Food and Agriculture Organization of the United Nations

International Plant Protection Convention

Department for Environment Food & Rural Affairs

London, 21–23 September 2022

# International Plant Health Conference

REPORT

PROTECTING PLANTS PROTECTING LIFE

London, 21–23 September 2022

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**REPORT**

Food and Agriculture Organization of the United Nations
Rome, 2023

PROTECTING PLANTS
PROTECTING LIFE

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# Contents

# Foreword


*Osama El-Lissy is the Secretary of the International Plant Protection Convention.*


*Nicola Spence is the Chief Plant Officer of the Department for Environment, Food and Rural Affairs of the United Kingdom.*

Dear plant-health community,
Imagine a world where farms bear no crops, forests have no trees, and nature exists without plants.

Not only would our world look incredibly different, but humanity would probably cease to exist altogether. Plants provide 98 percent of the air we breathe and 80 percent of the food we eat. That's how much our lives depend on plants, yet we often overlook how vital they are.

Our global plant resources are under threat from pests. Once plant pests are established in an area, it becomes nearly impossible and extremely costly to eradicate them. This sets back global efforts to achieve the United Nations' Sustainable Development Goals by curtailing our ability to provide food security for all, protect our environment and biodiversity for future generations, and ensure that crops and plant products are traded safely to help boost economic growth.

The International Plant Protection Convention Secretariat and the Department for Environment, Food and Rural Affairs of the United Kingdom of Great Britain and Northern Ireland partnered to gather the world's best plant-health experts and advocates. The first and largest International Plant Health Conference was held in London on 21–23 September 2022 and aimed to address new and emerging plant-health challenges resulting from climate change, increased international trade, rapid loss of biodiversity, and new pest pathways such as e-commerce. Together we explored more efficient policies, advanced scientific solutions, and structures and mechanisms at the national, regional and global levels.

Much work remains to protect our plants. We call on governments, legislators, policymakers and donors to invest in research, outreach and building the capacity of national plant protection organizations, and to strengthen pest monitoring and early-warning systems.

We need all industry sectors and government partners to join forces and adhere to international plant-health standards to mutually protect our plants, food supplies, and economies.

We need the public to be cautious when taking plants and plant products when travelling, as these could carry plant pests. Likewise, we should be aware, when buying plants and plant products online, that they should come with phytosanitary certificates that attest freedom from pests and that they meet phytosanitary import requirements.

When we protect plants, we protect our health, our environment, our livelihoods, and our lives.

*Nicola Spence and Osama El-Lissy*

# Acknowledgements

The Food and Agriculture Organization of the United Nations (FAO), the International Plant Protection Convention (IPPC) Secretariat, and the Department for Environment, Food and Rural Affairs of the United Kingdom of Great Britain and Northern Ireland (Defra) wish to thank the Conference Organizing Committee, the illustrious set of speakers and facilitators, the interpreters, the support staff and all participants (in-person and virtual) for making this conference a huge success.

Our gratitude goes as well to the donors, without whom this conference would not have been possible. We wish to acknowledge the contributions made by the European Union, FAO, Finland, Ireland, the Republic of Korea, the United Kingdom and various supporters of the International Year of Plant Health.

We would like to convey our collective appreciation of the enormous work done by Defra to make this conference happen by recognizing the great leadership of Nicola Spence and the immense contribution of her team.

We would also like to thank all IPPC Secretariat staff involved in the preparation of the conference, covering logistics, programme aspects and communication, Defra and the Animal and Plant Health Agency staff and volunteers who supported each of the sessions during the conference.

# Abbreviations and acronyms

| | |
|---|---|
| **CPM** | Commission on Phytosanitary Measures |
| **Defra** | Department for Environment, Food and Rural Affairs |
| **ePhyto** | electronic phytosanitary certificate |
| **IPM** | integrated pest management |
| **IPPC** | International Plant Protection Convention |
| **ISPM** | International Standard for Phytosanitary Measures |
| **FAO** | Food and Agriculture Organization of the United Nations |
| **NPPO** | national plant protection organization |
| **RPPO** | regional plant protection organization |
| **SDG** | Sustainable Development Goal |
| **UN** | United Nations |


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# Why an International Plant Health Conference

## INSTITUTIONAL BACKGROUND

Plant health is vital in ensuring sustainable agriculture and food security across the globe.

Every year, we lose as much as 40 percent of global crop yields or around USD 220 billion as a result of plant pests.

At the same time, more people are going hungry every year. Last year, 828 million people in the world faced hunger, according to the latest report on the state of the world's food security and nutrition by the Food and Agriculture Organization of the United Nations (FAO).

The global situation gets even more complex with the impact of the COVID-19 pandemic on food supply chains, persisting and new emerging conflicts, ongoing humanitarian crises and rising inequalities.

Climate change is altering ecosystems, paving the way for new niches where pests proliferate. This has been associated with the rise in plant pests and invasive species. In the last 40 years, invasive pest incursions have grown by 40 percent and have cost countries at least USD 70 billion. They are also one of the main drivers of biodiversity loss.

In addition, as international travel and trade increase, so do the movement of plants, plant products, goods and people, all of which serve as pathways for pests to expand their distributions.

Global frameworks have been established to address such global challenges. The International Plant Protection Convention (IPPC) was brought into force to protect the world's plants, minimize the impact of plant pests and effectively manage their spread. The convention, which in 2022 celebrated 70 years and is now ratified by 184 contracting parties or countries, is the only multinational treaty established to protect plants and plant resources.

Protecting plants and plant sources requires the implementation of the convention and adherence to the International Standards for Phytosanitary Measures (ISPMs) – the gold standard in plant health. These standards help countries set their national phytosanitary legislation and import requirements.


The importance of plant health cannot be overemphasized. In 2020–2021, we marked the International Year of Plant Health, which raised global awareness and helped elevate the issue on national agendas.

Building on these achievements, we celebrated the first International Day of Plant Health on 12 May 2022 to continue to inform and engage the public, policy-makers, academia, media and the private sector about the key role of plant health in achieving the United Nations 2030 Agenda. We thank the governments of Finland and Zambia, the FAO and other government partners who tirelessly advocated for the resolution to be adopted at the General Assembly of the United Nations.

## OBJECTIVES AND KEY MESSAGES

The **International Plant Health Conference** aimed to provide, for the first time, a forum to discuss global scientific, technical and regulatory plant-health issues in a conference setting and at the same time advocate the importance of plant health to the media and general public.

Covering a large spectrum of plant-health issues, the conference was orientated towards attaining the **United Nations' (UN's) Sustainable Development Goals (SDGs)**, especially:

- **SDG 1** End poverty in all its forms everywhere;
- **SDG 2** End hunger, achieve food security and improved nutrition and promote sustainable agriculture;
- **SDG 13** Take urgent action to combat climate change and its impacts; and
- **SDG 15** Sustainably manage forests, combat desertification, halt and reverse land degradation and halt biodiversity loss.

This helped optimize public attention and mainstream plant-health policies into UN discussions by promoting the following key messages:

- Healthy plants are key to achieving zero hunger and the UN Sustainable Development Goals.
- Be careful when bringing plants and plant products across borders.
- Make trading in plants and plant products safe by complying with international plant-health standards.
- Keep plants healthy while protecting the environment.
- Invest in plant-health capacity development, research and outreach.
- Strengthen monitoring and early-warning systems to protect plants and plant health.

