

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

PLANT HEALTH

2020

PROTECTING PLANTS

PP 2023



PROMOTING WORLD-WIDE PLANT HEALTH AND FOOD SECURITY

INTERNATIONAL SOCIETY FOR PLANT PATHOLOGY

# **ISPP NEWSLETTER**

**ISSUE 50 (4) APRIL 2020** 

Editor: Daniel Hüberli (email) Join the ISPP mail list

### **IN THIS ISSUE:**

The Festival Plant Health 2020 is online! Plant will be the main actors in Torino, Italy Postponed conferences due to COVID-19 Can an invasive snail help save coffee from leaf rust? Novel chemistry to protect our crops from fungal disease How three genes rule plant symbioses Cucumber Mosaic Virus – new book Birds carry *Phytophthora ramorum* in Britain Root-lesion nematodes of potato Sting nematodes modify metabolomic profiles of host plants Some domesticated plants ignore beneficial soil microbes Current Vacancies Acknowledgements Coming Events



INTERNATIONAL SOCIETY FOR PLANT PATHOLOGY (ISPP) www.isppweb.org

# THE FESTIVAL PLANT HEALTH 2020 IS ONLINE! PLANT WILL BE THE MAIN ACTORS IN TORINO, ITALY

### ANDREA MASINO, ISPP BUSINESS MANAGER



Agroinnova, the Centre of Competence for the innovation in the agro-environmental field of the University of Torino, have launched a path of activity with the aim of positioning Torino and Piedmont as active actors of the IYPH2020. Many initiatives have been linked to each other by the theme of plant health, celebrating the International Year of Plant Health.



The Festival Plant Health 2020 in Torino, now online, talks about stories regarding **plant diseases and plant pests**. It covers different issues: from One Health to Sustainable Communities, from Green Jobs to Climate Change, from Agriculture Crop Protection to Food, with a special focus on the role of plants for the Future Health of the Planet.



The main objective of the IYPH is to raise awareness of the importance and **impacts of plant health** in addressing issues of global importance, including hunger, poverty, food security, and threats to the environment and economic development.

Plants are under **constant attack** from invasive pests. These pests can severely damage crops, forests, and other natural resources that people depend on. Every year, they cause **billions of dollars of losses** in crops and trade revenue, in addition to expensive eradication efforts. People, especially through international travel and trade, most often **spread them**.

The experience gained with scientific Societies and international organisations has always aimed at giving Torino and Piedmont a big appeal at a global level. The highly active phytopathologists of Torino managed to host, for the first and only time so far in Italy, the International Congress of Plant Pathology (ICPP 2008), that still all colleagues remember for the perfect organisation and the high scientific content.

IYPH 2020 is therefore the perfect opportunity to underline the role played by Torino and Piedmont for **green protection and health promotion**. The setting up of a Festival on Plant Health, networking various scientific authorities but mostly **cultural institutions**, will be appreciated.

Help the plant pathology's role to spread around the world!

#### Follow the Festival:

- <u>Website</u>
- <u>Facebook page</u>
- Instagram profile





### POSTPONED CONFERENCES DUE TO COVID-19

In order to protect the health, safety and well-being of our international community from COVID-19 some conferences and workshops have been postponed or cancelled. Affected meetings with cancellations or new dates, where confirmed, are listed below. These changes have also been updated in the Coming Events list. Please let me know of any date changes that I may have missed.

I look forward to your continued support of the ISPP Newsletter. I also wish you and your loved ones the best of health.

16th Congress of the Mediterranean Phytopathological Union, postponed to 17 November - 20 November, 2020

7th International Bacterial Wilt Symposium, postponed to 3 November - 7 November, 2020

4th International Conference on Global Food Security, postponed to 20 September - 23 September, 2020

14th International Conference on Plant Pathogenic Bacteria, postponed to 6 June - 11 June, 2021

7th International Congress of Nematology, postponed to 8 November - 13 November, 2020

4th International Erwinia Workshop, postponed to 5 June - 6 June, 2021

IX International Postharvest Symposium, postponed - date to be announced

6th International Symposium on Head Blight, cancelled

Joint 18th International Botrytis Symposium & 17th International Sclerotinia Workshop, postponed to June, 2021

Daniel Hüberli



### CAN AN INVASIVE SNAIL HELP SAVE COFFEE FROM LEAF RUST?

### UNIVERSITY OF MICHIGAN NEWS, 23 JANUARY 2020

While conducting fieldwork in Puerto Rico's central mountainous region in 2016, University of Michigan ecologists noticed tiny trails of bright orange snail excrement on the undersurface of coffee leaves afflicted with coffee leaf rust, the crop's most economically important pest.

