

INTERNATIONAL NEWSLETTER ON PLANT PATHOLOGY

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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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Top 100 research papers of all time

The discovery of high-temperature superconductors, the determination of DNA's double-helix structure, the first observations that the expansion of the Universe is accelerating - all of these breakthroughs won Nobel prizes and international acclaim. Yet none of the papers that announced them comes anywhere close to ranking among the 100 most highly cited papers of all time.

Citations, in which one paper refers to earlier works, are the standard means by which authors acknowledge the source of their methods, ideas and findings, and are often used as a rough measure of a paper's importance. Fifty years ago, Eugene Garfield published the Science Citation Index (SCI), the first systematic effort to track citations in the scientific literature. To mark the anniversary, Nature asked Thomson Reuters, which now owns the SCI, to list the 100 most highly cited papers of all time. The search covered all of Thomson Reuter's Web of Science, an online version of the SCI that also includes databases covering the social sciences, arts and humanities, conference proceedings and some books. It lists papers published from 1900 to the present day. [Browse full article and interactive top 100 list.](#)

(Nature, News Feature, 29 October 2014)

The Good, the Bad and the Unknown

Molecular Plant-Microbe Interactions (MPMI) has played a leading role in disseminating new insights into plant-microbe interactions and promoting new approaches. Articles in the March Focus Issue highlight the power of genomic studies in uncovering novel determinants of plant interactions with microbial symbionts (good), pathogens (bad), and complex microbial communities (unknown). Many articles also illustrate how genomics can support translational research by quickly advancing our knowledge of important microbes that have not been widely studied. [Browse the March issue of MPMI.](#)

Plant microbiome can improve farming and plant health

People are increasingly aware of the link between the trillions of microbes that live within our bodies and human health. Studies have found that a healthy population of bacteria, or a microbiome, in a person can prevent food allergies and even treat depression.

Just as in the human body, microbes play a beneficial role in plant health. Growth-promoting bacteria or fungi can be added to plants or soil in a variety of ways - in seed coats, suspended in water and sprayed on plants or soil, or mixed into mulches that are added to the soil or placed around plant stems.

Study of this microscopic world has been going on for decades but is now attracting more interest from researchers looking for environmentally benign methods to improve agriculture. [Read full article.](#)

(Science 20, The Conversation, 23 January 2015)

Webcasts from Crop Management Seminar

Discussions from the biennial Crop Management Seminar held in Tifton, Georgia, USA, on November 2014, are freely available in webcast format through the Plant Management Network (PMN). The eight presentations, including a general soil health overview titled "The Road to Soil Health: Farming in the 21st Century" were given by industry experts during the two day cotton meeting. [Browse all webcasts](#).

(PMN Update 155, January 2015)

International year of soils

In collaboration with partner organisations and governments, Food and Agriculture Organization (FAO) of the United Nations launched the "International year of soils" in December 2014 to promote soil preservation. Recognising and valuing soils for their productive capacities as well as their contribution to food security and the maintenance of ecosystems services is central to the process. It has been estimated that 33% of land is moderately to highly degraded due to erosion, salinization, compaction, acidification and chemical pollution of soils. The campaign aims to raise the awareness on key soil functions through six key messages:

1. Healthy soils are the basis of healthy food production,
2. Soils are the foundation for vegetation which is cultivated or managed for feed, fibre, fuel and medicinal products,
3. Soils support our planet's biodiversity and they host a quarter of the total,
4. Soils help combat and adapt to climate change by playing a key role in the carbon cycle,
5. Soils store and filter water, improving our resilience to floods and droughts, and
6. Soil is a non-renewable resource; its preservation is essential for food security and our sustainable future.

Latest information on the campaign can be obtained from the "[International year of soils](#)" website.