# International Plant Health Conference by numbers

**3**
organizers
(FAO, IPPC, Defra)

**500**
attendees from
**74** countries

**9**
symposia (scientific, regulatory, technical)

**54**
submitted posters

**1 350**
live webcast participants

**120**
speakers and facilitators

**9**
side events of
**26** submitted requests

**64 788 110**
readers potentially reached between 21 and 25 September 2022

# Impressions from attendees


**Louise Marie Malaki**
Assistant Chief Executive Officer,
Ministry of Agriculture and Fisheries
Samoa


**Kinda Alraiss**
Molecular scientist, FERA Science Ltd
Syrian Arab Republic


**Tara Jeffery**
Plant health and seeds inspector,
Animal and Plant Health Agency
United Kingdom


**Washington Otieno**
Sanitary and Phytosanitary Senior
Advisor, CABI International
Kenya


**Artur Shamilov**
Agriculture officer, IPPC Secretariat
Russian Federation

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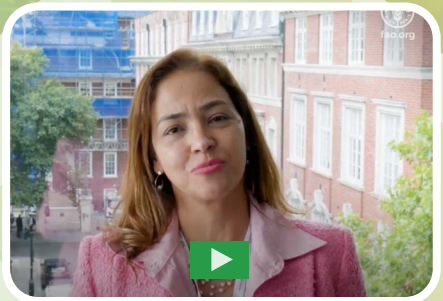
**Mekki Chouibani**
Executive Director, Near East Plant Protection Organization
Morocco

**Melisa Nedilskyj**
Agricultural Engineer, Plant Health Committee of the Southern Cone (COSAVE)
Argentina



**Edilene Cambraia**
General Coordinator, Ministry of Agriculture, Livestock and Food Supply
Brazil

**Andrew Gaunt**
Plant Health and Seeds Inspector, Animal and Plant Health Agency
United Kingdom

**Jingyuan Xia**
Director, Plant Production and Protection Division, FAO
China

**Magda Gonzalez**
Director Standards and Regulations Department
Costa Rica

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# Why plant health is important

by Jonathan Drori and Diarmuid Gavin

## “Plants are the primary source of all the food on the planet.


*Jonathan Drori, Author and specialist in the public understanding of science*

Every little bug, every critter, every animal – and remember, you and I are animals too – everything eats plants, or eats something else that eats plants. Plants give us the oxygen we breathe, and they are part of the water cycle, giving us rain. In life, they bind our soils. In death and decay, they become our soils.

People might get sick, perhaps animals too, but plants? Other than farmers or gardeners, most people in rich nations hardly spare a thought for plant health. If people need convincing, perhaps show them the horrifying, apocalyptic images of mile after mile of dead olive trees right now in southern Italy. They’ve been killed by ***Xylella***, a bacterial disease that has recently destroyed hundreds and hundreds of years of patient work and investment.

There are **thousands of nutritious, tasty and edible plant species** we could choose from. But astonishingly, whether we eat them ourselves, or feed them to animals, **the world depends on just three of them** for about half of all our calories. They are **wheat, rice and maize**. And just 12 species account for fully 85 percent of our food intake. What if something serious happened – say, the botanical equivalent of COVID-19 or Spanish flu – to one or two of our major food species? The effect could be devastating.


We increase our plant-health risk still further by sowing this tiny number of crop species on which we've chosen to depend, in **vast monocultures**. If you wanted to design a system to help pests and diseases to spread, that would be it. No wonder, these finely tuned, pernickety, intensively reared crops often depend on agrochemical protection. The evolution of insects' resistance to pesticides, and the evolution of the resistance of plant diseases, especially to fungicides, are now outpacing our ability to develop safe new treatments.


Globally, a quarter of the world's population already live with **moderate or severe food insecurity**. A plant-health epidemic, or heaven forbid, pandemic, could easily tip millions more into food poverty and hunger, even in a comparatively wealthy nation like the United Kingdom. For poorer countries it could be a catastrophe.

Stand back for a moment and think about what actions would make the greatest difference to overall plant health. Plant health must be seen in the context of the climate emergency, overall biodiversity loss and the way we live. Plant health isn't solely about our vital crops, but about our ecosystems. We could persuade our citizens to eat a more diverse range of plant species. Or radically, we could ensure that the prices of our goods and services include the true costs to the environment, for example of pollution or climate change. Surely, we require gutsy, far-sighted, charismatic leaders from across the world, working in unison, supported by the best evidence and the best scientific collaboration. That is why conferences such as this one, are so important. ”

## “We often take plants for granted, but their health is vital for the health of each one of us and the planet.


© Ruth Medjber

*Diarmuid Gavin, Garden designer, FAO National Goodwill Ambassador for Ireland, Champion of the International Year of Plant Health*

As plant pests and diseases leave millions of people without enough food to eat every day, we must **produce and consume food sustainably.** This includes preventing the introduction and spread of plant pests and diseases while protecting biodiversity. We know that **biodiversity** is crucial for a healthy environment. But we are losing so much biodiversity from the damage to our environment through human activities and the impacts of **climate change**. It’s time to take a more environmentally and socially sensitive approach to farming that focuses not only on production but also on **ecological health.** It is time to incorporate agroecological principles including pollinating practices and ensuring diversity to protect and reproduce soil health.

The IPPC community provides guidance on preserving biodiversity by protecting the environment from plant pests and invasive alien species – one of the main drivers of biodiversity loss. This means being much more disciplined, when importing plants, to respect quarantine periods and fulfil any other import requirements to ensure the healthy functioning of ecosystems.


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There are many ways in which each one of us can protect plant health, both at home, in our own gardens and at a commercial level.

We need to match our attitudes towards food and consumption and adopt a behaviour of **care for our plants, ourselves and the planet.** We can minimize the use of pesticides to produce and consume in a sustainably sound way, respecting biological cycles.

We can use our power as consumers to **buy sustainably farmed plants and produce.** We can **consume local and seasonal foods** and support **sustainable healthy diets** and agrobiodiversity with all-natural varieties and species of plants, fruits and vegetables.

The healthier plants are, the healthier we are through the food we consume and the biodiversity we preserve.


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Let's all be mindful when buying plants and plant products online. Let's think carefully about where we source material and ensure we use a reputable supplier.

**We all have a role to play in protecting our plant health.** Talk with your children, with your neighbours, and with your friends and family members. Organize a plant-health gathering at the nearby school or in your community. It is up to each one of us in the plant-health community to acknowledge all different ways of gardening, farming, producing and consuming in a sustainable manner to prevent the spread of diseases. It is up to each one of us to engage in action for **healthier plants for all.**

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# Summary of thematic highlights

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## DAY 1: PLANT HEALTH AND FOOD SECURITY

### Plenary

### Global perspective on food security

The close interaction between plant health and food security requires a transformation of the agrifood system if affordable, sufficient and healthy diets are to be produced within the planetary boundaries in a climate crisis. The discussion in this plenary session emphasized the need for effective plant-health management and the enhancement of tools and standards for pest and disease data management, risk assessment and prediction to protect smallholders' food security and livelihoods. A specific focus should be put on transboundary threats to plant health and investing in the development of new innovations in genetics, plant management and governance to mitigate the spread of pests and diseases. Additionally, the delegates debated the effects of international trade, travel and climate change on plant health as well as the impact of stringent controls on the economies of less developed countries. The discussion focused on the new challenges that national plant protection organizations (NPPOs) are facing in the advent of e-commerce and participants shared different experiences of coping strategies.

The session raised awareness about Food Vision 2030: a strategy for the sustainable development of the agrifood sector in Ireland. It confirmed the European Union's (EU's) support for the important work of the IPPC community and highlighted the European Green Deal and Farm2Fork approach in supporting sustainable agrisystems. The importance of reforming approaches to plant reproductive material, which would help complement the revised EU Plant Health Regime, was also emphasized.


