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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 Top 10 oomycete pathogens

"The Top 10 oomycete pathogens in molecular plant pathology" by S. Kamoun et al. was published in May 2015 by Molecular Plant Pathology (vol. 16, pp. 413-434). The abstract is as follows:-

Oomycetes form a deep lineage of eukaryotic organisms that includes a large number of plant pathogens which threaten natural and managed ecosystems. We undertook a survey to query the community for their ranking of plant-pathogenic oomycete species based on scientific and economic importance. In total, we received 263 votes from 62 scientists in 15 countries for a total of 33 species. The Top 10 species and their ranking are: (1) *Phytophthora infestans*; (2, tied) *Hyaloperonospora arabidopsidis*; (2, tied) *Phytophthora ramorum*; (4) *Phytophthora sojae;* (5) *Phytophthora capsici*; (6) *Plasmopara viticola*; (7) *Phytophthora cinnamomi*; (8, tied) *Phytophthora parasitica*; (8, tied) *Pythium ultimum*; and (10) *Albugo candida*. This article provides an introduction to these 10 taxa and a snapshot of current research. We hope that the list will serve as a benchmark for future trends in oomycete research.

See: http://dx.doi.org/10.1111/mpp.12190

Bringing broad-acre crop diagnostics to the paddock

The Lucid based MyCrop mobile application is continuing to expand to now include broad-acre pulses such as lupins and field peas (May 2015 release). This is in addition to diagnostic tools for wheat, barley and canola. The application aims to help growers and advisors diagnose problems in their crops and determine an appropriate treatment plan. Diagnoses could vary from nutritional to disease, environmental and insect pests problems. In the coming months the MyCrop application will be split into separate apps according to crop type to allow for the inclusion of variety selectors, economic analysis and crop monitoring content. Feedback on this application has been extremely positive with users finding the interface friendly and easy to use.

This project is funded by the Department of Agriculture and Food, Western Australia and The Grains Research Development Corporation. For more information please visit the MyCrop website:
http://agric.wa.gov.au/mycrop

(Lucid Newsletter, April 2015)

Professor Yi Liu, 25 December 1923 - 13 February 2015

Professor Yi Liu of the Department of Plant Pathology and State Key Laboratory for Agro-biotechnology at the China Agricultural University passed away in Beijing, China, on February 13 2015, aged 92. He is remembered for his significant contributions to the exploration and development of plant virology and plant pathology in China and his encouragement and organization of domestic and international scientific exchanges and cooperation.

Professor Liu was a great and true colleague. He was a renowned phytopathologist, an excellent supervisor and an exceptional leader of the University and the Chinese Society for Plant Pathology. He will be missed and respected, and will be always in the hearts of his friends, colleagues and students.

Professor Liu was born in the countryside of Lu-shun, Liaoning Province, China. He graduated from the Department of Plant Pathology, College of Agriculture, Peking University in 1947. After graduation, he worked at the same University (1947-1949) and worked in the former Beijing Agricultural University from 1949, except for a period of study leave as a visiting scholar at Romonosov Moscow State University and the Institute of Microbiology of the former Soviet Union Academy of Sciences from 1958 to 1962. In his later career, Professor Liu served as Dean of the Institute of Research and Development, Dean of the Graduate School and the Vice President of Beijing Agricultural University (1980-1987).

Professor Liu has been recognized as one of the pioneers of plant virology in China. He was deeply committed to the education of both undergraduate and graduate students. He made especially significant research contributions in the diagnosis and identification of plant viruses infecting sugar-beet and ornamental plants, applying electron microscopy, molecular biology and genetic engineering techniques to virus research. Leading his group, he paid much attention to fungus-transmitted plant viruses that cause severe damage to sugar-beet and winter wheat. His achievements were recognized in the First Class Prize of Science and Technology Progress issued by the National Education Commission of People's Republic of China in 1996.

Professor Liu served as Vice President (1985-1994) and President (1994-1998) of Chinese Society for Plant Pathology (CSPP), and associate Editor-in-Chief of the Acta Phytopatholoica Sinica (1994-1998). He was also a council member of ISPP (1996-2000), and the fourth and fifth national committee member of China Association for Science and Technology (CAST).

