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## INTERNATIONAL NEWSLETTER ON PLANT PATHOLOGY

ISPP Newsletter 47 (11) November 2017

News and announcements 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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### Announcement of Jakob Eriksson Prize recipient for 2018

The Jakob Eriksson Prize, for Plant Pathology is the highest international honour for achievement in plant pathology. It was established in 1923 to honor the memory of Jakob Eriksson, a prominent Swedish mycologist and plant pathologist who died in 1931. He was a dedicated internationalist who espoused the cause of international cooperation in plant pathology. The Prize will be awarded during the opening ceremony of the [International Congress of Plant Pathology](#) in Boston USA on 29 July 2018. The Royal Swedish Academy of Sciences administers the Jakob Eriksson Prize Fund which provides for a gold medal award at Congresses of the International Society for Plant Pathology (ISPP).



2018 Jakob Eriksson Prize Recipient,  
Emeritus Professor Pierre JGM de Wit

On behalf of the Jakob Eriksson Prize Commission, the ISPP takes pleasure in announcing that the 12th Jakob Eriksson Prize for Plant Pathology will be awarded to Emeritus Professor Pierre JGM de Wit of the Laboratory of Phytopathology, Wageningen University, the Netherlands for his pioneering research in molecular plant pathology and plant-microbe interactions.

Pierre de Wit has been a pioneer in molecular plant pathology and plant-microbe interactions research. His early studies were instrumental for the introduction of molecular biology techniques into phytopathology research. While studying the gene-for-gene interaction between tomato and the leaf mould fungus *Cladosporium fulvum*, his research group was the first to clone an avirulence gene of a pathogenic fungus in 1991. Subsequent functional analyses of this and other avirulence genes also cloned by his group revealed that the encoded molecules actually exert dual functions: besides mediating recognition in tomato genotypes that carry corresponding resistance genes, they contribute to disease establishment on tomato genotypes that lack the corresponding resistance genes. As such, his work contributed to the understanding of pathogen-secreted molecules that are presently recognised as effectors. Particularly, work on the *C. fulvum* Avr2 effector was instrumental to propose the so-called guard model, explaining the mode of action of resistance proteins. Avr2 was characterised as an inhibitor of tomato cysteine proteases, and through this activity disease establishment is promoted. In resistant plants, the Cf-2 resistance protein monitors the status of the tomato protease Rcr3 and, upon manipulation of Rcr3 by Avr2, activates immune responses. Another *C. fulvum* effector that he characterised in detail is the chitin-binding Avr4 protein that protects fungal hyphae against tomato chitinases by shielding of chitin in the fungal cell wall. Intriguingly, Avr4 homologs are found in *C. fulvum* relatives, such as the banana pathogen *Mycosphaerella fijiensis*, and the tomato resistance protein Cf-4 that recognises Avr4, is also able to recognise these Avr4 homologs.

Over the last years of his active career, Pierre de Wit has led an international consortium that sequenced the genome of *C. fulvum*, and of the closely related pine pathogen *Dothistroma septosporum*. This latter study was instrumental to understand host adaptation in this pathogen. In 1999, Pierre de Wit was elected member of the Royal Netherlands Academy of Arts and Sciences (KNAW) and for his pioneering work in molecular plant pathology, he was awarded the prestigious Academy Professor Prize in 2008. Amongst other awards he received the Emil Christian Hansen Gold Medal Award from the Carlsberg Foundation (1996) for elucidating the structure and function of a fungal avirulence gene, and the Noel Keen Award for research excellence in molecular plant pathology from the American Phytopathological Society (2007).

For many years, Pierre de Wit was one of the most cited scientists in the field of botany and zoology according to Thomson Reuters. He has (co-) authored close to 200 articles, several of which are published in high-impact scientific journals such as Nature, Science and the Proceedings of the National Academy of Sciences USA. Overall, Pierre de Wit is known as an excellent advocate for science and an inspiring mentor, and several of his former students and postdocs hold prestigious academic positions.