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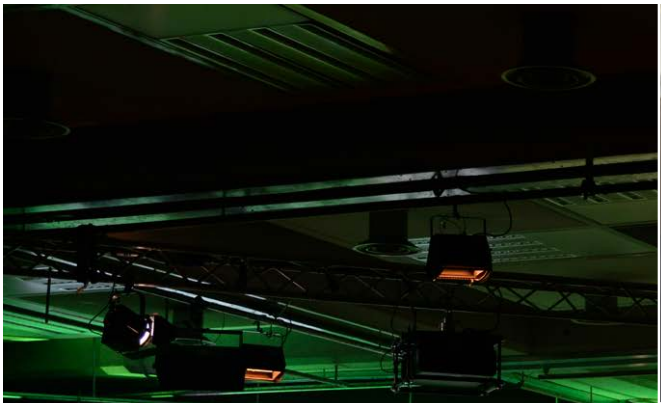

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## Scientific symposium

### Plant pest diagnostics – its importance and its relation to food security

Plant pests pose a threat to food security because they can damage crops, reduce the availability of food and increase its cost. Quick, accurate and reliable detection and identification of pests are essential. Plant pest diagnostics, a key activity of NPPOs and regional plant protection organizations (RPPOs), has gone through a revolution in the last century: from microscopic examination to sequencing, from laboratory-based to "place of inspection" based diagnostics. This session underlined the technological progress made in the last century to improve and speed up diagnosis, the opportunities and challenges of technologies such as high-throughput sequencing, the importance of quality assurance to ensure the reliability of diagnostics, and the importance of laboratory networks and bringing diagnostic capacities to farmers. For example, high-throughput sequencing technologies are progressively being transferred from research to plant-health diagnostics and costs are decreasing. However, the application of such technologies also brings challenges (such as sharing of sequence data and possible impact on plant-health policies).


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The establishment of diagnostic networks (such as Plantwise) bringing diagnostic capacities to farmers is key to early detection and is essential for effective pest management. Such networks, which are linked to reference laboratories, can also support NPPOs in fulfilling their pest reporting obligations and can speed up responses to pest incursions. The session highlighted the importance of harmonization of diagnostics in achieving trust between countries and facilitating trade. The example of the EU reference laboratories, established to ensure a harmonized and efficient implementation of regulations in the European Union, shows that such networks contribute to good quality diagnostics (in this case including organization of proficiency tests with national reference laboratories, training workshops, validation of tests, provision of reference material to EU national reference laboratories, and also support to non-EU countries). Quality assurance and validation are essential to ensure the reliability of the diagnostics. It is therefore crucial that resources are committed to ensuring the training of personnel in quality assurance and validation of tests.

## Regulatory symposium

### Emerging threats to plant health and food security

The desert locust is considered to be the most destructive migratory pest in the world. In this session, delegates heard about the management, monitoring and warning system for locusts in South America, developed by the NPPO of Argentina (the National Agrifood Health and Quality Service of Argentina (Senasa)) in collaboration with the Inter-American Institute for Cooperation on Agriculture and the


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RPPO of the region (the Regional Committee of Plant Health of the Southern Cone (COSAVE)). The integrated system helps to improve the management of locust emergencies, applying technology for information management, decision-making and issuing alerts that improve communication with stakeholders. It is planned to add further functionalities and to use the tool for other pests and diseases upon obtaining new funding.

It was observed during the session that there is a need for simplification and harmonization of the current system to ship seed internationally. The seed industry proposes a phytosanitary systems approach for seed that would provide assurance that the processes used to produce seed promote high seed quality and decrease the risk of seed-transmitted pests.

The discussion highlighted the importance of carrying out pest risk analysis and a comprehensive and in-depth impact assessment. It also drew attention to the role of surveillance for early detection and the crucial need to have a solid legal basis for a prompt reaction.

The session highlighted the challenges faced in achieving recognition of plant pest risk at the same level as risks to human and animal health, even though there is a consensus that plant health is an integral part of One Health.

The session concluded that there is an enormous need to embrace new technologies, such as geographical information systems, early-warning systems, drones

and satellites, to track the movement of mobile pests such as insects and also track the spread of bacterial diseases. Surveillance of symptomatic and asymptomatic plant stock is necessary as part of a proactive approach to plant-health management, mitigating the risk of high crop losses that impact food security. Reassessing the list of pests for which a country undertakes pest risk analyses is highly important to avoid blind spots in the policy process and to re-evaluate known knowledge. Seed companies are looking to explore a systems approach to producing seed so that biosecurity is not compromised in the search for a smoother international-trade method that does not burden consumers.


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## Technical symposium

### Early-warning systems

Plants growing outside their native range can be monitored for their reaction to pests and diseases that they would not normally encounter to provide early-warning information. Such plants are known as “sentinel plants”. Under the IPPC national reporting obligations, contracting parties are obliged to provide information about their pest situation, which can, in turn, be used when developing early-warning systems and when using other available resources such as the IPPC phytosanitary capacity evaluation tool. This session focused on early-warning systems, noting the need to continue collaborative surveillance approaches that help countries respond quickly to plant pest outbreaks and detections, including for emerging pests of general concern such as fall armyworm, *Fusarium oxysporum* f. sp. *cubense* Tropical Race 4 (the fungus that causes Fusarium banana wilt TR4), red palm weevil and Opuntia scale. One such approach – the Cooperative Agriculture Pest Survey in the United States of America – was presented, with its mission to conduct exotic plant pest surveys through a national network of cooperators and stakeholders to safeguard American agriculture and natural resources and to detect new pest incursions, among other focus areas. The importance of maintaining databases of the geographical distribution and hosts of crop pests and diseases, to allow rapid identification of potential threats, was also highlighted during the session.

## Side events

### Managing emerging threats in plant health – the European Union approach

**Organizers:** European Commission, DG SANTE, European Food Safety Authority, Joint Research Centre

This session focused on innovative approaches and best practices that are part of the EU Plant Health Regime. It presented innovative elements applied in the areas of research coordination, diagnostics, collaborative and reference networks, quantitative pest risk analysis, surveillance planning and implementation, new approaches in pest risk analysis, and horizon scanning for early detection of emerging plant-health risks, and how these elements support the functioning of the plant-health regulatory regime in the European Union. The European Union presented its regional experience of emerging plant-health risks and showcased a practical example of regional cooperation and practices.


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### Plant-health management in the Global South through partnerships

**Organizers:** Consultative Group on International Agricultural Research

In this session, the Consultative Group on International Agricultural Research (CGIAR) Plant Health Initiative, which aims to protect agriculture-based economies of low- and middle-income countries in Africa, Asia and Latin America from pest and disease outbreaks in major crops, was presented. The session emphasized the importance of integrated pest and disease management and inclusive partnerships. During the discussion, the expectations for the CGIAR Plant Health Initiative's proposed global diagnostic network were collected along with views on what should be done differently to manage the plant-health threats more effectively. Specific actions required to improve access to pest data were discussed, as this would enhance prediction accuracy and allow countries to prepare for rapid responses. The need to strengthen mycotoxin management in the Global South was identified, and factors limiting the translation of research on plant-health innovations into effective policies were discussed.