Intrigued, they conducted field observations and laboratory experiments over the next several years and showed that the widespread invasive snail, *Bradybaena similaris*, commonly known as the Asian tramp snail and normally a plant-eater, had shifted its diet to consume the fungal pathogen that causes coffee leaf rust, which has ravaged coffee plantations across Latin America in recent years.



In this July 2018 photo, U-M doctoral student Zachary Hajian-Forooshani and U-M ecologist John Vandermeer survey a Puerto Rican coffee farm damaged less than a year earlier by Hurricane Maria (Photo credit: Levi Stroud, U-M College of LSA).

Now the U-M researchers are exploring the possibility that *B. similaris* and other snails and slugs could be used as a biological control to help rein in coffee leaf rust. But as ecologists, they are keenly aware of the many disastrous attempts at biological control of pests in the past.

"This is the first time that any gastropod has been described as consuming this pathogen, and this finding may potentially have implications for controlling it in Puerto Rico," said U-M doctoral student Zachary Hajian-Forooshani, lead author of a paper published online recently in the journal *Ecology*.

"But further work is needed to understand the potential tradeoffs *B. similaris* and other gastropods may provide to coffee agroecosystems, given our understanding of other elements within the system," said Hajian-Forooshani, who is advised by U-M ecologist John Vandermeer, a professor in the Department of Ecology and Evolutionary Biology.

Vandermeer and U-M ecologist Ivette Perfecto, a professor at the School for Environment and Sustainability, lead a team that has been monitoring coffee leaf rust and its community of natural enemies on 25 farms throughout Puerto Rico's coffee-producing region.

Those natural enemies include fly larvae, mites, and a surprisingly diverse community of fungi living on coffee leaves, within or alongside the orange blotches that mark coffee leaf rust lesions. Hajian-Forooshani has been studying all of these natural enemies for his doctoral dissertation.

Read more.

### **N**OVEL CHEMISTRY TO PROTECT OUR CROPS FROM FUNGAL DISEASE

#### UNIVERSITY OF EXETER NEWS, 30 MARCH 2020

Currently, we protect our crops against fungal disease by spraying them with anti-fungal chemistries, also known as fungicides. However, the growing threat of microbial resistance against these chemistries requires continuous development of new fungicides. A consortium of researchers from the University of Exeter, led by Professor Gero Steinberg, combined their expertise to join the fight against plant pathogenic fungi.

In a recent publication in <u>Nature Communications</u>, they report the identification of novel mono-alkyl chain lipophilic cations (MALCs) in protecting crops against *Septoria tritici* blotch in wheat and rice blast disease. These diseases challenge temperate-grown wheat and rice, respectively, and so jeopardise the security of our two most important calorie crops.

The scientists' journey started with the discovery that MALCs inhibit the activity of fungal mitochondria. By inhibiting an essential pathway in mitochondria, MALCs cut down the cellular energy supply, which eventually kills the pathogen.

Whilst Steinberg and colleagues show that this "mode of action" is common to the various MALCs tested, and effective against plant pathogenic fungi, one MALC that they synthesised and named C18-SMe2+ showed unexpected additional modes of action. Firstly, C18-SMe2+ generates aggressive molecules inside the mitochondria, which target lifeessential fungal proteins, and in turn initiate a "selfdestruction" programme, which ultimately results in "cellular suicide" of the fungus. Secondly, when applied to crop plants, C18-SMe2+ "alerts" the plant defence system, which prepares the crop for subsequent attack, thereby increasing the armoury of the plant against the intruder. Most importantly, the Exeter researchers demonstrate that C18-SMe2+ shows no toxicity to plants and is less toxic to aquatic organisms and human cells than existing fungicides sprayed used in the field today.

Professor Steinberg said: "It is the combined approach of Exeter scientists, providing skills in fungal cell biology (myself, Dr Martin Schuster), fungal plant pathology (Professor Sarah J. Gurr), human cell biology (Professor Michael Schrader) and synthetic chemistry (Dr Mark Wood) that enabled us to develop and characterise this potent chemistry. "We now seek partners/investors to take this development to the field and prove its usefulness under 'real agricultural conditions'. Our long-term aim is to foster greater food security, in particular in developing nations."