(Greg Johnson on the recommendation of the Jakob Eriksson Prize Commission)

#### **ISPP Council membership review and notice of meeting**

ISPP Associated Societies are reminded that the Council of the International Society for Plant Pathology (ISPP) will meet at the International Congress of Plant Pathology (ICPP2018) in Boston, Massachusetts, USA on Tuesday July 31 from 6.30 to 9.30 pm. The draft Agenda for the Council meeting is [here](#).

Guidelines on the roles and responsibilities of ISPP Councillors are found [here](#).

Member Societies and Nominating Bodies are reminded of the need to review and to submit to the Council the name(s) of their appointee(s) for the ISPP Council 2018-2023. Present or past members of the Council may be recommended for reappointment. The term of office of Councillors and Officers shall be from the end of one Congress to the end of the next. Current Councillors representing Societies can be found via the drop down menu [here](#):

Greg I. Johnson, President, and Brenda Wingfield, Secretary General

#### **Submit an abstract for ICPP2018**

The countdown to ICPP2018 continues as we build the scientific program under the theme “Plant Health in a Global Economy.” There are approximately 50 concurrent sessions in the program with numerous workshops, field trips, and other formats still under consideration by the Scientific Program Committee. I am pleased to be working with this international committee including Jens Boch, Wen-Ling Deng, Paul Esker, Chandrasekar (Shaker) Kousik, Alissa Kriss, Lucy Moleleki, Stephen Parnell, Sarah Pethybridge, and Jian-Min Zhou. The APS Annual Meeting Board, chaired by Amy Charkowski, has now joined the ICPP2018 programming effort following the 2017 APS Annual Meeting in San Antonio.

You can be part of the exchange of science! This congress is your opportunity to share your research findings with the greater global community of plant pathologists arriving in Boston for ICPP2018. Submit an abstract and join leading experts who will present the latest advances and innovations, celebrate progress, and set a vision for assuring plant health in a global economy. The vision of the Congress, “An engaged world community of plant health scientists advancing knowledge for a safe, affordable, secure supply of food, feed, and fibre for a growing population,” reflects the broad and unique position plant pathology holds within the international community of scientists.

The abstract submission process is now open for short talks (10-minute oral presentations) and poster presentations. Abstract submissions close on 8 December 2017. This closing date was selected to allow time for processing, review, and notification to abstract submitters of status so there is ample time for applying for visas and any other necessary travel documents.

Please note: For ICPP2018, an individual may be the presenter of only one short talk presentation and one poster. This individual may be the co-author on additional presentations and posters.

Complete details, including guidelines for submission, options for editing submission, and the submission link, are available on the congress website, <http://icpp2018.org>.

(Scott Adkins, ICPP2018 Scientific Program Committee Chair)

**R.K.S. Wood FRS (1919 - 2017)**

In May of this year (2017) the plant pathology community lost one of its most prominent members of the mid-20th century. Few plant pathologists of the era could be unaware of Ronald Wood (widely known simply as RKS) through his prolific publication record, presentations at conferences, books and reviews. Starting in the late 1940s Ronald Wood published extensively in botanical and other journals. He was one of the first to address seriously the question of how plants either resisted or succumbed to microbial infection, and the parallel questions about what qualities enabled certain microorganisms to infect a plant whereas others, closely related, could not. RKS was an early advocate of 'looking under the bonnet' to study the



physiology and biochemistry of the interaction between plants and their pathogens. This became known as physiological plant pathology and was used as the title of his 1967 book, a highly detailed account of the science at that time. More recently the subject has slowly morphed into molecular plant pathology as the tools of investigation have become more sophisticated. The state of the science now allows extremely detailed dissection of the molecular signalling between plant and pathogen but the underlying questions being tackled are much the same as those framed by RKS some 50 years ago.

