ISPP INTERNATIONAL SOCIETY FOR PLANT PATHOLOGY

PROMOTING WORLD-WIDE PLANT HEALTH AND FOOD SECURITY

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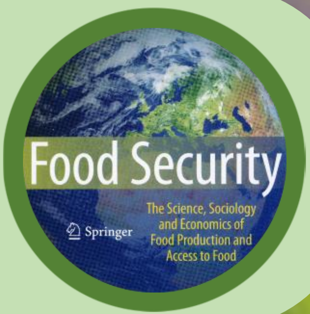

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FOOD SECURITY: SCIENCE FOR AFRICA'S FUTURE AND BEYOND

SERGE SAVARY, EDITOR-IN-CHIEF OF *FOOD SECURITY*

Food Security, the journal published by the ISPP, addresses major issues that the world faces today. That is because nearly all of the main problems the world faces today (climate change, biodiversity collapse, political instability and conflicts) affect the production, supply, and use of healthy food. Scientists have a role to play in the face of these challenges – they did it before; this is why *Food Security* was created by the ISPP on the impulse of Norman Borlaug.

Specifically, plant pathology, as a field of science, has a role to play in all the segments that contribute to food security, from production, to conservation of healthy harvests and transport, to consumption of healthy food.

Science for food security in Africa

The 2026 June Issue of Food Security focuses on Africa. Africa is the continent where human population growth is the highest, and where the proportion of hungry and malnourished humans is the largest. The absolute number of hungry humans in Africa soon will exceed that of South Asia. The challenges that science has to face are massive. Below is the table of contents of this Issue along with links to articles.

Title (O: Opinion; R: Research article)	Authorship	Link
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O-Science for Africa's future food security: the need for an all-Africa food supply strategy	Lukas Kornher *et al.*	https://link.springer.com/article/10.1007/s12571-025-01635-4
O - Science for Africa's future food security: linking agency and institutions in the food system	Makafui I. Dzudzor *et al.*	https://link.springer.com/article/10.1007/s12571-025-01585-x
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O - Science for Africa's future food security: rethinking breeding to adapt to diversified cropping systems	Mathieu A. T. Ayenan *et al.*	https://link.springer.com/article/10.1007/s12571-025-01616-7
O - Science for Africa's future food security: rethinking veterinary services for livestock health in Sub-Saharan Africa	Abdul Salami Bah	https://link.springer.com/article/10.1007/s12571-026-01669-2
O - Science for Africa's future food security: the entangled crisis of escalating conflict and eroding food security in the Sudano-Sahelian Region: 1994–2024	Shahriar Kibriya & Naureen Fatema	https://link.springer.com/article/10.1007/s12571-025-01575-z
O - The future of food security in Africa: pay more attention on local crops and experts	Wenmeng Zhang *et al.*	https://link.springer.com/article/10.1007/s12571-025-01584-y

O - Science for Africa's future food security: necessary steps to incorporate African vegetable biodiversity in food security	Sognigbe N'Danikou *et al.*	https://link.springer.com/article/10.1007/s12571-025-01589-7
O - Unlocking sustainable development goal indicator 2.4.1 for Sub-Saharan Africa: data gaps and underlying causes	Suyu Liu	https://link.springer.com/article/10.1007/s12571-025-01595-9
O - Science for Africa's future food security: analysing the impacts of banned pesticide use on agriculture and health	Abdul Salami Bah & Yongqiang Wang	https://link.springer.com/article/10.1007/s12571-026-01672-7
O - Science for Africa's future food security: Valuing tradition and embracing innovation to accelerate the digital transformation of African food and agriculture systems	Heike Baumüller	https://link.springer.com/article/10.1007/s12571-025-01570-4
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O - Breaking the barriers: Ethiopia's agricultural development innovations as a model for advancing Africa's food security and SDG 2030 amid global polycrises	Kefena Effa *et al.*	https://link.springer.com/article/10.1007/s12571-025-01596-8
R - Impact of climate-smart agricultural technologies adoption on food security in the West African Sahel: evidence from Mali and Niger	Lateef Olalekan Bello *et al.*	https://link.springer.com/article/10.1007/s12571-026-01654-9
R - Sustainable agricultural practices improve the food security of maize farmers in Ethiopia	Temesgen Kabeta Kidane *et al.*	https://link.springer.com/article/10.1007/s12571-026-01658-5
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R - Barriers and opportunities to smallholder goat enterprise in Botswana	Lovemore C. Gwiriri *et al.*	https://link.springer.com/article/10.1007/s12571-026-01648-7
R - "We are just like ploughing bulls": a comparative analysis of power relations and cooperation in Fulani and Mossi polygynous households in Burkina Faso	Guesbeogo Viviane Yameogo *et al.*	https://link.springer.com/article/10.1007/s12571-026-01659-4
R - Food supply implications of healthy diet consumption in Senegal by 2050	Wim Marivoet	https://link.springer.com/article/10.1007/s12571-026-01656-7

The Energy-Food nexus

The Editorial Board of Food Security met today, May 21, 2026, in an on-line meeting. The entire community of Editors of the Journal, some 60+ scientists, are currently working along with their own networks to produce a series of articles on the Energy-Food nexus. Energy is everything: of course, it is about petrol and (N) fertiliser. But Energy is also what is required to pump water for irrigation, to make machines work in the field, to enable lorries to transport harvests, to transport customers to markets, or to conserve harvests. Plant pathology has to do, and heavily so, with all these elements: water, fertiliser, weed management and herbicide use, harvest conservation, contamination by mycotoxins, and many more. Plant pathologists have much room to contribute to *Food Security*.