Professor Sarah Gurr said: "This is such a timely and important study. We are increasingly aware of the growing burden of plant disease caused by fungi and of our need to safe-guard our calorie and commodity crops better. The challenge is not only to discover and describe the mode of action of new antifungals but to ensure that chemistries potent against fungi do not harm plants, wildlife or human health."

### HOW THREE GENES RULE PLANT SYMBIOSES

#### JOHN INNES CENTRE PRESS RELEASE, 2 MARCH 2020

Beneficial relationships with microbes in the soil, known as symbioses, allow plants to access additional nutrients. The most intimate among them are intracellular symbioses that result in the accommodation of microbes inside plant cells. A study published in <u>Nature Plants</u>, led by scientists from the John Innes Centre in the UK and the University of Toulouse/CNRS in France, describes the discovery of a common genetic basis for all these symbioses.

It is hypothesised that the colonisation of land by plants was made possible through a type of symbiosis that plants form with a group of fungi called mycorrhizal fungi. Even today 80% of plants we find on land can form this mycorrhizal symbiosis. Plants have also evolved the ability to engage in intracellular symbiosis with a large diversity of other microbes.

Over the past two decades, studies on mycorrhizal symbiosis and another type of symbiosis, formed by legumes such as peas and beans with soil bacteria, have allowed the identification of a dozen plant genes that are required for the recognition of beneficial microbes and their accommodation inside plant cells. By contrast, other types of intracellular symbioses have been poorly studied.

To address this, the team compared the genomes of nearly 400 plant species to understand what is unique to those that can form intracellular symbioses. Surprisingly, they discovered that three genes are shared exclusively by plants forming intracellular symbiosis and lost in plants unable to form this type of beneficial relationship.



"Our study demonstrates that diverse types of intracellular symbioses that plants form with different symbiotic partners are built on top of a conserved genetic program." said Dr Guru Radhakrishnan, lead author of the study and a BBSRC Discovery Fellow at the John Innes Centre.

The research, led by Dr Radhakrishnan in the UK and Dr Pierre-Marc Delaux in France, was conducted as part of the Engineering Nitrogen Symbiosis for Africa (ENSA) project sponsored by the Bill & Melinda Gates foundation. ENSA is an international collaboration aiming at transferring naturally occurring symbioses to cereal crops to limit the use of chemical fertilisers and to improve yield in smallholder farms of sub-Saharan Africa where access to these fertilisers is limited.

"By demonstrating that different plant symbioses share a common genetic basis, our ambitious goal has become more realistic," says Dr Radhakrishnan.



### CUCUMBER MOSAIC VIRUS - NEW BOOK

Peter Palukaitis and Fernando García-Arenal (Eds). Cucumber Mosaic Virus. APS Press, USA. 380 pp.

A global menace, cucumber mosaic virus (CMV) has the broadest host range of any virus, with the ability to infect more than 1,000 plants and counting, as new host plants are identified annually. CMV can affect most vegetable plants and some fruit crops and can be economically devastating, resulting in losses as high as 100%. Because of this, CMV has recently been classified among the top 10 most important viruses worldwide.

Most publications about CMV focus on specific aspects of the virus. Cucumber Mosaic Virus, edited by Peter Palukaitis and Fernando García-Arenal, is the first to present a comprehensive collection of research. Providing historical context, the book starts with the reprinting of three articles that introduced cucumber mosaic disease into the scientific literature in 1916 then moves forward to discuss the latest discoveries. The 25 chapters cover pathology and molecular biology as well as CMV's exceptional ability to override host defense mechanisms, referred to as "RNA silencing suppression," and evaluations of disease detection methods and management strategies.

Containing contributions from an international group of 29 experts, Cucumber Mosaic Virus serves as a referenced work intended for use by scholars, students, teachers, regulators, and researchers. Visit <u>APS PRESS</u> to learn more about Cucumber Mosaic Virus.