Ronald Karslake Starr Wood was born and raised in Ferndale, south Wales. He excelled at school and won a government scholarship to university, going up to Imperial College to read Botany in 1937. His period as an undergraduate was well spent and he graduated in 1941 with first class honours. As a technically educated graduate RKS was selected for war work rather than military training. Preventing losses to home-grown food was a priority and Ronald's introduction to practical plant pathology, as a research assistant, started at this point.

After the end of hostilities RKS was appointed assistant lecturer at Imperial College and started a period of concentrated research activity both on his own behalf and jointly with research students, which he was increasingly expected to supervise, even while completing his own PhD (awarded in 1948). He was promoted successively to Lecturer, Reader and in 1964 to the Foundation Chair of Plant Pathology in the University of London. The research school in plant pathology at Imperial started by William Brown FRS during the 1920s was increasingly directed by RKS from the early 1950s onward, and it expanded greatly. Research themes which flourished under Ronald's guidance included the role of pectolytic enzymes in soft rot diseases, the physiology of vascular wilts, research on leaf spots, the role of phytoalexins in disease resistance and studies on induced resistance. Two periods he spent overseas were seminal. In 1950 he won a fellowship tenable at the University of California, and in 1957 he spent a year as research fellow at the Connecticut Agricultural Experiment Station. Both trips furnished him with new ideas, with the equipment to put them into practice and the personal contacts with other scientists which were to last a lifetime.

Although best known for physiological plant pathology the research group which RKS built up covered the subject much more widely. His own doctorate was on biological control; work on fungicides (including an early demonstration of fungicide resistance) featured intermittently, as did studies on the biology of poorly studied diseases (these were usually the remit for overseas students from countries where the disease was important). As funds allowed the group expanded to include further members of academic staff, notable amongst which

were Brian Deverall (a former research student under RKS) and Bryan Wheeler. RKS received widespread recognition for his work. Nationally he was elected Fellow of the Royal Society (the UK's national academy of science) in 1976 and was one of the first honorary members of the British Society for Plant Pathology. Internationally he was elected as Fellow of the American Phytopathological Society and as a corresponding member of the Deutsche Phytomedizinische Gesellschaft. At various times he was visiting lecturer, fellow or professor at a number of overseas universities including visiting Regents' Professor at the University of California. In 1978 at the third International Congress of Plant Pathology in Munich he was awarded the prestigious Otto-Appel-Denkmuende (medal) by the German Federal Republic.

RKS was active in professional affairs throughout his career, but arguably his most important role was his contribution to the founding of the Federation of British Plant Pathologists; and some years later helping it to evolve into the new British Society for Plant Pathology and becoming its first president. Meanwhile the Federation had acted as the parent body for organising the first International Congress of Plant Pathology held at Imperial College in 1968 with RKS, together with Bryan Wheeler, taking on much of the local organising. At the 1968 Congress the suggestion of an International Society took hold. Following a period of intense negotiation the International Society for Plant Pathology was formally constituted in 1970 with RKS as its first President; later (1998), he was elected as Fellow.

Little of the research that RKS directed was entirely novel but he had a very clear vision of what was important and what was likely to become so. His legacy includes an extensive list of publications, but even more importantly the people that he trained have gone on to promote the subject at research institutes and universities around the world. He supervised, wholly or partly, some 70 research students whose names read like a Who's Who of mid-20th-Century plant pathologists.

RKS considered plant pathology to be both a science and a technology. He fervently believed that the study of host-parasite interactions, although intellectually stimulating in its own right, should always have as its ultimate aim the seeking of solutions in practical crop protection. The critical mass generated by RKS raised the profile of plant pathology and helped transition it from a descriptive to an experimental science. In the words of one former research student 'He put plant pathology on the map'.

A longer version of RKS's obituary will appear in the December issue of Food Security.

