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News and announcements from all on any aspect of Plant Pathology are invited for the Newsletter. Contributions from the ISPP Executive, Council and Subject Matter Committees, Associated Societies and Supporting Organisations are requested.

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In this issue:

The hidden world of microbiomes

Biologist Elaine Hsiao explores the hidden world of microbial communities inside of us and in our surroundings.

https://youtu.be/MjhDRG-mQ7w

Future scenarios for plant virus pathogens as climate change progresses

A review chapter by R.A.C. Jones "Future scenarios for plant virus pathogens as climate change progresses" was published by Academic Press in 2016 in Advances in Virus Research, edited by M. Kielian, K. Maramorosch and T.C. Mettenleiter (Vol. 95, pp. 87-147). The summary is as follows:-

Knowledge of how climate change is likely to influence future virus disease epidemics in cultivated plants and natural vegetation is of great importance to both global food security and natural ecosystems. However, obtaining such knowledge is hampered by the complex effects of climate alterations on the behavior of diverse types of vectors and the ease by which previously unknown viruses can emerge. A review written in 2011 provided a comprehensive analysis of available data on the effects of climate change on virus disease epidemics worldwide. This review summarizes its findings and those of two earlier climate change reviews and focuses on describing research published on the subject since 2011. It describes the likely effects of the full range of direct and indirect climate change parameters on hosts, viruses and vectors, virus control prospects, and the many information gaps and deficiencies. Recently, there has been encouraging progress in understanding the likely effects of some climate change parameters, especially over the effects of elevated CO2, temperature, and rainfall-related parameters, upon a small number of important plant viruses and several key insect vectors, especially aphids. However, much more research needs to be done to prepare for an era of (i) increasingly severe virus epidemics and (ii) increasing difficulties in controlling them, so as to mitigate their detrimental effects on future global food security and plant biodiversity.

More information on Advances in Virus Research.

Virus impacts from "vine to wine"

Grapevine leafroll disease (GLD) has plagued vineyards for centuries, but little is known about how this virus impacts the fruit quality and actual wine produced from grapes of affected plants. Researchers from different disciplines at Washington State University (WSU) teamed up to examine virus impacts from "vine to wine." Their study, recently published in PLoS ONE.

They made wines from red grapes from vines with GLD and wines from healthy plants to learn the effects of GLD on wine chemistry. The grapes were harvested at different points in the season to measure whether early or late harvesting made the GLD more of a factor in the finished wine. They replicated the tests over three years to allow for changes from warm years versus cooler years.

Wines from GLD-affected grapes had significantly lower alcohol, polymeric pigments and anthocyanins (both are colouring agents in wine) compared to corresponding wines from grapes of non-symptomatic vines. The impacts wound up being more pronounced during cooler growing seasons than in warmer seasons. "We think that's because grapes mature much faster in warmer seasons and don't have as much time to be affected by the virus," said Naidu Rayapati, a WSU virologist and associate professor of plant pathology. "That's just a hypothesis at this point," he said, and he hopes to do more research into seasonal influences for a deeper understanding of how GLD impacts vine health and fruit and wine quality. He aims to translate this knowledge for practical applications in vineyards.

(WSU News, 9 May 2016)

No fight against the oak tree epidemic

A grave of dead trees has spread through Northern California. It seems that there is no fight against the oak tree epidemic due to a plant pathogen, *Phytophthora ramorum*. The experts first detected it in 1995, and it is believed that it was brought in the United States via imported ornamental plants. Presently, scientists believe that the only possible solution is to cut down the trees which carry the disease, situated along the borders of the areas already infected to stop the pathogen to move further.

Read more.

(Benjamin Teh, Regal Tribune, 5 May 2016)

Second Edition of Compendium of Grape Diseases - new book

Compendium of Grape Diseases, Disorders, and Pests, Second Edition. 2015. Wayne F. Wilcox, Walter D. Gubler, and Jerry K. Uyemoto (Eds). APS Press, 232 p.

The newly released Compendium of Grape Diseases, Disorders, and Pests, Second Edition, Was expanded to include the latest diagnostic and management information for diseases, plus insect pests and abiotic disorders such as environmental stresses. In total, it contains 375 detailed images and management recommendations for nearly 70 diseases, insects, and disorders of grape into more than 230 pages. This reference is ideal for vineyard staff and consultants, as well as researchers, extension agents, and diagnosticians who are working to ensure these delicate crops make it safely through the growing season.