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## Supporting food security through international grain and seed trade and investment

**Organizers:** International Grain Trade Coalition, International Grains Council, The Standards and Trade Development Facility & the International Seed Federation

This session focused on the trade of grain and seed, which is a key driver of economic growth, and the contribution of this trade to food security. Trade routes of grains, oilseeds, rice and pulses are dynamic, with the future of the grain trade more focused on food. A rules-based trading system is of great importance at a time when the world is facing multiple overlapping food crises. This requires harmonization of phytosanitary measures and transparency when implementing these measures. To be able to answer current plant-health challenges and to support food security, there is a need to strengthen dialogue and cooperation across governments and with the private sector. The session highlighted that it is only through cooperation and partnership at local, national and international levels that the quality of seeds and their contribution to food and nutrition security can be ensured, this requiring the availability of sufficient, diverse, locally adapted, and improved varieties for all farmers while respecting the environmental, health, social and economic aspects of seed production and trade.

*All presentations and recordings from Day 1 of the conference can be found at the conference page on the IPPC website: www.ippc.int/en/news/international-plant-health-conference*

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## DAY 2: PLANT HEALTH AND ENVIRONMENTAL PROTECTION

### Plenary

### Climate change and the impacts on plant health

The main theme discussed during the plenary session was the impact of climate change – in terms of increases in carbon dioxide concentration, temperature, sea level, drought, and severity of rain and floods – on plant pests and how climate change results in changes in pest populations and distribution, occurrence of natural enemies, pest outbreaks and, consequently, plant health. These climate changes have a great impact on food security and international trade. Some tools, such as molecular techniques for early pest diagnosis and forecasting models to anticipate pest distribution, are being used by some countries in their risk analysis and decision-making.

The IPPC community has been working on this topic through the implementation of an action plan developed by the Commission on Phytosanitary Measures (CPM) Focus Group on Climate Change and Phytosanitary Issues. The action plan is based on the IPPC Strategic Framework 2020–2030 and aims to address and manage the climate-change impacts on plant health by 2030. To achieve this, raising awareness of the climate-change impacts on plant health, capacity building and international cooperation are fundamental. Countries and national, regional and global organizations are developing different initiatives to address and manage climate-change impacts on plant health by using forecasting models and other technologies, organizing technical groups and related events, and so on. However, the discussion reinforced the need for better communication, mobilization of resources and international cooperation to reach this goal and the conference served as a great opportunity to raise awareness on this issue.

## Scientific symposium

### Integrated pest management and nature-based solutions

Integrated pest management (IPM), with its nature-based solutions, offers sustainable pest control, helps in pesticide risk reduction, and thereby protects and promotes the use of biodiversity. Success stories of the implementation of IPM technology, as well as its impact on farmers' livelihoods, were demonstrated during this session. The importance of strengthening the knowledge of farmers to support the implementation of IPM technology was highlighted, as was the key role of public- and private-sector advisory services in facilitating the uptake of nature-based solutions. The discussion focused on the farmer communities' motivations to implement IPM technology related to compliance with production standards and thereby access to markets, while exploring the barriers to implementation and uptake of IPM in terms of accessibility, availability and affordability. Techniques such as the sterile insect technique (and related techniques) for the integrated, area-wide management of insect pests is an example of an environmentally friendly means of suppressing and even eradicating major insect pests, such as various species of fruit fly and mosquito, that is applied by different countries. The session concluded that biocontrol, with its contribution to biodiversity and support for better human health for agricultural workers, should be considered as the foundation of pest management. The discussion confirmed that more research and data are required to address the demand for nature-based solutions. Along with the environmental value of IPM, the delegates emphasized the socio-economic benefits of IPM and the need to encompass return-of-investment analysis when assessing the cost–benefits of IPM. This should be complemented by the development of long-term programmes of action as well as efforts to enhance partnerships between the public and private sectors.


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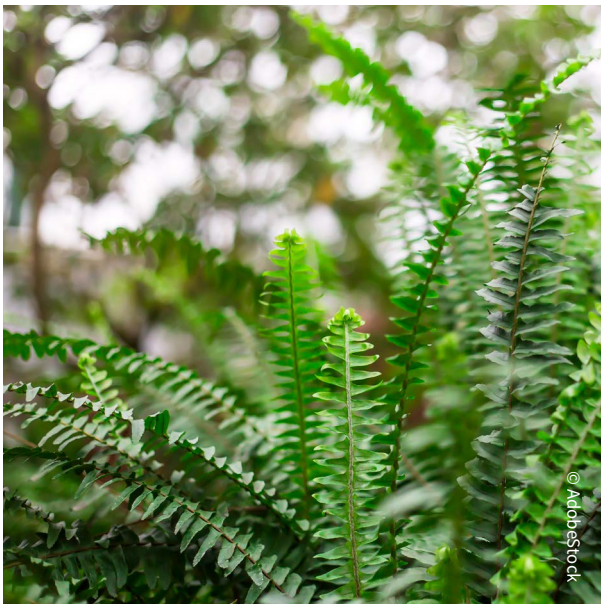
## Regulatory symposium

### Addressing climate change and biodiversity issues in plant-health policies

Plant-health authorities face increasing challenges in protecting plant health in a changing climate, and these challenges must be factored into the design and delivery of long-term interventions. In this session, the complex nature of framing climate change in the context of agriculture, while maintaining biodiversity, was emphasized. Referring to the One Health approach, the discussion focused on the need to manage and maintain ecosystem services that are essential for plant health. The diversity of genetic resources and the breeding of resistant plants, the need to reduce the use of pesticides and to manage the pollution they cause, and the actions needed to embrace an ecosystems approach, including pest risk management, in the face of accelerating climate change were all examined. The process for evaluation of treatments and the need for contracting parties to submit available treatments or research supporting a new submission were explored, with delegates directed to resources that can be used to develop research protocols in such a way that speeds up their evaluation. Specific experience from Australia was presented on trials of technologies to automate the detection of "hitchhiker" species on inanimate objects. These technologies include RingIR technology, which involves identifying the presence of insects based on the volatiles emitted by them, and camera systems to screen the external surfaces of containers and identify the presence of any biosecurity risk material in real time.



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## Technical symposium

### Soil health, the soil microbiome and plant health

This session explored the role of soil health in plant health. Twenty-five percent of the planet's biodiversity is found within soils and, still, our soils are at risk. Globally, 33 percent of soils are considered degraded, with this figure set to rise. Without healthy soils, plant health, yield and nutrition are compromised, significantly impacting food security, while carbon sequestration is reduced in degraded soils. Healthy soils are a dynamic and structurally complex living system. Baseline data or a full understanding of the mechanisms and ecological interactions involved in healthy soils are missing. Nevertheless, there is evidence that regenerative practices such as avoiding soil compaction, effective utilization of crop rotations, and the use of cover crops and lays can aid the formation of disease-suppressive soils. Exploitative practices have compromised many of the services provided by healthy soils and their intrinsic biodiversity, and it now falls to farmers, as custodians of the land, to implement regenerative practices for soil health. Suitable support of a few, farm-scale, codesigned demonstration projects can have a significant impact towards the incremental adoption of best practices by others as the cost–benefits become clear. Public subsidies for the adoption of some best practices should be included in the support portfolio to promote soil health. Utilizing a variety of communication tools and the incremental availability of first-hand evidence can help spread practices across communities (with a specific focus on gender gaps), enhance engagement over time, demonstrate impact and build trust in healthy soil practices.

