INTERNATIONAL NEWSLETTER ON PLANT PATHOLOGY

ISPP Newsletter 45 (12) December 2015

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.

Editor: Daniel Hüberli (E-mail)

Subscribe to the ISPP Newsletter by joining the ISPP mail list

In this issue:

Seasonal greetings

With the holiday season upon us, I thought it would be appropriate to make this edition of the Newsletter focused on food. As we sit around shared tables at the beach or in the cosy warmness of our homes with families, friends and colleagues to reflect the year's events, let us remember that there has been a lot of research that has provided the bounties in front of us. From coffee, to bananas, to onions, to gin and wine, and to oilseed, each crop has come into contact with pathogens which mean there is a group of plant pathologists behind the scene doing the hard yards to make it to our tables. This time of year is also a good time to reflect on where our food has come from; perhaps from space farms in the not-to-distant-future!

With these thoughts ringing in your ears, Peter Williamson and I send our warm greetings for the holiday season to all ISPP members and their families and colleagues. The ISPP President, Greg Johnson, will be sending his special annual message and greetings to everyone in the January issue of the ISPP Newsletter. Best wishes for happy and safe 2016 from DownUnder!

Grevillea - Collagraph print with watercolour (D. Hüberli, 2015)

(Daniel Hüberli, ISPP Newsletter Editor)

ISPP Newsletter - Present and past

Under Daniel Hüberli's editorship, the ISPP Newsletter is published once a month. It is a valuable source of news and comment on topics in plant pathology, and successive issues provide a timeline of events in ISPP's history.

More than 200 issues of the Newsletter are now archived, starting with Volume 1, Number 1 of November 1970, which starts with these words from ISPP's first President, Ronald Wood: "Since this is the first issue of the International Newsletter on Plant Pathology it may be appropriate for me to write on how the International Society for Plant Pathology was established and its aims now that it is a going concern."

From Volume 1, Number 1 we can also learn that phytotoxins were much discussed at that time, and that Dr Norman Borlaug was awarded the 1970 Nobel Peace Price!

From 1970 to 1997 the Newsletter was issued in printed form. Most of the printed issues are now included in the archive, thanks to Peter Williamson's work in indexing and filing scanned pages from Peter Scott's collection of print copies.

Some gaps in the archive remain to be filled. Peter Scott would be very glad to hear from anyone who may have kept copies of the Newsletter and who would be willing to lend them for scanning. Most of the gaps lie between 1983 and 1993, with a few more in 1972, 1976, 1981, 1995 and 1997.

(Peter Scott, ISPP Fellow, UK)

The first 7 years - A report on the journal Food Security

The origin of the journal "Food Security" can be traced back to the address given by Norman Borlaug at ICPP1998 in Edinburgh, UK, part of which could be paraphrased as, "What are you guys doing about Food Security?" A Task Force for Food Security was promptly formed under the chairmanship of Peter Scott and several activities were undertaken. These included two Challenge Programmes, one of which was concerned with informing farmers in Ghana about cassava diseases and the other with introducing the general public to the seriousness of the threat of plant disease in South Africa.

Peter and I were evaluating further activities that the Task Force could undertake and came up with the idea of a food security journal. Accordingly, we wrote a proposal and Peter canvassed the views of several eminent academics and practitioners concerned with the topic. Having obtained their enthusiastic approval, we sent the proposal around to various publishers. Springer took us up, one of their team remarking that the company was not merely interested but very interested in the proposal. So, after some correspondence and two phone conferences, we met with Springer representatives at their offices in Dordrecht. There we came to an agreement, on behalf of ISPP, for shared ownership with the publisher at present and a future option on sole ownership. The journal would be a quarterly of about 80 pages per issue, double column and we had a choice of size. There and then, and with a certain amount of sangfroid, we elected to go for Springer's largest - 28 X 21 cm! So the journal was duly inaugurated at ICPP2008 in Turin and the first issue appeared in March the following year.

One problem was what should the journal be called? Reflecting the challenge of the coverage it needed, we settled on Food Security: the Science, Sociology and Economics of Food Production and Access to Food, recognising that plant pathology would be included in the enormously broader context of food security. Norman Borlaug said in the foreword to the first issue that he hoped we would not forget the political angle and now, with 1.5 billion people over weight and 2 billion suffering from hidden hunger, it looks as if we should probably have had nutrition in there as well!