(Simon Archer)

#### **Update on 3rd International Conference on Global Food Security, December 2017**

A total of 1230 abstracts were received of which 800 have been selected. There were 43 applications for the symposium session and 15 were selected. The symposium sessions and the latest programme are on the conference website <http://www.globalfoodsecurityconference.com/>

(Lise Korsten, Conference Chair, University of Pretoria, South Africa)

#### **21st Australasian Plant Pathology Society Conference, September 2017**

Combining forces to deliver a high quality plant science event, the Australasian Plant Pathology Society and the Plant Biosecurity Cooperative Research Centre recently delivered a very successful joint conference - Science Protecting Plant Health 2017.

This was the 21st Biennial Australasian Plant Pathology Society conference combined with the Global Plant Biosecurity conference held in Brisbane, Queensland, from 26-28 September 2017. The conference presented the latest science, research and practice from leaders in the disciplines of plant biosecurity, plant pathology, entomology and more, covered the breadth of plant health science, from the molecular to the paddock scale, and from community engagement to national policy.

The program consisted of 5 plenary sessions together with 5 concurrent sessions each morning and afternoon for the 3 days. The Daniel McApline lecture, to honour the father of plant pathology in the Australasian region and extended to an eminent scientist in recognition of their significant contribution to Australasian plant pathology, was given by Prof. Barbara Howlett of the University of Melbourne and titled "A genome to paddock approach to control plant disease." The outgoing APPS President, Dr Kim Plummer of La Trobe

University Victoria, delivered the presidential address titled “How to build a plant pathologist.”

We received 386 abstract with 518 delegates attending the conference from 30 countries Australia, Azerbaijan Brazil Cambodia Canada, China, France, Fiji, Greece, Guyana, Hungary, Indonesia, Iran, Kenya, Lao People’s Democratic Republic, Malaysia, Myanmar, Netherlands, New Zealand, Philippines, Reunion, Serbia and Montenegro, Singapore, South Africa, South Korea, Sweden, Switzerland, Thailand, United Kingdom, USA and Vietnam. Ninety students attended with 74 of these presenting their work.

Thirteen pre and post conference workshops were offered as well as two field trips - one pre and one post conference. Three poster viewing sessions during the conference allowed just under 200 posters to be viewed.

Seven members received the award of Fellow of APPS: Dr John Alcorn for his contribution to plant pathology and to taxonomic mycology; Prof. Rosie Bradshaw for her contribution to our understanding of fungal diseases of forests in particular needle blight of radiate pine; Associate Prof. Treena Burgess for her contribution to the biology, ecology and genetics of beneficial and detrimental microorganisms in natural ecosystems, plantation forestry and horticulture with a focus on biodiversity and biosecurity issues; Dr Ian Hood for his contribution to forest pathology in particular for his basidiomycetes research; Dr Malcolm Ryley who has conducted research on major summer field crop diseases and developed effective disease management practices including biosecurity measures for field and horticultural crops; Prof. Roger Shivas who has comprehensively studied the rust and smut fungi of Australia and has been honoured by the international taxonomic community with five species and one genus, Shivasia; and Prof. Brett Summerell for his ground breaking research on the taxonomy of Fusarium, on techniques for plant disease diagnosis and on fungal diseases of Australian flora.



New Fellows of APPS Prof Roger Shivas, Dr Ian Hood, Associate Prof Treena Burgess, Prof Brett Summerell with outgoing APPS President Dr Kim Plummer.

The Lester Burgess Award for Research Communication was presented to Dr Greg Johnson who has been a leader in promoting the management of pathogens in post-harvest horticulture in the Australasian region. Three members were awarded the Lester Burgess Award for Diagnostics and Extension; Dr Kevin Moore for his efforts in rapidly developing and extending integrated disease management strategies limiting the losses to Ascochyta blight in chickpea crops; Mr Greg Platz for his commitment to enhance the long term sustainability and profitability of the grains industry whilst being an exceptional communicator with an ability to mentor young researchers; and Susan Thompson for her dedication as a diagnostics and extension summer crops pathologist for nearly 30 years.