*All presentations and recordings from Day 2 of the conference can be found at the conference page on the IPPC website: www.ippc.int/en/news/international-plant-health-conference*


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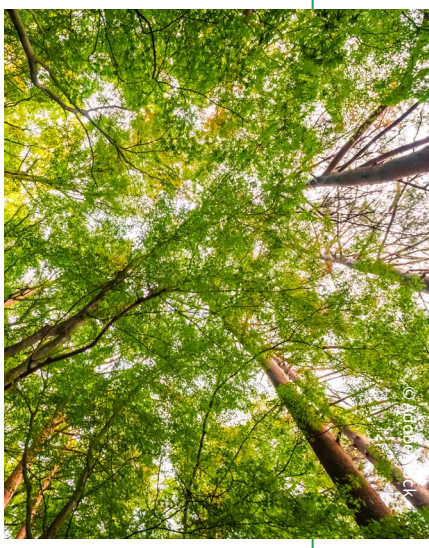
## Side events

### Forest health in a changing climate – risks, mitigations and tools

**Organizers:** United Kingdom **Met** Office & Birmingham Institute of Forest Research

Declining forest health is a global issue that needs to be addressed by the worldwide community. An overview of global forest biosecurity, with an emphasis on climate change, was provided during this session. How the United Kingdom government is meeting its forest-health research needs, including through the creation of a specialist centre (the Centre for Forest Protection), was explored. The session presented key insights into fundamental science experiments investigating forest health and pathology in a changed (future) atmosphere, provided an overview of the interrelationship between climate change and forest health, and described the development of a practical forecasting tool. The session concluded that research on the impact of climate on forest health should increase and be sustained over longer timescales. Additionally, the delegates recommended that knowledge exchange between researchers and practitioners be strengthened by fostering and sustaining forest-and plant-health communities of practice. These should enhance capacity-building initiatives at the interface of forestry and climate science to safeguard forest health. Delegates also recommended that forestry attitudes and behaviours be integrated on an international scale and within the IPPC framework.



### Whose voice counts? Codesigning a biosecure future for positive plant health

**Organizers:** Forest Research United Kingdom

In this session, innovative perspectives on the social dimensions of plant health were presented by a group of international researchers actively engaged in interdisciplinary efforts around prevention, detection and control (mitigation) of invasive pests and pathogens, and adaptation to them.

### International plant-health research partnership to address global challenges

**Organizers:** Euphresco, Plant Biosecurity Research Initiative and B3

It is not possible to avoid all the challenges to plant health posed by global trade, increasing travel activities and climate change. However, it is possible to optimize strategies to address these challenges with effective cooperation and coordination. This session focused on the role that research partnerships can play. Research has a key role in underpinning plant-health activities, ranging from pest risk analysis, regulation, surveillance, taxonomy and diagnostics to actions at outbreaks to eradicate the pests and control further spread. Research also helps to maintain and develop scientific expertise and infrastructure that support plant health. Transnational research collaboration can provide the best solutions to difficult situations, as it enables the efficient use of national research funds and personnel resources by pooling them. Cooperation creates a more diverse and critical mass of expertise to deliver more output compared to that which could be achieved through separate small projects alone. The audience showed interest in strengthening international research coordination in plant health. Academia and for-profit organizations were identified as the entities to involve in future activities, alongside research funders and policymakers.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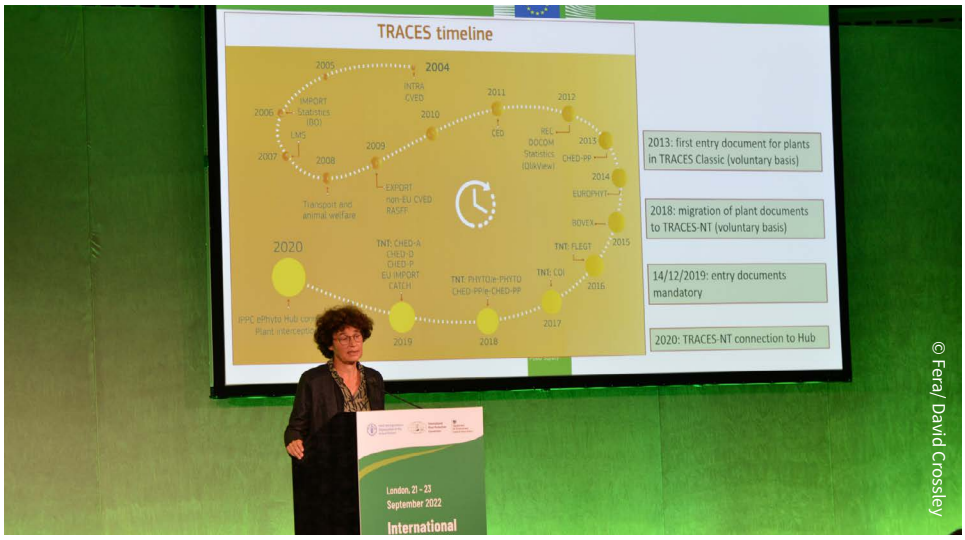
## DAY 3: PLANT HEALTH AND SAFE TRADE

### Plenary
### Facilitating safe trade and economic development

The IPPC community has an important role to play in the facilitation of safe trade. This plenary session concluded that the IPPC community should reinforce the harmonization of mitigation measures for particular pests and ensure that the setting of standards is scientifically driven. For effective, harmonized plant protection, it is critical that the facilitation of safe trade is a key consideration in standard setting. The plenary session focused on the need to ensure that a risk-based approach is applied during plant-health negotiations. Additionally, it highlighted the need to set up a framework that prevents political solutions being applied for matters that should be based on technical and scientific evidence.

During the session, delegates were provided with a concrete example of how the IPPC ePhyto (Electronic Phytosanitary Certificate) Solution facilitates safe trade. The ePhyto Solution is an information-technology innovation intended to reduce the risks associated with physical paper certificates while enhancing communication between NPPOs and the efficiency of border cargo clearance. International adoption of the ePhyto Solution is projected to result in the eventual replacement of paper phytosanitary certificates and create opportunities to provide certificates in an innovative, secure, cost-effective and globally harmonized way. The TRACES system, the sanitary and phytosanitary certification and border-clearance platform maintained by the European Commission, provides a single connection to the IPPC ePhyto Hub for EU Member States and is definitively a success story, as it greatly facilitates the work of trading partners.

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## Scientific symposium

### Changing trade patterns for plants and plant products

This session provided further information on the ePhyto Solution as a globally harmonized approach for electronic certification that complies with ISPMs and, as of September 2022, connects 110 countries. The Global Alliance for Trade Facilitation is providing technical support to developing countries to help them adopt the ePhyto Solution. Implementation leads to fewer delays and significant cost savings for exporters.

The session discussed novel pest-management strategies for insects that are being developed within Japan's Moonshot programme. The aim of the programme is to eliminate the need for pesticides by 2050. The techniques include laser shooting, biocontrol and incompatible insect techniques. The possibility of gene editing biocontrol agents is being investigated.

During the session, delegates heard about the use of electronic cold pasteurization, which is being developed in the United States of America as an alternative to phytosanitary treatments such as fumigation for eliminating or sterilizing plant and human pathogens and insect pests present in fresh produce. An intense stream of electrons is created by a high-voltage current. Uses on seed and wood are currently being investigated.

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## Regulatory symposium

### Transparency and reliable trade relations

This session revolved around the transparency of information to be shared between NPPOs, industry actors and official bodies to ensure that the movement of plant material both within a country and between countries was auditable and carried the necessary assurances with regards to plant-health biosecurity. During the session, there was an overriding message about the need for NPPOs to be transparent and how this can facilitate trade between countries who apply an open approach to their plant-health biosecurity status while promoting trust in the sourcing of material from other countries. The implementation of ISPMs, in addition to the transparency of information from industry via their biosecurity certification accreditation schemes, will be the robust foundations on which to deliver clean, healthy plant material across the globe, which is essential considering the opening of new markets, a trebling of plant-trade volumes, and reduced times in transporting plant material around the globe.