Over the 7 years of the journal's existence it has expanded by a factor of four from the mooted 320 pages in 2009 (actually 480) to this year's approximately 1280 pages. The number of issues per annum has also expanded from four to six. Submissions are now running at about 400 per year and, on the basis of 2014 data for original papers, case studies and reviews, 20% are published.

The current editorial board consists of 45 Associate Editors and four Senior Editors. The latter look after four aspects of Food Security: they are Eric Craswell (Physical Environment), Stephen Waddington (Biological Environment and Deputy Editor in Chief), Anna Herforth (Nutritional and Sociological Environment) and Ulrike Grote (Economic and Political Environment). Their job is to choose appropriate Associate Editors for the papers submitted and they, in turn, find specialists for the journal's peer-review process.

We are deeply indebted to all the Senior and Associate Editors for their hard work in identifying appropriate reviewers and to the reviewers themselves for their conscientious critiques of the papers.

(Richard Strange, Editor in Chief of Food Security, 10 November 2015)

Setting standards in teaching agriculture in Australian Universities

An Australian team, funded by the Australian government's Office of Learning and Teaching has created an agriculture-specific set of threshold learning outcomes (TLOs) and associated academic standards statement. The AgLTAS statement is a formal document that articulates the collective views of agriculture discipline stakeholders, including academics, industry and students, endorsed by the Australian Council of Deans of Agriculture. Discussions with industry stakeholders that need access to graduates specialising in plant pathology/plant health suggested that industry requires individuals that not only have a broad knowledge of pathogens and associated basic diagnostic skills, but that they also require a skill set that allows them to make decisions when faced with a real world problem that involves economics and environmental implications also. Industry also agreed that students needed to demonstrate highly developed problem solving and communication skills. However, industry-specific (vocational) knowledge was generally regarded as attainable during on-the-job training after graduation. The statement together with an online Curriculum Mapping Tool can be used to map curriculum and assure TLOs for University Bachelor-level students. They are available at www.agltas.edu.au.

(Amanda Able)

A Phytophthora that is taking the gin out of the tonic

European juniper (*Juniperus communis*) produces berries that used in the making of gin is being killed by a Phytophthora disease. A study by Plantlife said juniper was in a "critical state" due to the spread of the deadly disease caused by *Phytophthora austrocedrae*. The report followed a survey carried out by amateur enthusiasts. A decline of the juniper population is caused by the failure of bushes, many of which are over a century old, to produce seeds.

Phytophthora austrocedri was first characterised as a new species from Argentina in 2007 associated with lethal dieback of *Austrocedrus chilensis* (Chilean cedar), which is native to the region. In the UK, it was first reported in 2011. Symptoms on juniper include necrosis of needles, lesions on stems, dieback of twigs and branches, and eventually death of the bush. The survey found that 63% of bushes surveyed in Scotland have brown patches, and 79% of juniper recorded in 2014 were either mature, old, or dead. Deborah Long, Plantlife Scotland, said: "We know juniper populations are struggling, but they now face an additional threat with this new disease."

(ProMED-mail, 29 October 2015), http://www.promedmail.org/post/3751425

The "big rust's" impact on coffee disease management

Coffee rust has made significant headlines in recent years for its devastating effect on coffee crops. According to the United States Agency for International Development (USAID), losses in Latin America and the Caribbean alone have totalled well over $1 billion, causing hardship to coffee plantations, their labourers, coffee retailers, and the consumers who pay more for their morning coffee.

But this fungal disease, also known as "the big rust," has a much longer and more encompassing history that goes all the way back to its discovery in 1869. This history is reviewed in detail through a new Phytopathology article entitled, "The Big Rust and the Red Queen: Long-Term Perspectives on Coffee Rust Research," written by Stuart McCook, historian at the University of Guelph in Ontario, Canada, and John Vandermeer, professor of ecology and evolutionary biology at the University of Michigan, USA.

In this essay, the authors discuss the big rust in a broader historical context, chronicling coffee rust epidemics, the social and ecological conditions that produced them, and the evolving scientific responses to this threat. The article highlights the many innovations used to combat coffee disease outbreaks, such as the efforts to develop disease-resistant plants, chemical and agroecological control, and even a network of international coffee research institutes. It also incorporates the broader social and economic histories of coffee production into particular stories of rust epidemics and rust research. The article also points out examples of the current research and disease mitigation challenges in developing nations versus affluent parts of the world.

By taking this broad perspective, the authors suggest we are entering a new phase in the global history of the coffee rust.