(Cheng-gui Han, Jia-lin Yu, Da-wei Li, Qi Wang and Greg Johnson)

Beneficial viruses in crops

A short paper titled "A new look at plant viruses and their potential beneficial roles in crops" by M. J. Roossinck was published in May 2015 by Molecular Plant Pathology (vol. 16, pp. 331-333). The article highlights some of the viruses that provide a trait to crop plants that increases their value or growth potential, or decreases the need for the use of chemical fertilizers or pesticides.

See: http://dx.doi.org/10.1111/mpp.12241

Population biology of fungal invasions

"The population biology of fungal invasions" by P. Gladieux et al. was published in May 2015 by Molecular Ecology (vol. 24, pp. 1969-1986). The abstract is as follows:-

Fungal invasions are increasingly recognized as a significant component of global changes, threatening ecosystem health and damaging food production. Invasive fungi also provide excellent models to evaluate the generality of results based on other eukaryotes. We first consider here the reasons why fungal invasions have long been overlooked: they tend to be inconspicuous, and inappropriate methods have been used for species recognition. We then review the information available on the patterns and mechanisms of fungal invasions. We examine the biological features underlying invasion success of certain fungal species. We review population structure analyses, revealing native source populations and strengths of bottlenecks. We highlight the documented ecological and evolutionary changes in invaded regions, including adaptation to temperature, increased virulence, hybridization, shifts to clonality and association with novel hosts. We discuss how the huge census size of most fungi allows adaptation even in bottlenecked, clonal invaders. We also present new analyses of the invasion of the anther-smut pathogen on white campion in North America, as a case study illustrating how an accurate knowledge of species limits and phylogeography of fungal populations can be used to decipher the origin of invasions. This case study shows that successful invasions can occur even when life history traits are particularly unfavourable to long-distance dispersal and even with a strong bottleneck. We conclude that fungal invasions are valuable models to contribute to our view of biological invasions, in particular by providing insights into the traits as well as ecological and evolutionary processes allowing successful introductions.

See: http://dx.doi.org/10.1111/mec.13028

First International Summer School on Plant Disease Epidemiology, 30 March - 3 April 2015, Raipur, India

Despite the impact of plant disease epidemics on the sustainability of agricultural systems worldwide, plant disease epidemiology is becoming a topic infrequently offered in graduate or post graduate curricula. This is leading to a shortage of scientists trained in botanical epidemiology. The First International Summer School on Plant Disease Epidemiology (ISSPDE) was meant to offer an exposure to important aspects of plant disease epidemiology to graduate and post-graduate students, as well as to young or experienced plant scientists.

The First ISSPDE was organized by the Indira Gandhi Agricultural University, Raipur, India, under the aegis of the Epidemiology Subject Matter Committee of the International Society of Plant Pathology (ISPP), chaired by Jonathan Yuen, SLU, Sweden. Pr. Anil Kotasthane (IGAUR), Dr. U.S. Singh (IRRI), and Serge Savary (INRA) contributed to the planning and organization of the five-day school, with lectures by Tito Caffi (University of Piacenza, Italy), Odile Carisse (Agriculture and Agrifood Canada), Paul Esker (University of Costa Rica), Neil McRoberts (University of California, Davis), Serge Savary (INRA, France), and Laetitia Willocquet (INRA, France).

The goals of this Summer School were to (1) bring together a series of core concepts and methods for botanical epidemiology, (2) use this platform to invite the participants to explore different perspectives and approaches, and (3) invite plant pathologists to engage in epidemiological education and research through the following messages:

- Plant disease epidemiology has an impact to be made in a world that faces major population, environmental, social, and economic challenges. Foremost is an enhancement of global Food Security through improved disease management.
- Methods in plant disease epidemiology diversify and expand rapidly, largely because of their connection with many branches of sciences: mathematics, statistics, information science, molecular biology, sociology, economy, medical epidemiology.