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## Technical symposium

### Emerging pathways

This session highlighted the role that emerging non-plant pathways can play in the introduction and spread of quarantine pests and considered best practices to mitigate these risks. The presentations focused on sea containers, cargo, e-commerce, and courier and mail services. Both e-commerce and sea containers pose a significant pest risk if safeguarding tools are not applied. The session emphasized the importance of raising awareness about pest risk and improving collaboration with customs authorities and with industry stakeholders along the entire supply chain and across national, regional and international boundaries. Industry and public stakeholders all have a significant role to play in helping regulators better safeguard consignments moving on these pathways while facilitating safe trade. Engaging promptly and openly with relevant stakehold-

ers is critical when assessing the potential impact of emerging pest issues and proposed phytosanitary measures. Allowing key stakeholders to provide input into the solutions as they are being developed is crucial. Focused outreach and public-awareness campaigns are essential, and regulators should ensure that the information is presented in a manner that is easy to understand, consistent and transparent. National plant protection organizations were strongly encouraged to ensure that lists of prohibited and restricted agricultural goods are readily available and communicated to e-commerce stakeholders, including members of the public. This would be a helpful strategy to increase awareness of good practices of international phytosanitary standards. The delegates encouraged regulators to emphasize the public benefits arising from their cooperation and assistance in preventing pest introductions. These benefits include optimized use of government resources and improved efficiencies, fewer rejected or seized consignments, maintenance of trading relationships, decreased monetary loss for the industry, and protection of the environment and plant resources.


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*All presentations and recordings from Day 3 of the conference can be found at the conference page on the IPPC website: www.ippc.int/en/news/international-plant-health-conference*

## Side events

### Facilitating safe trade – why is a gender lens important?

**Organizers:** The Standards and Trade Development Facility housed at the World Trade Organization

Sanitary and phytosanitary measures, including ISPMs, are in theory "gender neutral" yet, through sharing of various national examples, this session highlighted that men and women are not equal when it comes to compliance with these standards and guidelines. Manual weeding and pest scouting are dominated by women. Women play a key role in scouting for pests and harvesting and handling production, and hence also in meeting the requirements of relevant standards. Attention should therefore be paid to the roles that women have in plant value chains and gender mainstreaming should start from the time of standard development. Phytosanitary capacity building traditionally remains focused on achieving compliance with ISPMs in the most technically effective and economically efficient manner. However, the session recommended that efforts should be made to mainstream gender in a manner that ensures and prioritizes the roles of women, the challenges they face and the impacts on them, by enhancing multistakeholder partnerships. It was suggested that NPPOs need to build relationships with their clients to better understand the challenges that they face in trade and to support the closing of the gender gap. A good example of positive gender tools is the implementation of transformative digital solutions such as the ePhyto Solution, which offer opportunities to facilitate inclusion while reducing some of the barriers faced by women and other marginalized groups. Development agencies helping countries to implement sound policy are recommended to include gender considerations in how they approach and design assistance related to the practical implementation of plant-health projects.

### Systems approaches – exploring shared responsibility to enhance safe and efficient trade of amenity and ornamental plant material

**Organizers:** International Association of Horticultural Producers and Plant Health Alliance

This session presented a preliminary survey of the international ornamental trade by the International Association of Horticultural Producers, which indicated that a systems approach to plant health using voluntary standards could augment regulatory systems.

The voluntary Plant Health Management Standard, developed by the United Kingdom's trade sector with input from the NPPO, sets out a proactive systems approach that can be applied to on-site and supply-chain scenarios, nationally and internationally. This standard integrates regulatory measures with voluntary procedures that are incorporated daily and throughout the year.

The session explored how the United Kingdom's NPPO works in partnership with stakeholders, including trade and environmental non-government organizations, to deliver a proactive systems approach nationally and recognizes the Plant Health Management Standard as a key component for improving plant health and biosecurity at both a business and a national level.

The online "Beyond Compliance" tools, developed via an IPPC project and funded by the Standards and Trade Development Facility, were discussed. They provide decision support and were designed to help NPPOs evaluate the effectiveness of systems approaches, so that they can develop a more informed position for negotiation.

## Biotechnology (precision breeding)

**Organizers:** Department for Environment, Food & Rural Affairs, United Kingdom

This session focused on precision breeding tools, which have come to the fore in crop breeding. Such tools allow more precise and expedited genetic changes compared to traditional approaches, where cross-breeding or randomly induced mutational screening can take a decade for the creation of a new elite variety. The broad spectrum of beneficial traits includes resistance to pests and diseases, environmental tolerances, increased yields and nutritional traits. This is particularly important where breeding may otherwise be difficult or impossible, as is the case with bananas. Such traits are essential to future-proof food security and achieve the UN Sustainable Development Goals.

Some unease remains around the use of "unnatural" precision breeding, demonstrated by differences in public opinion and regional policy, and this can create a barrier to trade. Concerns affecting precision breeding are in part a reflection of mistakes made in the 1990s with genetically modified organisms. The research community may have too readily believed those concerns would "blow over", but they have had a lasting impact. Supermarkets played a major part in this, as the commercial decisions to pull products before the scientific opinion was formed set a tone. Today, the role of scientists in communicating the potential benefits is incredibly important and climate change being at the forefront of minds opens the door for discussion.


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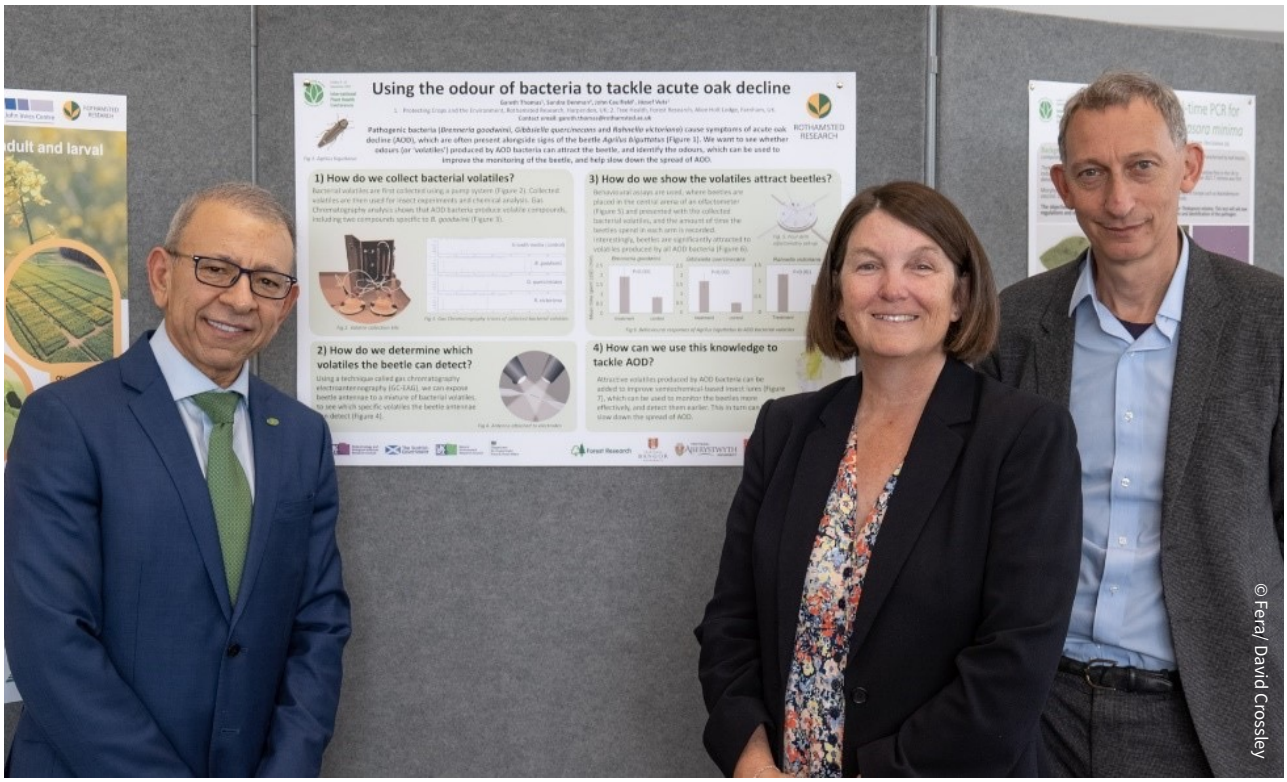
Argentina has led the way in the creation of a regulatory system for precision breeding, based on the final product being free from transgenes, and others such as Canada have now followed suit. This compares to process-based regulation in, for example, the European Union, where precision breeding currently falls under genetically modified organism regulation. Regulatory transparency and engagement are key. During the session, it was discussed that part of the challenge in the European Union is the fact that the risk assessment by the European Food Safety Authority is decoupled from decision-making by the European Commission.