Associated Societies of ISPP are invited to present bids to host the 14th International Congress of Plant Pathology, ICPP2032

ANDREA MASINO AND TERESA COUTINHO, 1 MARCH 2026

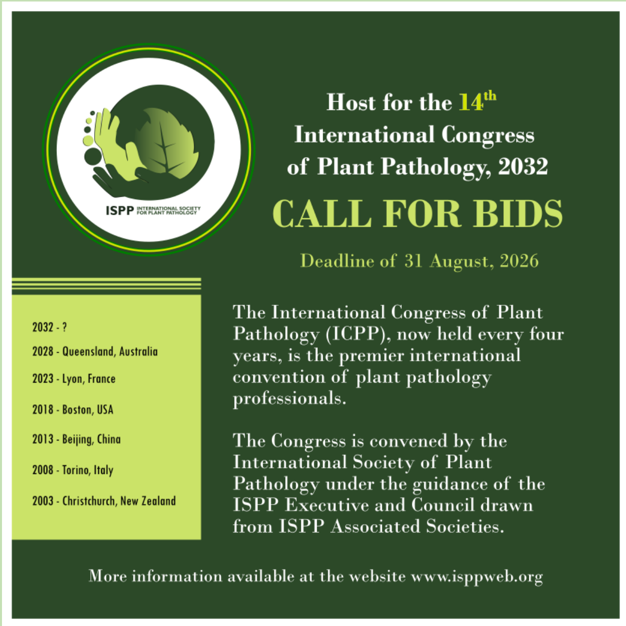
Associated Societies of ISPP are invited to present bids to host the 14th International Congress of Plant Pathology in 2032 (ICPP2032). Traditionally the ICPP is held in August. ISPP councillors are urged to consider and discuss this opportunity with their Society.

In calling for bids to host ICPP2032 the Executive recommends that bidding should be restricted to Societies that have been financial members of ISPP for at least three years. ISPP should also give consideration to giving priority in 2032 to a Society that has not previously hosted ICPP.

Attention to options for virtual attendance should also continue, both to broaden participation opportunities and strengthen the financial viability of Congresses and strengthen engagement with ISPP between Congresses.

The deadline for receipt of bids is 31 August, 2026. They should be sent to the Business Manager of ISPP, with c.c. to the Secretary ISPP, as e-mail attachments and/or Web addresses.

If a Society is considering a bid for the 14th International Congress of Plant Pathology, 2032, please read the bid and congress guidelines and requirements carefully. They can be accessed here.



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Obituary of James E. Duffus (1929-2025): Pioneering Sugarbeet and Vegetable Virologist

GAIL C. WISLER, JUNE 2026

James (Jim) Edward Duffus, 96, passed away in Salinas, California, on May 29, 2025. He was born in Detroit, Michigan on 11 February 1929. His beloved wife of 72 years, Racheal (Anderson) Duffus, passed away the previous December of 2024. Jim was devoted to his family and is survived by his three children: Mark, John, and Lisa, and six grandchildren. If you knew Jim, you also likely knew Rachael who accompanied him on many of his trips.

Jim received a B.S. in Botany from Michigan State University. There, his love for biology, specifically plants, began to blossom. He received his Ph.D. in Plant Pathology at the University of Wisconsin, Madison. After graduation, Jim chose a position as a Research Plant Pathologist at the USDA-ARS Sugarbeet Research Center in Salinas, California in 1954, as part of a team to address the *Beet curly top virus* that was significantly impacting sugarbeet production at that time.

Jim Duffus became world renowned for his research that focused on persistent insect-transmitted viruses of sugarbeet and vegetables, including lettuce, tomato, cucurbits, and their weed hosts. He served 17 years as research leader of the Sugarbeet Production Research Unit and led a broad research program that included pathology, genetics, nematology, agronomy and development of improved breeding lines. He described over one third of the world's beet viruses, over one-half of California's lettuce diseases caused by viruses, and he was respected internationally for his research on insect transmission of viruses and plant virus epidemiology.

Jim had many “firsts” during his career. He was the first to realise that “virus yellows” of sugarbeet was sometimes caused by a complex of viruses, one of which he discovered and named *Beet western yellows virus* (BWYV). This was an important discovery with worldwide implications due to the wide host range of BWYV and its significance in agricultural production. He also was the leader in studying the epidemiology of viruses in the beet yellows complex in the U.S. This work led to the implementation of beet-free periods to help manage these viruses in California. Through this work he developed a method to inoculate plants with viruliferous aphids in sugarbeet fields for large-scale use in breeding programs.

This allowed more rapid development of varieties tolerant to BWYV and the yellows virus complex. He demonstrated that BWYV is an important pathogen of vegetables worldwide and caused many diseases that were previously thought to be due to other causes, including nutritional disorders.