Prof Lester Burgess with Lester Burgess Medal winners Greg Platz, Dr Kevin Moore and Dr Greg Johnson.

The Allen Kerr Postgraduate Prize was awarded to Dr Matthew Laurence for his internationally significant contributions to the understanding of the complex fungal pathogen *Fusarium oxysporum*. Matthew has four publications as first author in referred journals already in his career.



Outgoing APPS President Dr Kim Plummer with the Dr Matthew Laurence the recipient of the Allen Kerr Postgraduate prize.

At the annual general meeting, Prof. Brett Summerell was endorsed as the new President and members of the incoming Management Committee were endorsed and introduced.

There were plenty of networking opportunities with the opening reception held in the Skyroom at the Brisbane Convention and Exhibition Centre recently voted the World's Best Convention Centre while the conference dinner was held at the historic and spectacularly renovated Brisbane City Hall.

[Presentations](#) and the [Proceedings](#) are now available online.

(Jennifer Cobon, Australasian Plant Pathology Society Conference Convenor)

### **XXIII National Congress of Italian Phytopathological Society, October 2017**

The XXIII National Congress of Italian Phytopathological Society (SIPaV - Società Italiana di Patologia Vegetale), which was the 25th anniversary from the foundation of the Society, was held from the 4th to 6th October 2017 in Piacenza (Italy). The Congress was organised by the Department of Sustainable Crop Production (DI.PRO.VE.S.) of Università Cattolica del Sacro Cuore. A total of 127 participants were present.

Three sessions were organised on relevant topics of plant pathology: I) Plant/microbe interaction, II) Botanical epidemiology and disease control, and III) Food safety and mycotoxins. The special session "Opificio delle Idee" was dedicated to young researchers. A total of 38 oral presentations were given including three presentations by invited keynote speakers from INRA Bordeaux and Toulouse (France), and Universitat de Lleida (Spain); 91 posters were also shown. Since the official journal of SIPaV, "Journal of Plant Pathology", will be edited from 2018 by Springer, the Executive Editor of Springer Nature gave an oral presentation describing the future editorial guidelines and upcoming novelties.

Three round table discussions were also organised on key topics related to research opportunities for young researchers: I) scientific publications, II) spin-off, and III) patents. Before the beginning of the Congress, a two-day course on project management at the European level (EU Research and Innovation programme Horizon 2020) was held and attended by 26 participants.



Welcome to the XXIII National Congress of Italian Phytopathological Society (SIPaV) - Università Cattolica del Sacro Cuore, Piacenza (Italy).



Book of abstracts of the Journal of Plant Pathology (Volume 99, Supplement, 2017).



Celebrating the 25th Anniversary of the SIPaV.



Poster session.



The SIPaV Award "Giovanni Scaramuzzi" 2017 assigned to Laura Pagliari with the PhD thesis "On the role of phloem protein in plant-pathogen interaction".



First session “Plant/microbe interaction”: invited keynote speaker, François Delmotte (INRA, Bordeaux).

(Luana Giordano, the SIPaV Secretary-treasurer)

### **Radiation modelling offers crop disease hope**

Aggressive new strains of the stem rust plant disease such as Ug99, have the potential to cause devastating crop epidemics, famine, and massive financial loss. Now, however, biosurveillance authorities can potentially head off invasions of these crop diseases, thanks to the repurposing of early warning systems originally used to forecast ash dispersal from erupting volcanoes and radiation from nuclear accidents.

A team of scientists from the University of Cambridge, Britain’s national weather service, the Met Office, and the International Maize and Wheat Improvement Centre (CIMMYT) have adapted disaster modelling systems to predict when and how Ug99 and other strains are most likely to spread. The research, published in the journal [Nature Plants](#), quantifies for the first time the circumstances - the routes, timings and outbreak sizes – under which dangerous strains of stem rust could spread out of East Africa to the large wheat-producing areas in India and Pakistan.