The book is broken into four distinct parts:

- Part one covers diseases caused by biotic factors. It particularly addresses commonly occurring diseases caused by fungi and oomycetes, bacteria, phytoplasmas, viruses and virus-like agents (including nematode-transmitted viruses), and nematode parasites of grapevines.
- Part two discusses mites and insects that cause disease-like symptoms in grapes. Coverage includes leafhoppers and treehoppers, mealybugs, thrips, and much more.
- Part three discusses disorders caused by abiotic factors, with special emphases on chimeras, environmental stresses, nutritional disorders, the various causes of shrivelled fruit, and pesticide toxicity.
- Part four offers two new sections that will help users save money and minimize pesticide use. The first, Grapevine Fungicides, discusses fungicides and cultural practices in the context of minimizing disease resistance. The second, Spray Technology for Grapevines, which emphasizes cost saving techniques and practices, helps users minimize pesticide use and ensures the chemical hits its target, not elsewhere in the environment.

The Compendium also includes an introduction that provides helpful overviews of the grape plant, its worldwide cultivation and varied uses, its history, rootstocks, morphology, and developmental stages. Appendices include an updated list of common grapevine disease names caused by microbes, nematodes, and viruses; as well as a guide to the many equivalent names given to grapevine diseases and disorders in the English, French, German, Italian, and Spanish languages. An expanded glossary of more than 800 terms is also used in the book, along with a comprehensive index to make this resource accessible to anyone working in the grape industry, including diagnosticians, extension specialists; consultants; scientists; vineyard managers and staff; juice, fresh fruit, and raisin producers; and students. A detailed description of this book can be found on APS Press website.

Tolerance to olive tree killer

Tests suggest some varieties of olive trees appear to be resistant to *Xylella fastidiosa*, an invasive pathogen posing a serious risk to Europe's olive industry. The study, carried out by Italian researchers and funded by the European Food Safety Agency (EFSA), began in 2014 and consisted of two main types of experiments: artificial inoculation with needle and inoculation via insect vectors collected from the field. The tests were carried out on a variety of species, including a range of olive, grape, stone-fruit (almond and cherry), and oak varieties.

"The key results are that, 12-14 months after artificial inoculation on different olive varieties, the team found that young plants typically grown in the region displayed symptoms of the dieback," said Giuseppe Stancanelli, head of the EFSA's Plant and Animal Health Unit. But he added: "What has also been shown is that some varieties have shown some tolerance. They grow in infected orchards but do not show strong symptoms, as seen in more susceptible varieties. They are still infected by the inoculation but this infection is much slower so it takes longer for the infection to spread, and the concentration of the bacterium in the plant is much lower."

These results are important in terms of providing information for tree breeders. However, it is too early to say whether or not the olive yields from the varieties that have displayed tolerance to the infection are nonetheless reduced or adversely affected.

Read more.

(Mark Kinver, BBC News, 29 March 2016)

Unmanned aircraft systems helping crop surveillance

For years it's worked the same way when trying to find signs of pests and diseases in crops that often stretch for miles - a crop consultant stands in front of a 250-acre wheat field, knowing there is 10,000 more acres out there to scout. This is where the promise of small unmanned aircraft systems (UAS) comes in, with the potential to make crop pest detection much easier, quicker and more informed.

Read more.

https://youtu.be/cGGolYVNE5c

(Plant Biosecurity Cooperative Research Centre (PBCRC), The Leaflet, 27 May 2016)

Resistance to a new encounter pathogen: myrtle rust in Australia

A review paper by P.A. Tobias et al. titled "A curious case of resistance to a new encounter pathogen: myrtle rust in Australia" was published in June 2016 by Molecular Plant Pathology (vol. 17 pp. 783-788). The summary is as follows:-

Resistance genes (R genes) in plants mediate a highly specific response to microbial pathogens, often culminating in localized cell death. Such resistance is generally pathogen race specific and believed to be the result of evolutionary selection pressure. Where a host and pathogen do not share an evolutionary history, specific resistance is expected to be absent or rare. *Puccinia psidii*, the causal agent of myrtle rust, was recently introduced to Australia, a continent rich in myrtaceous taxa. Responses within species to this new pathogen range from full susceptibility to resistance. Using the myrtle rust case study, we examine models to account for the presence of resistance to new encounter pathogens, such as the retention of ancient R genes through prolonged 'trench warfare', pairing of resistance gene products and the guarding of host integrity.