Jim discovered the first virus shown to be a pathogen of both plants and its aphid vector. His 1963 paper on *Sowthistle yellow vein virus* (SYVV) is a classic study of virus vector relationships and suggested that SYVV propagated in the aphid vector due to the extremely long latent period; a significant advancement in the field of plant virus-vector interactions. His initial work in this area stimulated many researchers to further investigate the properties of these viruses that infect plants as well as insects.

Jim was the first to discover that the greenhouse whitefly was a vector of plant viruses. This led to numerous studies identifying whitefly species that were vectors of economically limiting viruses of lettuce, cucurbits, tomatoes and sugarbeet.

Rhizomania of sugarbeet, caused by the soilborne *Beet necrotic yellow vein virus* (BNYVV) and transmitted by *Polymyxa betae*, was well known in Europe but not in the U.S. In 1984, Jim and his team positively identified BNYVV from symptomatic sugarbeets in California, symptoms of which had been previously confused with those of the sugarbeet cyst nematode. The USDA-ARS in Salinas became the go-to place for rhizomania identification, resistance breeding and collaborations with growers and industry representatives.

Jim served on several committees of the American Phytopathological Society (APS), American Society of Sugar Beet Technologists, and the International Society for Plant Pathology (ISPP). He was elected APS Fellow in 1983. He received the Meritorious Service Award from the American Society of Sugar Beet Technologists (ASSBT) and the Savitsky Memorial Award in 2001, granted by the ASSBT, among the most prestigious awards in the sugar industry.

In recognition of his role in plant-insect-virus interactions, Jim was invited to present papers for international organisations in over nine countries on such diverse subjects as sugarbeet and vegetable virus diseases, virus transmission by aphids and whiteflies, epidemiology, and disease management practices. Jim always argued that to understand what plant viruses are doing in the field, one must use the insect vector in the laboratory and greenhouse and not rely solely on mechanical transmission. The fruits of his research clearly demonstrate this point.

Note: Please refer to the Monterey County (CA) Historical Society for a full article that includes additional history and photos of the Salinas Valley agriculture, guayule latex production, the transition to sugarbeet followed by cool-season vegetable production (in press). A shorter version will be found in the Journal of Sugar Beet Research, Wisler, G. C.. *James E. Duffus: Pioneering sugarbeet and vegetable virologist* (2026, in press). DOI: 10.5274/JSBR.63.1.38. (The term "sugarbeet" is used by APS, whereas "sugar beet" is primarily used by the sugar industry).

A TIMELINE OF DESTRUCTION AND DISCOVERY: 180 YEARS OF "PLANT DESTROYER" RESEARCH

AMERICAN PHYTOPATHOLOGICAL SOCIETY NEWSROOM, 13 MAY 2026

A microscopic "plant destroyer" not only helped trigger one of the deadliest famines in modern history but also reshaped global agriculture and gave birth to an entirely new scientific discipline. Now, nearly 180 years after the Irish Potato Famine devastated Ireland and altered the course of human history, researchers are tracing the remarkable scientific journey of the organism behind it: *Phytophthora infestans* and the larger genus, *Phytophthora*.

In a new feature article published in *Plant Disease*, researchers Z. Gloria Abad and Jorge A. Abad present a comprehensive 180-year timeline of the taxonomy and identification of *Phytophthora* species. The review explores how scientists progressed from early theories about mysterious crop failures in the 1840s to today's advanced genomic technologies capable of decoding entire pathogen genomes.

The genus *Phytophthora*—whose name literally means "plant destroyer"—contains 261 species and includes some of the world's most destructive plant pathogens. These organisms attack crops, forests, ornamental plants, and natural ecosystems, causing billions of dollars in annual agricultural losses and threatening global food security. The best-known species, *Phytophthora infestans*, was the causal pathogen behind the Irish Potato Famine between 1845 and 1852, when approximately 1.5 million people died and another 1.5 million emigrated due to starvation.

Abad and Abad recount how pioneering scientists such as Miles Joseph Berkeley and Heinrich Anton de Bary helped establish the science of plant pathology by demonstrating that microorganisms could cause plant disease. Their work transformed scientific thinking and laid the foundation for modern disease diagnosis and crop protection.

The article also highlights the dramatic technological evolution in identifying *Phytophthora* species. For more than a century, researchers relied primarily on morphology to distinguish species. However, since 2000, DNA sequencing and high-throughput genomic technologies have revolutionised the field. The review also presents information of major international taxonomic resources and updates data from the "Revision of *Phytophthora*" (Abad *et al*. 2023) including databases from 212 to 261 species and emphasises the importance of "ex-type" cultures, the original reference specimens used to define species identities.

"This timeline of 180 years of the taxonomy and identification of *Phytophthora* is truly fascinating," the authors noted. "There were many challenges, but also many important technological contributions that have cemented *Phytophthora* as a solid and unique genus of plant pathology."