Globally, regulation and acceptance of precision breeding are ultimately likely to be driven by market forces. Price, safety and nutrition consistently top consumer priorities. The session reported that Argentina has experienced an explosion in research and development in precision breeding, both in terms of investment and innovation, but it's important to remember that farmers will not grow something without a clear economic benefit. This relates to farmers' decisions on whether to use precision-bred crops based on market forces, but also to the prioritization of target traits for breeding. This remains something to consider within publicly funded research and development, which might include, for example, work to breed plants with traits that confer resistance to threats that may not yet be present but are likely to arrive. If precision-bred crops are generated to grow in novel environments, they will encounter different pests and diseases, and this requires thought and future-proofing.

# Conference posters and early-career competition winners




*The winning poster submitted by Dr Gareth Thomas, with our judges (left to right) Dr Osama El-Lissy, Professor Nicola Spence and Jonathan Drori. Source: © FERA*

**A call for international research posters was launched with the support of Fera Science Ltd, particularly encouraging submissions from early-career researchers.**

Many excellent submissions were received, displaying a broad expertise in plant health, relevant to the conference themes of food security, environmental protection and safe trade. Each submission was assessed by a joint Fera, Defra and Animal and Plant Health Agency scientific committee, with 50 posters selected for inclusion at the conference, of which 30 had the lead author as an early-career researcher.

These were an extremely welcome addition to the conference, with posters being rotated over the three days, aligned to the daily themes.

A special competition was run for the 30 early-career researchers who submitted their work, with our panel of distinguished judges – Professor Nicola Spence (United Kingdom Chief Plant Health Officer), Dr Osama El-Lissy (IPPC Secretary) and renowned author Jonathan Drori – judging each poster against the quality of the research and clarity of communication. A “theme winner” was then shortlisted for each day (Table 1).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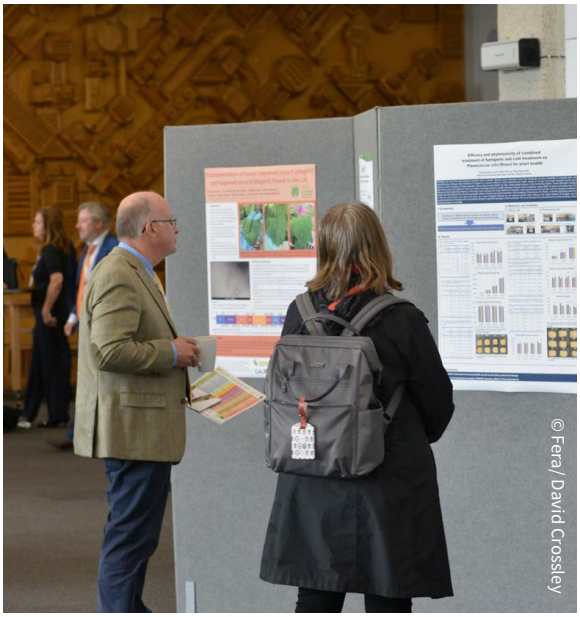

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**Table 1: Early-career poster competition winners**

| Theme | Author, organization | Poster title |
|---|---|---|
| Food security | Viet-Cuong Han, Curtin University, Australia | First report of pathogens associated with shot-hole disease on flowering cherry trees (*Prunus* × *yedoensis*) and warning of their possible cross-infection with stone fruits trees (*Prunus* spp.) |
| Environmental protection | Gareth Thomas, Rothamsted Research, United Kingdom | Using the odour of bacteria to tackle acute oak decline |
| Safe trade | Alex Lines, Animal and Plant Health Agency, United Kingdom | Digital data collection tools in plant health surveillance and action |

An overall winner of the best early-career researcher poster for the International Plant Health Conference 2022 was then decided from these three, with the winner being Dr Gareth Thomas for his work on acute oak decline. We approached Gareth for a comment on the conference and he said, "the conference was a very enjoyable experience, and it was particularly insightful to learn about the science-led policies in place, which are used to address global plant-health challenges".

Each of our theme winners received a prize kindly donated by Jonathan Drori.

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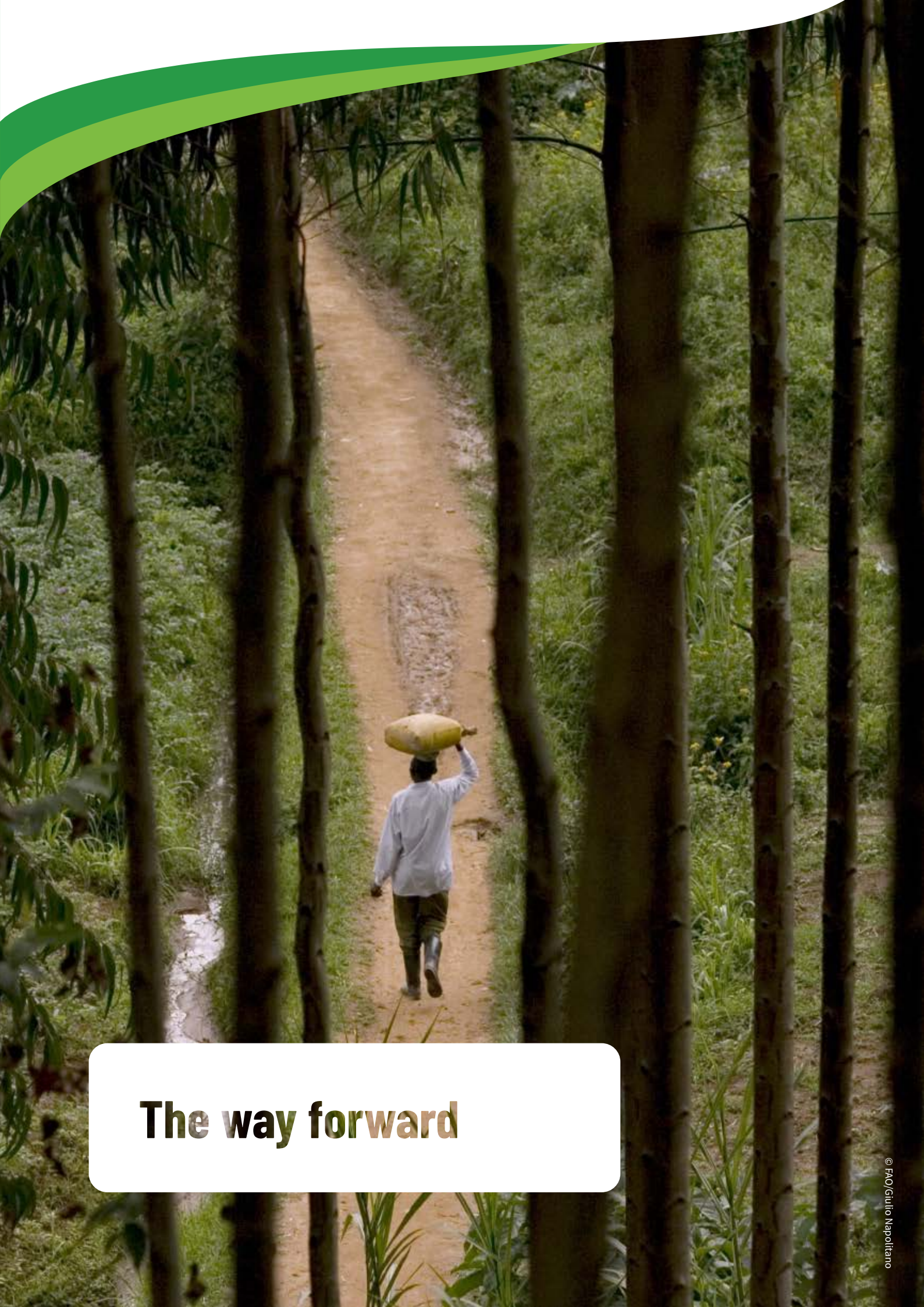
*Duncan Allen, Plant Pest Scientist, Department for Environment, Food & Rural Affairs, United Kingdom*



