PROMOTING WORLD-WIDE PLANT HEALTH AND FOOD SECURITY

INTERNATIONAL SOCIETY FOR PLANT PATHOLOGY

ISPP NEWSLETTER

ISSUE 53 (1) JANUARY 2023

Editor: Daniel Hüberli (**email**)

Join the ISPP **mail list**

IN THIS ISSUE:

ISPP President's Greetings for 2023

The Global Plant Health Assessment Book of Reports is avialable on the ISPP website

Ninth Update on ISPP Resilience Bursary for Plant Pathologists

The 13th Arab Congress of Plant Protection

Mycovirus undercuts fungus's attacks on wheat

Open Letter on the crucial role of fungi in preserving and enhancing biodiversity

Scientists develop environment-friendly spray to tackle rusty plant threat

Combatting soilborne pathogens and nematodes vital for food security: Impressions from attendees of the VIII International Cereal Nematode Symposium

New information portal launched to help in fight against pests and diseases of coconut

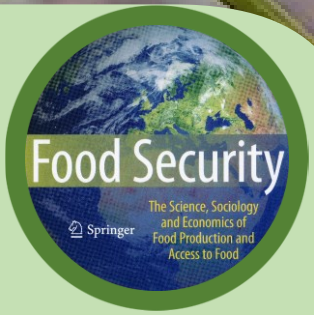
Alternative plant protection strategies for tomorrow's coffee

Global predictions for the risk of establishment of Pierce's disease of grapevines

Current Vacancies

Acknowledgements

Coming Events



ISPP PRESIDENT'S GREETINGS FOR 2023

JAN LEACH, ISPP PRESIDENT

The International Society for Plant Pathology (ISPP) relies heavily on volunteers to fulfill our purpose, which is to promote the worldwide development of plant pathology, and the dissemination of knowledge about plant diseases and plant health management (ISPP isppweb.org). What better time than the beginning of a New Year to recognise and thank the web of volunteers who have collectively contributed to ISPP's success? Over the next few paragraphs, I'll highlight just a few of the many volunteers who are now serving ISPP, and hopefully, will inspire a new generation of volunteers to step forward.

To accomplish an international meeting of the scale of the **International Congress of Plant Pathology (ICPP)** requires many volunteers. The team working towards ICPP2023 (www.icpp2023.org) in Lyon, France has been working since 2018 to make this meeting a success. ICPP2023 is hosted by the French Society of Plant Pathology (SFP; www.sfp-asso.org), and the local and international organising committees of volunteers established by the SFP have built an amazing program that includes topics of interest to all! We are deeply indebted to **Nathalie Poussereau** and **Mathias Choquer** who are the volunteer co-Vice Presidents of the Congress for ISPP, and who are leading the organisation as Chairpersons for ICPP2023.

ICPP2023 programming is also guided by another group of wonderful volunteers, ISPP's Subject Matter Committees (SMCs), led by **Khaled Makkouk**, Vice President in charge SMCs. These committees 'consider and report on special fields or problem in plant pathology' for ISPP, and are frequently leaders in organising international meetings, such as the 14th International Conference on Plant Pathogenic Bacteria held this year in Assisi, Italy (www.icppb2020.com). You will see the touch of the SMCs in the ICPP2023 program, particularly in the diverse listing of satellite meetings.

ISPP's outreach via our newsletter, publications and our website is also handled by dedicated volunteers. Under the guidance of Editor in Chief **Serge Savary**, his team of Editors, and all of you volunteer reviewers, ISPP's journal *Food Security* has climbed to a remarkable impact factor of 7.15! Beyond the journal, Serge and a stellar team of over 100 volunteers just published a Global Plant Health Assessment (GPHA), a herculean effort that provides a snapshot of plant disease impacts on diverse plant systems in defined ecoregions (see advertisement in this issue). The GPPHA is published at the ISPP website (ISPP isppweb.org) which is managed by **Peter Williamson**; Peter ensures that the ISPP website is up-to-date and secure. The Task Force on Challenges for Plant Pathology 2050, co-chaired by **Lodovica Gullino** and **Greg Johnson**, identifies key future challenges for plant pathology, seeking ideas and insights for how to address them. The ISPP newsletter connects our membership, which is comprised of the members of more than 60 plant health societies worldwide. **Daniel Huberli** has been Editor the ISPP Newsletter for than 8 years; I think all can agree that Daniel has done an amazing job of summarising exciting research advances and news related to plant health, as well as information on ISPP activities.

I particularly want to thank **Greg Johnson**, Past President, and **Mathews Paret**, Treasurer, who have gone above and beyond their defined roles for ISPP in envisioning and executing the establishment of the ISPP Resiliency Bursary to support emergency/refugee situations, specifically for plant pathologists. Thanks to the many donations from member individuals and societies, and for guidance and assistance from volunteers within the Polish Society of Plant Pathology, this fund has contributed to fellowships enabling a number of Ukranian plant pathologists to continue research in Polish laboratories.

In closing, a heartfelt thanks to members of the ISPP Executive Committee and Secretariat, some of whom are pictured below. This group of devoted leaders has provided guidance and decisions to ensure ISPPs health and progress over the past four years. I thank **Brenda Wingfield** (Secretary), **Greg Johnson** (Past President), and **Khaled Makkouk** (Vice President for SMCs) for their sound advice grounded in many years of service to ISPP. Mathews Paret, who was new to the position of Treasurer in 2018 has provided particularly sound guidance that will place ISPP on firm financial footing going forward. To **Andrea Masino**, our a very responsive and active Business manager, and **Daniel Huberli**, the exceptional ISPP Newsletter Editor, thank you! ISPP will be strong into the future because of the spirit of volunteerism that is ubiquitous in our membership. Thank you to all of you who have contributed to ISPP!

Wishing you all a healthy and productive New Year!