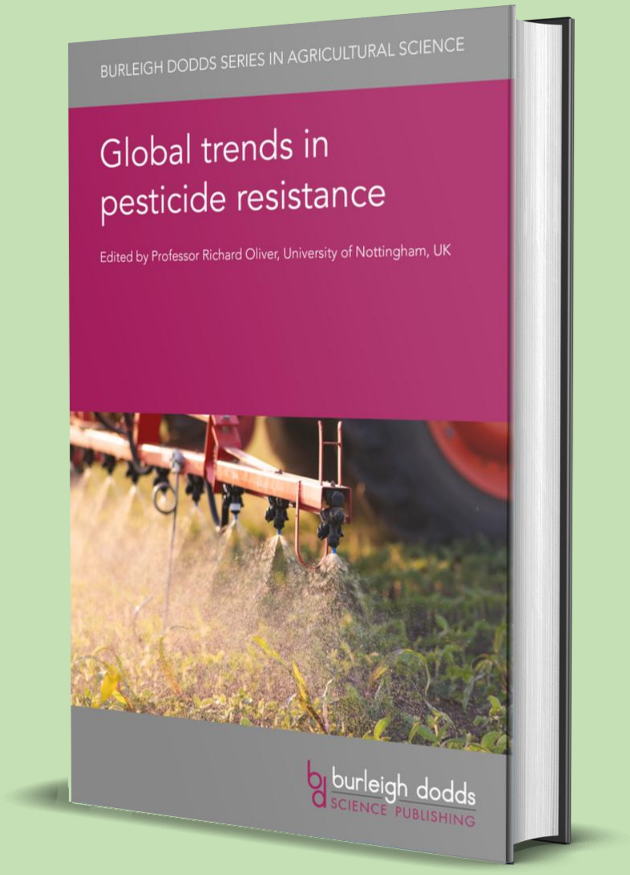
The authors also revisit a long-running debate over the geographic origin of *P. infestans*. While some 20th-century researchers argued for a Mexican origin, the review discusses historical and modern evidence supporting the Peruvian Andes as the pathogen's center of origin, including recent genomic studies involving more than 1,700 pathogen genotypes from around the world.

By documenting the evolution of *Phytophthora* research from early microscopy to whole-genome sequencing, the article demonstrates how advances in science continue to strengthen global efforts to monitor, identify, and manage destructive plant diseases. The review also carries a personal dimension for the authors, who recently retired after nearly 5 decades working in plant pathology. Gloria and Jorge Abad acknowledge the many researchers who contributed to the field over generations.

To learn more, read "*Phytophthora*: Timeline of Taxonomy and Identification From Plant Pathology's Origin to Molecular Technologies"—freely available in *Plant Disease*.

GLOBAL TRENDS IN PESTICIDE RESISTANCE. NEW BOOK

Eds. Professor Richard Oliver (2026). Global trends in pesticide resistance. Burleigh Dodds Science Publishing. 614 pp.



Burleigh Dodds Science Publishing are delighted to announce the publication of their new title: Global trends in pesticide resistance, edited by Professor Richard Oliver (University of Nottingham, UK).

The book provides a comprehensive overview of pesticide use in particular regions around the world and the consequent development of resistance to the key groups of pesticides.

The book also reviews what we know about current patterns of resistance, gaps in knowledge, likely future trends in resistance and potential solutions such as integrated disease, pest and weed management.

Find out more about this new book here.

Special Offer

Enter code **PR20** at checkout via www.bdspublishing.com to redeem 20% off your purchase of any book in the Burleigh Dodds Agriculture Science Series. Discount code expires 31st July 2026.

The next Green Revolution: Plant hormone therapy could improve global food security

COLORADO STATE UNIVERSITY NEWS, 23 FEBRUARY 2026

Plants have an immune system, like people, and when it is triggered by threats like disease or pests, a plant's defenses are activated. But there's a downside to this protective mechanism: The plant's growth is suppressed when its immune system is turned on.

Colorado State University researchers have found a way to boost a plant's growth while maintaining its immunity through a hormone treatment that shows promise for food production.

Colorado State University researchers Grace Johnston, left, and Professor Cris Argueso have found a way to boost a plant's growth while maintaining its immunity through a hormone treatment that shows promise for food production (Photo credit: Hannah Tran/CSU).

A plant threatened by disease will defend itself by producing hormones that can keep the plant alive but also stunt its growth – which is a problem if the plant is needed for food. By genetically manipulating the hormonal response of a commonly studied plant, scientists have harnessed the best of both worlds – immunity and productivity – and they believe this can be reproduced in crops. Their findings were published in *Current Biology*.

"Only time will tell once it's integrated into crops what effect this will have, but it does have the potential to be as big of a breakthrough as the Green Revolution 60 years ago in terms of food security," said Cris Argueso, an associate professor in CSU's Department of Agricultural Biology and senior author of the study.

Plants react to the constantly changing conditions surrounding them through plant-specific hormones called phytohormones, which are very different from animal hormones and help regulate virtually every aspect of plant growth and development. Argueso calls this the plant's "chemical brain."

A 'greener' revolution

During the Green Revolution, geneticist and plant pathologist Norman Borlaug identified a wheat mutation that dramatically increased yield. He developed cultivars that were grown around the world, preventing famine. Borlaug is credited with saving a billion people from starvation and received a Nobel Peace Prize for his discovery. Downsides of the Green Revolution included widespread use of chemical fertilizers and pesticides and environmental degradation.

If the CSU researchers are successful in genetically altering crops to be more productive and disease resistant, the crops will need less fertilizer to grow and fewer chemicals to prevent disease, making this revolution "greener." Of course, adding fertilizer will always enhance growth, even in plants that are naturally productive; but for now, the researchers are focused on integrating these beneficial traits into important food crops – wheat, corn and soybeans.