"Up until the mid-1980s, the story of the coffee rust was largely the story of invasions, as the disease spread into regions where it was not previously present," McCook said. "By the mid-1980s, however, the disease had reached almost every coffee-producing region in the world."

"For a brief while, in the 1980s and 1990s, it looked as if coffee farmers-with the help of scientists-had adapted to the disease, making it 'just another disease' on the farm. But we suggest that this fragile equilibrium has begun to break down, both because of broader ecological changes that we are only beginning to understand, and also because of increasing volatility in the global coffee economy," he said.

Read this paper in the September 2015 issue of Phytopathology.

(Phytopathology News, November 2015)

Protecting crops from nematodes using 'peptide mimics' technology

A new technology developed by researchers at Queen's University Belfast, Northern Ireland, has the potential to reduce crop losses across the developing world and boost the incomes of subsistence farmers. The technology is designed to combat parasitic 'nematodes' which infect crop plants and are responsible for a 12.3% reduction in global agricultural productivity, a loss of around £100 billion annually. The research, which involves using 'peptide mimics' - versions of the parasites' own brain chemistry - to confuse the real parasites and ultimately, render them impotent, has been awarded a Phase II Grand Challenges Exploration grant of $1million from the Bill & Melinda Gates Foundation to be developed in Belfast and proceed to trials in Kenya.

The project will focus on banana and plantain - although in theory it could extend to other crops - which are cultivated across 130 countries, making them the eighth most produced staple in the world. The fruits are often grown by smallholders in the developing world and can account for up to 30 per cent of farmers' income. Despite their popularity, however, the crop is highly susceptible to a variety of plant parasitic nematodes, which typically reduce yields by 30-50%.

Lead researcher on the project, r Johnathan Dalzell from Queen's Institute for Global Food Security said, "Through our lab work we have identified a family of peptide mimics, which specifically and potently interfere with their neurobiology, disorientating the parasites so they can't find the host plant. They then die quickly through lack of food. Importantly, these peptide mimics appear to have no impact on non-target animals. This is a clean and robust approach to parasite control."

As a result of the Gates Foundation grant and other funding, the Queen's-led project will proceed to glasshouse trials, in association with the International Institute for Tropical Agriculture in Nairobi, Kenya. Subsequently, field trials will be conducted and regulatory approval sought.

(News wise, 15 October 2015)

Diseases of Edible Oilseed Crops - new book

Chattopadhyay, C.; Kolte, S.J. and Waliyar, F. 2015. Diseases of Edible Oilseed Crops. CRC Press, Boca Raton, Florida, USA, 455 p.

The book "Diseases of Edible Oilseed Crops" presents a thorough collection of information on the diseases of cultivated annual oilseed crops, viz., peanut, rapeseed-mustard, sesame, soybean, sunflower and safflower. This book is a result of pressing need and demand from researchers, teachers and students and interest by the publishers (CRC Press) to update the information in the previously published three-volume book of Dr Kolte in 1984-85. It covers and integrates worldwide literature in the field for the last 30 years up to 2014, setting it apart from other books that are only of regional importance. By compiling decades of information from previously scattered research into a single globally-minded volume, "Diseases of Edible Oilseed Crops" provides these much-needed updates and enhancements. The book is foreword written by Dr William D. Dar (DG, ICRISAT). More details on the CRC website.

(C. Chattopadhyay)

'The Downy Mildew Rap'

He does not wear bling, a fur coat, or baggy jeans, but plant pathologist Peter Magarey knows how to write rap. So much so that his song 'The Downy Mildew Rap' is still remembered by many South Australian grape growers despite being written more than 20 years ago.

With the state facing outbreaks of the sometimes devastating downy mildew the song has never been more relevant. Downy mildew is a fungal disease usually triggered by a combination of rainfall and certain temperatures.

Mr Magarey co-authored the rap with his cousin also a plant pathologist. "We were concerned about trying to educate the public about the conditions required for downy mildew to occur. So we sat down and nutted out a song," Mr Magarey said.

They have also written a poem about downy mildew in the style of "The Man From Snowy River." "We're just using different methods to communicate stories and summaries about diseases and pests," Mr Magarey said. "It's just good to have fun and all learn together, as growers and researchers and people who are extending information out."

Listen to rap.

(ABC News, 3 November 2015)

Australia-Africa plant biosecurity partnership

Fifteen senior biosecurity fellows from Africa have begun an intensive six weeks of study of Australia's globally recognised plant biosecurity system. The course began on the 23 October with a week-long workshop at AgriBio in Melbourne.