# BIRDS CARRY PHYTOPHTHORA RAMORUM IN BRITAIN

A paper by D. Dadam *et al.* titled "Migratory passerine birds in Britain carry *Phytophthora ramorum* inoculum on their feathers and "feet" at low frequency" was published in February 2020 by *Forest Pathology* (vol. 50, Issue 1, e12569). The abstract is as follows:-

In this study, we investigated whether birds could be vectors facilitating long-distance spread of Phytophthora ramorum in Britain. Migratory bird species associated with the main sporangium-producing host plants and most likely to pick up P. ramorum spores were considered. Swabs were taken from the flank and "feet" of 1,014 birds over a 12-month period (April 2011-March 2012) in the west of Britain and subsequently analysed for the presence of P. ramorum using nested PCR. Ten positive samples from 10 birds were identified: three in Cornwall, one in Devon, three in Gloucestershire, two in north Wales and one in Merseyside. Phytophthora ramorum was detected on samples from four species of thrushes (Redwing Turdus iliacus, Fieldfare T. pilaris, Blackbird T. merula and Song Thrush T. philomelos) and one species of warbler (Chiffchaff Phylloscopus collybita). All birds that tested positive were sampled in late autumn and winter (October-February), when long-distance movements (over 100 km) would have stopped. The low incidence of P. ramorum found using PCR suggests that the incidence of inoculum, whether viable or not, on birds was low. The apparently low incidence of inoculum on birds suggests migratory passerine birds can carry P. ramorum inoculum on their feathers and "feet," albeit at low frequency. The dates of positive samples indicate that birds would not have been moving long distances at the time but further work is needed to estimate the extent of their contribution to the spread of P. ramorum in Britain.

#### Read paper.

## ROOT-LESION NEMATODES OF POTATO

A paper by V. Orlando *et al.* titled "Root-lesion nematodes of potato: Current status of diagnostics, pathogenicity and management" was published in April 2020 by *Plant Pathology* (vol. 69, Issue 3, Pages 405-417). The abstract is as follows:-

Root-lesion nematodes of the genus Pratylenchus are migratory endoparasites with worldwide economic impact on several important crops including potato, where certain species like P. penetrans, P. neglectus, and P. scribneri reduce the yield and quality of potato tubers. Morphological identification of Pratylenchus spp. is challenging, and recent advancements in molecular techniques provide robust and rapid diagnostics to differentiate species without the need of specialist skills. However, the fact that molecular diagnostics are not available for all Pratylenchus species means that there are limitations in worldwide application. In general, rootlesion nematodes are difficult to manage once introduced into agricultural land and damage can be related to pathogenicity and population densities. In addition, rootlesion nematodes interact with fungi such as Verticillium dahliae, resulting in disease complexes that enhance the damage inflicted on the potato crop. Management interventions are often focused on limiting nematode reproduction before planting crops and include the application of nematicides, and cultural practices such as crop rotation, cover crops, biofumigation, and biological control. Understanding the limitations of the available crop protection strategies is important and there are many gaps for further study. This review discusses the status of distribution, pathogenicity, the diagnosis, and management of the main species of root-lesion nematodes, reported to infect potatoes worldwide, and highlights areas for potential future research.

Read paper.

# STING NEMATODES MODIFY METABOLOMIC PROFILES OF HOST PLANTS

### KRISY GASHLER, <u>CORNELL CHRONICLE</u>, 11 MARCH 2020

Nematodes exist in almost every environment and survive as parasites on human, animal or plant hosts. Plant-parasitic nematodes can devastate agricultural crops by interfering with roots; the annual economic loss from such pests is estimated at more than \$100 billion.

Two Cornell researchers and their colleagues have discovered that the plant-parasitic sting nematode (*Belonolaimus longicaudatus* Rau) caused changes in the chemical makeup of African bermudagrass. Attacks by the nematodes triggered specific types of plant immunity and changed the plants' acid and sugar profiles.

The paper, "<u>Sting Nematodes Modify Metabolomic</u> <u>Profiles of Host Plants</u>," was published recently in *Nature Scientific Reports.* 

Endoparasites burrow into a plant's roots and hijack some of the plant's machinery to feed themselves. Previous research on certain endoparasites demonstrated that as plants evolve to strengthen their defenses, parasites evolve to overcome them, causing a cascade of genetic changes within their plant hosts.

In contrast, ectoparasites – which browse on a plant's root and then move on – are not as tightly coupled with the plants they attack as endoparasites, and were assumed to cause more limited changes. This new research disproves that assumption.

Read more.

# Some domesticated plants Ignore Beneficial Soil Microbes

### HOLLY OBER, <u>UC RIVERSIDE NEWS</u>, 10 MARCH 2020

While domestication of plants has yielded bigger crops, the process has often had a negative effect on plant microbiomes, making domesticated plants more dependent on fertiliser and other soil amendments than their wild relatives.

In an effort to make crops more productive and sustainable, researchers recommend reintroduction of genes from the wild relatives of commercial crops that restore domesticated plants' ability to interact with beneficial soil microbes.