“We want to create crop plants that can defend really well against pathogens but don’t have a yield penalty, which is the dream for farmers,” Argueso said. “We joke that this is the ‘green’ Green Revolution.”

One similarity between Borlaug’s work and Argueso’s is that her lab is also working with a hormone mutant. The researchers studied a model plant species called Arabidopsis thaliana, also known as thale cress, a well-known plant in the mustard family. They selected plants of this species that had an autoimmune mutation that prevents them from thriving – like having an autoimmune disorder.

When plants are stressed by pests or disease, cytokinin hormones, which are responsible for cell division, are suppressed in a growth-defense tradeoff. By understanding phytohormone interactions and restoring cytokinin levels in the plants with overactive immune systems, the scientists were able to restart growth without negatively impacting the plant’s defenses. In fact, the plants they designed were even more resistant to disease.

While the researchers’ approach relies on genetic manipulation to change a plant’s chemical signals, it is much faster and easier than identifying and altering the specific gene responsible by mapping the plant’s entire genome, as is standard practice for modifying crop traits. Argueso likens their simpler solution to how a doctor might prescribe a pill to correct a chemical imbalance. She expects the mutations they’ve developed to be useful for agriculture for decades.

“We are exploring collaborations with breeding programs across the world, so this can be tested in different regions with all sorts of crops,” Argueso said. “If these mutations have the potential that we think they do, we would like them to be used everywhere.”

STUDENT RESEARCH

The study was funded by the National Science Foundation and led by Grace Johnston, who conducted the research as a student. Johnston was recruited into Argueso’s lab as an undergraduate biology student and wrote the paper as her master’s thesis. She is now a research associate in the lab.

“I did not know I wanted to do plant science,” said Johnston, who credits Argueso’s mentoring for her achievement and love of plant biology. “By the time I was done with my undergrad degree, we still didn’t know enough about these plants, and I just couldn’t let it go.”

Johnston received prestigious fellowships from the National Science Foundation and the American Society of Plant Biologists to support her work while earning her undergraduate and graduate degrees.

“This is a CSU research success story,” Johnston said. “Cris took me on when I didn’t know anything about science, and here we are eight years later, and we have the opportunity to actually impact food security.”

Argueso is passionate about inspiring young researchers like Johnston. Students from her lab have gone on to receive important national and international awards, and currently three undergraduate researchers are part of her team.

CLIMATE-DRIVEN SHIFTS IN THE POTENTIAL DISTRIBUTION OF QUARANTINE FOREST PATHOGENS IN EUROPE: INSIGHTS FROM SPECIES DISTRIBUTION MODELLING

A paper by Miłosz Tkaczyk and Maciej Lisiewicz titled "Climate-driven shifts in the potential distribution of quarantine forest pathogens in Europe: Insights from species distribution modelling" was published on 19 May 2026 by *Plant Pathology* (Vol. 75, Issue 3, e70187). The abstract is as follows:-

Climate change is increasingly recognised as a major driver of shifts in the geographic ranges of forest pathogens, with profound implications for forest health and management. Rising temperatures, altered precipitation regimes and longer growing seasons can facilitate pathogen establishment, survival and spread, particularly in regions previously constrained by climate. In this study, we assessed the current and future climatic suitability of four forest pathogens of phytosanitary concern—*Davidsoniella virescens*, *Bretziella fagacearum*, *Litylenchus crenatae* and *Stegophora ulmea*—with a specific focus on Europe. Using species distribution models (MaxEnt) calibrated with confirmed occurrence records and bioclimatic variables, we projected potential distribution patterns under baseline conditions and future climate scenarios (SSP1-2.6, SSP2–4.5, SSP3–7.0 and SSP5–8.5). Our results indicate a pronounced northward and eastward expansion of climatically suitable areas for *D. virescens* and *B. fagacearum*, particularly under high-emission scenarios, suggesting an increased risk of climatic suitability conducive to establishment in large parts of Europe. In contrast, *L. crenatae* exhibited relatively limited range shifts, while *S. ulmea* showed moderate expansion coupled with localised contractions. These species-specific responses highlight the importance of biological traits, dispersal strategies and ecological constraints in mediating climate-driven range dynamics. Overall, our findings underscore the growing phytosanitary risks posed by climate change and demonstrate the value of integrating species distribution modelling into early-warning systems and adaptive forest management strategies aimed at mitigating future pathogen impacts in European forests.

Read paper.

HOW PLANTS FIGHT BACK AGAINST BACTERIA THAT PROMOTE WATERLOGGING IN LEAVES

PHYS.ORG, NARA INSTITUTE OF SCIENCE AND TECHNOLOGY, 1 APRIL 2026

Over a decade ago, scientists discovered that bacteria can manipulate the host plant's ABA system by injecting effector proteins into cells, driving ABA up and thereby keeping stomata shut. However, the plant's side of this story remained unclear. Do plants actively defend themselves against water-soaking under high-humidity conditions? How do they sense rising humidity and turn that into a response?

In a recent study, a research team led by Assistant Professor Shigetaka Yasuda from the Nara Institute of Science and Technology (NAIST), Japan, set out to answer these questions.