Senior biosecurity fellows begin their 6 week intensive. (Source: Plant Biosecurity CRC website)

The Fellows are the first members of the Africa Plant Biosecurity Network, which aims to improve plant biosecurity and safe trade of agricultural products in ten east and southern African countries; Burundi, Ethiopia, Kenya, Malawi, Mozambique, Rwanda, Tanzania, Uganda, Zambia and Zimbabwe.

Further information is available through the Plant Biosecurity CRC website.

(Australian Centre for International Agricultural Research (ACIAR) eNews, November 2015)

Australian tobacco plant could make farms in space possible

Scientists from Brisbane's Queensland University of Technology and the University of Sydney have discovered a plant species that has survived 750,000 years by sacrificing its immune system to focus on surviving the tough conditions in the Australian outback. Scientists who are researching the history of the *Nicotiana benthamiana*, a type of native tobacco plant known as Pitjuri to indigenous Australians, say it could solve the dilemma of how to grow crops in space.

"You can take genes from almost any plant or animal and squirt it into the leaves of this plant, and it will treat it as its own and make that gene product, whether it's an antibody or anything else," Dr Waterhouse said. The plant was used to create an Ebola virus experimental antibody trialled on two French aid workers recently.

Having now discovered why the plant has these properties, Dr Waterhouse believes there is the opportunity to transfer its resilient traits to other species of plants. One of the imaginative things we've talked about is that in a place like space, where everything is very sterile, you could have higher yielding crops.

Scientists have also discovered that the plant's seeds are about 50 percent bigger than those of other comparable species. "It saves the energy it would usually use for a defence system and ploughs it into making bigger seeds and growing faster," he said. The downside is that such crops could only be successfully propagated in places where there were no pathogens, because although it created bigger seeds, its lack of an immune system would leave it prone to disease.

The geneticist also said that, in a world struggling with the effects of climate change and drought, there were other circumstances where plants with the Pitjuri's traits could be put to good use. "This is where conditions are harsh and they could survive on less water and concentrate on making the product we want, which is often the seed," he said.

Read paper.

https://www.youtube.com/watch?v=hXa-vSR08os

(David Iliffe, ABC Rural, 5 November 2015)

Secrets of a rice-killing fungal toxin

Researchers at the RIKEN Center for Sustainable Resource Sciences (CSRS) in Saitama, Japan, have discovered the enzyme needed for synthesis of tenuazonic acid (TeA), a well-known toxin that is produced by multiple types of fungus and affects fruits, vegetables, rice, and other crops. In their study published in Nature Communications, the authors describe how they found the gene for this enzyme, and reveal that its structure is unique among known enzymes.

TeA is known to be produced by at least three different plant pathogenic fungi, and is associated with spoiling of fruits, vegetables, and food-crops, as well as post-harvest decay. "Now that we know the gene responsible for biosynthesis of this harmful toxin," notes co-lead author Takayuki Motoyama, "after further testing we might be able to devise a way to regulate its expression and prevent destruction of important crops."

While preventing TeA synthesis might be a goal for crop preservation, TeA also has antitumor, antibacterial, and antiviral properties that could prove beneficial in many situations. Understanding exactly how it is synthesised is therefore an important next step.

Read paper in the October 2015 issue of Nature Communications.

(Science Codex, 27 October 2015)

Gas sensor array to detect sour skin in onions

Onion is the second most economically important commercial vegetable crop for fresh market in the United States. It is estimated that approximately 2.8 million tonnes of onions are produced each year in the U.S. Across the world, average annual onion consumption per person is estimated to be over 6 kg. Onions like any other vegetables are threatened by various bacterial or fungal diseases. US scientists have investigated a method of detection of sour skin caused by the bacteria *Burkholderia cepacia* that is one of the most important post-harvest bacterial disease in onions.

The study proved the efficacy of using a customised gas sensor array to detect sour skin infected onions among healthy onions. The sensor responses showed significant difference between the volatiles released by control onions and sour skin diseased onions starting from 4 to 7 days after inoculation. The tested customized gas sensor array shows great potential to be used as an automated detection tool for onion postharvest diseases in storage.

Read paper.

(Emanuela Fontana, Fresh Plaza, 30 October 2015)

Acknowledgements

Thanks to Amanda Able, Grahame Jackson, Greg Johnson, Peter Scott, Richard Strange, Dagmar Hanold and Peter Williamson for contributions.