Read paper.

Campaigning for safe chemical use in Uganda

"A loud booming voice on a megaphone breaks the silence in the farming village of Kaptum centre."Akwaa! lo mite kapurto nyepo ceyec cepo nyepokaptisyet!", (come attend a plant health rally by ministry of agriculture officials). Farmers quickly gather and listen attentively as Ministry of Agriculture, Animal Industry and Fisheries (MAAIF) officials conduct the plant health rally.After the rally, we meet Betty Seyekwo, a hardworking farmer and mother of seven children living in Kapchorwa-Uganda. Last season, she planted beans in her 2 acre farm and harvested 13 bags. This was a decline from the previous season when she harvested 20 bags. Before changing crops to beans, Betty was predominantly a maize farmer until a strange disease wiped out her entire crop."

Read more of this and other stories on The Plantwise Blog. Plantwise is a global programme led by CABI, which works to help farmers lose less of what they grow to plant health problems.

Second announcement of the 50th Anniversary Congress of the South African Society for Plant Pathology

The South African Society of Plant Pathology will be holding its 50th Congress at the Champagne Sports Resort (Drakensburg, KwaZulu-Natal, South Africa) from 15 to 19 January 2017.

For more details see: www.saspp.co.za

Avocado fungal disease identified in Chile

For many years Chilean growers and exporters have been finding an unidentified fungus on their avocados occasionally, but choosing the correct treatment proved difficult due to a lack of knowledge about the problem. That is all about to change following a recent study from the country's Rosario Evaluation Centre (CER) which identified the fungus as a *Colletotrichum* sp, a problem that is also present in other major avocado-producing countries like Mexico and Peru. The fungus appears irregularly, depending on how much moisture there is in the season, and the necrotic lesions, sunken consistency and softness of flesh it generates lead to rejections on arrival in overseas markets.

The CER says that for many years the industries of Mexico and Peru have been using applications to the flowers and the fruit in development to prevent the appearance of the fungus, but in the case of Chile the use of fungicides on avocados was very rare. The centre expects that with this new knowledge, growing practices for avocados will change in Chile to use better control methods.

"It has become fundamental to develop more research into *Colletotrichum* sp with the aim of identifying local species, the critical moments of control and the timely periods for the application of the corresponding fungicides, "said CER plant pathology director Natalia Camus."While *Colletotrichum* sp is not currently the main cause of rejections of Chilean avocados abroad, it's essential to start considering this fungus in phytosanitary programs, especially in seasons with high relative humidity when the avocados are growing."

(Fresh Fruit Portal News, 2 May 2016)

GM banana with resistance to *Mycosphaerella fijiensis*

A banana strain resistant to a common fungal disease caused by *Mycosphaerella fijiensis* could help smallholder farmers in East Africa better control the crippling disease, which has been spreading across the region over the last three decades. The results of confined field trials of a genetically modified (GM) banana with improved resistance to a black sigatoga disease, the devastating leaf spot fungus, are promising, researchers have told SciDev.Net.

The team led by Andrew Kiggundu, head of banana biotechnology research at the Uganda's National Agricultural Research Laboratories Institute (NARL) in Kawanda, analysed 19 lines of GM bananas and found promising results in five of them. Andrews told SciDev.Net further research is needed to calculate the exact yield gains from using the resistant banana strain.

The researchers inserted genes for chitinase preventing the fungus from invading the plant cells and causing the disease. Kiggundu said laboratory tests using leaves from transgenic plants showed almost full immunity when cultured fungi were applied to the leaves. Researchers collaborated closely with the Catholic University of Leuven in Belgium, where several banana lines were engineered to include the chitinase gene before being brought to NARL for testing.

Settumba Mukasa, resident banana expert in the department of crop science at Uganda's Makerere University, said the field trials had more significance for building research capacity in Uganda than the development of a new disease-resistant banana. "The project is a stepping stone for subsequent breeding programs and genetic engineering programmes. As a consequence of this project we can now do transformations of other varieties of bananas and other crop species," said Mukasa.

While black sigatoka is among the top three diseases affecting bananas in Uganda it mainly affects Cavendish, which are not as widely cultivated as other types of bananas. But for the few farmers in Uganda who do grow Cavendish bananas, the development may be useful since the disease is currently controlled by aerial pesticide spraying which is expensive for smallholders and affects their health.

(International Association for the Plant Protection Sciences (IAPPS), Global Plant Protection News, 30 March 2016)

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