# The way forward

The first International Plant Health Conference concluded with a positive turn-out, robust discussions and opportunities for new or strengthened collaboration on ways to tackle global food security, the harmful impacts of climate change on plant health and the urgent need to protect the environment and facilitate safe trade.

The discussion emphasized:

- the essential **need to communicate** to the public the importance of plant health;
- the importance of **effective plant-health management** and the need to enhance tools and standards for pest data management, risk assessment and prediction to protect smallholders' food security and livelihoods;
- the urgent need to **invest in developing new innovations** in genetics, plant management and governance to mitigate the spread of pests and diseases;
- the need to **establish diagnostic networks**, bringing diagnostic capacities to farmers for early detection and effective pest management;
- that **harmonization of diagnostics** is important to achieve consistentency between countries and facilitate trade;
- the need to **simplify the current system of shipping seed internationally** and adhere to consistent application of phytosanitary standards for seeds;
- the opportunities in **embracing new technologies**, such as geographical information systems, early-warning systems, drones and satellites, to track the movement of mobile pests such as insects and the spread of plant pathogens;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- the need to further **develop databases of geographical distribution of host crops** and pests for the timely identification and rapid response to potential threats;
- the need to **clearly and effectively communicate the impact of climate change on plant health**;
- the urgent need to **enhance capacity** at national, regional and international levels **to tackle the challenges posed by climate change** by managing and maintaining ecosystems, including the reduction of indiscriminate use of pesticide;


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- that **research has a key role in underpinning plant-health activities,** ranging from pest risk analysis, regulation, surveillance, taxonomy and diagnostics, to actions to prevent, contain, and if possible eradicate outbreaks of pests and control further spread;
- the need to **invest in research** to address the demand for nature-based solutions and to fully understand the mechanisms and ecological interactions of healthy soils and the impact of climate on forest health;
- the importance of **IPM technology**, as well as the key role of public- and private-sector services to facilitate the uptake of nature-based solutions;
- that **biocontrol**, with its contribution to biodiversity and support for the health of agricultural workers, should be considered at the foundation of pest management;
- the importance of **enhancing capacity-building initiatives at the interface of forestry and climate science** on an international scale and within the IPPC framework;
- that the IPPC community should reinforce the harmonization of mitigation


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measures for particular pests, **ensure that the setting of standards is scientifically driven** and prevent political solutions for matters that should be based on technical and scientific evidence;

- that private sectors along the supply chain at all levels, institutions, and the public, **all have a significant role** to play in helping regulators to effectively safeguard against emerging plant pest pathways while facilitating safe trade;
- that having **focused outreach and dissemination** of timely and adequate information from regulators in simple, consumable and consistent terms for a wider audience is critical (for example, a clear list of prohibited agricultural goods in the e-commerce sphere, communicated publicly by regulators, would be an effective strategy to increase awareness of good practices and required standards);
- that attention should be paid to **the roles that women have in plant-health value chains** and that **gender equity** should be emphasized at all levels of plant health, including standard development;
- the incredibly **important role of scientists in communicating the potential benefits of plant breeding** to address climate-change challenges and pest problems;
- that, globally, regulation and acceptance of **precision breeding** are likely to be driven by market forces, with price, safety and nutrition consistently at the top of consumer priorities; and
- that, it is important to **leverage scientific advancements in biotechnology and precision editing** to combat invasive pests, tackle the challenges posed by climate change, and increase food security.

The IPPC Secretariat will work with all partners in the plant-health community


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to put these suggestions into action. As an outcome from the intense three days of discussion in London, it was suggested that the **International Plant Health Conference is held every four years** to take stock of the global plant-health challenges and to share and exchange knowledge and strategies on how the global plant-health community can address the rising problems in protecting the world's plants.

In the meantime, the plant-health community will continue, together, to uphold the **international treaty on plant health**. Every actor – including parliamentarians, ministers, government administrative bodies, the private sector and industry associations, research and academia, international organizations, donors, partners, media and the wider public – has a role to play. Adoption of the International Plant Protection Convention must result in long-term gains for all stakeholders and sustainable fulfilment of the IPPC mission of protecting plant health and facilitating safe trade. The ISPMs are in place for countries to apply. These help countries to develop national phytosanitary regulations, legislation and import requirements.

I thank the tireless and continuous work of CPM bodies in supporting the implementation of the convention, the IPPC Strategic Framework 2020–2030, and the development and implementation of standards. I wish to recognize the CPM Bureau, the Standards Committee, the Implementation and Capacity Development Committee, the Strategic Planning Group, expert working groups, technical panels and focus groups. Our common contributions and cooperation keep the wheels turning as we move forward towards protecting the world's

plants.

The IPPC Secretariat is committed to continue steadfast support of national and regional plant protection organizations to implement the convention and standards and build sustainable and consistent capacity. **We urge governments to invest in the work of NPPOs and in research and outreach related to plant health.** These are **sound investments** that will lead to **food security** and to **healthy populations, environment and economies.**

I ask donors to support the IPPC and plant-health initiatives, for we have common targets to achieve our mission in support of the UN Sustainable Development Goals.

I encourage the IPPC community to foster cooperation in the spirit of the convention, through collaboration in developing international standards, exchanging information and developing capacity.

As individual citizens, we can promote positive behaviours in keeping plants and our environment healthy. We all must be mindful when bringing back exotic plants when we travel. We should be cognizant of the risks of what we export and import to a different country or region. We must also be mindful when buying plants and plant products online and think carefully about where we source material.

On behalf of FAO and the IPPC Secretariat, I remain fully committed to ensuring that the gains from this confernce will not lose momentum, addressing the challenges ahead, and celebrating progress.

Together, **we can build a world where healthy plants thrive!**

Sincerely,
Osama El-Lissy

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