Their paper, which was published in *Nature Communications*, was co-authored by Professor Yusuke Saijo from NAIST, Dr. Masanori Okamoto from RIKEN, Japan, Assistant Professors Akihisa Shinozawa and Izumi Yotsui from Tokyo University of Agriculture, Japan, and Professor Masatsugu Toyota from Saitama University, Japan.

Working with a small plant species called Arabidopsis thaliana and the bacterial pathogen *Pseudomonas syringae*, the team first found that high humidity rapidly induces the production of an enzyme called CYP707A3, which breaks down ABA.

Lower ABA levels prompt stomata to open, releasing water from the spaces between leaf cells where bacteria grow. Plants lacking CYP707A3 were significantly more vulnerable to water-soaking, confirming its defensive role.

The researchers then traced this signaling chain upstream, revealing that rising humidity triggers an increase in calcium ions in leaf cells via channel proteins called CNGC2, CNGC4, and CNGC9. In turn, this activates the CAMTA3 transcription factor, which regulates the expression of specific genes that promote CYP707A3 production. Notably, breaking any link in this chain greatly impaired resistance to water-soaking.

To understand how the bacteria respond, the team used genetically modified *P. syringae* strains with different effector proteins removed. They found that the protein AvrPtoB is not only the main effector suppressing CYP707A3 under high humidity but also a modulator of ABA production.

As Asst. Prof. Yasuda puts it, “Plants activate defenses to prevent water accumulation, while pathogens try to counteract this by hijacking the plant's water-retention system.”

These findings reveal that plants sense high humidity as a warning and mount a molecular defense, and that bacteria have evolved specific mechanisms to dismantle it.

“Our work provides insights that could support the development of new plant disease management strategies, particularly under high-humidity conditions that are expected to become more frequent with climate change,” concludes Asst. Prof. Yasuda.

“Examining whether similar defense mechanisms operate in major crops, such as rice, could help improve our understanding of disease resistance and support future crop protection approaches.”

THE FUNGUS THAT SPOILS NEARLY EVERYTHING: RESEARCHERS DISCOVER THE SECRET BEHIND GRAY MOLD'S UNSTOPPABLE SPREAD

AMY QUINTON, UNIVERSITY OF DAVIS NEWS, 20 MAY 2026

Even if you haven't heard of *Botrytis cinerea*, you've likely seen it — slowly growing in your store-bought blueberries, tomatoes or even on your beautiful orchids. Commonly known as gray mold, the fungus attacks hundreds of plants. For years, scientists have unsuccessfully tried to breed crops that could resist the fungus. New research from the University of California, Davis, suggests decades of crop breeding strategies may have overlooked a crucial piece of the puzzle: the pathogen itself.

Two related studies led by Dan Kliebenstein, professor in the UC Davis Department of Plant Sciences, show the problem may lie in a fundamental misunderstanding of how plants and the pathogen interact. The studies were published in the Proceedings of the National Academy of Sciences.

AN UNEXPECTED DEFENSE

Scientists had long assumed that when different plants are attacked by a fungus, they mount a broadly similar defense — the same basic response with minor variations.

"It's like they might do little decorations on the Christmas tree, but it's always a Christmas tree," Kliebenstein said. The team's findings challenge that assumption. For some plants, it's not a Christmas tree at all. It's a saguaro cactus.

Each plant mounted a response that was fundamentally its own, whether comparing closely related crops or distant ones. That finding alone helps explain why decades of resistance breeding have yielded only modest results.

"It's why we could never figure out how to move information from one plant to help another become resistant, because what one plant is doing doesn't actually do anything for the other plant," Kliebenstein said.

A HUMAN-LIKE PATHOGEN

The second study yielded more surprising results. Rather than having a universal "master key" to infect any plant it encounters, gray mold appears to sense what it's growing on and adjusts its attack accordingly.

"The pathogen is like a human," Kliebenstein said. "At some level, it knows it's attacking a strawberry, and there's one set of things it should do. If it's attacking a tomato, it knows it's attacking a tomato and it decides to do something completely different."

In a sense, Kliebenstein said the fungus is "tasting" the difference between a strawberry and a tomato — reading the plant's own chemical defenses and flavors — then countering them.

REFRAMING THE PROBLEM

The two studies could shift how scientists approach disease prevention, Kliebenstein said.

"They suggest that everything we've been trying on the plant or fungus side is probably always going to be doomed to fail, and instead we should be looking at how the pathogen knows what it's attacking," he said.

If researchers can identify the genes the fungus uses to recognise which plant it's attacking, they might be able to confuse the fungus chemically or genetically. A disoriented pathogen could allow the plant's own natural defenses to take over.

"We've been hitting ourselves against a brick wall and we just never thought about this," Kliebenstein said. "Now we might have realised — oh, if we take two steps to the right, the brick wall ends."

It's a strategy that could, in theory, work across many crops at once, in contrast to current approaches that must be engineered one plant at a time.

The stakes are significant. Gray mold causes an estimated 5% to 10% crop loss across many fruits and vegetables, affecting everything from grapes and lettuce to soybeans and cut flowers.