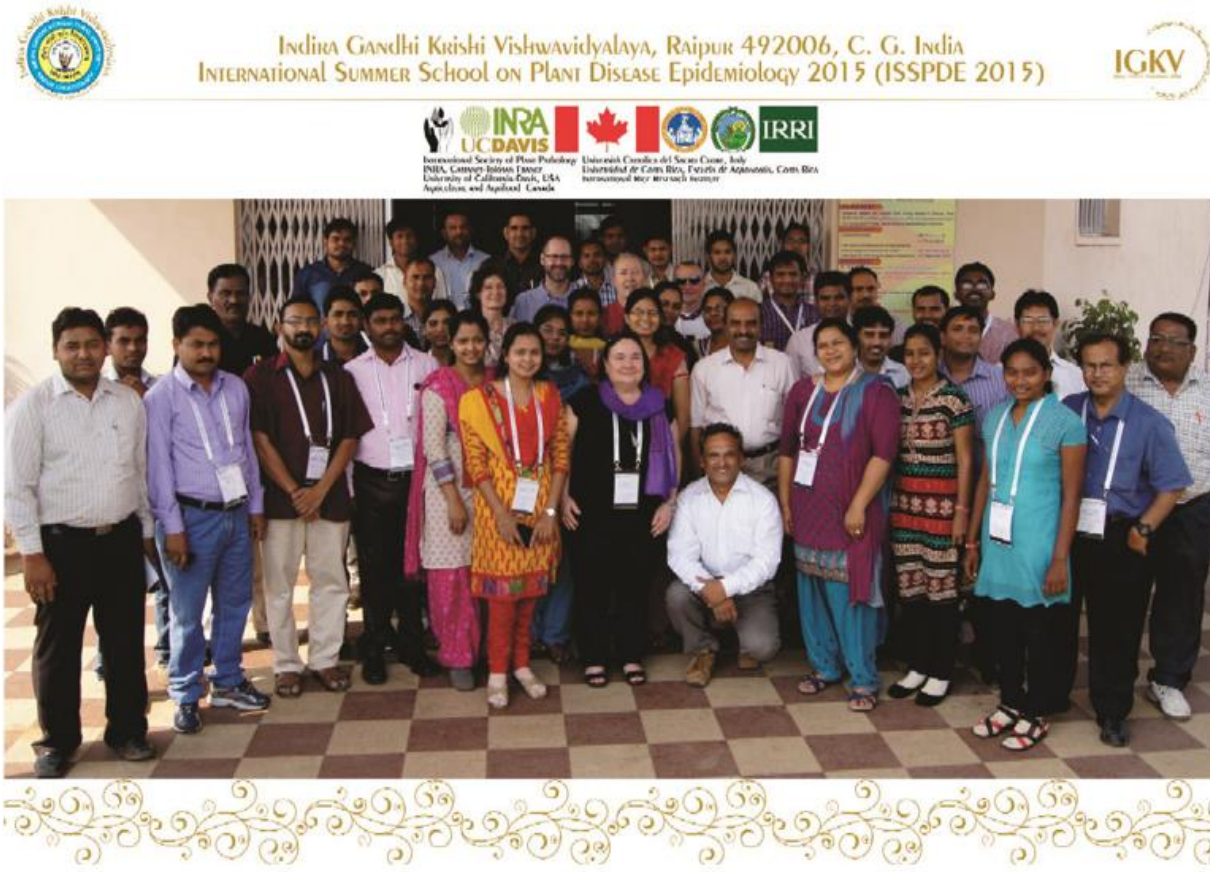
A total of 63 participants attended the Summer School. Participants were MSc, PhD, junior and more experienced scientists from numerous Indian institutions (Universities, Research Centres, and the private sector). These participants had been selected from a number of applications which were screened in Oct 2014 - Jan 2015 by the organizers and lecturers.

The Summer School was organized around sessions (lectures, discussions, exercises) on: introduction to plant disease epidemiology, pathogen detection and measurement, sampling in plant disease epidemiology, methodology of plant disease epidemiology, temporal progress of plant disease epidemics, spatial progress of plant disease epidemiology, crop loss assessment and modelling, epidemiological concepts and host plant resistances, epidemiological effects of biological control, epidemiological concepts and disease management, and decision making and information theory.

A website is being developed where materials (presentation slides, picture) from the first ISSPDE are being deposited: https://sites.google.com/site/issbepidem. This website also provides further details on the lecturers, organizers, and participants of the Summer School. It will also announce the venue of the next International Summer School on Plant Disease Epidemiology.

Additional comments and thoughts are posted at: http://1680kcal.org/

Acknowledgements: The First International Summer School on Plant Disease Epidemiology (international and national travels, board and lodging, logistics) was entirely funded by the Government of Chhattisgarh, India, and the University of Raipur, Indira Gandhi Krishi Vishwavidyalaya. Additional support in logistics was provided by the South Asia Office of the International Rice Research, New Delhi.