“The combined expertise from plant sciences and atmospheric dispersion sciences has delivered ground-breaking tools that highlight the risks, and support the management of the devastating potential of these diseases,” says the Met Office’s Matthew Hort, a co-author of the research.

The scientific team used field disease surveys from the CIMMYT and weather data from the Met Office as key input for the modelling framework. The team says its work, including 3D spore dispersal animations and a catalogue of dispersal trends (indicating likely directions, frequencies, pathogen loads), provides new ways to raise awareness, communicate risks, and inform agricultural stakeholders. The modelling framework can be applied as a tool to analyse risks in case new disease strains should be uncovered in other geographic areas. This has already helped in estimating dispersal risks from sites of other diseases in Europe and Siberia.

In ongoing work the team is developing an early warning system forecasting rust risk in Ethiopia, East Africa's largest wheat-producing country.

[Read more.](#)

(Jeff Glorfeld, [Cosmos magazine](#), 27 September 2017)

### **Roy L. Millar (1924 - 2017)**

Roy L. Millar, professor emeritus of plant pathology, died 18 August at the age of 93. He was born 24 May 1924, in Calgary, Alberta, Canada. After serving as a pilot in World War II, he graduated from the University of Alberta with a bachelor's in plant pathology in 1950 and a M.S. in 1952. He received his Ph.D. from Cornell in 1955.

Millar began his career as a plant scientist with the Canadian Department of Agriculture, returning to Cornell in 1959, where he served as a faculty member in the Department of Plant Pathology. He became a U.S. citizen in 1970.

During his career at Cornell he served as president of the Northeastern American Phytopathological Society (APS), as editor-in-chief of the journal *Phytopathology* and was elected a fellow of the APS in 1973. Millar was chair of the Department of Plant Pathology at the time of his retirement in 1986.

Millar's research concerned the physiology of disease, and he conducted foundational studies on pathology of forage legumes, focused on areas such as alfalfa phytoalexins and cyanogenesis of birdsfoot trefoil. His graduate students included Verna Higgins, long-time faculty member at the University of Toronto; Jim Stack, director of the Great Plains Diagnostic Network at Kansas State University; and Bill Fry, Cornell faculty member and former chair in the Section of Plant Pathology and Plant-Microbe Biology in the School of Integrative Plant Science.

Millar was known for a course he taught on concepts in plant pathology. Gary Bergstrom, chair of the Plant Pathology and Plant-Microbe Biology Section, said that the breadth and rigor of the course had a lasting impact on a generation of plant pathologists trained at Cornell. Millar was also known for his great enthusiasm for Cornell hockey.

(Magdalen Lindeberg, *Cornell Chronicle*, 9 October 2017)

### **A beacon for applied plant pathology: The origins of Plant Disease**

A paper by Paul D. Peterson et al. titled "A beacon for applied plant pathology: The origins of Plant Disease" was published in November 2017 by *Plant Disease* (vol. 101 pp. 1836-1842). The abstract is as follows:-

This year marks a full century since the founding of the journal *Plant Disease*. The story of how the journal developed, from its origins as a service publication of the USDA in 1917 to the leading applied journal in the field today, reflects on major historical themes in plant pathology. Central to this narrative is the delicate balancing act in plant pathology between fundamental and applied science. During the 1960s and 1970s, substantial numbers of plant pathologists in the U.S. expressed concerns through the American Phytopathological Society (APS) over what they viewed as an alarming and increasing scarcity of applied papers in the flagship journal, *Phytopathology*. These concerns led increasingly to calls for a second APS journal devoted to applied research. After a period of uncertainty and indecision, the dissolution of the USDA *Plant Disease Reporter* (PDR) in 1979 offered APS leadership an unusual opportunity to assume publication of a journal with a 63-year legacy of publishing practical plant pathology. In a bold move, APS Council, with the decision in 1979 to take on the publication of PDR under the new title, *Plant Disease*, provided plant pathologists and the larger agricultural science community with an innovative vehicle to communicate applied plant pathology.