7th IUFRO Phytophthora in Forests and Natural Ecosystems, 10-14 November 2014

[The 7th IUFRO Working Party 7.02.09](#) Phytophthora in Forests and Natural Ecosystems international meeting was held during 10-14 November 2014 in Esquel - Chubut, Patagonia in Argentina and was organised by Alina Greslebin in collaboration with Maria Laura Vélez and Mario Rajchenberg "Universidad Nacional de la Patagonia San Juan Bosco" (UNPSJB), "Centro de Investigación y Extensión Forestal Andino Patagónico" (CIEFAP), and "Fundación Bosques de la Patagonia" (Esquel, Argentina) and the support of the 7th IUFRO Working Party 7.02.09 Phytophthora in Forests and Natural Ecosystems International. The Committee included, Everett Hansen (Oregon State University, OR, USA), Thomas Jung (Phytophthora Research and Consultancy, Germany, and Faculdade de Ciências e Tecnologia Universidade do Algarve, Portugal), Andrea Vaninni (Università degli Studi della Toscana, Italy), Giles Hardy (Murdoch University, Perth WA, Australia), Clive Brasier (Forest Research, UK), Pham Quang Thu (Vietnamese Academy of Forest Science, Vietnam), Michael J. Wingfield (Department of Genetics, Forestry and Agricultural Biotechnology Institute (FABI), University of Pretoria, Pretoria, South Africa). The local organizing Committee was: Maria Belén Pildain (CIEFAP and UNPSJB), Maria Laura Besio and Carla Nowak (CIEFAP) and Yanina Andrea Assef and Gabriela Papazian (UNPSJB). The Scientific committee was: E. Hansen, Dave Rizzo (University of California Davis, USA), Mateo Gaberlotto (University of California, USA), Ellen Goheen (USDA - Forest Service, USA), Susan J. Frankel (USDA - Forest Service, USA), A. Greslebin, M.L. Vélez and M. Rajchenberg. Officers of the event were: E. Hansen (Americas Chair), A. Vannini and T. Jung (European Chairs), and G. Hardy (Australasian Chair).



Fig. 1. Participants of the 7th IUFRO Working Party 7.02.09 Phytophthora in Forests and Natural Ecosystems international meeting during visit to "Los Alerces" National Park in Patagonia in Argentina (top) and views of the scientific presentations (bottom).

Eight sessions and a .Closing Discussion. were presented including, Taxonomy (Chairs: Z. Gloria Abad, USDA-APHIS-Center of Plant Health Science and Technology, Maryland, USA and E. Hansen), Role of Phytophthora species in emergent diseases (Chairs: Joan F. Webber, Centre for Ecosystems, Society and Biosecurity Forest Research, Surrey, UK, and M. E. Sánchez, Universidad de Córdoba, Spain), Tools for Phytophthora surveys (Chairs: Ana Maria Pérez-Sierra, Centre for Ecosystems, Society and Biosecurity Forest Research, Surrey, UK, and David Cooke, The James Hutton Institute Invergowrie, Dundee, UK), Surveys and new records (Chairs: Marilia Horta Jung, University of Algarve, Portugal and T. Jung), Biology and Genetics (Chairs: Ana Maria Vettraino, University of Tuscia, Italy and M. Garbelotto), Ecology (Chairs: S.J. Frankel and A. Vannini), Ecophysiology and Physiopathogenicity (Chairs: M. L. Véez and F. Fleischmann), and Management and Control (Chairs: E.M. Goheen and G. Hardy). The scientific part finished with a closing discussion on the 'Situation of Phytophthora in forests and natural ecosystems in the continents: What is being done and what is needed?'



Fig. 2. *Austrocedrus chilensis* affected with "Mal del Ciprés".

Visits to "Nanty Fall" Reserve and "Los Alerces" National Park to see "Austrocedrus root disease" ("Mal del Ciprés"), a disease caused by *Phytophthora austrocedri* on the native Patagonian tree *Austrocedrus chilensis*, at landscape scale, symptoms and ecophysiology of the disease with presentation by A. Greslebin, M. L. Vélez, M. Rajchenberg and C. Nuñez (Figs 2 & 3). In addition, two extra-Congress fieldtrips were organized. The pre-Congress trip included a visit to Victoria Island, the place where it is hypothesized *P. austrocedri* was introduced, "El Bolsón" to see "Mal del Ciprés" as well as *Pinus* spp. plantations affected by *Sirex noctilio*, and an extended visit to "Los Alerces" National Park where different native forest sanitary problems were observed including the mortality of *Nothofagus dombeyi* and *Austrocedrus chilensis*, as well as other plant diseases (Fig. 2). Also many panoramic places were visited including magnificent lakes, rivers, glaciers and forests. The post-Congress trip involved a trip through typical steppe landscapes to "Piedra Parada" (standing stone) natural Reserve, the remains of an ancient volcano's boiler, where there were also paleontological and archaeological attractions, many fossil fields, as well as almost 5000-year-old cave painting sites, and to the Valdivian rainforest to visit the ancient *Fitzroya cupressoides* emblematic trees.

The social part included typical Argentinian "Asado" in "Los Alerces National Park" (Fig.3), a reception dinner with a concert playing pieces of tango by Astor Piazzola, a trip in the narrow gauge railway known as "La Trochita" with a formation that includes a steam locomotive from the 1930s to visit Nahuel Pan station, the place of the native Mapuche community Nahuel Pan (Fig. 4), and a farewell dinner with Tango dancers, exhibition and dancing party.