(Serge Savary)

New test to revolutionise disease detection in people, crops and stock

A single-drop DNA test developed by researchers at University of Queensland's (UQ) Australian Institute for Bioengineering and Nanotechnology (AIBN) and the School of Agriculture and Food Sciences could revolutionise the detection of diseases in humans, livestock and crops. The test gives a result in 90 minutes and detects viruses, bacteria, fungi or parasites in humans, crops and cattle and could be used by health workers or farmers in the field - saving lives, time and money. The test uses a single drop of liquid that changes colour if the test is positive.

In its current form, the test can be made sensitive enough to detect even the smallest trace amounts of DNA or RNA in almost any sample such as blood, saliva, or soil, and it can also scan for multiple pathogens (bacteria, viruses and other micro-organisms that cause disease) or cancer markers. The test has already proved accurate in detecting human diseases such as HIV, malaria, tuberculosis the H1N1 influenza virus, as well as *E. coli* in water, bovine herpes virus in cattle, and fusarium fungus in crops.

The new test is especially suited for developing countries, but it will also be very useful for the Australian agricultural and livestock industries as it provides a fast method to detect diseases without the need to send samples to the laboratory. The technology will soon be trialled in Cambodia to test for food pathogens, in a project led by Professor Botella with support from the Australian Centre for International Agricultural Research (ACIAR). Other key researchers involved in the project are inventor Dr Eugene Wee and PhD student Han-Yih Lau.

The research is published in the journal ChemComm and can be accessed via http://dx.doi.org/10.1039/C4CC10068A.

Olive Quick Decline Syndrome

The olive quick decline syndrome (OQDS) is a disease that appeared suddenly a few years ago in the province of Lecce, Salento peninsula (south-eastern Italy). The major causal agent of the disease is *Xylella fastidiosa*, a quarantine pathogen of American origin whose unwelcome introduction in the area has created much disturbance because: (i) the dramatic damage suffered by the olive groves where the pathogen has established itself; (ii) the alarm that this finding has raised in a country (Italy) whose olive/oil industry is a primary

asset, and in the European Union, which is facing the first confirmed record in its territory of this alien and much feared microorganism. Read full article.

(Georgofili WORLD Newsletter, 16 April 2015)

Canadian Phytopathological Society News

The March 2015 issue of the CPS News 59:1-29 can be found at http://phytopath.ca/.

(Deena Errampalli)

Bacterial raincoat protects crops from pathogens

Researchers at the Universities of Edinburgh and Dundee have discovered how communities of beneficial bacteria form a waterproof coating on the roots of plants, to protect them from pathogens that could potentially cause disease. They studied the protective film formed by the common soil bacterium Bacillus subtilis and found it incorporates proteins that change shape as they reach the film surface. This exposes an impervious surface on the protein molecules, enabling them to slot together like a jigsaw puzzle, to protect bacteria underneath. Researchers say that being able to control the production of the biofilm in agricultural products could enable improved protection for plants. The study is published in Proceedings of the National Academy of Sciences.

(Phys.org, April 2015)

Shield for potato blight

A gene to help protect potatoes from potato blight caused by *Phytophthora infestans* has been located after a 10-year trawl through the genomes of wild potato varieties.

The blight inflicts billions of dollars annually in harvest damage to potatoes, the most important food crop after grains, and the disease is kept in check only through repeated chemical spraying.

The genetic treasure, called the elicitin response (ELR) gene, was found in a South American wild potato called Solanum microdontum, a native of Bolivia and Argentina. ELR works in association with a key gene in the immune system, BAK1/SERK1, according to the researchers, led by Vivianne Vleeshouwers of Wageningen University in The Netherlands.

The researchers inserted the gene into the cultivated potato, Desiree, and found it was more resistant to several strains of blight. ELR could potentially enhance disease resistance to a number of oomycete plant pathogens, many of which are serious threats to a variety of crops and to world food security.

More information: Nature Plants, http://www.nature.com/articles/nplants201534

Feeding more than 9 billion by 2050: challenges and opportunities

The current issue of Food Security contains 22 papers (with one exception, "The coffee rust crises in Colombia and Central America (2008-2013): impacts, probable causes and proposed solutions"), which arose out of a workshop sponsored by the OECD Co-operative Research Programme on Biological Resource Management for Sustainable Agricultural Systems.

Read papers on http://link.springer.com/journal/12571/7/2/page/1

Acknowledgements

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