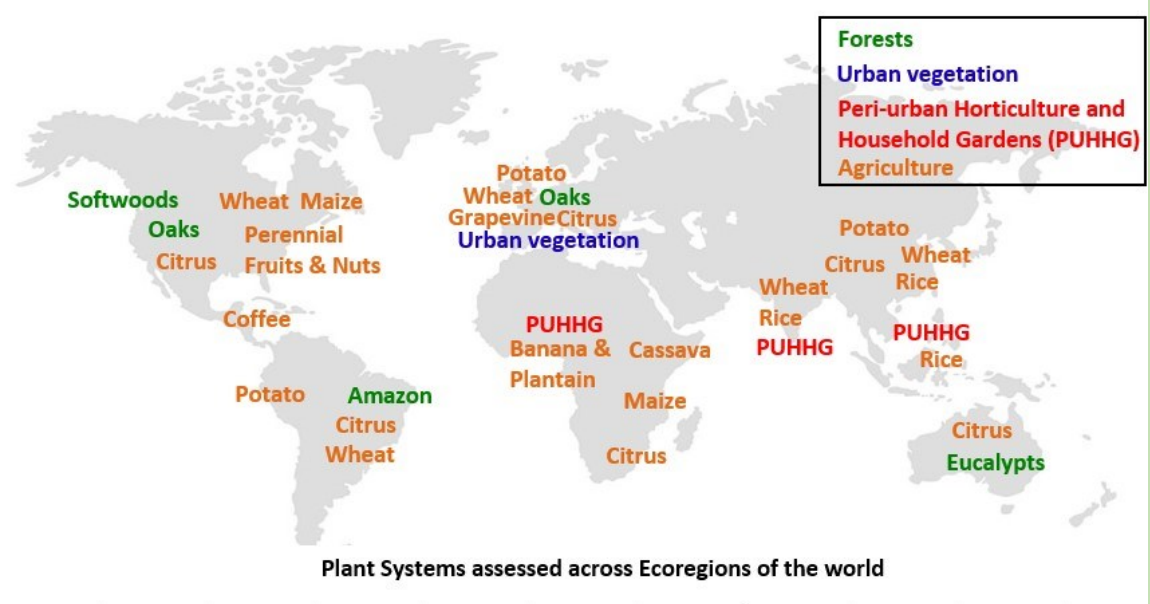
Jan

2018-2023 ISPP Executive and Secretariat, front left to right, Brenda Wingfield, Jan Leach, Daniel Huberli, Mathews Paret. Rear, left to right, Greg Johnson, Khaled Makkouk, and Andrea Masino.

THE GLOBAL PLANT HEALTH ASSESSMENT BOOK OF REPORTS IS AVIALABLE ON THE ISPP WEBSITE

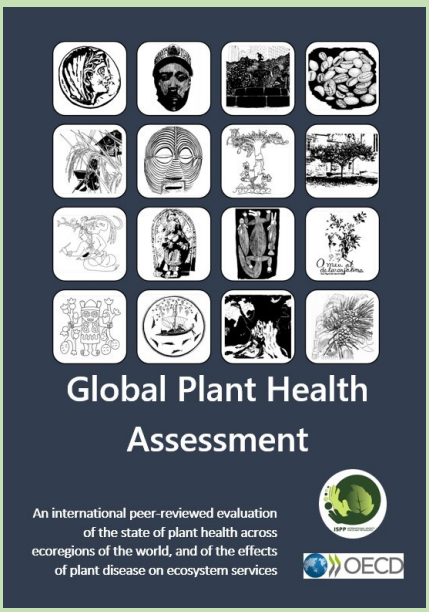
LAETITIA WILLOCQUET

The Global Plant Health Assessment (GPHA) conducted under the aegis of the ISPP has mobilised about 100 scientists all over the world who generated reports on the state and evolution of plant health and its impact on ecosystem services (provisioning, regulating, cultural). Twenty-six reports have been produced, which enable an assessment based on the available literature. These reports address forests, urban vegetation, peri-urban horticulture, and household gardens, as well as agricultural systems across Ecoregions of the world.



Plant Systems assessed across Ecoregions of the world

The 26 reports are assembled in a book, together with a description of the context and procedure involved in the GPHA. The GPHA book is available under two formats: pdf and e-pub.



Both book formats are posted on the ISPP website at https://www.isppweb.org/about_gpha.asp and can be downloaded for free.

The GPHA book provides a global resource describing the state of plant health across Ecoregions and Plant Systems of the world. The GPHA book is a resource for research, education, and policy purposes.

NINTH UPDATE ON ISPP RESILIENCE BURSARY FOR PLANT PATHOLOGISTS

STOLIARCHUK NADIIA MYKOLAIVNA, MAŁGORZATA JĘDRYCZKA, MAŁGORZATA MAŃKA AND GREG JOHNSON

As I write this it is 21 December 2022, the solar solstice, the turning of the year, when since ancient times, people looked with hope to the coming of Spring or Autumn in the year ahead. For the people of Ukraine how different today is compared to 2021, and how much greater is their hope for the end of winter and the war, and a return to peace and prosperity.

I had not started 2022 thinking I would be writing monthly updates on the Resilience Bursary for Plant Pathologists established by the International Society for Plant Pathology in March 2022 to help plant pathologists in need with an initial focus on plant pathologists from Ukraine, who were reaching Poland and other countries as refugees.

When you read this, I will have celebrated an important milestone – turning 70. In more normal times this would warrant a party, but with the COVID-19 epidemic still affecting many, and with the war in Ukraine causing loss I decided to forgo a grand celebration. Instead, I asked my colleagues, friends and relatives to consider donating the cost of a cup of coffee (or more) to the ISPP Resilience Fund. Every US$250 raised supports a Bursary recipient for a week, so if you're reading this, please consider donating (see link here). In the USA, donations are tax deductible.