[Read paper.](#)



### **Saving the world's favourite treat: Chocolate**

Like many other crops, cacao is under constant threat from diseases and environmental challenges exacerbated by our tendency to grow only a few varieties with similar or identical genetic traits and defects. "Most varieties produced worldwide belong to a narrow set of clones selected in the forties," said Wilbert Phillips-Mora, who oversees a collection of 1,235 types of cacao trees and heads the Cacao Genetic Improvement Program at C.A.T.I.E. (an acronym in Spanish for the Tropical Agricultural Research and Higher Education Centre). A narrow gene pool means that most commonly cultivated varieties of cacao are susceptible to the same diseases, and these blights can spread quickly.

Cacao production brought relative prosperity to the Caribbean coast of Costa Rica until the late 1970s, when farmers began to notice that pods on their trees were developing a fuzzy white fungal coating and eventually mummifying. The fungus, *Moniliophthora roreri*, soon spread around the country, and by 1983 Costa Rican exports of dry cacao beans had declined by 96 percent. The industry here has never recovered.

The fungus continues to spread. Increasing travel and commerce in the developing world have provided new pathways for infection. The most recent confirmed outbreak, which was in Jamaica in September 2016, was the first confirmed outside of Latin America, and it has demonstrated the fungus' ability to survive more distant travel than previously known. Other cacao-producing regions, such as West Africa, the source of virtually all the cacao that ends up in mass-produced products may face similar outbreaks.

Even without frosty pod rot, cacao is a problematic crop. Other diseases such as witches' broom, black pod, and cacao swollen-shoot virus, also afflict the tree. Climate change promises to further exacerbate problems with tropical plant pathogens. That is where Dr. Phillips-Mora's project comes in. The genetic diversity of cacao, in the International Cacao Collection at C.A.T.I.E., may avert a chocolate crisis.

In the early 1980s, Dr. Phillips-Mora worked to identify the most naturally tolerant and productive cacao trees, then painstakingly hybridised the candidates to create novel varieties. In terms of disease resistance and yield, the differences were astonishing. Dr. Phillips-Mora's six hybrids produce on average about three times more cacao than standard varieties; under ideal conditions, the most prolific hybrids can produce six times more cacao. After an 11-year trial, a hybrid called C.A.T.I.E.-R6 experienced a 5 percent frosty pod rot infection rate, compared to 75 percent infection for a control variety.

Most cacao farmers are very poor, because the system is based on material that doesn't have good yielding capacity. Trees that buck this trend could make the family business look more enticing to the next generation of cacao growers. The C.A.T.I.E. hybrids are now growing in all Central American countries, as well as in Mexico and Brazil.

The current roster of C.A.T.I.E. clones were bred in response to known cacao production threats; the future will present new demands. Pathogens evolve. Unstable political situations in the developing world can affect agriculture. Climate change will alter landscapes in unpredictable ways.

The solution is not to replace all cacao with the six available C.A.T.I.E. varieties, but to be able to continue to diversify the cacao materials growing worldwide. Like the Svalbard Global Seed Vault, the International Cacao Collection is a contingency against future disasters of unknown character.

[Read more.](#)

(Myles Karp, The New York Times, 25 September 2017)

### **Apps that identify what's destroying crops**

A new app called Plantix, was developed in Berlin, Germany, by a group of graduate students and scientists who came together to help Indian farmers combat disease, pest damage and nutrient deficiency in their crops. After months criss-crossing this vast country by train, conducting research in rural areas, the team concluded that a diagnostics app featuring image recognition would help farmers most, especially since smartphone prices were falling to affordable levels.