Thousands of years ago, people harvested small wild plants for food. Eventually, they selectively cultivated the largest ones until the plump cereals, legumes, and fruit we know today evolved. But through millennia of human tending, many cultivated plants lost some ability to interact with soil microbes that provide necessary nutrients. This has made some domesticated plants more dependent on fertiliser, one of the world's largest sources of nitrogen and phosphorous pollution and a product that consumes fossil fuels to produce.

"I was surprised how completely hidden these changes can be," said Joel Sachs, a professor of biology at UC Riverside and senior author of a paper published recently in <u>Trends in Ecology and Evolution</u>. "We're so focused on above ground traits that we've been able to massively reshape plants while ignoring a suite of other characteristics and have inadvertently bred plants with degraded capacity to gain benefits from microbes."

Read more.



No current vacancies.

### **ACKNOWLEDGEMENTS**

Thanks to Grahame Jackson, Greg Johnson, and Andrea Masino for contributions.



### **COMING EVENTS**

#### IX International Postharvest Symposium

Postponed – date to be announced Rotorua, New Zealand Website: <u>scienceevents. co. nz/postharvest2020</u>

### Plant Health 2020 – APS Annual Meeting

8 August - 12 August, 2020 Denver, Colorado, USA Website: <u>www. apsnet.</u> <u>org/meetings/annual/planthealth2020/Pages/default.</u> <u>aspx</u>

#### International Seed Testing Association Seed Health Workshop: Seed health methods to detect fungi, bacteria and viruses

31 August - 4 September, 2020 Pretoria, South Africa Website: <u>https://www.seedtest.org/en/event-detail---0--</u> <u>0--0--111.html</u>

#### Asian Conference on Plant Pathology: Importance and Impact of Global Plant Health

15 September - 18 September, 2020 Tsukuba International Congress Center, Ibaraki, Japan Website: <u>https://acpp2020.org/</u>

### 4<sup>th</sup> International Conference on Global Food Security

20 September - 23 September, 2020 Montpellier, France Website: <u>www. globalfoodsecurityconference. com</u>

### International Plant Health Conference "Protecting

Plant Health in a changing world 5 October - 8 October, 2020 Paasitorni Conference Centre, Helsinki, Finland Website: <u>www.fao.org/plant-health-2020/events/eventsdetail/en/c/1250609/</u>

#### 13<sup>th</sup> Arab Congress of Plant Protection 1 November - 6 November, 2020 Le Royal Hotel, Hammamat, Tunisia Contact: Dr. Asma Jajar, Chairperson of Organising Committee info@acpp-aspp. com

Website: <u>acpp-aspp. com</u>

#### 7th International Bacterial Wilt Symposium

3 November - 7 November, 2020 Montevideo, Uruguay Website: <u>7ibws2020. fq. edu. uy</u>

### 7<sup>th</sup> International Congress of Nematology

8 November - 13 November, 2020 Antibes Juan-les-Pins, France Website: <u>www. alphavisa. com/icn/2020/index. php</u>

### 16<sup>th</sup> Congress of the Mediterranean

Phytopathological Union 17 November - 20 November, 2020 Limassol, Cyprus Website: <u>cyprusconferences. org/mpu2020</u>

#### 11<sup>th</sup> Australasian Soilborne Diseases Symposium 24 November - 27 November, 2020

Cairns, Queensland, Australia Website: <u>asds2020. w. yrd. currinda. com</u>

#### 7<sup>th</sup> International Conference of Pakistan Phytopathological Society

29 November - 1 December, 2020 University of Agriculture Faisalabad and Ayub Agricultural Research Institute, Faisalabad, Pakistan Website: <u>pakps. com/web/7icpps</u>

### Joint 18<sup>th</sup> International *Botrytis* Symposium & 17<sup>th</sup> International *Sclerotinia* Workshop

June, 2021 Avignon, France Website: <u>colloque. inra. fr/botrytis-sclerotinia-2020</u>



4<sup>th</sup> International *Erwinia* Workshop 5 June - 6 June, 2021 Assisi, Italy Website: <u>www. icppb2020. com</u>

14<sup>th</sup> International Conference on Plant Pathogenic Bacteria 6 June - 11 June, 2021 Assisi, Italy Website: <u>www.icppb2020.com</u>

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





### 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 <u>Privacy Information</u> <u>Notice</u> 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