This month we hear from Stoliarchuk Nadiia Mykolaivna who specialises in technology transfer and innovative products related to research in the field of biology.

Greg Johnson
ISPP Immediate Past President

NADIIA STOLIARCHUK'S STORY

I am, Stoliarchuk Nadiia Mykolaivna, PhD in Economics, Assistant Professor, and Senior Research Fellow, at the Research and Innovation Development Department National Scientific Centre "Institute of Agrarian Economics", Kyiv, Ukraine and Head of the Young Scientists Council.

I started my scientific career in 2011, enrolling in full-time post-graduate studies at the National Scientific Centre "Institute of Agrarian Economics".

In 2015, I successfully defended my candidate's thesis on the topic: "Accounting and internal audit of innovative activity in research institutions".

Now the vector of my research has changed in the direction of innovation economy, technology transfer, innovation in agriculture, sustainable development, agricultural production, food security, economic efficiency, investment attractiveness, economic modeling.

February 24, 2022 forever changed the lives of many Ukrainians, including mine. On this day, I woke up at 5:40 a.m. in Kyiv to the sounds of explosions and decided to leave the capital of Ukraine that same day. To tell the truth, I did not believe in the beginning of this war and was completely unprepared for it. I hastily left after 10 years of life with only a laptop and documents.

I am sincerely grateful to my Polish colleagues for the kind reception and help in Poznań. I was once again convinced that the world scientific community and cooperation have great opportunities and no barriers. At first, I had cooperation with the Poznan University of Life Science where I worked on the research innovative development of agricultural production as a factor of food security based on the goals of sustainable development and in the conditions of the new world crisis.

Later I was able to continue my scientific research in the Pathogen Genetics and Plant Resistance Team of the Institute of Plant Genetics of the Polish Academy of Sciences thanks to the support of ISPP Bursary. The grant I received from the ISPP Bursary Fund through the Polish Phytopathological Society was my third individual grant obtained during my stay in Poland (internship № 9/2022). I am grateful for the support as it allowed me to start research in Poland, meet interesting people and gain new knowledge.

I am not a biologist, but at the National Scientific Centre "Institute of Agrarian Economics", I dealt with issues of technology transfer and innovative products related to research in the field of biology. Our institute closely cooperated with the Institute of Agriculture in Chabany, Kyiv Region and the Institute of Plant Protection in Kyiv, so we had the opportunity to evaluate their innovations.

During the internship, work was carried out with preparation of the mathematical model (SPEC decision support system). This work has been planned in the project funded by Corteva Agriscience Poland Sp. z o.o.), who are interested in cooperation with plant pathologists and see a great added value in our work.

I initiated and organized the signing of the Memorandum of Cooperation between the Institute of Plant Genetics of the Polish Academy of Sciences and my alma mater, the National Scientific Centre "Institute of Agrarian Economics".

I also had the opportunity to participate in the following seminars and improve my knowledge: "Inoculum-based plant disease forecasting" prepared by Prof. dr hab. Małgorzata Jędryczka and "Food legume genetic resources for a sustainable future" prepared by Prof. Roberto Papa, Università Politecnica delle Marche (UNIVPM), Ancona, Italy.

I am very thankful to Prof. Jędryczka and the Pathogen Genetics and Plant Resistance Team of the Institute of Plant Genetics PAS for the opportunity to enrich my professional activity with new experiences. I am grateful to my scientific family and everyone who helps Ukraine.

THE 13TH ARAB CONGRESS OF PLANT PROTECTION

KHALED M. MAKKOUK, ISPP VICE-PRESIDENT

The Arab Society of Plant Protection (ASPP) organised the 13th Arab Congress of Plant Protection (ACPP) in collaboration with the Ministry of Agriculture in Tunisia represented by the National Agricultural Research Institute of Tunisia (INRAT), in Hammamat, Tunisia during 15-21 October, 2022. Around 300 participants from 17 Arab countries and 18 countries outside the region joined this congress. Around 400 papers were included in the congress scientific program as either oral or poster presentation. The congress program also included a one day agriculture/touristic trip in northern Tunisia. During the congress, a new executive committee for the period 2023-2025 was elected and is composed as follows:

Safaa Kumari (Syria), President; Ahmed Katbeh (Jordan), Vice President; Ibrahim Al-Jboory (Iraq), Past President and Editor-in-Chief of Arab and Near East Plant Protection Bulletin; Zinette Mousa (Lebanon), Secretary-Treasurer; Khaled Makkouk (Lebanon), member and Editor-in-Chief, Arab Journal of Plant Protection; Asma Najjar (Tunisia), member and chairperson of awards and honors committee; Emad El-Maaroof (Iraq), member and chairperson of translation committee; Houda Bouraghda (Algeria), member and chairperson of publications committee; Hasan Dahi (Egypt), member and chairperson of membership and public relations committee.

MYCOVIRUS UNDERCUTS FUNGUS'S ATTACKS ON WHEAT

USDA AGRICULTURAL RESEARCH SERVICE RESEARCH NEWS, 29 NOVEMBER 2022

A naturally occurring virus co-discovered by Agricultural Research Service (ARS) and university scientists may offer a way to undermine a costly fungal threat to wheat, barley and other grain crops.

The fungus, *Fusarium graminearum*, is the chief culprit behind a disease called Fusarium head blight, or "scab." Unchecked with fungicides or other measures, scab diminishes the yield and quality of the crops' grain. Under wet, humid conditions, the scab fungus can release a toxin called deoxynivalenol (a.k.a., "vomitoxin") that can contaminate the grain, reducing its point-of-sale value or leading to outright rejection depending on end use.

Now, however, a team of scientists with the ARS Application Technology Research Unit in Wooster, Ohio, and South Dakota State University in Brookings (SDSU) has discovered a strain of a fungal virus, or "mycovirus," that disables the scab fungus's vomitoxin-making machinery.