The farmer photographs the damaged crop and the app identifies the likely pest or disease by applying

machine learning to its growing database of images. Not only can Plantix recognise a range of crop diseases, such as potassium deficiency in a tomato plant, rust on wheat, or nutrient deficiency in a banana plant, but it is also able to analyse the results, draw conclusions, and offer advice. It is currently available in Hindi, Telugu and English in India, and in five other languages for use in other countries.

In Africa, the Consultative Group on International Agricultural Research, a body dedicated to food security, has just won a \$100,000 (£76,000) award to expand its research and bring a similar app to farmers across the continent. David Hughes of Penn State, who co-leads the project, describes it as "transformative" and says they "can amplify by 100 times what we have achieved so far".

In fact, the number of digital helpers that can fit in farmers' pockets has grown dramatically in recent years. Krishna Kumar, chief executive of CropIn Technology, a data-driven farming company, believes agricultural "start-ups will innovate fast and change every aspect of the industry". Each farmer represents a data point, and it's really the data set that's valuable. Research on this scale in this field hasn't been done before by any global research organisation. This is why farmers don't usually have to pay to use such apps.

[Read more.](#)

(Jorn Madslien, BBC News, 13 October 2017)

### **Crops evolving ten millennia before experts thought**

Ancient hunter-gatherers began to systemically affect the evolution of crops up to thirty thousand years ago – around ten millennia before experts previously thought – according to new research by the University of Warwick. Professor Robin Allaby, in Warwick's School of Life Sciences, has discovered that human crop gathering was so extensive, as long ago as the last Ice Age, that it started to have an effect on the evolution of rice, wheat and barley - triggering the process which turned these plants from wild to domesticated.

In Tell Qaramel, an area of modern day northern Syria, the research demonstrates evidence of einkorn being affected up to thirty thousand years ago, and rice has been shown to be affected more than thirteen thousand years ago in South, East and South-East Asia. Furthermore, emmer wheat is proved to have been affected twenty-five thousand years ago in the Southern Levant and barley in the same geographical region over twenty-one thousand years ago.

Professor Allaby and his colleagues made calculations from archaeobotanical remains of crops mentioned above that contained 'non-shattering' genes - the genes which caused them to retain their seeds – and found that human gathering had already started to alter their evolution millennia before previously accepted dates. The study shows that crop plants adapted to domestication exponentially around eight thousand years ago, with the emergence of sickle farming technology, but also that selection changed over time. It pinpoints the origins of the selective pressures leading to crop domestication much earlier, and in geological eras considered inhospitable to farming.

The research, '[Geographic mosaics and changing rates of cereal domestication](#)', is published in *Philosophical Transactions of the Royal Society B*.

(University of Warwick, [Press Releases](#), 23 October 2017)

### **Lychee Disease Management - new book**

Lychee Disease Management. 2017. Kumar, M., Kumar, V., Bhalla-Sarin, N., Varma, A. (Eds.). Springer Singapore, 277 p.

This book offers a comprehensive compilation of biotic and abiotic factors that affect lychee production and commercialisation. It addresses disease management for a range of causal agents, including the leaf mite (*Acerya litchi* Keifer), leaf miner (*Conopomorpha cramerella*), fruit borers (*Conopomorpha cramerella*, *Platyepplus aprobola* Meyer and *Dichocrosis* sp.), leaf webber / roller (*Platyeppla aprobola* Meyer), litchi bug (*Tessarotoma javanica* Thunb), bark-eating caterpillar (*Indarbela quadrinotata*) and shoot borer (*Chlumetia transversa*), etc.

Specialised chapters highlight potential approaches to optimising and increasing the scope of lychee export, as well as systematic research on the development and refinement of technologies for enhancing lychee productivity and quality. Further aspects addressed include post-harvest handling, processing and value addition, the development of tolerant varieties, and high yield and processing. As such, 'Lychee Disease Management' offers a valuable resource dedicated to the global agriculture community, which is currently facing considerable production and commercialisation problems.

Visit [Springer](#) to learn more about this book.

### **Acknowledgements**

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