual meeting via Zoom.
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

67th Annual Conference on Soilborne Plant Pathogens and the 52nd Annual Statewide California Nematology Workshop
22 March - 24 March, 2022
California Polytechnic State University, San Luis Obispo, USA
Website: soilfungus.wsu.edu

16th Congress of the Mediterranean Phytopathological Union
4 April - 8 April, 2022
Limassol, Cyprus
Website: cyprusconferences.org/mpu2022

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)
11 July - 15 July, 2022
Mikulov, Czech Republic
Website: ucanr.edu/sites/ICGTD/Workshops_559/

11th Australasian Soilborne Diseases Symposium
2 August - 5 August, 2022
Cairns, Queensland, Australia
Website: asds2022.w.yrd.currinda.com

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

13th Arab Congress of Plant Protection
16 October - 21 October, 2022
Le Royal Hotel, Hammamat, Tunisia
Contact: Dr. Asma Jajar, Chairperson of Organising Committee info@acpp-aspp.com
Website: acpp-aspp.com

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

13th International Congress on Plant Biotechnology and Agriculture
12 June - 16 June, 2023
Cayo Guillermo, Cuba
Website: bioveg.bioplantas.cu

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

12th INTERNATIONAL CONGRESS ON PLANT PATHOLOGY

ICPP 2023

ONE HEALTH for all plants, crops and trees

LYON

20-25 August, France

www.icpp2023.org

ISPP INTERNATIONAL SOCIETY FOR PLANT PATHOLOGY

SFP Société Française de Phytopathologie

The International Society for Plant Pathology & the French Phytopathological Society

INTERNATIONAL SOCIETY FOR PLANT PATHOLOGY (ISPP)

WWW.ISPPWEB.ORG

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