In nature, the mycovirus, a species called *Fusarium graminearaum Vg1*, infects the scab fungus to replicate and spread. But the new mycovirus strain, dubbed *F. graminearum Vg1-SD4*, takes such attacks a step further by stopping the scab fungus from making vomitoxin—a fortuitous benefit for wheat plants.

A "mycovirus" could help stop the Fusarium head blight fungus from contaminating wheat grains and giving them a ghastly bleached appearance (shown at right) (Credit: USDA Agricultural Research Service).

Indeed, in laboratory and greenhouse experiments, cultures of the scab fungus that had been infected with the mycovirus strain grew slower than non-infected cultures and produced no vomitoxin in the grain of susceptible potted wheat plants. In contrast, the grain of wheat plants exposed to mycovirus-free cultures of scab contained 18 ppm of vomitoxin, a byproduct of the fungus's metabolism that can be harmful to livestock and human health.

ARS molecular biologist Shin-Yi Lee Marzano and her collaborators discovered the mycovirus strain after sequencing its genomic makeup and noticing slight differences from its "parent" species, FgVg1, which had been maintained in a live culture of the scab fungus and known to science for about a decade.

Marzano cautioned that their research—reported in the July 2022 issue of *Microorganisms*—is still in its early stages. However, with further study, the mycovirus strain could prove useful as a biological control agent that could be formulated and sprayed onto susceptible wheat varieties or other small-grain crops. That, in turn, could potentially offer growers another tool to use in avoiding costly losses to scab and its contamination of grain destined for livestock and human consumption.

OPEN LETTER ON THE CRUCIAL ROLE OF FUNGI IN PRESERVING AND ENHANCING BIODIVERSITY

EUROPEAN FOREST INSTITUE LATEST NEWS, 14 DECEMBER 2022

When we think of forests we usually think of trees, plants and animals. But forests could not exist without fungi, which lie at the base of the biodiversity webs that support much of life on Earth.

Most fungi live as branching, fusing networks of tubular cells known as mycelium which can make up between a third and a half of the living mass of soils. Globally, the total length of fungal mycelium in the top 10cm of soil is more than 450 quadrillion km: about half the width of our galaxy. These networks comprise an ancient life-support system that easily qualifies as one of the wonders of the living world. Despite that, fungi represent a meagre 0.2% of our global conservation priorities.

Fungi are largely invisible ecosystem engineers that have shaped life on Earth for more than a billion years. In fact, around 500 million years ago, fungi facilitated the movement of aquatic plants onto land, fungal mycelium serving as plant root systems for tens of millions of years until plants could evolve their own. This association transformed the planet and its atmosphere – the evolution of plant-fungal partnerships coincided with a 90% reduction in the level of atmospheric carbon dioxide. Today, most plants depend on mycorrhizal fungi – from the Greek words for fungus (mykes) and root (rhiza) – which weave themselves through roots, provide plants with crucial nutrients and defend them from disease.

Put simply, fungal networks embody the most basic principle of ecology: that symbiosis is fundamental to life on earth. Plants supply carbon to their fungal partners in exchange for nutrients like nitrogen and phosphorus - much of the phosphorus that makes up the DNA in your own body will have passed through a mycorrhizal fungus. In their exchange, plants and fungi engage in sophisticated trading strategies. The influence of these quadrillions of microscopic trading decisions spills out over whole continents. Globally, at least 5 billion tons of carbon dioxide are allocated from plants to mycorrhizal networks each year.

A CALL TO ACTION

A paradigmatic but often forgotten example of the keystone role of fungi is in the world's forests, which are among the most important biological systems on our planet. They are our largest terrestrial carbon sink and the main terrestrial source of precipitation and oxygen. They house much of the planet's biodiversity, serving as irreplaceable libraries of different ways to rise to the challenge of living.

However, current biodiversity, climate change, and sustainable food strategies, including forest restoration efforts overlook fungi and focus overwhelmingly on plants (flora) and animals (fauna). We urgently need to add a third "F" – funga – to create holistic conservation strategies that simultaneously address the triple planetary challenges of climate change, biodiversity loss and food security.

Fungi must be incorporated into law-making and decision-making in international environmental treaties and frameworks, as well as national agricultural and environmental laws and policies, and local conservation and environmental initiatives. We invite the leaders meeting in COP 15 to start this process by adding fungi to the Post-2020 global biodiversity framework. Fungi have long sustained and enriched life on our planet. It's time they receive the attention they deserve.

This open letter was written by:

Marc Palahí, Director European Forest Institute

Toby Kiers, Director Society for the Protection of Underground Networks

Merlin Sheldrake, author of Entangled Life

Giuliana Furci - Executive director, Fungi Foundation & co-chair IUCN SSC Fungal Conservation Committee

Robert Nasi, Chief Executive Officer, CIFOR-ICRAF

César Rodríguez-Garavito, Professor of Clinical Law and Director, Earth Rights Advocacy Clinic, New York University School of Law

Photo credit: Carolina Magnasco/Fungi Foundation

SCIENTISTS DEVELOP ENVIRONMENT-FRIENDLY SPRAY TO TACKLE RUSTY PLANT THREAT

UNIVERSITY OF QUEENSLAND NEWS, 19 DECEMBER 2022

University of Queensland scientists have developed an environmentally friendly RNA-based spray to help combat myrtle rust, which has wiped out many Australian plants.

Developed in the Mitter lab in collaboration with Department of Agriculture and Fisheries forest pathologists, the spray induces RNA interference (RNAi) – a natural way to shut down protein translation – which means it could stop the spread of myrtle rust through bushland, home gardens and nurseries. The research is published in *Molecular Plant Pathology*.