Fig. 3. Typical Argentinian "Asado" in "Los Alerces National Park" and presentation on aspects of the "Mal del Ciprés" disease on *Austrocedrus chilensis* in the Patagonian area.

The outstanding international meeting on Phytophthora was an exceptional venue for extended discourse with world experts and provided an excellent opportunity to find out about emerging plant health emergencies. The meeting had about 100 participants from 22 countries including Argentina, Australia, Brazil, Canada, Chile, China, Czech Republic, France, Germany, Ireland, Italy, Mexico, New Zealand, Norway, Portugal, Spain, Sweden, The Netherlands, United States of America, United Kingdom, and Vietnam.



Fig. 4. Trip in the narrow gauge railway "La Trochita" to visit the native Mapuche community Nahuel Pan

(Dr. Z. Gloria Abad, USDA-APHIS-PPQ-S&T Center of Plant Health Science and Technology Beltsville Laboratory, USA)

Case investigation and forensic evidence for a new plant disease

A paper by Ariena H. C. van Bruggen *et al.* titled "Case investigation and forensic evidence for a new plant disease: The case of lettuce corky root" was published in March 2015 by Plant Disease (vol. 99, pp. 300-309). The abstract is as follows:-

The process of disease diagnosis reminds of the process of solving a crime. This starts with a so-called 'crime scene investigation' (CSI) carried out in a highly systematic manner. The CSI is followed by 'forensic investigation' in specialized laboratories. The final step in solving a crime is the 'crime scene reconstruction' process, which involves systematic elimination of unlikely scenarios and comparison of results from the analysis of physical evidence with eye witness accounts. If more evidence becomes available, an 'old case may be reactivated'. In this review, the same sequence of activities is followed to solve a plant disease problem using a case study of a disease that was difficult to diagnose, namely the 'case' of corky root of lettuce.

See: <http://dx.doi.org/10.1094/PDIS-09-14-0953-FE>

Septoria pathogen "hijacks" wheat crop defenses

Wheat represents one of the most important food crops worldwide and its yields are continuously under threat from plant diseases often caused by pathogenic fungi. *Septoria tritici* blotch (STB) is currently one of the most economically important of these diseases, and is caused by the fungal species *Zymoseptoria tritici* (also known as *Septoria tritici* or *Mycosphaerella graminicola*). This disease causes premature death of wheat leaves, reducing the ability of plants to capture sunlight, which ultimately reduces their grain production. A new study from Rothamsted Research, strategically funded by BBSRC, and undertaken in collaboration with partners from Syngenta has revealed a novel strategy, which is used by *Z. tritici* to cause disease on wheat leaves. The work is published in the journal Plant Physiology.

The researchers aimed to identify the mechanisms by which the fungus manages to cause disease of wheat crops. To achieve this, the collaborators used a combination of advanced recent technologies, including RNA sequencing to measure gene activity along with quantification of natural biochemicals. These methods and data collection allowed monitoring of changes in the physiology of the plant and the fungus simultaneously. Measurements were made throughout all phases of a disease interaction from the fungus landing on the leaf surface through to its reproduction (and potential spread) in infected leaves. These "large scale" datasets led to the discovery of new strategies used by the fungus to cause disease.

The study provides clear evidence for a cunning manipulation of the plants' ability to defend themselves at different stages of infection. Whilst plant defenses were suppressed during early infection the actual appearance of STB disease symptoms on leaves involved a clear activation of plant defenses. This is counter intuitive to what one would expect and suggests that *Z. tritici* tricks wheat into a premature form of defense

involving cellular suicide as it attempts to limit pathogen spread. However, the fungus reproduces itself well within this environment. This can be considered a form of eventual hijack of the wheat defense response. [Read full article](#).

(Ag Professional, 29 January 2015)

Ferdinand Julius Cohn: dissertation, research work and seed testing

A brief biographical account of German biologist, Ferdinand Julius Cohn (24 January 1828 - 25 June 1898), who was one of the founders of modern bacteriology and microbiology, is contained in the October 2014 Issue of the ISTA Bulletin. The article focuses on his role in the early development of seed testing science. [Read PDF article](#).

(Seed Testing International (ISTA News Bulletin) No. 148, October 2014)

Plant innate immunity review is free

The review "Plant Innate Immunity: Perception of Conserved Microbial Signatures" by Benjamin Schwessinger and Pamela C. Ronald is free to download until the end of March through Annual Reviews. [Download PDF article](#).

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