GLOBAL WHEAT HEALTH ALLIANCE LAUNCHED TO STRENGTHEN DISEASE RESISTANCE IN WHEAT

CIMMYT NEWS, 7 MAY 2026

CIMMYT and Cornell University are jointly leading a new international partnership within the landmark HyBread investment, supported by the Gates Foundation and the UK Foreign, Commonwealth & Development Office (FCDO), to accelerate disease resistance in wheat for vulnerable farming communities in South Asia and East Africa.

Efforts to protect wheat from fast-evolving diseases in South Asia and East Africa are getting a new international push through the Global Wheat Health Alliance (GWHA), a partnership within the Disease-Resistant Wheat Hybrids Initiative, known as HyBread. Co-led by CIMMYT and Cornell University, GWHA will connect gene discovery, field testing and pre-emptive breeding to help deliver stronger disease resistance in new wheat varieties and hybrids.

Wheat is the world's second most widely cultivated crop, grown on more than 220 million hectares and serving as a staple food for billions of people. About one quarter of the world's wheat-growing area is in South Asia and East Africa, where roughly 170 million tons are produced each year. In these regions, rapidly evolving fungal diseases including stem rust, yellow rust, wheat blast, and Fusarium head blight are threatening improved varieties and breeding populations, placing decades of agricultural progress at risk.

GWHA is designed to move resistance more efficiently from research into breeding pipelines and, ultimately, into farmers' fields. Field testing sites in Kenya, Mexico, Bolivia, Bangladesh, and Ethiopia will evaluate thousands of wheat lines under high disease pressure, while research partners contribute resistance genes, gene-editing mutants and molecular markers that can accelerate selection.

Over three years, the alliance will generate large-scale disease phenotyping data, deliver wheat lines with stacked resistance to major diseases and train at least 100 scientists in disease evaluation and resistance breeding. Within HyBread, GWHA provides the foundation for stable disease resistance needed to support successful hybrid wheat development.

The partnership brings together complementary and world-leading strengths. CIMMYT leads disease screening, breeding and global germplasm distribution. The Borlaug Global Rust Initiative (BGRI), housed at Cornell University, provides scientific leadership, coordination and capacity development. The John Innes Centre and the University of Maryland contribute gene discovery, mapping, and gene editing expertise. National partners in Ethiopia (Ethiopian Institute of Agricultural Research), Kenya (Kenya Agricultural and Livestock Research Organization), Bangladesh (Bangladesh Wheat and Maize Research Institute), and Bolivia (Instituto Nacional de Innovación Agropecuaria Y Forestal) test and deploy improved materials in target environments.

GWHA builds directly on 15 years of successful global collaboration under the BGRI. Investments in the BGRI mobilized a global research community that successfully countered Ug99, a dangerous strain of stem rust that raised fears of major crop losses across Africa and beyond. The initiative also helped limit damage from severe outbreaks in Ethiopia in 2013 and 2021 and accelerated the deployment of resistant varieties across vulnerable regions.

The GWHA component within HyBread is co-led by Dr. Maricelis Acevedo, Research Professor in Cornell University's School of Integrative Plant Science and Director for Science of the BGRI, and Dr. Pawan Kumar Singh, Principal Scientist and Head of Wheat Pathology at CIMMYT. Dr. Flavio Breseghello, CIMMYT's Global Wheat Program Director, leads the broader HyBread initiative.

"Wheat diseases do not stop at national borders, and neither can the effort to protect wheat," said Dr. Maricelis Acevedo. "The GWHA brings together the world's best science with the communities who need it most. We are not just discovering resistance genes. We are building the networks, expertise, and institutional capacity needed to protect wheat for generations. The stakes are too high, and the window too narrow, for anything less than a fully coordinated global effort."

"The pathogens are evolving faster than ever, and varieties must evolve ahead of them" said Dr. Pawan Kumar Singh. "The GWHA gives us the framework to move resistance genes from the laboratory bench to the breeding pipeline to the farmer's field in record time. By linking CIMMYT's global breeding engine with the extraordinary gene discovery work happening at our advanced research partners, we can stay ahead of the threat."

"Hybrid wheat has the potential to transform productivity for smallholder farmers across South Asia and Sub-Saharan Africa," said Dr. Flavio Breseghello. "But that transformation will only succeed if hybrids carry the disease resistance that farmers need to manage real-world risks. GWHA is the disease resistance backbone of HyBread. Every hybrid we develop must perform under the stem rust pressure of the Ethiopian highlands, the blast threat expanding across South Asia, and the FHB risk that compromises both yield and food safety. By integrating the GWHA's resistance pipeline directly into our hybrid breeding program, we ensure that breakthrough yield gains and durable disease protection are delivered together, as one package, to the farmers who need them most."

CURRENT VACANCIES

There are no current vacancies.