University of Queensland scientists, Louise Shoey, Rebecca Degnan and Dr Anne Sawyer (Credit: University of Queensland).

PhD candidate Rebecca Degnan said in the decade myrtle rust had been in Australia it had become a huge problem, with more than 350 native hosts. "Of those plants that have been screened, only three per cent were completely unable to be infected, and more than 40 species have been deemed conservation priorities because of damage from myrtle rust," Ms Degnan said.

Molecular plant biologist Dr Anne Sawyer said the team wanted to find an alternative myrtle rust control to fungicides. "Growers rely heavily on fungicides, but they come with a lot of problems such as being harmful to humans and beneficial organisms like bees and monarch butterflies as well as water contamination," Dr Sawyer said. "Pests and pathogens can also develop resistance to chemicals and consumers are becoming more aware of residues on their fruit and vegetables."

"We already knew that RNA interference works against other plant pests and pathogens, and our research found rusts are very amenable to this method when we sprayed the double-stranded RNA onto the plants."

Dr Sawyer said the early results were very positive, and further research would test the spray in more uncontrolled conditions outside of the lab and glasshouse.

"Now that we've seen the proof of concept of RNAi in myrtle rust, there are a lot of possibilities for other rusts as well," Dr Sawyer said. "It's really exciting, especially when you talk to people who have been working on myrtle rust for a long time and have seen the damage it can do."

Watch: Exogenous RNAi for sustainable plant protection Seminar presented by Dr Anne Sawyer, 19 August 2022.

Short UQ/DAF rust documentary: Season 3 Episode 4 – 16 Dec 2020.

COMBATTING SOILBORNE PATHOGENS AND NEMATODES VITAL FOR FOOD SECURITY: IMPRESSIONS FROM ATTENDEES OF THE VIII INTERNATIONAL CEREAL NEMATODE SYMPOSIUM

JULIE MOLLINS, CIMMYT NEWS, 7 NOVEMBER 2022

The International Maize and Wheat Improvement Center (CIMMYT) coordinated the VIII International Cereal Nematode Symposium between 26-29 September, in collaboration with the Turkish Ministry of Agriculture and Forestry, the General Directorate of Agricultural Research and Policies and Bolu Abant Izzet Baysal University.

As many as 828 million people struggle with hunger due to food shortages worldwide, while 345 million are facing acute food insecurity – a crisis underpinning discussions at this symposium in Turkey focused on controlling nematodes and soilborne pathogens causing reduced wheat yields in semi-arid regions.

A major staple, healthy wheat crops are vital for food security because the grain provides about a fifth of calories and proteins in the human diet worldwide.

Seeking resources to feed a rapidly increasing world population is a key part of tackling global hunger, said Mustafa Alisarli, the rector of Turkey's Bolu Abant Izzet Baysal University in his address to the 150 delegates attending the VIII International Cereal Nematode Symposium in the country's province of Bolu.

Suat Kaymak, Head of the Plant Protection Department, on behalf of the director general of the General Directorate of Agricultural Research and Policies (GDAR), delivered an opening speech, emphasising the urgent need to support the CIMMYT Soilborne Pathogens (SBP) research. He stated that the SBP plays a crucial role in reducing the negative impact of nematodes and pathogens on wheat yield and ultimately improves food security. Therefore, the GDAR is supporting the SBP program by building a central soilborne pathogens headquarters and a genebank in Ankara.

Discussions during the five-day conference were focused on strategies to improve resilience to the Cereal Cyst Nematodes (*Heterodera* spp.) and Root Lesion Nematodes (*Pratylenchus* spp.), which cause root-health degradation, and reduce moisture uptake needed for proper development of wheat.

Richard Smiley, a professor emeritus at Oregon State University, summarised his research on nematode diseases. He has studied nematodes and pathogenic fungi that invade wheat and barley roots in the Pacific Northwest of the United States for 40 years. "The grain yield gap – actual versus potential yield – in semiarid rainfed agriculture cannot be significantly reduced until water and nutrient uptake constraints caused by nematodes and Fusarium crown rot are overcome," he said.

Experts also assessed patterns of global distribution, exchanging ideas on ways to boost international collaboration on research to curtail economic losses related to nematode and pathogen infestations.

A special session on soilborne plant pathogenic fungi drew attention to the broad spectrum of diseases causing root rot, stem rot, crown rot and vascular wilts of wheat.

Soilborne fungal and nematode parasites co-exist in the same ecological niche in cereal-crop field ecosystems, simultaneously attacking root systems and plant crowns thereby reducing the uptake of nutrients, especially under conditions of soil moisture stress.

Limited genetic and chemical control options exist to curtail the damage and spread of these soilborne problems which is a challenge exacerbated by both synergistic and antagonistic interactions between nematodes and fungi.

Nematodes, by direct alteration of plant cells and consequent biochemical changes, can predispose wheat to invasion by soilborne pathogens. Some root rotting fungi can increase damage due to nematode parasites.

INTEGRATED MANAGEMENT

For a holistic approach to addressing the challenge, the entire biotic community in the soil must be considered, said Hans Braun, former director of the Global Wheat Program at CIMMYT.

Braun presented efficient cereal breeding as a method for better soilborne pathogen management. His insights highlighted the complexity of root-health problems across the region, throughout Central Asia, West Asia and North Africa (CWANA).

Richard A. Sikora, Professor emeritus and former Chairman of the Institute of Plant Protection at the University of Bonn, stated that the broad spectrum of nematode and pathogen species causing root-health problems in CWANA requires site-specific approaches for effective crop health management. Sikora added that no single technology will solve the complex root-health problems affecting wheat in the semi-arid regions. To solve all nematode and pathogen problems, all components of integrated management will be needed to improve wheat yields in the climate stressed semi-arid regions of CWANA.

Building on this theme, Timothy Paulitz, research plant pathologist at the United States Department of Agriculture Agricultural Research Service (USDA-ARS), presented on the relationship between soil biodiversity and wheat health and attempts to identify the bacterial and fungal drivers of wheat yield loss. Paulitz, who has researched soilborne pathogens of wheat for more than 20 years stated that, "We need to understand how the complex soil biotic ecosystem impacts pathogens, nutrient uptake and efficiency and tolerance to abiotic stresses."

Julie Nicol, former soilborne pathologist at CIMMYT, who now coordinates the Germplasm Exchange (CAIGE) project between CIMMYT and the International Center for Agricultural Research in the Dry Areas (ICARDA) at the University of Sydney's Plant Breeding Institute, pointed out the power of collaboration and interdisciplinary expertise in both breeding and plant pathology. The CAIGE project clearly demonstrates how valuable sources of multiple soilborne pathogen resistance in high-yielding adapted wheat backgrounds have been identified by the CIMMYT Turkey program, she said. Validated by Australian pathologists, related information is stored in a database and is available for use by Australian and international breeding communities.

ECONOMIC LOSSES

Root-rotting fungi and cereal nematodes are particularly problematic in rainfed systems where post-anthesis drought stress is common. Other disruptive diseases in the same family include dryland crown and the foot rot complex, which are caused mainly by the pathogens *Fusarium culmorum* and *F. pseudograminearum*.

The root lesion nematode *Pratylenchus thornei* can cause yield losses in wheat from 38 to 85 percent in Australia and from 12 to 37 percent in Mexico. In southern Australia, grain losses caused by *Pratylenchus neglectus* ranged from 16 to 23 percent and from 56 to 74 percent in some areas.

The cereal cyst nematodes (*Heterodera* spp.) with serious economic consequences for wheat include *Heterodera avenae*, *H. filipjevi* and *H. latipons*. Yield losses due to *H. avenae* range from 15 to 20 percent in Pakistan, 40 to 92 percent in Saudi Arabia, and 23 to 50 percent in Australia.

In Turkey, *H. filipjevi* has caused up to 50 percent crop losses in the Central Anatolia Plateau and *H. avenae* has caused up to 24 percent crop losses in the Eastern Mediterranean.

The genus *Fusarium* which includes more than a hundred species, is a globally recognised plant pathogenic fungal complex that causes significant damage to wheat on a global scale.

In wheat, *Fusarium* spp. cause crown-, foot-, and root- rot as well as head blight. Yield losses from Fusarium crown-rot have been as high as 35 percent in the Pacific Northwest of America and 25 to 58 percent in Australia, adding up losses annually of $13 million and $400 million respectively, due to reduced grain yield and quality. The true extent of damage in CWANA needs to be determined.

Abdelfattah Dababat, CIMMYT's Turkey representative and leader of the soilborne pathogens research team said, "There are examples internationally, where plant pathologists, plant breeders and agronomists have worked collaboratively and successfully developed control strategies to limit the impact of soilborne pathogens on wheat." He mentioned the example of the development and widespread deployment of cereal cyst nematode resistant cereals in Australia that has led to innovative approaches and long-term control of this devastating pathogen.

Dababat, who coordinated the symposium for CIMMYT, explained that, "Through this symposium, scientists had the opportunity to present their research results and to develop collaborations to facilitate the development of on-farm strategies for control of these intractable soilborne pathogens in their countries."

Paulitz stated further that soilborne diseases have world-wide impacts even in higher input wheat systems of the United States. "The germplasm provided by CIMMYT and other international collaborators is critical for breeding programs in the Pacific Northwest, as these diseases cannot be managed by chemical or cultural techniques," he added.

Closing ceremony of the International Cereal Nematode Symposium. From left to right; Hans Braun, Brigitte Slaats, Richard Sikora, Grant Hollaway, Mesut Keser, Zahra Maafi, Richard Smiley, Mustafa Imren, Fatih Ozdemir, and Amer Dababat (Photo: CIMMYT).

ROAD AHEAD

Delegates gained a greater understanding of the scale of distribution of cereal cyst nematodes and soilborne pathogens in wheat production systems throughout West Asia, North Africa, parts of Central Asia, Northern India, and China.

After more than 20 years of study, researchers have recognised the benefits of planting wheat varieties that are more resistant. This means placing major emphasis on host resistance through validation and integration of resistant sources using traditional and molecular methods by incorporating them into wheat germplasm for global wheat production systems, particularly those dependent on rainfed or supplementary irrigation systems.

Sikora stated that more has to be done to improve Integrated Pest Management (IPM), taking into consideration all tools wherever resistance is not available. Crop rotations for example have shown some promise in helping to mitigate the spread and impact of these diseases.

"In order to develop new disease-resistant products featuring resilience to changing environmental stress factors and higher nutritional values, modern biotechnology interventions have also been explored," Alisarli said.

Brigitte Slaats and Matthias Gaberthueel, who represent Swiss agrichemicals and seeds group Syngenta, introduced TYMIRIUM® technology, a new solution for crown rot and nematode management in cereals. "Syngenta is committed to developing novel seed-applied solutions to effectively control early soilborne diseases and pests," Slaats said.

It was widely recognised at the event that providing training for scientists from the Global North and South is critical. Turkey, Austria, China, Morocco, and India have all hosted workshops, which were effective in identifying the global status of the problem of cereal nematodes and forming networks and partnerships to continue working on these challenges.

NEW INFORMATION PORTAL LAUNCHED TO HELP IN FIGHT AGAINST PESTS AND DISEASES OF COCONUT

JULIE MOLLINS, CIMMYT NEWS, 7 NOVEMBER 2022

A new information portal called Cocopest has been launched at the 58th International Coconut Community (ICC) Session and Ministerial Meeting to help in the fight against pests and diseases of coconut – a crop that in 2020 was valued at USD $65 billion.