ACKNOWLEDGEMENTS

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COMING EVENTS

36th Symposium of the European Society of Nematologists
1 June – 5 June, 2026
Egmond aan Zee, The Netherlands
Website: www.esn2026.nl/home

25th Annual Fusarium Laboratory Workshop
21 June – 26 June, 2026
Manhattan, Kansas, USA
Contact: John Leslie jfl@ksu.edu

Plant Health 2026
1 August – 4 August, 2026
Providence, Rhode Island, USA
Website:
www.apsnet.org/meetings/annual/PH2026/Pages/default.aspx

Plant Pathology 2026
8 September – 10 September, 2026
John Innes Centre Conference Centre, Norwich, UK
Website: Not yet available

13th Australasian Soilborne Diseases Symposium
14 September – 18 September, 2026
Melbourne, Australia
Website: www.asds-apps.com

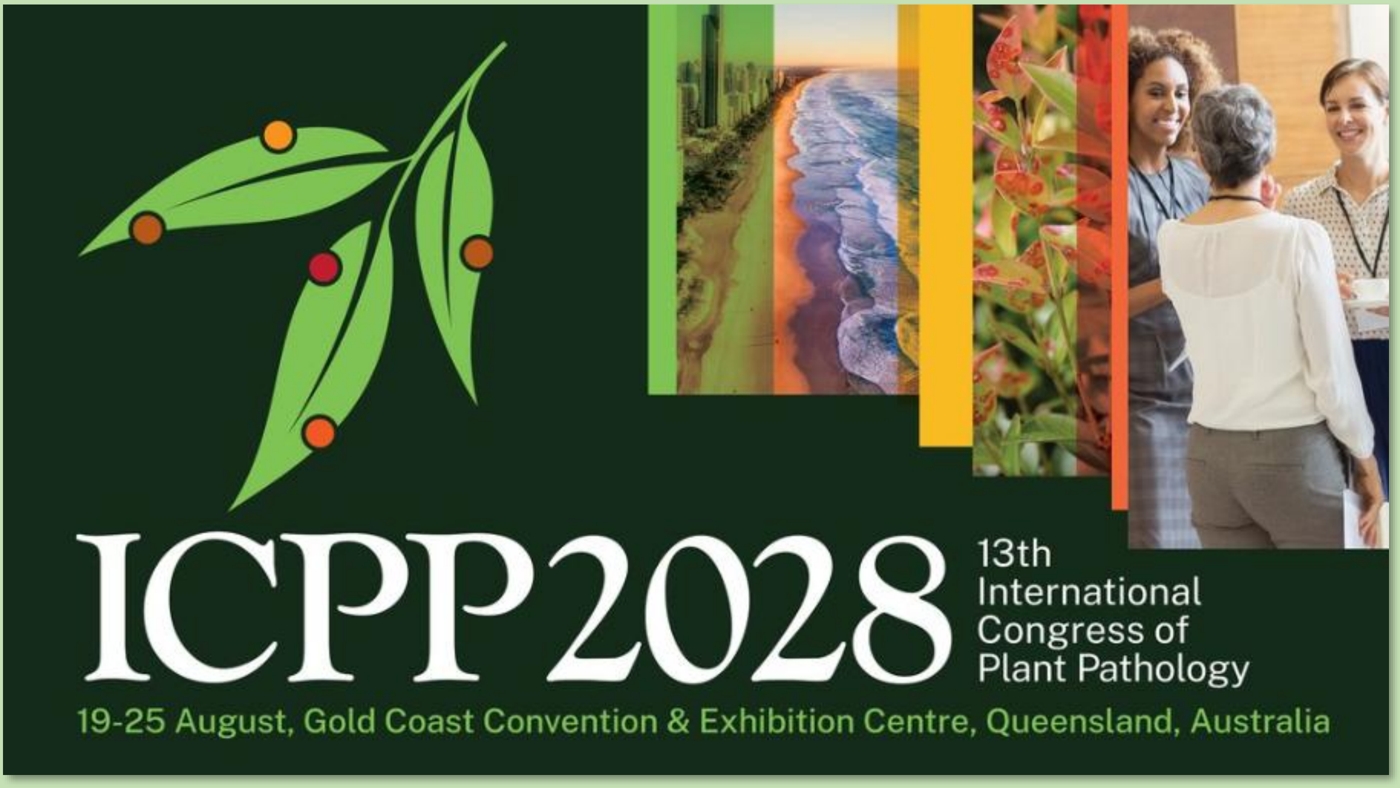
20th IOBC – WPRS Working Group meeting on: "Integrated Control in Oilseed Crops"
29 September – 1 October, 2026
Swedish University of Agricultural Sciences (SLU), Campus Alnarp, Lomma, Sweden
Website: www.slu.se/ICOC20

7th International Symposium on Fusarium Head Blight
5 October – 8 October, 2026
Department of Agricultural, Food and Environmental Sciences, University of Perugia
Perugia, Italy
Website: www.7isfhb.org

International Phytobiomes Conference 2026
3 November – 5 November, 2026
Niagara-on-the-Lake, Ontario, Canada
Website: https://phytobiomesconference.org/

XXI International Plant Protection Congress (IPPC) 2027 in conjunction with 26th Australasian Plant Pathology Conference (APPC)
1 November – 5 November, 2027
Te Pae Christchurch Convention Centre, Christchurch, New Zealand
Website: www.ippc2027.com

13th International Congress of Plant Pathology 2028
19 August – 25 August, 2028
Gold Coast, Queensland, Australia
Website: www.icpp2028.org


ICPP2028
13th
International
Congress of
Plant Pathology
19-25 August, Gold Coast Convention & Exhibition Centre, Queensland, Australia

INTERNATIONAL SOCIETY FOR PLANT PATHOLOGY (ISPP)

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