The resource, which has been developed by CABI and financially supported by the ICC, was revealed by Dr Jelfina Alouw, Executive Director of the ICC at the meeting which was held virtually and co-organised by Tonga's Ministry of Agriculture, Food and Forests.

Cocopest brings together information from journals, books and abstracts in one central place for the first time. It currently features 20 datasheets with details on 13 insects, two bacteria, two fungi, one virus and two mites that can impact upon coconut production.

These include the coconut rhinoceros beetle (*Oryctes rhinoceros*) and the Guam Haplotype coconut rhinoceros beetle, African rhinoceros beetle (*Oryctes boas*), Bogia Coconut Syndrome (BSC), Phytoplasma causing Lethal Yellowing Disease (LYD) and *Phytophthora palmivora*.

Coconut is grown on about 12.25 million hectares in more than 90 countries and is consumed by people in more than 110 countries worldwide. The 20-member countries of the ICC occupy 87% of the global total area and produce around 86% of the world's coconut supply.

The ICC member countries include eight Asian countries: India, Indonesia, Malaysia, Philippines, Sri Lanka, Thailand, Vietnam and Timor Leste, nine Pacific countries: Federated States of Micronesia, Fiji, Kiribati, Marshall Islands, Papua New Guinea, Samoa, Solomon Islands, Tonga and Vanuatu, one Caribbean country: Jamaica, one African country: Kenya and one country in South America: Guyana.

However, the coconut – scientifically and practically referred to as the 'tree of life' – faces numerous challenges which include low productivity due to the senility of the palms, pests and diseases, land conversion, low quality of planting materials and low levels of maintenance.

Not only does Cocopest aim to provide information and good quality resources on coconut pests and diseases but it also serves to provide advice and recommendations for ICC members.

This includes images, taxonomic data, information on the distribution of the pest and diseases as well as symptoms, prevention and control, detection and inspection. There is also an 'expert' section which can connect people with experts from regional diagnostic networks.

Dr Feng Zhang, CABI's Regional Director, East & South East Asia, presented at the meeting on strengthening CABI's partnership with the ICC for the sustainable development of the coconut sector.

CABI and ICC have a strong collaboration with goes back to the signing of a Memorandum of Understanding in 2017 and a Letter of Agreement for Technical Cooperation on development of the Cocopest portal in 2021. The broad aims of the partnership are to facilitate scientific exchange, conduct research in areas of mutual interest and strengthen capacity development and publication of research.

Dr Alouw said, "Coconut is an important economic crop for ICC member countries – many of whom have embarked on massive replanting programmes to meet the current increasing demand for coconut and its by-products.

"With this, however, comes the increasing risk posed by pests and diseases. While there is a plethora of information available, Cocopest serves to be an easily accessible portal to help coconut producers maximise their yields and profitability of this key cash crop."

During the meeting, Dr Zhang proposed how further collaboration between CABI and the ICC could include utilising the CABI-led global Plantwise framework which sees plant doctors at plant clinics help farmers diagnose and treat their plant health problems.

CABI could also share its expertise in helping with the development of a regional biosecurity plan and programmes which empower women and youth – thereby reducing inequalities and gender mainstreaming to boost marginalised communities' participation in the coconut industry.

ALTERNATIVE PLANT PROTECTION STRATEGIES FOR TOMORROW'S COFFEE

A paper by Athina Koutouleas *et al.* titled "Alternative plant protection strategies for tomorrow's coffee" was published on 16 November 2022 by *Plant Pathology* (early view). The abstract is as follows:-

Continuous pesticide usage has negative impacts on people and ecosystems associated with coffee farms. Alternative plant protection strategies can be implemented that are sustainable for both the environment and the coffee farmer. In this review, new genomic techniques (NGTs) such as RNAi (RNA interference, using spray-induced gene silencing – SIGS) are presented as a possible novel strategy to manage Coffea arabica pests and diseases. Exploitation of the coffee agroforestry system (AFS) is presented as another strategy, offering both plant protection and ecosystem restoration functions. Interactions within a coffee-AFS were found to both hinder and bolster the development of some coffee pests and diseases. Biological control represents a third strategy that has been examined to-date to combat important coffee pests and diseases (i.e., American leaf spot, black coffee twig borer, coffee berry borer, coffee berry disease, coffee leaf miner, coffee leaf rust, coffee wilt disease and green coffee scale). The astute use of RNAi, AFS and/or biological control have the potential to provide alternatives to conventional pesticides for future sustainable coffee production. However, these approaches must be compatible with the coffee farmers' local needs and accessibility and bolstered through nationwide support by advisory services and coffee authorities.

Read paper.

GLOBAL PREDICTIONS FOR THE RISK OF ESTABLISHMENT OF PIERCE'S DISEASE OF GRAPEVINES

A paper by Alex Giménez-Romero *et al.* titled "Global predictions for the risk of establishment of Pierce's disease of grapevines" was published on 20 December 2022 by *Communications Biology* (Vol. 5, 1389). The abstract is as follows:-

The vector-borne bacterium *Xylella fastidiosa* is responsible for Pierce's disease (PD), a lethal grapevine disease that originated in the Americas. The international plant trade is expanding the geographic range of this pathogen, posing a new threat to viticulture worldwide. To assess the potential incidence of PD, we have built a dynamic epidemiological model based on the response of 36 grapevine varieties to the pathogen in inoculation assays and on the vectors' distribution when this information is available. Key temperature-driven epidemiological processes, such as PD symptom development and recovery, are mechanistically modelled. Integrating into the model high-resolution spatiotemporal climatic data from 1981 onward and different infectivity (R_0) scenarios, we show how the main wine-producing areas thrive mostly in non-risk, transient, or epidemic-risk zones with potentially low growth rates in PD incidence. Epidemic-risk zones with moderate to high growth rates are currently marginal outside the US. However, a global expansion of epidemic-risk zones coupled with small increments in the disease growth rate is projected for 2050. Our study globally downscales the risk of PD establishment while highlighting the importance of considering climate variability, vector distribution, and an invasive criterion as factors to obtain better PD risk maps.

Read paper.

CURRENT VACANCIES

Emerging Fungal and/or *Phytophthora* Plant Disease Population Genomicist - NC State

We seek a solution-driven research scholar with expertise on plant pathogenic oomycetes including *Phytophthora* species and fungi. They will conduct cutting-edge science to track emerging plant pathogenic *Phytophthora* and fungi that can be used by decision-makers to improve local and global efforts to manage emerging pathogens that threaten crop production and food security. Examples of research include population genomics using modern high-throughput sequencing methods (e.g., long-read, rad-seq, pen-seq, single cell, etc.) sequencing to track outbreak strains, understand centers of origins, migrations, and sources of plant diseases, analytics of spatially explicit population genomics datasets to predict transmission pathways, and deployment of rapid response strategies to detect and limit potential damage by emerging threats. Applicants with a history of working across boundaries using population genomics datasets with plant disease epidemiologists and spatial modelers is important. Approaches that leverage translation to stakeholders at the local, national and international levels are especially important.

This position is Open rank and part of the Emerging Plant Diseases and Global Food Security Cluster. Individual will participate in teams that help develop proposals to advance interdisciplinary research in emerging plant diseases is expected (NSF Predictive Intelligence for Pandemic Preparedness Phase 2 grant anticipated submission fall 2023). The successful candidate will also become part of the integrated core team of the cluster that is part of Plant Science Initiative at NC State. Closing date: 1 January 2023. To apply go to: https://jobs.ncsu.edu/postings/172923

Assistant/Associate Professor of Plant Pathology at Louisiana State University

The Department of Plant Pathology and Crop Physiology, Baton Rouge, Louisiana State University is seeking an Assistant/Associate Professor of Plant Pathology. This is a full-time 12-month, tenure-track position with an appointment of 70% research, 20% extension, and 10% teaching, focused on the biology, etiology and management of sugarcane diseases. The successful candidate is expected to develop a strong and innovative research program for managing sugarcane diseases and to develop their own area of specialisation within plant pathology. The application deadline is 14 December 2022 or until a suitable candidate is identified. Apply online by attaching files containing a letter of application, curriculum vita, official university transcripts, three letters of reference and a one-page statement each on research, extension, teaching and how you would address Diversity, Equity, and Inclusivity in your academic mission. More details about the position is available in the PDF.

Assistant Professor of Plant Pathology at the University of California, Davis

The Department of Plant Pathology in the College of Agricultural and Environmental Sciences at the University of California, Davis is recruiting an Assistant Professor of Plant Pathology with an emphasis in plant virology. This is an academic year (9-month), tenure track Assistant Professor position, with responsibilities for research, teaching, mentoring and service, that includes an appointment in the California Agricultural Experiment Station (AES). Faculty members who hold an Agricultural Experiment Station appointment have a responsibility to conduct research and outreach relevant to the mission of the California Agricultural Experiment Station. Participation in outreach programs and performance of University service are also expected.

The successful candidate is expected to develop an independent, productive and competitively funded research program in fundamental and/or applied virology regarding viruses and/or virus-like agents associated with plants. This includes work with emerging viral diseases of field, fruit and nut and vegetable crops in California and around the world. Areas of interest include virus-plant host interactions, diagnostics, epidemiology, seed transmission, and virus-vector interactions. We expect that this proposed position will exploit new technologies to develop knowledge that will contribute environmentally sound disease control methods for plant virus diseases that threaten agriculture. The individual may take advantage of the large-scale diagnostic capabilities at Foundation Plant Services (FPS) for virus discovery and develop associations with the Seed Biotechnology Center and Genome Center. More info in the PDF.

To apply, please visit: https://recruit.ucdavis.edu/JPF05269

ACKNOWLEDGEMENTS

Thanks to Grahame Jackson, Małgorzata Jędryczka, Greg Johnson, Jan Leach, Khaled M. Makkouk, Małgorzata Mańka, Stoliarchuk Nadiia Mykolaivna, and Laetitia Willocquet for contributions.

COMING EVENTS

Plant and Animal Genome Conference 30
13 January - 18 January, 2023
San Diego, California, USA
Website: www.intlpag.org/30/

3rd Global Soil Biodiversity Conference
13 March - 15 March, 2023
Dublin, Ireland
Website: gsb2023.org

68th Annual Conference on Soilborne Plant Pathogens and the 53rd Annual Statewide California Nematology Workshop
28 March - 30 March, 2023
California, USA
Website: soilfungus.wsu.edu

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

International Fusarium Laboratory Workshop
18 June - 23 June, 2023
Bari, Italy
Website: fusarium2023.ispacnr.it/

Plant Health 2023 – APS Annual Meeting
12 August - 16 August, 2023
Denver, Colorado, USA
Website:
www.apsnet.org/meetings/annual/Pages/default.aspx

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

Plant Pathology 2023
5 September - 8 September, 2023
Birmingham, UK
Website: www.bspp.org.uk/conferences/plant-pathology-2023/

24th Australasian Plant Pathology Society Conference
20 November - 24 November, 2023
Adelaide, South Australia
Website: eventstudio.eventsair.com/apps2023/

XX International Plant Protection Congress
1 July - 5 July, 2024
Athens, Greece
Website: www.ippcathens2024.gr

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

ISPP INTERNATIONAL SOCIETY FOR PLANT PATHOLOGY

www.icpp2023.org

SFP Société Française de Phytopathologie

The International Society for Plant Pathology & the French Phytopathological Society

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

SUBSCRIBE OUR NEWSLETTER